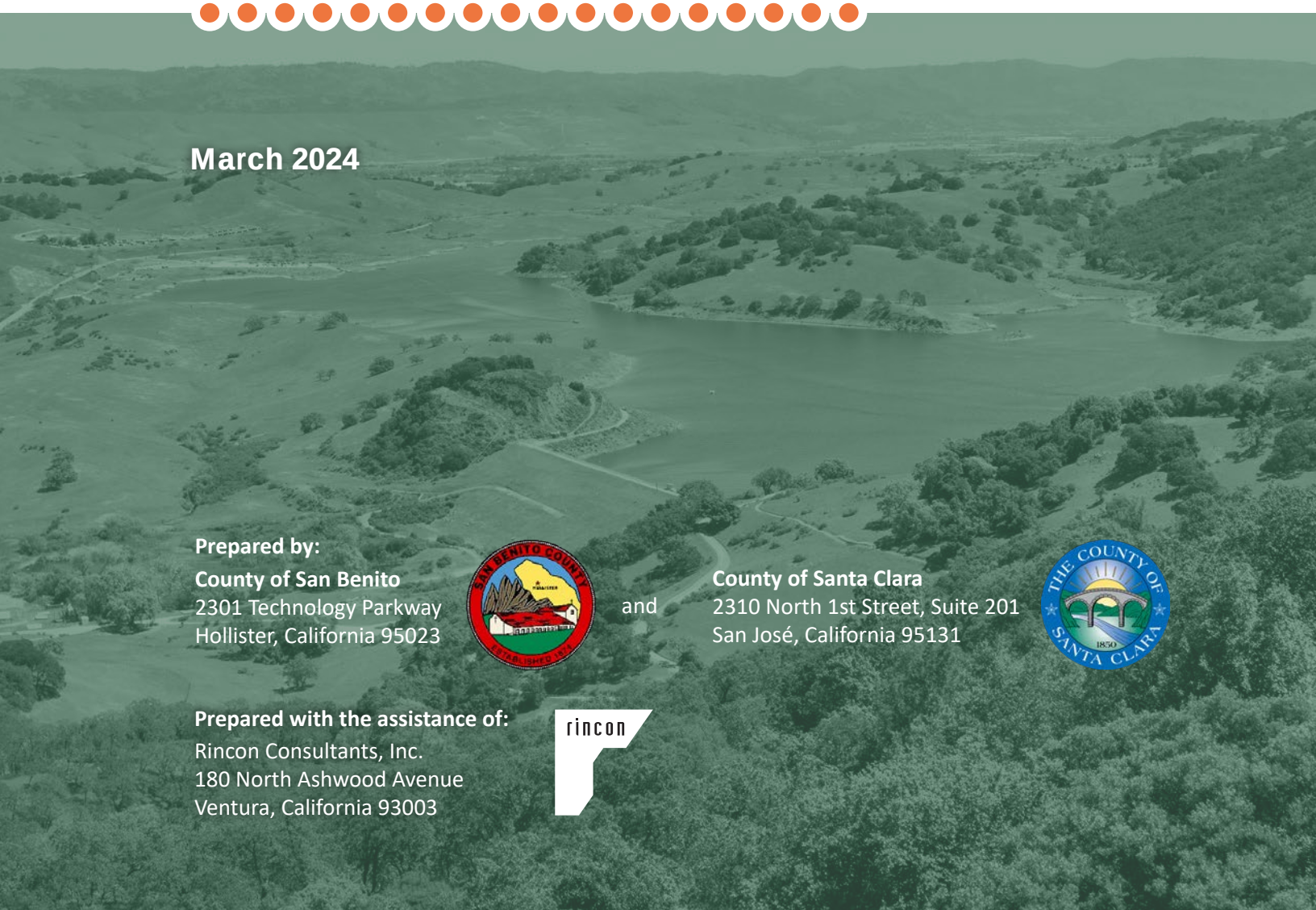
Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

County of San Benito & County of Santa Clara MSA

Priority Climate Action Plan



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Acknowledgements

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CPRG Work Group

- Association of Monterey Bay Area Governments
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- Santa Clara Valley Water
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Acronyms and Abbreviations

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AMBAG	Association of Monterey Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
BayREN	Bay Area Regional Energy Network
BIPOC	Black, Indigenous, and People of Color
CARB	California Air Resources Board
CCA	Community Choice Aggregator
CEC	California Energy Commission
CALGreen	California Green Building Standards Code
CalRecycle	California Department of Resources Recycling and Recovery
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CH4	Methane
CPAU	City of Palo Alto Utility
CO2e	Carbon Dioxide Equivalent
CPRG	Climate Pollution Reduction Grant
DOF	State of California Department of Finance
DPM	Diesel particulate matter
EO	Executive Order
EJScreen	Environmental Justice Screening Tool
EPA	United State Environmental Protection Agency
EV	Electrical Vehicle
GHG	Greenhouse Gas
GGRF	Greenhouse Gas Reduction Fund
GWP	Global Warming Potential
ICLEI	Local Governments for Sustainability International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt Hour
LIDAC	Low-income and Disadvantaged Communities

MSA	Metropolitan Statistical Area
MSW	Municipal Solid Waste
MT	Metric tons
MTC	Metropolitan Transportation Commission
N_2O	Nitrous Oxide
PCAP	Priority Climate Action Plan
PG&E	Pacific Gas and Electric Company
PM2.5	Fine Particulate Matter
SB	Senate Bill
SVCE	Silicon Valley Clean Energy
T&D	Transmission and Distribution
TCR	The Climate Registry
VMT	Vehicles Mules Traveled
VTA	Santa Clara Valley Transportation Authority
ZEV	Zero emission vehicle

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1

Introduction

1 Introduction

The County of Santa Clara received a Planning Grant from the Climate Pollution Reduction Grants (CPRG) program to develop this Priority Climate Action Plan (PCAP) for the San Jose–Sunnyvale–Santa Clara, CA metropolitan statistical area (MSA), which is comprised of San Benito and Santa Clara Counties. Because the geographic area of the MSA includes both counties, it will be referred to in this PCAP as the San Benito County and Santa Clara County MSA. To develop the PCAP the Counties of San Benito and Santa Clara worked collaboratively with each other and brought in additional partners including the Council of San Benito County Governments (SBCOG), the Association of Monterey Bay Area Governments (AMBAG), and other jurisdictions in the counties. The PCAP has been developed to support investment in policies, practices, and technologies that reduce greenhouse gas (GHG) and air quality emissions, create high-quality jobs, spur economic growth, and enhance the quality of life for the communities in San Benito and Santa Clara County. This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 98T76501 to the County of Santa Clara. The contents of this document do not necessarily reflect the views and policies of the EPA, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

The EPA's Climate Pollution Reduction Grants program is a funding opportunity aimed at supporting projects at the state, local, tribal, and territorial levels to reduce GHG emissions and other harmful air pollution. This grant program seeks to support innovative and effective strategies for mitigating climate change and addressing air pollution. Funding for the CPRG program is sourced from the Inflation Reduction Act (IRA), which provides $370 billion in loans, grants, and other financial support to tackle climate change and transition to a clean energy economy. Under the CPRG program $250 million has been earmarked for Planning Grants to develop GHG reduction plans and over $4.6 billion is designated for implementation of the measures outlined in these GHG reduction plans. The PCAP is the first planning document developed under the CPRG process. The purpose of the PCAP is to provide a better understanding of the MSA-wide GHG emissions, identify priority strategies to reduce these emissions, identify co-benefits associated with climate action, and bring together a variety of stakeholders to contribute to the emission reduction planning process. The PCAP includes only those emissions and associated actions identified as a priority within the MSA. A follow-on Comprehensive Climate Action Plan (CCAP) will be developed during the next phase of the CPRG process and will include more detailed information and additional measures to reduce emissions.

The PCAP was developed in collaboration with members of the Santa Clara County Climate Collaborative CPRG Work Group. The Work Group includes members from public agencies and non-profits in Santa Clara County and San Benito County.

This PCAP is organized into 7 sections:

1. Introduction
2. San Benito County & Santa Clara County Overview
3. GHG Emissions Inventory
4. Priority Measures
5. Low-Income/Disadvantaged Community Benefits Analysis
6. Review of Authority to Implement

7. Coordination and Outreach
8. Next Steps

1.1 California Regulatory Context

California remains a global leader in the effort to reduce GHG emissions and combat climate change through its mitigation and adaptation strategies. With the passage of Assembly Bill (AB) 32 in 2006, California became the first state in the United States to mandate GHG emission reductions across its entire economy. To support AB 32, California has enacted legislation, regulations, and executive orders (EO) that put it on course to achieve robust emission reductions and address the impacts of a changing climate. The following is a summary of more recent executive and legislative actions most relevant to the PCAP's development and implementation.

2006 Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires the California Air Resources Board (CARB) to prepare a Scoping Plan that outlines the main State strategies for reducing GHG emissions to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions.

Based on this guidance, CARB approved a 1990 statewide GHG baseline and 2020 emissions limit of 427 million metric tons of CO2 equivalent (MMT CO2e). The Scoping Plan was approved by CARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2014 Scoping Plan update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

2016 Senate Bill 32

On September 8, 2016, the governor signed Senate Bill (SB) 32 into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged).

2016 Senate Bill 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires the California Department of Resources Recycling and Recovery (CalRecycle), in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

2017 Scoping Plan Update

On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 goal set by SB 32. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies, such as SB 350 and SB 1383.

The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2014 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six metric tons of carbon dioxide equivalents (MT CO_2e) by 2030 and two MT CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

2018 Senate Bill 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard (RPS) Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

2018 Executive Order B-55-18

On September 10, 2018, the governor issued Executive Order (EO) B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

2020 Advanced Clean Trucks Regulation

The Advanced Clean Trucks Regulation was approved on June 25, 2020. The regulation establishes a zero-emissions vehicle (ZEV) sales requirement for trucks or on-road vehicles over 8,500 lbs. gross vehicle weight and set a one-time reporting requirement for large entities and fleets. Under the regulation, manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Additionally, the regulation established a one-time reporting requirement for large entities and

fleets where fleet owners, with 50 or more trucks, are required to report about their existing fleet operations by March 15, 2021.

2022 Scoping Plan Update

In November 2022, CARB adopted the 2022 Scoping Plan, which provides a framework for achieving the 2045 carbon neutrality goal set forth by AB 1279. The 2022 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently approved legislation, such as AB 1279. The 2022 Scoping Plan includes discussion of the Natural and Working Lands sector as both an emissions source and carbon sink. The Plan centers equity in terms of State climate investments and climate mitigation strategies.

2022 Senate Bill 1020

Adopted in September 2022, SB 1020 advances the State's trajectory to 100 percent clean energy procurement by 2045 by creating clean energy targets of 90 percent by 2035 and 95 percent by 2040. SB 1020 builds upon SB 100, which accelerated the State's RPS and requires electricity providers to increase procurement from eligible renewable energy resources to 60 percent by 2030 and 100 percent by 2045.

2022 Assembly Bill 1279

Adopted in September 2022, AB 1279, codifies the statewide carbon neutrality goal into a legally binding requirement for California to achieve carbon neutrality no later than 2045 and ensure 85 percent GHG emissions reduction under that goal. AB 1279 builds upon EO B-55-18 that originally established California's 2045 goal of carbon neutrality.

2022 Advanced Clean Cars II

The Advanced Clean Cars II regulation was adopted in August 2022. The regulation amends the Zero-emission Vehicle Regulation to require an increasing number of zero-emission vehicles, and relies on advanced vehicle technologies, including battery electric, hydrogen fuel cell electric and plug-in hybrid electric-vehicles, to meet air quality, climate change emissions standards, and Executive Order N-79-20, which requires that all new passenger vehicles sold in California be zero emissions by 2035. The regulation also amends standards for gasoline cars and heavier passenger trucks to continue to reduce smog-forming emissions.

2023 Advanced Clean Fleet

Approved by CARB on April 28, 2023, the Advanced Clean Fleets Regulation requires fleets, businesses, and public entities that own or direct the operation of medium- and heavy-duty vehicles in California to transition to 100 percent zero-emission capable utility fleets by 2045. Under the regulation, fleet operators may choose to purchase only ZEVs beginning in 2024 and remove internal combustion engine vehicles at the end of their useful life or fleet operators may elect to meet the State's ZEV milestone targets as a percentage of the total fleet starting with vehicle types that are most suitable for electrification.

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San Benito County and Santa Clara County Overview

2 San Benito County and Santa Clara County Overview

The San Benito County and Santa Clara County MSA is comprised of the incorporated and unincorporated areas within San Benito and Santa Clara Counties.

San Benito County encompasses approximately 1,400 square miles and is situated southeast of the San Francisco Bay Area, within the Monterey Bay Region. The County has two incorporated cities, Hollister and San Juan Bautista and boasts a rich history of ranching and agriculture. With an estimated total population of 67,579, approximately 71 percent of the county's residents identify as Black, Indigenous, and People of Color (BIPOC). Specifically, 61 percent of the county's residents identify as Hispanic or Latino.

Santa Clara County spans approximately 1,300 square miles and is located in the southern tip of the San Francisco Bay Area. The County is bordered by the rolling hills of the Diablo Range to the east, the Santa Cruz Mountains to the west, and the San Francisco Bay to the north. The County is situated at the heart of Silicon Valley, but also has a historical and currently active agricultural economy. With an estimated total population of 1,870,945, BIPOC make up approximately 72 percent of Santa Clara County's residents. Figure 1 depicts San Benito and Santa Clara Counties, major roadways, urban areas, and waterbodies.

The San Francisco Bay Area has long been recognized as a pioneer in climate action. From grassroots movements to groundbreaking policies, the region has consistently led the charge in mitigating climate change and implementing sustainable policies. Many jurisdictions in the region have established aggressive GHG reduction targets which meet or exceed state targets for carbon neutrality by 2045. These jurisdictions have also identified innovative programs and initiatives, ranging from building electrification to carbon sequestration. However, there remains a significant challenge in securing adequate funding to support these initiatives and implement them in an equitable manner. The high cost of implementing new technologies, infrastructure, and programs poses a barrier to progress.

Although making progress locally on GHG mitigation, San Benito County and Santa Clara County residents are already facing and will continue to experience increasingly extreme and frequent climate impacts as global temperatures rise above pre-industrial levels. Both counties are expected to experience more frequent and intense heat events, prolonged periods of drought, increased frequency and severity of wildfires, degraded air quality, and more frequent extreme precipitation events and flooding, particularly in low-lying and riverine areas.[1] These climate projections and impacts underscore the urgent need for the MSA to contribute their fair share to mitigating climate change.

[1] https://cal-adapt.org/

Figure 1 San Benito County and Santa Clara County Metropolitan Statistical Area

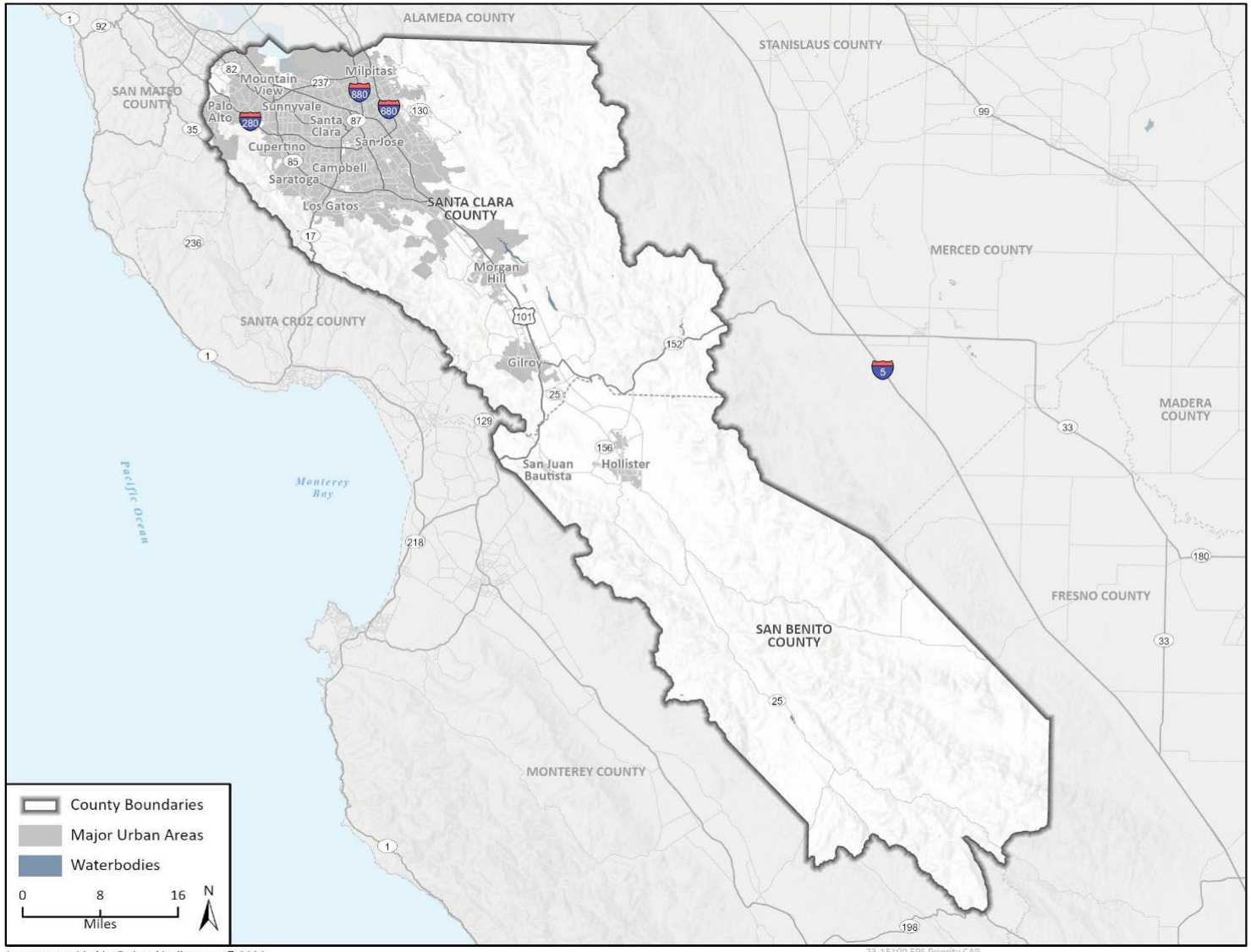

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Fig X MSA San Benito and Santa Clara County

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Greenhouse Gas Emissions Inventory

3 Greenhouse Gas Emissions Inventory

The Counties of San Benito and Santa Clara developed a 2017 MSA-wide inventory of major sources of GHG emissions within each county to support the development of the PCAP and associated priority mitigation measures. The GHG emissions inventory was developed to quantify community-wide GHG emissions within the MSA. This inventory covers the entirety of San Benito and Santa Clara counties including the unincorporated areas and incorporated cities.

This GHG inventory draws upon best available data from within the counties to provide a realistic and relatively current representation of major sources of GHG emissions within the MSA, including emissions associated with regional on-road and off-road transportation, building energy use, and solid waste generation. The sectors selected for the PCAP analysis were the largest emissions sectors, cumulatively making up over 95% of total MSA areawide emissions.

3.1 GHG Inventory Methodology

The PCAP inventory focuses on the three GHGs most relevant to local jurisdictions: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The other gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) make up a smaller percentage of emissions (5.6% statewide) and are emitted primarily through the manufacturing of semiconductors, electricity transmission, refrigeration, and aerosols. Due to their small overall contribution and general lack of data associated with their use within the MSA, they have been excluded. The 2017 community GHG emissions inventory was developed in alignment with accounting protocols provided by the Local Governments for Sustainability International Council for Local Environmental Initiatives (ICLEI) U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 as recommended by the US EPA, Association of Environmental Professionals (AEP), and the California Office of Planning and Research (OPR). Use of Community Protocol methodology for GHG accounting aligns with California's GHG inventory methodologies and is consistent with methodologies recommended by the Intergovernmental Panel on Climate Change (IPCC)2. The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory.

This inventory was prepared using the following high quality data resource(s) as defined by the Quality Assurance Project Plan approved in January 2024:

- Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report
- California Energy Commission (CEC)
- Silicon Valley Clean Energy (SVCE)
- City of Palo Alto Utility (CPAU)
- Pacific Gas and Electric Company (PG&E)
- Silicon Valley Power (SVP)
- The Climate Registry (TCR)
- EPA eGRID

[2] IPCC (2006), 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T Ngara, and K. Tanabe (eds.). Hayama, Kanagawa, Japan. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/

- Replica (National Origin-Destination big data model)[3]
- Metropolitan Transportation Commission (MTC)
- California Air Resources Board (CARB)'s 2021 EMission FACtor model (EMFAC2021 v1.0.1)
- State of California Department of Finance (DOF)
- Environmental Protection Agency (EPA) Emissions Factors Hub
- CARB's OFFROAD model (OFFROAD2021)

Detailed methodology and quality assurance procedures for preparation of this inventory are contained in Appendix A.

3.2 GHG Inventory Results

2017 GHG emissions in the MSA totaled 11,228,575 MT CO_2e, primarily driven by on-road transportation (46%) and building energy (44%), with electricity and natural gas emissions comprising an equal contribution to MSA community emissions. The remaining sources of emissions quantified in the PCAP include solid waste (5%), and off-road equipment (5%). All emissions estimates in the GHG inventory are derived from the best available data from public utilities, state and local agencies and well documented models including Replica, which is being utilized by other agencies for similar purposes. The results of the 2017 community GHG inventory are shown in Figure 2 and Figure 3 and summarized in detail in Table 1.

[3] https://documentation.replicahq.com/docs/disaggregate-trip-tables

Table 1 San Benito County and Santa Clara County MSA 2017 Community GHG Emissions Inventory

Sectors and Subsectors	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy					
Residential Electricity	3,703,796,815	kWh	0.000096	MT CO_2e/kWh	355,120
Residential Electricity T&D	156,670,605	kWh	0.000096	MT CO_2e/kWh	15,022
Nonresidential[1] Electricity	11,851,547,069	kWh	0.000166	MT CO_2e/kWh	1,963,285
Nonresidential Electricity T&D	501,320,441	kWh	0.000166	MT CO_2e/kWh	83,047
Residential Natural Gas	233,437,889	therms	0.005311	MT CO_2e/therm	1,239,894
Nonresidential Natural Gas	235,664,731	therms	0.005311	MT CO_2e/therm	1,251,721
Transportation					
Passenger VMT	12,174,339,548	VMT	0.000333	MT CO_2e/mile	4,051,544
Commercial VMT	855,337,943	VMT	0.001303	MT CO_2e/mile	1,114,566
Off-road Diesel	26,142,644	gallons	0.010349	MT CO_2e/gal	270,547
Off-road Gasoline	21,438,109	gallons	0.009241	MT CO_2e/gal	198,117
Off-road Natural Gas	17,391,900	gallons	0.004628	MT CO_2e/gal	80,490
Solid Waste					
Landfill Methane	1,555,839	wet short tons	0.378000	MT CO_2e/ton	588,107
Process Emissions	1,555,839	wet short tons	0.011000	MT CO_2e/ton	17,114
Total					**11,228,575**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

[1] Nonresidential includes emissions from commercial, industrial, and direct access sources.

Figure 2 San Benito County and Santa Clara County MSA 2017 GHG Emissions by Sector

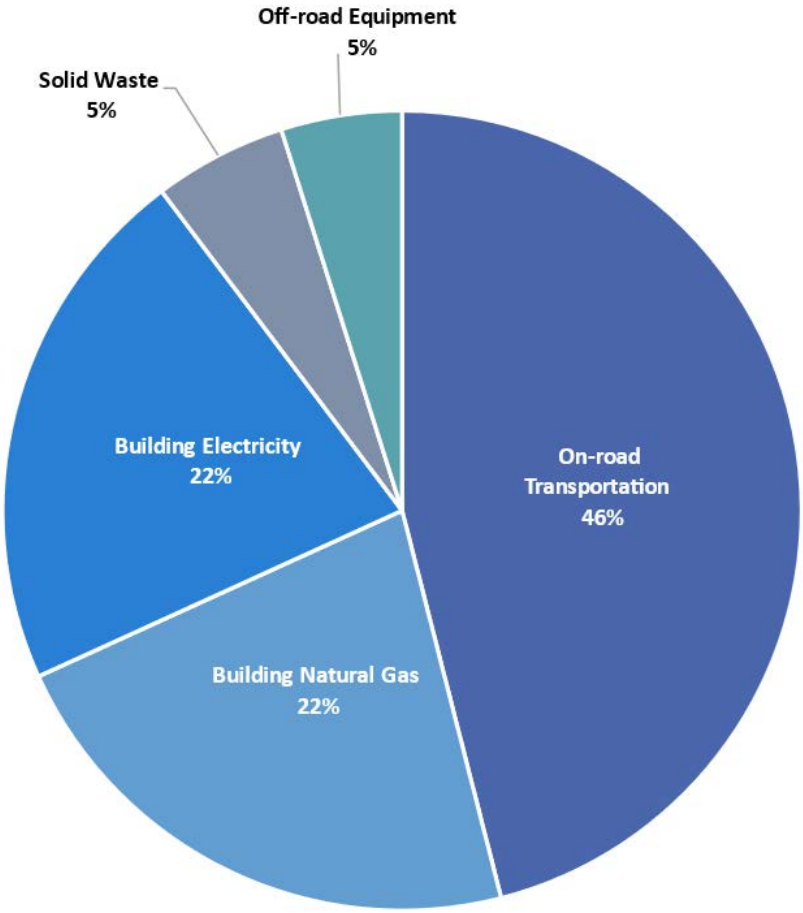
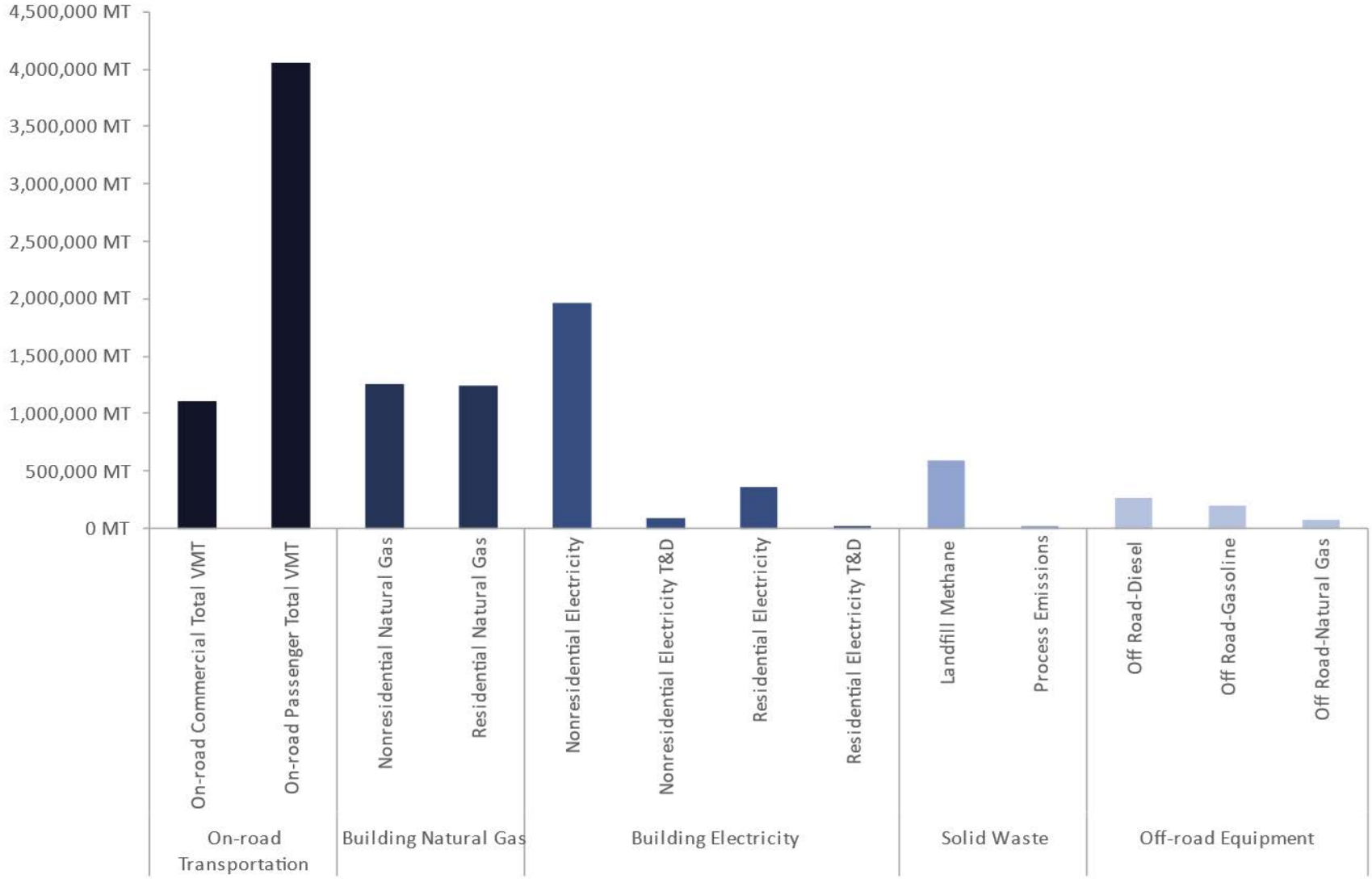


Figure 3 San Benito County and Santa Clara County MSA 2017 GHG Emissions by Sub-Sector



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4

Priority Measures

4 Priority Measures

The measures in this section have been identified as priority measures for the MSA based on their significant GHG reduction potential, benefits to low-income and disadvantaged communities (LIDACs), and additional co-benefits. The measures included have been identified in collaboration with the CPRG Work Group, San Benito County, Council of San Benito County Governments, Association of Monterey Bay Area Governments, and the Bay Area Air Quality Management District, and represent key actions to help the region, state, and U.S. meet the established GHG reduction commitments and avoid worsening impacts from climate change. This list is not exhaustive of San Benito County's and Santa Clara County's priorities. Instead, the selected priority measures included in this PCAP meet the following criteria:

- The measure is implementation ready, meaning that the design work for the policy, program, or project is complete enough that a full scope of work and budget can be included in a CPRG implementation grant application.
- The measure can be completed in the near term, meaning that all funds will be expended, and the project completed, within the five-year performance period for the CPRG implementation grants.
- The measure advances the following San Benito County and Santa Clara County priorities:
  - Operational Development and Excellence
  - Planning for Sustainable Growth
  - Technology
  - Community Engagement
  - Healthy & Safe Communities
  - Equity and Access

Table 2 summarizes San Benito County's and Santa Clara County's PCAP priority measures including:

- Estimates of the cumulative GHG emissions reductions from 2030 and 2050,
- Key implementing agency, and
- Geographic scope.

Table 3 through Table 14 provides additional details for each of the PCAP priority measures and implementation considerations. The priority measures are organized by GHG emission sector. For each priority measure the following information has been assessed:

- Estimate of the quantifiable GHG emissions reductions
- Implementing agency or agencies
- Milestones for obtaining implementing authority, as appropriate
- Implementation schedule and milestones
- Geographic location
- Funding sources (if applicable)
- Metrics for tracking progress
- Applicable sector

The measures included in this document detail achievable and implementable GHG emissions reduction efforts that, with funding, will help San Benito and Santa Clara Counties reduce emissions to meet targets that will be established as part of the CCAP and in line with the State of California goals of reaching carbon neutrality no later than 2045 and reducing anthropogenic emissions 85% below 1990 levels by 2045, as well as meeting the interim 2030 goal of reducing emissions by at least 40% below 1990 levels. These goals are in line with and support the commitments the United States has made to support the United Nation's Paris Agreement goals of keeping the rise in global average temperatures below 2 °C with efforts to limit increases to 1.5 °C by reducing global GHG emissions to carbon neutrality by mid-century.[4] The priority measures are organized by sector and, when implemented, will help put the MSA on a path towards reaching their climate goals. The measures are organized in the following framework:

- **Sectors.** Sectors define the GHG emissions category in which the GHG reductions will take place and include Building Energy, Transportation, and Carbon Sequestration, Organics, and Materials Reuse.
- **Measure.** Measures are discrete programs that the counties or partners can implement to achieve GHG emissions reductions as well as community and LIDAC benefits.

Appendix B provides the calculations developed to assess the GHG reduction potential and additional information on GHG emissions reductions associated with each priority measure.

4.1 Approach Summary

Measures outlined in the PCAP aim to mitigate GHG emissions, local air pollutants, and address equity and access concerns, particularly in LIDACs. With California's transition to carbon-free electricity by 2045 as per SB 100, prioritizing the electrification of buildings becomes imperative to curb greenhouse gas emissions from the built environment while improving indoor air quality and reducing energy burdens for LIDACs. Electrifying vehicles, transit, and equipment also leverages California's carbon-free electricity to reduce air pollutants like nitrogen oxides and particulate matter, GHG emissions, and thereby improve air quality and health outcomes in LIDACs and highly polluted areas. Providing access to building electrification, ZEVs, and public and active transit options not only contributes to cleaner air and safer indoor environments but also enhances public health outcomes and job accessibility. Focusing these measures in LIDACs will provide a higher quality of life for residents. Additionally, carbon sequestration, organics, and materials reuse programs help mitigate GHG emissions by reducing methane release from landfills and increasing carbon sequestration. Compost application further enhances soil health, while a compost broker and carbon credit system offer financial incentives to farmers, many of whom reside in LIDACs. Food recovery initiatives play a vital role in reducing landfill waste, thereby lowering greenhouse gas emissions, and providing recovered food to communities in need, including LIDACs. Lastly, waste reduction through community-scale reuse can decrease lifecycle greenhouse gas emissions and air pollutants.

[4] IPCC. Special Report. https://www.ipcc.ch/sr15/.

Table 2 San Benito and Santa Clara County MSA PCAP Priority Measures

Priority Measure		Cumulative GHG Emission Reductions (MT CO_2e)		Implementing Agency or Agencies	Geographic Scope
		2030	2050		
Building Energy					
BE-1	Regional Holistic Building Decarbonization Program for Low-and-Moderate Income Occupant Housing	136,404	1,277,330	BayREN, ABAG, AMBAG, BAAQMD, CCAs, Santa Clara County, San Benito County, Habitat for Humanity, Rebuilding Together, Association for Energy Affordability, Rising Sun Center for Opportunity, Pacific Gas & Electric	San Benito County and Santa Clara County
BE-2	Establish a Public Facility Community Resiliency and Implementation Fund	32,970	655,774	Cities, Counties	San Benito County and Santa Clara County
BE-3	Establish Commercial, Agricultural, and Industrial Buildings Decarbonization Program to Support Non-Residential Decarbonization With Incentives and Technical Support	838,126	27,859,310	AMBAG, County of Santa Clara	San Benito County and Santa Clara County
Transportation					
T-1	Develop Safe, Accessible, Clean, and Equitable Multi-Modal Mobility Hubs	144,770	362,891	MTC, VTA	San Benito County and Santa Clara County
T-2	Implement the VTA Visionary Transit Network	9,256	200,461	VTA, Sa	San Benito County and Santa Clara County
T-3	Create a Regional Bike Lane Fund to Build a Bike-Ped Highway	356	5,096	County of San Benito, County of Santa Clara, VTA	San Benito County and Santa Clara County

Priority Measure		Cumulative GHG Emission Reductions (MT CO_2e)		Implementing Agency or Agencies	Geographic Scope
		2030	2050		
T-4	Implement Transit Signal Priority Programs to Reduce Wait Times and Idling for Public Transit	7,207	36,323	County of San Benito, County of Santa Clara VTA	San Benito County and Santa Clara County
T-5	Funding and Technical Assistance for Agricultural Equipment Decarbonization	2,363	108,691	AMBAG	San Benito County and Santa Clara County
T-6	Enact a Zero Emission Transit and Charger Program	28,065	450,316	VTA	San Benito County and Santa Clara County
Carbon Sequestration, Organics, and Materials Reuse					
COM-1	Expand Incentive Programs for Compost Application	64,101	491,445	County of San Benito, County of Santa Clara	San Benito County and Santa Clara County
COM-2	Enhance the Existing Food Recovery and Organics Diversion Program	1,361,748	10,440,066	County of San Benito, County of Santa Clara	San Benito County and Santa Clara County
COM-3	Develop a Community-Scale Reuse System	211	2,316	County of San Benito, County of Santa Clara	San Benito County and Santa Clara County

Notes: BayREN = Bay Area Regional Energy Network; ABAG = Association of Bay Area Governments; AMBAG = Association of Monterey Bay Area Governments; MTC = Metropolitan Transportation Commission; VTA = Santa Clara Valley Transportation Authority

4.2 Building Energy

Building energy emissions constitute a significant portion (44 percent) of the MSA's overall community GHG emissions. Within this category, electricity and natural gas contribute equally, each accounting for 22 percent of building energy emissions. This presents a compelling opportunity for GHG emissions reduction strategies. Notably, the State has already taken steps to address electricity emissions through SB 100, which mandates accelerated standards for California's Renewable Portfolio Standard (RPS). The RPS program requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 50 percent of total procurement by 2026, 60 percent of total procurement by 2030, and 100 percent procurement by 2045. California's RPS was further accelerated in 2022 by SB 1020 which established additional requirements that procurement from eligible renewable energy resources and zero-carbon resources increase to 90 percent of total procurement by 2035 and 95 percent of total procurement by 2040.

While electricity in California is expected to be carbon free by 2045, natural gas emissions will remain largely static. Therefore, to maximize GHG reduction efforts in tandem with statewide electricity grid decarbonization initiatives, the proposed building energy priority measures focus on promoting equitable building electrification. This strategic approach aims to mitigate GHG emissions from natural gas combustion in existing buildings, especially in challenging-to-decarbonize areas such as LIDACs, high pollution areas, and commercial industries. While upfront costs of existing building electrification can be a challenge, especially for LIDAC communities, the long-term savings and co-benefits are significant.

BE-1 Regional Holistic Building Decarbonization Program for Low-and-Moderate Income Occupant Housing

Measure Description

This measure will align with and expand existing efforts established through the Bay Area Regional Energy Network (BayREN) which provide a suite of services and financial incentives to accelerate building electrification adoption rates within its service area. This holistic measure will provide an array of incentives and services primarily focused on low-and-moderate-income homes in LIDAC, frontline and environmental justice communities. The program will address existing gaps in the financial and technical support structure to offer free energy efficiency and electrical appliance installations and financial incentives (such as new and existing rebates, incentives, and financing) for households in LIDACs in Santa Clara and San Benito Counties. The measure will include implementing electrification upgrades using innovative approaches, such as on a neighborhood scale. The measure will build upon and augment programs that upgrade residential properties to address deferred maintenance and health and safety concerns (such as lead, asbestos, mold, etc.) to increase the amount of updated housing units in LIDAC communities ready for decarbonization. The measure will implement efficiency measures for building envelopes and heating distribution systems, along with demand response and load shifting measures. The measure will also create marketing campaigns describing the financial, health, and environmental benefits associated with building electrification. A concierge program will be established that provides contractors, business owners, multi-family owners, and homeowners with technical resources and training materials on electrical appliance installations, and cost-benefit calculation tools. A new program will be developed that offers trainings to increase access to electrician and manufacturing jobs related to

the building electrification industry. The measure will also include investigating policy options to address barriers and help residents prepare for the regulations recently adopted by BAAQMD, which will prohibit the sale and installation of NOx emitting appliances for indoor space and water heating in the Bay Area, focusing on replacement upon burnout using a phased approach that begins in 2027 to reduce health-damaging emissions of nitrogen oxides (NOx) from these appliances. Policy areas include improving permitting processes, landlord cooperation in rental properties, and addressing potential housing displacement and increases in energy costs.

Table 3 Measure BE-1

Regional Holistic Building Decarbonization Program for Low-and-Moderate Income Occupant Housing	
Cumulative GHG Emissions Reductions (2030)	136,404 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	1,277,330 MT CO_2e
Implementing Agency/Agencies	BayREN, ABAG, AMBAG, BAAQMD, CCAs, Santa Clara County, San Benito County, Habitat for Humanity, Rebuilding Together, Association for Energy Affordability, Rising Sun Center for Opportunity, Pacific Gas & Electric
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2026: Engage LIDAC households and establish building electrification program ▪ 2026-2045: Implement building electrification program to install carbon-free appliance replacements and perform energy efficiency retrofits ▪ 2030: Implement decarbonization retrofits in 20% of LIDAC households ▪ 2045: Implement decarbonization retrofits in 95% of LIDAC households
Geographic Location	San Francisco Bay Area Region and San Benito County, LIDACs
Funding Sources	Some regional, state, and federal funds are available for building electrification. However, gaps exist, especially for HVAC decarbonization and electric infrastructure upgrades. These upgrades remain financially infeasible in LIDAC communities.
Metrics for progress tracking	▪ Number of homes retrofitted ▪ Number of carbon-free appliances purchased or installed ▪ Reduction in GHG emissions ▪ Average energy cost savings per household in LIDACs ▪ Dollars spent on incentives and direct installs ▪ Number of trained contractors to conduct retrofits
Applicable Sector	Buildings and Energy

BE-2 Establish a Public Facility Community Resiliency and Implementation Fund

Measure Description

This measure will establish a fund and procedure to cover the costs and coordinate installation of carbon free equipment in publicly owned and/or operated community-serving and critical facilities including fire stations, libraries, resilience centers, aquatic centers and more. Publicly owned facilities often face a large backlog of deferred maintenance on equipment that serves the broader community, and the increased upfront costs of electrification can make decarbonization projects infeasible. Electrification of public facilities in LIDAC communities will be prioritized as a pilot program. As part of the pilot program, a coalition of municipalities will implement decarbonization projects, host training for contractors, identify contracting, permitting, and technical challenges, and develop a program to address hurdles for electrification of publicly owned facilities. Public facilities (including both city and county owned and/or operated buildings) serve a wide range of communities including LIDACs but often lack the funding required to decarbonize their operations. The Public Facility Resiliency Fund would provide financial support to bridge the funding gap between like for like replacements of gas infrastructure or appliances and upgraded electric infrastructure, appliances, publicly owned or operated electric vehicle infrastructure, and microgrid resilience technology. The pilot will achieve building a portfolio of large building greenhouse gas (GHG) reduction infrastructure measures; assessing their actual performance at GHG reduction; engaging disadvantaged and vulnerable communities directly benefiting from the public improvements and accurately assessing equitable enhancements; and providing workforce development and training to achieve high quality jobs with union options that other regional communities throughout the nation can learn about through web based development information and case studies.

Table 4 Measure BE-2

Establish a Public Facility Community Resiliency and Implementation Fund	
Cumulative GHG Emissions Reductions (2030)	32,970 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	655,774 MT CO_2e
Implementing Agency/Agencies	Cities, Counties
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2027: Implement identified municipal building decarbonization retrofits and continue to identify municipal buildings to decarbonize throughout the MSA. ▪ 2026-2045: Implement additional municipal building decarbonization retrofits ▪ 2030: Decarbonize 29% of identified municipal buildings ▪ 2045: Decarbonize 95% of identified municipal buildings
Geographic Location	Cities, San Benito County and Santa Clara County
Funding Sources	Some regional, state, and federal funds are available for electrification of municipal facilities. However, there is not sufficient funding for electrification of critical facilities in San Benito and Santa Clara Counties.
Metrics for progress tracking	▪ Number of buildings retrofitted ▪ Number of carbon-free appliances purchased or installed ▪ Average energy savings per building ▪ Average energy cost savings per building
Applicable Sector	Building Energy

BE-3 Establish Commercial, Agricultural, and Industrial Buildings Decarbonization Program to Support Non-Residential Decarbonization with Incentives and Technical Support

Measure Description

This measure will establish a program to provide technical assistance and funding and financing support to accelerate the rate of decarbonization/electrification of industrial, agricultural, and commercial buildings. As a part of this program an effort will be established to work with leaders in the local commercial, agricultural, and industrial community with the aim of identifying, piloting, and scaling large energy efficiency and electrification projects. The program will support and collaborate with local community-based organizations (CBOs) for culturally appropriate, multilingual outreach campaigns about building electrification in LIDACs and BIPOC run businesses, with particular attention to hard-to-electricity building types (e.g., agricultural facilities, commercial kitchens). Within this program, an initiative will be launched to identify and pilot solutions for hard-to-electricity end uses to serve as a model for future building decarbonization in the commercial, agricultural, and industrial industries in San Benito and Santa Clara Counties.

Table 5 Measure BE-3

Establish Commercial, Agricultural, and Industrial Buildings Decarbonization Program to Support Non-Residential Decarbonization with Incentives and Technical Support	
Cumulative GHG Emissions Reductions (2030)	838,126 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	27,859,310 MT CO_2e
Implementing Agency/Agencies	AMBAG, County of Santa Clara
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2030: Outreach to commercial, industrial, and agricultural communities to identify building decarbonization opportunities and hurdles ▪ 2026-2050: Phase-in carbon-free equipment ▪ 2030: Achieve a 15% phase-in of carbon-free equipment ▪ 2050: Achieve 90% decarbonization of nonresidential buildings
Geographic Location	San Benito and Santa Clara commercial, industrial, and agricultural land use areas
Funding Sources	Some regional, state, and federal funds are available for non-residential building electrification. However, gaps exist, especially for HVAC decarbonization and electric infrastructure upgrades. These upgrades remain financially infeasible in LIDAC communities.
Metrics for progress tracking	▪ Number of facilities/buildings retrofitted ▪ Number of carbon-free appliances purchased or installed ▪ Average energy savings per building/facility ▪ Average energy cost savings per building/facility
Applicable Sector	Building Energy

4.3 Transportation

Transportation is the predominant contributor to GHG emissions in the region, constituting 46 percent of the total. These emissions are driven by the combustion of fossil fuels in vehicles, which not only emits significant levels of GHG emissions but also air quality emissions. These emissions cause environmental impacts and pose significant health risks to communities residing near transportation infrastructure. Prioritizing increased adoption of EVs, enhanced accessibility and operations of public transit, and creating safe and accessible active transportation options are crucial strategies to mitigate the impact of transportation. California has already implemented several legislative programs, including the Advanced Clean Cars Program[5], Pavley Standards[6], and Innovative Clean Transit[7] regulations to combat transportation related GHG emissions.

The proposed priority measures in the transportation sector encompass the development of charging infrastructure to encourage EV adoption in the private and public sectors, improvement of accessibility to EV mode share options and public transit, and expansion of active transportation infrastructure. These measures not only align with California's transportation goals but also contribute to GHG reduction by reducing vehicle miles traveled (VMT) and decarbonizing the vehicles that remain. Additionally, the measures also establish initiatives to replace off-road equipment such as agricultural equipment with emission-free alternatives, further contributing to overall GHG and air quality emission reductions from the transportation sector.

T-1 Develop Safe, Accessible, Clean, and Equitable Multi-Modal Mobility Hubs

Measure Description

This measure aligns with and greatly expands existing regional efforts to create mobility hubs to reduce single occupancy vehicle miles traveled and enhance access to transit, biking, walking, and scooting for every community member. The development of multi-modal mobility hubs will be prioritized in LIDACs to expand access to active and public transit options which are convenient and cost effective. Implementation of these hubs in LIDACs will incorporate strategies focused on generating, maintaining, and safeguarding affordable housing, as well as protecting local businesses to mitigate displacement. Potential project elements may include, but are not limited to:

- First-mile, last-mile connectivity improvements
- Micro-mobility access (electric scooters & bikeshare)
- Enhancements to bicycle facilities
- Safety improvements to increase rider safety
- Income based discounted fare and bike share program
- Incentives for E-bike usage

[5] In January 2012, CARB approved a new emissions-control program (the Advanced Clean Cars program) combining the control of smog, soot causing pollutants, and GHG emissions into a single coordinated package of requirements for passenger cars and light trucks model years 2017 through 2025. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles, Zero Emissions Vehicles, and Clean Fuels Outlet programs, and is more stringent than the federal Corporate Average Fuel Economy (CAFE) standards. Advanced Clean Cars II was approved by CARB in August 2022 and expands the program's roadmap so that by 2035 all new cars and passenger trucks will be zero-emission vehicles (ZEV).

[6] Pavley Standards were signed into law in 2022 with AB 1493 and required vehicle manufacturers to reduce GHG emissions from new passenger vehicles and light trucks from 2009 through 2016.

[7] CARB. 2019. Innovative Clean Transit regulation. https://ww2.arb.ca.gov/sites/default/files/2019-10/ictfro-Clean-Final_0.pdf?utm_medium=email&utm_source=govdelivery

- Enhanced signage, wayfinding, and real-time transit departure information.
- EV carsharing, EV charging, and DC Fast Chargers

This measure aims to develop 34 mobility hubs around established bus rapid transit, light rail, and commuter rail stations within the MSA.

Table 6 Measure T-1

Develop Safe, Accessible, Clean, and Equitable Multi-Modal Mobility Hubs	
Cumulative GHG Emissions Reductions (2030)	144,770 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	362,891 MT CO_2e
Implementing Agency/Agencies	Metropolitan Transportation Commission (MTC), Valley Transit Authority (VTA), San Benito County Transit Authority (SBCTA)
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2027: Identify mobility hub locations within San Benito County which expand interconnectivity of cities with Santa Clara ▪ 2026-2032: Establish community transit subsidy program ▪ 2026-2039: Establish mobility sharing and incentive programs ▪ 2027-2042: full scale mobility hub operations at light rail, commuter rail, and bus rapid transit (BRT) locations including: ▪ 600 e-bikes ▪ 600 e-bike incentives ▪ 100 EV cars for EV car share ▪ 340 Level 2 EV charging stations ▪ 340 DC charging stations
Geographic Location	Santa Clara and San Benito County transit routes
Funding Sources	The existing program is locally funded by MTC.[1] However, additional funding is needed to expand the multi-mobility hubs offering and network, potentially in LIDACs.
Metrics for progress tracking	▪ Number of mobility hubs established ▪ Annual ridership in light rail, commuter rail, and bus transit ▪ Annual e-bike ridership ▪ Quantity of e-bike incentives distributed annually ▪ Size of EV car share fleet and miles travelled (if possible) ▪ Number of EV chargers installed ▪ Annual kWh supplied at mobility hub EV charging stations ▪ Annual percent uptime of EV charging stations at mobility hubs
Applicable Sector	Transportation

[1] MTC mobility hub grant program does not cover the cost for all eligible mobility hub locations identified within the Bay Area. Additionally, currently only Santa Clara County is considered eligible for grant funding from MTC as San Benito County is not incorporated within the Bay area region in which the program was scoped. For more information regarding eligible mobility hub locations, see https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf

T-2 Implement the VTA Visionary Transit Network

Measure Description

This measure will facilitate the implementation of the VTA Visionary Transit Network in Santa Clara County with connections to San Benito County transit lines. The measure will expand the range and increase the frequency of light rail, rapid bus, and local bus services and shuttle availability with extended hours. The measure will also expand first/last mile improvements and increase the fleet, frequency, and service area of micro-transit and community transit. This measure aims to support the transit regional goals developed by the Visionary Transit Network to improve public transit for residents within the MSA. The initiative will reduce single passenger vehicle VMT and the associated GHGs by attracting greater ridership through enhanced transit connectivity between Santa Clara and San Benito Counties, expanded regional transit alternatives through collaborative efforts and investments with SBCTA especially along the critical Highway 101 corridor.

Table 7 Measure T-2

Implement the VTA Visionary Transit Network	
Cumulative GHG Emissions Reductions (2030)	9,256 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	200,461 MT CO_2e
Implementing Agency/Agencies	VTA, SBCTA
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2024: Complete community engagement and plan development ▪ 2025-2040: Implement service improvements and expansions to bus and light rail services ▪ 2030-2040: Implement 100% of service improvements and expansions
Geographic Location	Santa Clara County with extension of service to San Benito County
Funding Sources	While funding has supported the planning efforts to support the VTA Visionary Transit Network, additional funding is needed to implement the network and expand benefits to San Benito County and LIDACs in the region.[1]
Metrics for progress tracking	▪ Percent increase in frequency by route ▪ Number of miles added to routes ▪ Proportion or number of hours of service added ▪ Number of facilities at stops and stations improved ▪ Number of first/last mile shuttle routes added ▪ Annual ridership per route
Applicable Sector	Transportation

[1] The VTA Visionary Transit Network required operations funding for VTA. VTA's transit service is primarily funded by Santa Clara County sales tax. These funds will not be sufficient to implement transit service improvements and VTA is currently unable to increase the sales tax pursuant to state legislation. These operations funds also cannot cover extensions of service into San Benito County.

https://medium.com/@monicamallon/what-is-the-vta-visionary-transit-network-bd848cb03723

T-3 Create a Regional Bike Lane Fund to Build a Bike-Ped Highway

Measure Description

This measure will facilitate the construction of a comprehensive network of protected bike lanes and pedestrian pathways, known as the Bike-Ped Highway, spanning multiple jurisdictions in San Benito and Santa Clara Counties. Specific funding will be allocated to support the design, construction, and maintenance of this Bike-Ped Highway, which will connect key destinations (such as mobility hubs) across both counties. The location of these projects will prioritize connectivity and access in LIDACs and within high pollution areas as a way to decrease air quality emissions. Funding is required to complete the construction of the regional Bike-Ped Highway to enhance safety, thereby encouraging increased utilization. Safety and wayfinding elements, including signage, lighting, curbs, barriers, and pavement markings, will be integral components of the Bike-Ped Highway development.

Table 8 Measure T-3

Create a Regional Bike Lane Fund to Build a Bike-Ped Highway	
Cumulative GHG Emissions Reductions (2030)	356 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	5,096 MT CO_2e
Implementing Agency/Agencies	VTA
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2045: Implement Bike-Ped Highway infrastructure buildout on identified roadways and establish system to monitor bicyclist and pedestrian numbers ▪ 2030: Achieve 7% build out of Bike-Ped Highway ▪ 2045: Achieve 100% build out of Bike-Ped Highway
Geographic Location	Santa Clara and San Benito County roadways
Funding Sources	While funding has supported the planning efforts to support the Regional Bike Land Fund, additional funding is needed to implement the Bike-Ped Highway and expand benefits to San Benito County and LIDACs in the region.
Metrics for progress tracking	▪ Miles of bicycle lanes installed by Class (i.e., Class I, II, IV) ▪ Annual bicyclist and pedestrian estimates
Applicable Sector	Transportation

T-4 Implement Transit Signal Priority Programs to Reduce Wait Times and Idling for Public Transit

Measure Description

This measure aims to implement transit signal priority programs in San Benito and Santa Clara Counties to enhance the efficiency and reliability of public transit systems by giving priority to buses and other transit vehicles at traffic signals. Transit signal priority programs can reduce delays, improve on-time performance, and enhance overall effectiveness of public transiting, making it a more reliable and attractive transportation option for community members. These programs also reduce air quality and GHG emissions caused by idling.

Table 9 Measure T-4

Implement Transit Signal Priority Programs to Reduce Wait Times and Idling for Public Transit	
Cumulative GHG Emissions Reductions (2030)	7,207 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	36,323 MT CO_2e
Implementing Agency/Agencies	VTA
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2027: Identify priority intersections that popular bus routes frequent and establish schedule for transit route treatments ▪ 2025-2040: Implement schedule of transit route treatments ▪ 2030: Implement 12% of transit route treatments ▪ 2040: Implement 100% of transit route treatments
Geographic Location	Santa Clara and San Benito transit routes
Funding Sources	VTA has identified transit signal priority program options and funding is needed to procure and deploy solutions. Additional funding will be needed to plan, procure, and deploy solutions in San Benito County.
Metrics for progress tracking	▪ Percent of transit routes with traffic signal priority treatments ▪ Average speed of buses by route ▪ Annual bus ridership by route
Applicable Sector	Transportation

T-5 Funding and Technical Assistance for Agricultural Equipment Decarbonization

Measure Description

This measure aims to broaden AMBAG's existing suite of programs to provide technical and financial assistance for the decarbonization of off-road and agricultural equipment. As part of this initiative, financial support will be extended to agricultural operators to facilitate the replacement or retrofitting of fossil-fuel-powered agricultural and off-road equipment with carbon-free alternatives, which will reduce air pollutants and GHG emissions. Free technology assessment services will be offered to agricultural operators to assess existing conditions of their current equipment and practices and then identify financially and technologically feasible opportunities for decarbonization. Additionally, AMBAG and partnering agencies will host culturally appropriate workshops and training sessions, to educate agricultural operators on the benefits and methods of decarbonizing their equipment.

Table 10 Measure T-5

Funding and Technical Assistance for Agricultural Equipment Decarbonization	
Cumulative GHG Emissions Reductions (2030)	2,363 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	108,691 MT CO_2e
Implementing Agency/Agencies	AMBAG, County of Santa Clara
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2027: Engage agricultural community to identify easy opportunities for equipment decarbonization ▪ 2025-2027: Identify funding parameters and priority equipment to decarbonize in program ▪ 2030: Achieve 177 agricultural equipment decarbonized ▪ 2027-2050: Establish agricultural equipment decarbonization program ▪ 2050: Achieve 1,350 agricultural equipment decarbonized
Geographic Location	Agricultural communities within San Benito and Santa Clara County
Funding Sources	Some regional, state, and federal funds are available for agricultural equipment decarbonization. However, additional funding will be needed to transition equipment at scale, especially in LIDACs.
Metrics for progress tracking	Number of fossil fuel agricultural equipment replaced by equipment type, fuel type, and alternate fuel replacement
Applicable Sector	Transportation

T-6 Enact a Zero Emission Transit and Charger Program

Measure Description

The existing ZEV charging infrastructure is not sufficient to entice mass migration to ZEVs in San Benito and Santa Clara Counties. This measure will expand a zero-emission transit and charger program in Santa Clara County and establish a similar initiative in San Benito County to accelerate the adoption of zero-emission public transit and necessary charging infrastructure. The measure will build upon VTA's existing bus chargers, electric buses, and on-route charging pilot program. Through this initiative, dial-a-ride services and bus route services offered through San Benito County Local Transportation Authority (SBCTA) will receive funding to decarbonize, install, and maintain ZEV charging infrastructure, including hydrogen fueling and electric charging stations.

Table 11 Measure T-6

Enact a Zero Emission Transit and Charger Program	
Cumulative GHG Emissions Reductions (2030)	28,065 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	450,316 MT CO_2e
Implementing Agency/Agencies	VTA, SBCTA
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2027: Identify funding parameters and priority vehicles to decarbonize in the program ▪ 2025-2027: Identify funding parameters and priority charging/fueling infrastructure in the program ▪ 2027-2050: Transition 100% of transit fleet to ZEVs
Geographic Location	Santa Clara and San Benito transit routes
Funding Sources	Some local, state, and federal funds are available for transit decarbonization. However, additional funding will be needed to transition vehicles and charging infrastructure at scale.
Metrics for progress tracking	▪ Number of EV buses in VTA fleet ▪ Annual ridership of VTA busses ▪ Number of EV chargers installed for bus use along mobility hub facilitated routes
Applicable Sector	Transportation

4.4 Carbon Sequestration, Organics, and Materials Reuse

California's emission reductions in the waste sector will be driven primarily through compliance with SB 1383, which requires all jurisdictions in the State to reduce organic waste disposal by 75 percent and increase edible food recovery by 20 percent relative to 2014 levels by 2025. SB 1383 also requires each jurisdiction to procure a specific quantity (tons) of compost or organic material per year. When organic materials like food scraps and yard waste get sent to landfills, they emit methane as they decompose. Methane is considered a climate super pollutant, is 28 times more potent than carbon dioxide, and is a primary driver of short-term climate impacts.8 Landfills are the third largest source of methane emissions in California and emit air pollutants, including $PM_{2.5}$ which are detrimental to human health.[9] California's organic diversion goals are aspirational, and SB 1383 is largely unfunded. Jurisdictions across the State are currently struggling to meet the organic diversion requirements due to limited facilities that provide opportunities for composting as well as limited resources to ensure compost quality and identify locations for compost application. The priority measures outlined below will help the MSA meet California's SB 1383 diversion and procurement requirements by building out infrastructure and expanding incentive programs to increase compost procurement and utilization in the region.

[8] https://www.iea.org/reports/methane-tracker-2021/methane-and-climate-change
[9] https://calrecycle.ca.gov/organics/slcp/

COM-1 Expand Incentive Programs for Compost Application

Measure Description

The measure will expand on existing compost incentive programs aimed at facilitating effective procurement, distribution, and utilization of compost, and fostering sustainable agricultural practices which enhance soil health and carbon sequestration. The enhancement of the existing regional compost broker program will serve as a centralized platform connecting compost producers with agricultural entities, landscapers, and other end-users, to identify locations for compost application. Furthermore, Santa Clara County's existing Agriculture Resilience Incentive (ARI) program, which compensates farmers and ranchers for adopting agricultural practices that sequester carbon, will be expanded and funded to provide continued benefits to participants in San Benito and Santa Clara Counties. In addition to incentives for landowners to apply compost, the initiative will develop a carbon credit program designed to generate verifiable carbon credits from compost application which could help sustain long term program funding. Participating landowners and agricultural producers will receive financial incentives in the form of carbon credits for procuring and applying compost through the regional compost broker program. These carbon credits can be used to offset emissions or sold on regional carbon markets, contributing to climate mitigation efforts and potentially generating revenue. In addition, an aligned education campaign will host targeted outreach and educational activities to raise awareness about best practices for separating organic waste, reducing contamination, and maximizing the value of compostable materials.

Table 12 Measure COM-1

Expand Incentive Programs for Compost Application	
Cumulative GHG Emissions Reductions (2030)	64,101 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	491,445 MT CO_2e
Implementing Agency/Agencies	Santa Clara County, San Benito County, Joint Venture Silicon Valley
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2030: Plan expansion of ARI program; enhance and expand the Santa Clara County compost broker program; plan and establish carbon credit financing system ▪ 2027-2050: Achieve SB 1383 procurement requirements (92,901 tons of compost)
Geographic Location	MSA-wide program implementation with focus on compost application on agricultural soils.
Funding Sources	Some local, regional, and state funds are available for existing compost efforts in the MSA. However, additional funding will be needed to expand program offerings.
Metrics for progress tracking	▪ Tons of compost procured through broker program annually ▪ Tons of compost distributed for soil amendments through carbon crediting system ▪ Tons of compost applied to agricultural soils per project facilitated by ARI
Applicable Sector	Agriculture

COM-2 Enhance the Existing Food Recovery and Organics Diversion Program

Measure Description

This measure will facilitate the development of a Food Recovery and Diversion Program to address food waste opportunities in San Benito and Santa Clara Counties. The program will focus on implementing a comprehensive approach focused on food recovery, diversion, and composting. This initiative includes the growth of local food recovery and organics diversion infrastructure hubs, launching an education campaign to improve municipal compost quality, and increasing funding for current and emergency food waste reduction and food recovery activities. The program will expand existing, and develop new, food recovery and organics diversion hubs dedicated to food recovery and redistribution efforts, collaborating with organizations, food banks, shelters, and other community partners to collect, store, and redistribute surplus food to those in need. These local hubs will be strategically located within San Benito County and Santa Clara County to serve as central points for edible food collection and distribution, collection of organic waste for composting, and distribution of finished compost. This program will also have linkages to COM-1 to help produce high quality compost for application on natural and working lands. Additionally, the initiative will allocate and direct funding to support both existing and emerging food waste reduction and food recovery activities in the counties.

Table 13 Measure COM-2

Enhance the Existing Food Recovery and Organics Diversion Program	
Cumulative GHG Emissions Reductions (2030)	1,361,748 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	10,440,066 MT CO_2e
Implementing Agency/Agencies	Santa Clara County, San Benito County, Joint Venture Silicon Valley
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2030: Establish local food recovery infrastructure hubs and compost infrastructure hubs; expand funding for current and emergent food waste reduction efforts ▪ 2027: Achieve SB 1383 diversion requirements (75% of organic waste diverted from landfill)
Geographic Location	Santa Clara County and San Benito County
Funding Sources	Some local, regional, and state funds are available for existing compost efforts in the MSA. However, additional funding will be needed to expand program offerings.
Metrics for progress tracking	▪ Number of food recovery hubs established ▪ Tons of food delivered to and distributed at recovery hubs ▪ Number of compost hubs established ▪ Tons of waste deposited at compost hubs ▪ Tons of compost generated ▪ Annual compost quality testing and tracking ▪ Tons of compost collected for distribution
Applicable Sector	Solid Waste/ Natural and Working Lands

COM-3 Develop a Community-Scale Reuse System

Measure Description

This measure involves developing a community-scale food and beverage container reuse program to minimize waste created by single-use foodservice products. The program will develop infrastructure and systems enabling consumers in San Benito County and Santa Clara County to borrow reusable packaging like cups and to-go containers from participating foodservice establishments (e.g. restaurants, coffee shops) and return them to convenient locations throughout both counties. The program will also serve institutions, such as public schools and workplace cafeterias, which would like to eliminate single-use products but do not have the capacity to wash durable products on site. This initiative will promote sustainable partnerships and cooperation with local businesses, residents, agencies, and non-profit organizations to decrease waste generation. The measure includes a thorough community-centered engagement, planning, and design process to ensure diverse stakeholder and community needs are addressed to the extent possible. Culturally appropriate and multi-lingual community education events and materials will be developed and hosted to encourage participation in the reuse program and align with the cultural values of communities in San Benito and Santa Clara Counties. It should also be noted that the GHG benefits of a community-scale reuse system go well beyond those quantified here. A majority of the GHG emissions would come from lifecycle savings related to reduced manufacturing of disposable single-use foodservice items.

Table 14 Measure COM-3

Develop a Community-Scale Reuse System	
Cumulative GHG Emissions Reductions (2030)	211 MT CO_2e
Cumulative GHG Emissions Reductions (2050)	2,316 MT CO_2e
Implementing Agency/Agencies	Sunnyvale, San Benito County, additional participating jurisdictions in San Benito and Santa Clara County
Milestones for Obtaining Implementing Authority	Authority already obtained
Implementation Schedule and Milestones	▪ 2025-2030: mapping, engagement, pilot system setup ▪ 2027-2030: system improvements and system expansion ▪ 2030-2050: full-scale system operation ▪ 2030-2050: Achieve annual target of 334 tons reduction of disposable food ware use
Geographic Location	San Benito and Santa Clara County
Funding Sources	This program is currently unfunded and will need funding to support the planning, development, and implementation phases.
Metrics for progress tracking	▪ Number of participating facilities and partners ▪ Number of single-use products reduced ▪ Total jobs created ▪ Jobs created in LIDAC communities ▪ Water consumption at provider washing sites ▪ Annual miles travelled by reuse food ware collection trucks
Applicable Sector	Solid Waste

Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

5

Low-Income and Disadvantaged Community Analysis

5 Low-Income and Disadvantaged Community Analysis

5.1 Overview

The measures outlined in this PCAP have been developed specifically to generate substantial benefits for low-income and disadvantaged communities (LIDACs). This section delineates each LIDAC within San Benito and Santa Clara Counties and forecasts the impacts and benefits of PCAP implementation on these communities. Details on how San Benito and Santa Clara Counties collaborated with LIDACs during the development of this PCAP, as well as plans for continued engagement in the future, are described in Section 7: Coordination and Outreach and Section 8: Next Steps.

Santa Clara and San Benito Counties are currently experiencing and will continue to experience impacts from climate change. LIDACs are historically marginalized, underserved, and pollution-burdened populations who will be disproportionately affected by impacts from climate change. Identifying LIDACs through an evaluation of socioeconomic conditions, demographic trends, and historical and environmental patterns of pollution exposure can offer stronger solutions, policies, and programs to address climate disparities. Incorporating LIDAC findings in the San Benito County and Santa Clara County MSA PCAP will provide a more targeted deployment of climate-related resources to increase benefits directly to LIDACs.

5.2 Low-income and Disadvantaged Communities Identification Methodology

In accordance with the EPA's CPRG LIDAC Technical Guidance[10,] LIDACs in Santa Clara and San Benito Counties were identified as any census tract classified as disadvantaged according to the White House's Climate and Economic Justice Screening Tool (CEJST). A census tract is considered disadvantaged if they are (1) at or above the threshold[11] for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden. Additionally, a census tract that is entirely surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged. The CEJST tool includes the following eight burdens categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.

In addition to identifying LIDACs, the PCAP also identified high-pollution census tracts, as these areas exhibit disproportionately high levels of pollution exposure. High pollution census tracts are defined as those scoring in the 65th percentile or higher for pollution burden according to the California Environmental Protection Agency's (CalEPA) CalEnviroScreen tool. The CalEnviroScreen tool is a data-based index that provides a relative evaluation of pollution burden and health vulnerabilities across California. CalEnviroScreen ranks each census tract in California relative to

[10] https://www.epa.gov/system/files/documents/2023-05/LIDAC%20Technical%20Guidance%20-%20Final_2.pdf

[11] Census tracts are identified as disadvantaged if they are at or above the 90th percentile for climate change, energy, health, housing, legacy pollution, transportation, water, and wastewater data indicators and are above the 65th percentile for low income. Additionally, census tracts are identified as disadvantaged if they are at or above the 90th percentile for workforce development data indicators and more than 10% of people ages 25 years or older whose high school education is less than a high school diploma.

other census tracts by providing percentile scores for 21 indicators of pollution burden and health vulnerability.

Supplementary data indicators from the CEJST and CalEnviroScreen tool as well the U.S. EPA's Environmental Justice Screening Tool (EJScreen) and Federal Emergency Management Agency's (FEMA's) National Risk Index tool were utilized to identify pollution, climate, and health risks, impacts, and vulnerabilities in LIDACs and high pollution census tracts across both counties. Furthermore, data from these tools was gathered to provide additional environmental and socioeconomic context, highlighting further challenges faced by these communities. In instances of overlapping data categories among the tools, preference was given to tools utilizing more recent data or data indicating burdens in the national percentile. These additional areas are not considered LIDACs but may be prioritized in the CCAP and through future initiatives.

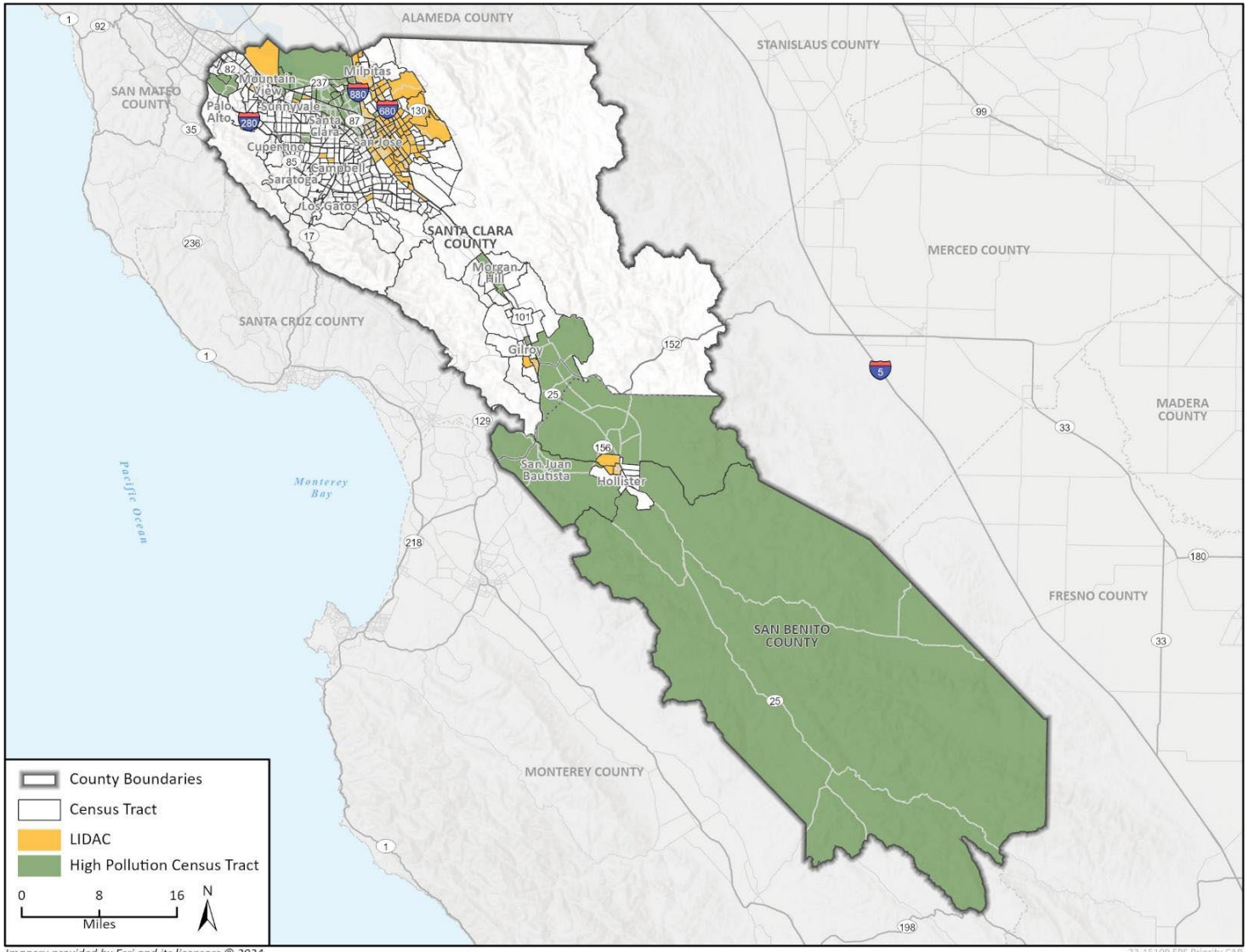
5.3 Low-income and Disadvantaged Communities in Santa Clara and San Benito Counties

There are 95 LIDAC census tracts based on the CEJST tool in Santa Clara and San Benito Counties. There are 26 additional census tracts in Santa Clara and San Benito Counties that are considered high pollution burdened based on the CalEnviroScreen tool. Figure 4 shows all Santa Clara and San Benito County LIDAC census tracts and high pollution census tracts.

San Benito County has fewer LIDACs than Santa Clara County, limited to three LIDACs located near Hollister, as seen in Figure 5. The vast majority of San Benito County corresponds to high pollution census tracts.

There is a high concentration of LIDACs and high pollution census tracts in the northeastern portion of Santa Clara County. This area of Santa Clara County corresponds to where a larger portion of the County population resides as seen in Figure 6. The LIDACs and high pollution census tracts are mainly within incorporated cities.

Figure 4 LIDACs and High Pollution Census Tracts in the San Benito County and Santa Clara County MSA



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Additional data are based on 2010 census tracts by CalEnviroScreen 4.0, 2021; Climate and Economic Justice Screening Tool, 2024.

23-15109 EPS Priority CAP
Fig X LIDACs and High Pollution Census Tracts

Figure 5 LIDACs and High Pollution Census Tracts in San Benito County

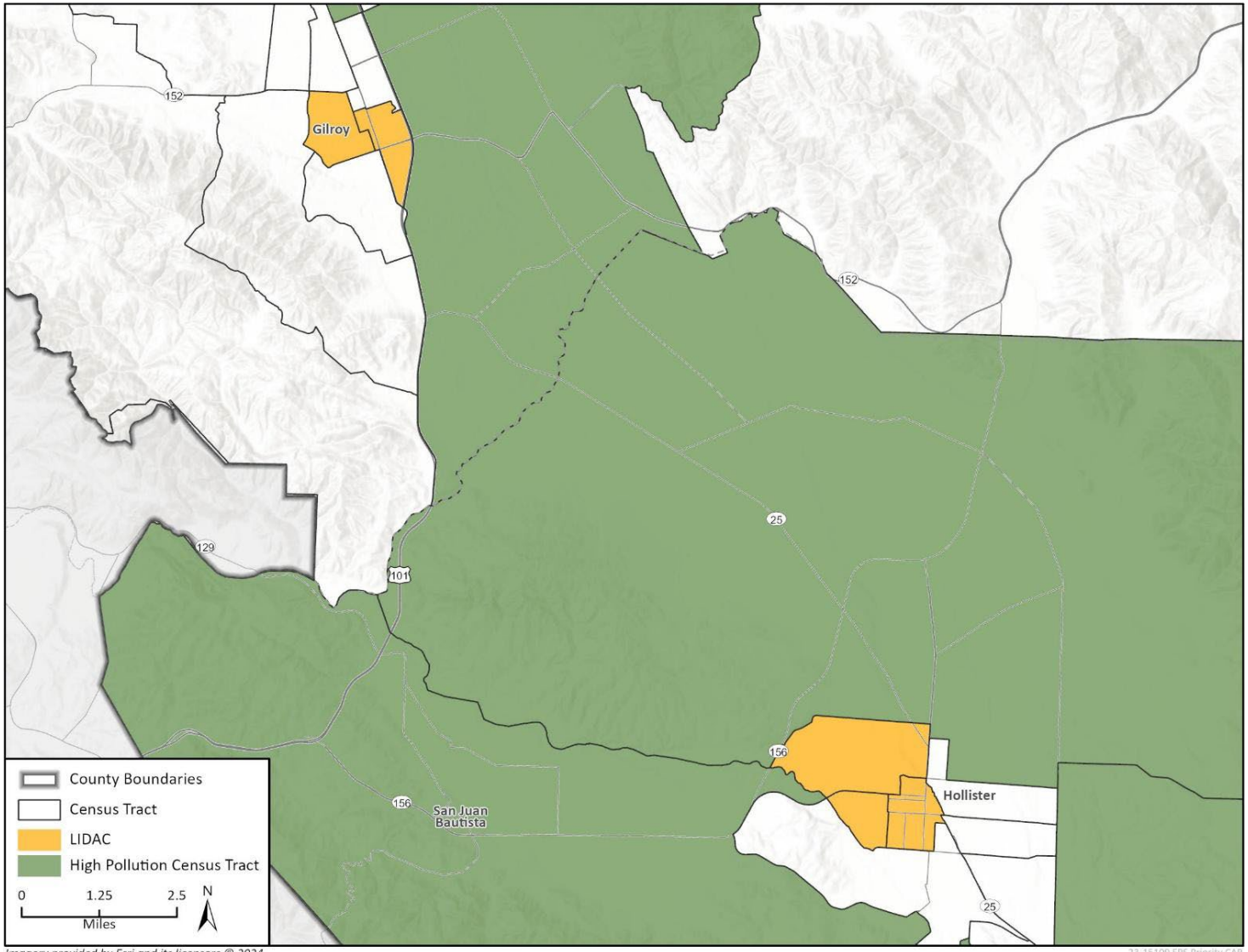
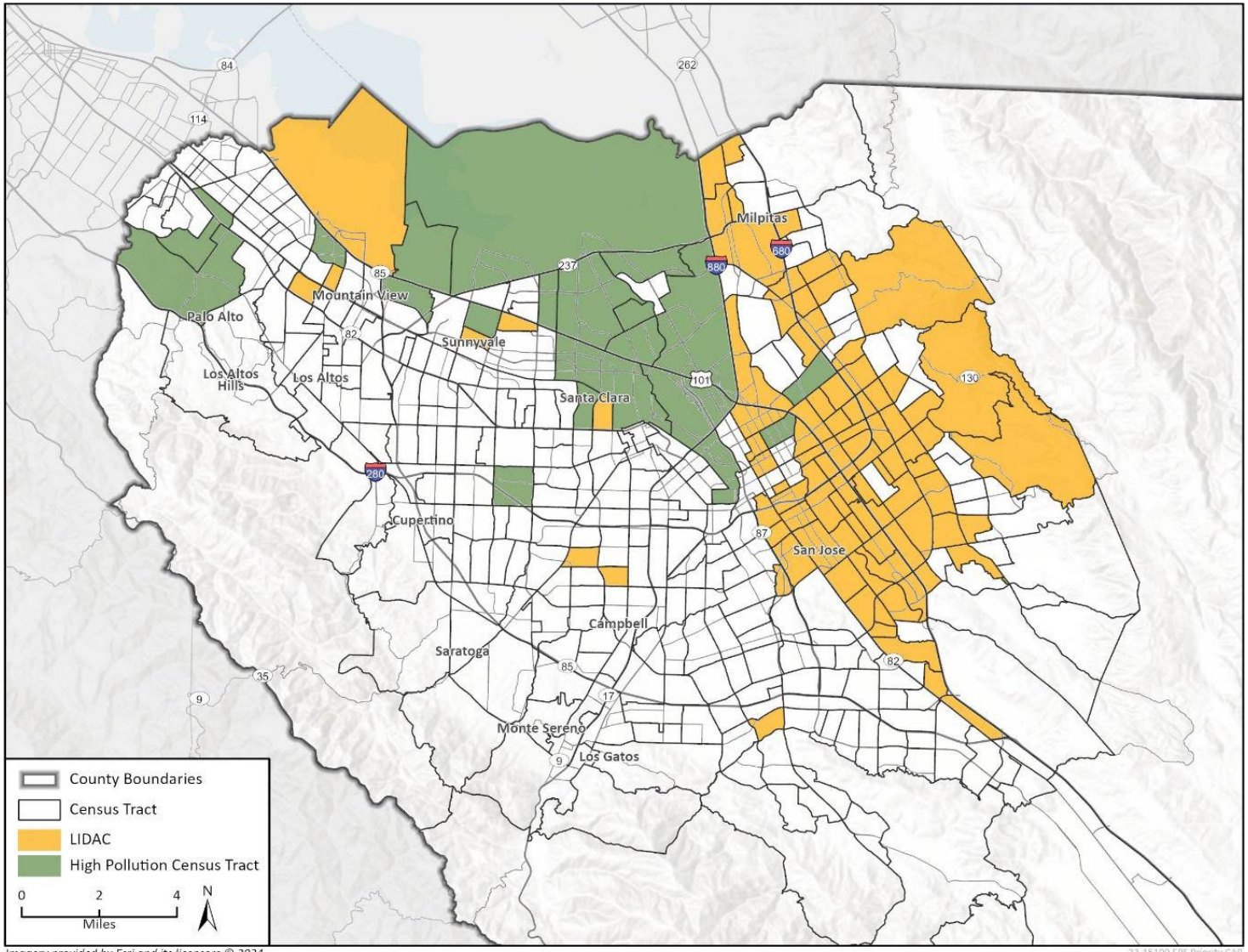


Figure 6 LIDACs and High Pollution Census Tracts in Northern Santa Clara County



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Additional data are based on 2010 census tracts by CalEnviroScreen 4.0, 2021; Climate and Economic Justice Screening Tool, 2024.

23-15109 EPS Priority CAP
Fig X LIDACs and High Pollution Census Tracts - Zoomed In

The following tables provide the list of LIDAC and high pollution census tracts, their corresponding population numbers, and general location within each county. Table 15 provides a list of LIDAC census tracks within San Benito and Santa Clara Counties using the CESJT tool and EPA methodologies. Table 16 lists additional pollution burdened communities identified within the MSA using the CalEnviroScreen tool. These census tracts were included for informational purposes only.

Table 15 LIDAC Census Tracts in San Benito County and Santa Clara County MSA

Census Tracts	Population	Location
Santa Clara County LIDACs		
6085503902	5,973	Alum Rock
6085504102	5,883	Alum Rock
6085504202	4,359	East Foothills
6085512508	8,351	Gilroy
6085512603	4,634	Gilroy
6085504413	1,981	Milpitas
6085504418	5,115	Milpitas
6085504422	3,849	Milpitas
6085504504	12,367	Milpitas
6085504506	7,088	Milpitas
6085504507	6,459	Milpitas
6085509303	3,563	Mountain View
6085509404	7,129	Mountain View
6085500100	8,306	San Jose
6085500902	5,659	San Jose
6085501000	5,414	San Jose
6085501101	4,695	San Jose
6085501401	3,226	San Jose
6085501402	3,046	San Jose
6085501501	4,623	San Jose
6085501502	4,843	San Jose
6085501600	7,716	San Jose
6085501700	4,982	San Jose
6085503105	2,460	San Jose
6085503110	4,917	San Jose
6085503111	5,132	San Jose
6085503112	4,141	San Jose
6085503113	5,052	San Jose
6085503117	3,071	San Jose
6085503118	5,286	San Jose
6085503121	4,788	San Jose
6085503122	3,602	San Jose

Census Tracts	Population	Location
6085503123	3,901	San Jose
6085503204	8,105	San Jose
6085503207	4,150	San Jose
6085503210	4,254	San Jose
6085503211	4,592	San Jose
6085503212	4,379	San Jose
6085503213	4,925	San Jose
6085503217	4,834	San Jose
6085503218	5,118	San Jose
6085503304	7,213	San Jose
6085503305	5,810	San Jose
6085503306	4,373	San Jose
6085503315	8,637	San Jose
6085503321	4,690	San Jose
6085503325	4,722	San Jose
6085503327	4,504	San Jose
6085503337	3,455	San Jose
6085503401	4,468	San Jose
6085503402	5,286	San Jose
6085503506	6,816	San Jose
6085503507	2,397	San Jose
6085503508	6,533	San Jose
6085503510	5,826	San Jose
6085503511	3,620	San Jose
6085503601	3,383	San Jose
6085503602	5,602	San Jose
6085503703	4,073	San Jose
6085503707	6,087	San Jose
6085503708	2,955	San Jose
6085503709	6,457	San Jose
6085503710	3,858	San Jose
6085503711	5,368	San Jose
6085503712	4,484	San Jose
6085503713	3,550	San Jose
6085503803	4,704	San Jose
6085503804	5,285	San Jose
6085503903	3,773	San Jose
6085504001	6,078	San Jose
6085504002	6,772	San Jose

Census Tracts	Population	Location
6085504315	6,781	San Jose
6085504316	4,760	San Jose
6085504318	6,095	San Jose
6085504320	2,931	San Jose
6085504321	5,574	San Jose
6085504323	6,005	San Jose
6085504410	4,724	San Jose
6085504411	5,884	San Jose
6085506305	6,726	San Jose
6085506501	7,421	San Jose
6085511915	3,664	San Jose
6085512017	7,565	San Jose
6085512039	5,402	San Jose
6085512043	6,583	San Jose
6085505303	6,345	Santa Clara
6085508800	3,884	Sunnyvale
6085508900	5,184	Sunnyvale
6085503214	8,468	Unincorporated Santa Clara County area
6085503312	4,027	Unincorporated Santa Clara County area
6085504308	4,537	Unincorporated Santa Clara County area
6085504601	1,016	Unincorporated Santa Clara County area
San Benito County LIDACs		
6069000400	6,348	Hollister
6069000701	4,851	Hollister
6069000300	4,588	Unincorporated San Benito County area

Table 16 Additional High Pollution Areas in San Benito County and Santa Clara County MSA

Census Tracts	Population	Location
Santa Clara County High Pollution Areas		
6085508102	3,408	Cupertino
6085512310	5,050	Morgan Hill
6085512311	4,211	Morgan Hill
6085509108	4,428	Mountain View
6085509304	3,607	Mountain View
6085500300	3,788	San Jose
6085501102	4,305	San Jose
6085504319	7,633	San Jose
6085504602	2,355	San Jose
6085505006	11,441	San Jose
6085505009	11,332	San Jose
6085505100	4,076	San Jose
6085504901	9,956	Santa Clara
6085505001	10,204	Santa Clara
6085505007	4,239	Santa Clara
6085505202	6,936	Santa Clara
6085505302	4,168	Santa Clara
6085511500	7,992	Stanford
6085504802	5,516	Sunnyvale
6085509000	7,570	Sunnyvale
6085504700	588	Unincorporated Santa Clara County area
6085511705	1,113	Unincorporated Santa Clara County area
6085512602	2,404	Unincorporated Santa Clara County area
San Benito County High Pollution Areas		
6069000100	4,600	Unincorporated San Benito County area
6069000200	6,263	Unincorporated San Benito County area
6069000802	3,049	Unincorporated San Benito County area

5.4 Burdens Facing Low-income and Disadvantaged Communities in Santa Clara and San Benito Counties

Pollution Burden

Of the air pollution factors examined in this analysis, ozone is the highest burden, followed by diesel particulate matter, then fine particulate matter (PM2.5). Over 80% of the LIDAC tracts in the MSA region are in the 65th or higher national percentile for ozone pollution. These ozone burdened communities are located in the cities of San Jose, Mountain View, Milpitas, Gilroy, Hollister, and

East Foothills. Diesel particulate matter was found to be in or above the 65th percentile for 52% of LIDAC communities in the area. Communities with this level of diesel particulate matter burden were located in San Jose, Mountain View, Milpitas, Gilroy, Hollister, and East Foothills. PM 2.5 was the lowest source of air pollution with only 1% of LIDAC census tracts reporting over the 65th percentile, which were located in the City of Gilroy.

According to CalEnviroScreen's aggregated pollution burden score, 20% of the area's LIDAC communities are in or above the 65th percentile for California for exposure to ozone and PM2.5 concentrations, diesel particulate matter emissions, drinking water contaminants, children's lead risk from housing, pesticide use, toxic releases from facilities, and traffic density. This burden score also considers, to a lesser extent, the following pollution factors: proximity to cleanup sites, impaired water bodies, groundwater threats, hazardous waste facilities and generators, and solid waste sites and facilities.

Socioeconomic and Built Environment Burdens

In the MSA area, many communities are exposed to socioeconomic and built environment burdens including:

- High traffic routes,
- Barriers to accessing transportation,
- High unemployment, and
- High rates of linguistic isolation.

Over 24% of the area's LIDAC communities are in or above the 65th national percentile for transportation barriers, which means these tracts experience higher than average relative cost and time spent on transportation relative to all other census tracts in the county. 65% of the area's LIDAC communities are in or above the 65th national percentile for traffic proximity and volume, meaning they live within 500 meters of high traffic routes. Many of these communities experience some of the highest proximity and volume of traffic in the United States: 44% of LIDAC communities in the area are in the 90th to 99th national percentile for traffic proximity and volume. These communities are mostly located in San Jose, with others in Sunnyvale, Milpitas, and Gilroy. 40% of LIDAC tracts, mostly in Hollister, San Jose, Gilroy and unincorporated Santa Clara County, are in or above the 65th percentile for unemployment. The MSA area also faces some of the highest rate of linguistic isolation in the country, measured by the number of households where no one over the age of 14 reports speaking English "very well". 95% of LIDAC tracts are in the 90th to 99th percentile for linguistic isolation, mainly in the cities of San Jose, Sunnyvale, Alum Rock, Hollister and unincorporated Santa Clara County. 100% of LIDAC tracts in the area are in and above the 80th national percentile for linguistic isolation.

Health Factors

Communities in this MSA area face various health concerns which may be caused by or exacerbated by environmental factors such as air pollution. Chronic asthma as well as asthma attacks can be caused by air pollution. 52% of the area LIDAC tracts are in the 65th or higher state percentile for California for asthma, as recorded through emergency room visits for asthma attacks. These communities are mainly located in the city of San Jose, Hollister, Milpitas, Alum Rock, and unincorporated Santa Clara County. Emerging research indicates diabetes may be influenced by air pollution as well as other sources. 17% of LIDACs in the area are in or above the 65th national

percentile for diabetes, mostly located in the City of San Jose. Cancer risk also increases with exposure to air pollution. 17% of the area's LIDACs are in or above the 65th national percentile for lifetime cancer risk from inhalation of air toxins, including particulate matter, nitrogen oxides, and ground-level ozone.

5.5 Climate Risks in Santa Clara and San Benito County

LIDACs in Santa Clara and San Benito Counties are experiencing and will continue to experience adverse and disproportionate impacts from climate change and have more limited resources to adapt to these impacts. The following climate risks describe projected climate conditions for both Santa Clara and San Benito County LIDACs:

Extreme Heat and Warm Nights

Average annual temperatures in Santa Clara County and San Benito County could increase significantly due to climate change.[12] [13] Both counties are projected to experience more extreme heat days (i.e., days when the daily maximum threshold is above the maximum temperature typically experienced in the region) for longer periods of time. Extreme heat days disproportionately impact LIDACs, in particular people experiencing homelessness, outdoor workers, older adults, children, and individuals with underlying chronic diseases. High costs or limited access to energy infrastructure, low-quality housing, and other economic burdens on LIDACs increase risk of heat-related illnesses such as heat stroke and dehydration, contributing to increasing rates of mortality. Often LIDACs have poor health outcomes due to systemic inequities and high rates of comorbidities and chronic health conditions can increase vulnerability to heat-related illnesses.

Drought

San Benito and Santa Clara County are expected to experience significant drought conditions from increasing temperatures and lengthened dry spells. Drought can affect LIDACs as it can reduce economic productivity particularly in the agricultural industry which can result in income disruption to agricultural workers. Additionally, drought brings increased risk of wildfires and dust storms and contributes to poor air quality which impacts public health. There could also be an increase in the price of water that would create barriers for low-income households who may not be able to afford clean water.

Wildfire

Wildfire risk in Santa Clara and San Benito County is projected to increase as a result of climate change.[14] Buildings with LIDAC residents could be exposed to wildfire which can cause risk of injury, death, or financial hardship. In addition, wildfire smoke can increase respiratory issues for LIDACs that do not have access to adequate indoor air filtration systems. Santa Clara County has a history of wildfire including the Santa Clara Unit (SCU) Lightning Complex fires in August 2020 that caused significant property damage and high repair costs for roads, bridges, parks, and recreational facilities. Although San Benito County has not experienced recent severe wildfire events, the vast

[12] https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CHPRs/CHPR069SanBenito_County2-23-17.pdf
[13] https://www.cdph.ca.gov/Programs/OHE/CDPH%20Document%20Library/CHPRs/CHPR085SantaClara_County2-23-17.pdf
[14] https://siliconvalleytwopointzero.org/downloads/factsheets/SiliconValley2.0_Wildfire_Factsheet.pdf

majority of the County is designated within High Fire Hazard Zones according to the California Department of Forestry and Fire Protection.[15]

Landslide

Landslides are expected to increase in Santa Clara County and San Benito County due to higher intensities of extreme precipitation events and wildfires.[16] Landslides can cause structural damage to buildings and critical transportation facilities as well as human injury. LIDACs may not have access to timely emergency evacuation information and insufficient financial means to retrofit homes or rebuild after damage.

Air Quality

Climate change is expected to worsen air quality in Santa Clara County and San Benito County. Dust, smog, and wildfire smoke are examples of pollutants that may increase the concentration of toxins related to outdoor pollution. Emissions from buildings and transportation also pose risks to LIDACs as LIDACs are typically located near truck routes and roadways and highways with high amounts of average daily traffic. Indoor air pollution caused by gas appliances can pose public health risks such as an increase in the number of hospitalization cases due to asthma and other respiratory illnesses. LIDAC residents living in substandard housing often lack appropriate ventilation and therefore experience higher rates of indoor air pollution (carbon dioxide, nitrogen dioxide, nitrogen oxide, sulfur oxides, carbon monoxide).[17]

Flooding

Future rainstorms are projected to be more intense in Santa Clara County and occur over a shorter wet season, leading to an increased risk for stream flooding.[18] Extreme rain events are expected to overwhelm stormwater drainage systems causing power outages and road closures. Both stream flooding and overwhelmed stormwater drainage systems could result in evacuation orders and property damage. Areas at higher elevations are projected to experience an increase in snowstorms. These adverse effects will disproportionately affect LIDACs as they may not be able to afford the costs of property retrofits or property repairs from damage.

Sea Level Rise

Santa Clara County is located adjacent to the San Fransisco Bay which is predicted to experience the effects of sea level rise. Infrastructure damage from San Francisco Bay flooding will disproportionately impact LIDAC residents in Santa Clara County and cause further financial burdens associated with recovery from loss of homes and businesses. Potential contamination of freshwater aquifers from the rising sea and groundwater levels can also pose a public health risk to LIDAC

[15] https://egis.fire.ca.gov/FHSZ/
[16] Climate Vulnerability Technical Compendium. Santa Cruz County. August 2022. https://www.santacruzcountyca.gov/Portals/0/County/OR3/CAAP/Appendix%20C%20-%20Santa%20Cruz%20County%20Climate%20Vulnerability%20Technical%20Compendium%20.pdf
[17] Health, Department of Public. "Health Impacts of Climate Change." Health Impacts of Climate Change. Accessed February 28, 2024. https://www.cdph.ca.gov/Programs/OHE/Pages/Climate-Health-Equity/Health-Impacts.aspx#:~:text=The%20resulting%20human%20health%20impacts,flooding%2C%20increased%20occurrences%20of%20vector-
[18] "Silicon Valley 2.0 -Climate Hazard Fact Sheet: Riverine Flooding in Santa Clara County Full Coyote Creek (Credit: Valley Water)." February, 2024. https://siliconvalleytwopointzero.org/downloads/factsheets/SiliconValley2.0_Riverine-Flooding_Factsheet.pdf.

communities along the shoreline[19]. San Benito County is inland and is not exposed to the effects of sea level rise.

While the direct impacts of climate risks are described above, there are numerous cascading impacts resulting from climate change. For example, road closures due to flooding may limit access to jobs or schools. Power outages from wildfire or public power safety shutoffs may impact people reliant on certain types of medical devices. Like many of the direct impacts of climate changes, these indirect impacts often fall on the most burdened populations.

According to FEMA's National Risk Index, LIDAC communities in Santa Clara County and San Benito County experience a high proportion of climate change and natural hazard risk. Over 98 percent of LIDACs are in or above the 65th national percentile for natural hazard risk, while 53 percent of LIDAC communities are in or above the 90th national percentile for natural hazard risk. The highest risk hazards are earthquake and wildfire, with drought, heat wave and landslide also ranked prominently. All the Santa Clara County and San Benito County LIDACs are in or above the 80th national percentile for expected annual loss from combined hazards, while 73 percent of LIDACs are in or above the 90th national percentile for combined hazard expected annual loss. The areas at highest risk and most expected annual loss are Hollister, San Jose, Sunnyvale, Alum Rock, and areas of unincorporated Santa Clara County.

5.6 PCAP Measure Descriptions of Benefits and Equity Considerations

Building Energy

BE-1 Regional Holistic Building Decarbonization Program for Low-and-Moderate Income Occupant Housing

- **Community Co-Benefits:** Increasing electrification adoption rates in LIDACs will improve indoor air quality, reduce long-term energy costs, and increase access to high road jobs. Building electrification will also provide heating and cooling through electric HVAC systems such as heat pumps.
- **Equity Considerations:** LIDACs are energy-burdened since a high percentage of their gross household income is spent on energy bills such as natural gas bills. By targeting electrification in LIDACs, a higher number of households can benefit from long term reductions in energy bills derived from higher efficiency appliances, especially when paired with energy efficiency upgrades to buildings. LIDACs often experience health disparities and face co-morbidities. Improving indoor air quality by removing natural gas appliances will improve health outcomes and contribute to reduced rates of asthma and respiratory issues.[20] Increasing access to electrician and manufacturing jobs related to the building electrification industry offer living wages, benefits, and career advancement.[21]

[19] Toxic Tides and Environmental Injustice: Social Vulnerability to Sea Level Rise and Flooding of Hazardous Sites in Coastal California. Lara J. Cushing, Yang Ju, Scott Kulp, Nicholas Depsky, Seigi Karasaki, Jessie Jaeger, Amee Raval, Benjamin Strauss, and Rachel Morello Frosch. Environmental Science & Technology 2023 57 (19), 7370-7381 DOI: 10.1021/acs.est.2c07481

[20] https://www.scientificamerican.com/article/the-health-risks-of-gas-stoves-explained/

[21] https://berkeleyca.gov/sites/default/files/2022-01/Berkeley-Existing-Buildings-Electrification-Strategy_Executive-Summary.pdf

BE-2 Establish a Public Facility Community Resiliency and Implementation Fund

- **Community Co-Benefits:** Electrifying municipal facilities will demonstrate the community's commitment to decarbonization and will encourage future pilot initiatives that offer public health benefits county-wide. Electrification will also be paired with backup electricity systems, improved air filtration, and cooling to provide additional resilience and benefits to the community.
- **Equity Considerations:** LIDACs often live in substandard or overcrowded housing conditions increasing their reliance on municipally-owned facilities for resources and temporary refuge during climate change exacerbated events. By upgrading municipal facilities, LIDACs can access facilities with improved indoor air quality and cooling resources to combat exposure to extreme heat and poor air quality during extreme weather events, e.g., heat waves, wildfire and smoke.

BE-3 Establish Commercial, Agricultural, and Industrial Buildings Decarbonization Program to Support Non-residential Decarbonization with Incentives and Technical Support

- **Community Co-Benefits:** Decarbonizing commercial, agricultural, and industrial buildings will reduce GHG emissions and offer long-term cost savings to businesses that are energy burdened. Decarbonization of these facilities will also reduce air quality emissions in LIDAC communities and for workers in these locations.
- **Equity Considerations:** LIDAC-owned businesses housed in industrial, commercial, and agricultural buildings can financially benefit from decarbonization by reducing long-term energy costs associated with natural gas. Electrifying buildings will clean indoor air and provide access to cost-effective indoor cooling which will also benefit workers, who are often from LIDAC communities. Improving worker conditions will reduce health impacts associated with extreme heat and bad air quality days.

Transportation

T-1 Develop Safe, Accessible, Clean, and Equitable Multi-Modal Mobility Hubs

- **Community Co-Benefits:** Benefits associated with mobility hubs include reduced car-dependency and associated lower GHG emissions and air pollution, reduced commute trip lengths, increased access to jobs, recreation, and services, and improved personal safety.
- **Equity Considerations:** Mobility hubs located in LIDACs will increase and improve access to multiple modes of transportation. This increases cost savings associated with alternative low-cost transportation approaches, reducing financial burdens for LIDAC households. Reducing mode conflicts reduces risk of collisions and exposure to accidents. Mobility hubs will contribute towards an overall decrease in VMT which will contribute to regional improvements in air quality. LIDACs are vulnerable to gentrification associated with public transit expansion plans. Working in partnership with local organizations will address mobility justice to improve transportation options while preventing displacement from increased property values.

T-2 Implement the Valley Transportation Authority (VTA) Visionary Transit Network

- **Community Co-Benefits:** Public transit improvements such as first/last mile upgrades, an increase in transit frequency, and extended operating hours in LIDACs will improve mobility and offer better access to employment opportunities. Active transportation improvements such as bikeways will encourage physical activity in LIDACs and improve overall public health outcomes. The subsequent increase in transit ridership will decrease both GHG and air quality emissions and lower costs for riders compared to car ownership.
- **Equity Considerations:** LIDACs experience a higher rate of pollution and poor air quality than more affluent neighborhoods. Decreasing car dependency can offer long-term cost savings for those burdened with financial car-ownership while reducing GHG emissions. LIDACs also tend to have multiple-seat rides (e.g., multiple bus transfers) and lengthier commutes. Strategies to extend hours for public transit service will reduce commute trip length and lower the number of seats per ride which will improve commuter experiences. Improved public transit can make it easier for individuals, particularly those in LIDACs, to access jobs located farther away from their homes and communities.

T-3 Create a Regional Bike Lane Fund to build a Bike-Ped Highway

- **Community Co-Benefits:** The Bike-Ped Highway will increase opportunities for active transportation, decreasing local air pollutants by decreasing vehicle ridership, reducing traffic congestion, and encouraging physical activity which will improve overall public health outcomes. A dedicated Bike-Ped Highway provides a designated space for cyclists and pedestrians separate from motor vehicle traffic, reducing risk of accidents and increasing safety.
- **Equity Considerations:** Bicycle networks are often incomplete or are lacking in LIDAC communities.[22] Lacking access to active transportation, LIDACs tend to have higher rates of comorbidities and an increased exposure to poor air quality. By strategically targeting LIDACs to develop bikeways, bike ridership will increase and offer opportunities to improve public health including physical and mental health. Building bikeways in LIDACs will also bring design opportunities for tree planting and other strategies for cleaner air and better access to green spaces.

T-4 Implement Transit Signal Priority Programs to Reduce Wait Times and Idling for Public Transit

- **Community Co-Benefits:** By implementing transit signal priority programs, the community will experience less delays, lowering wait times and improving public transit reliability.
- **Equity Considerations:** Community members in LIDACs are often transit dependent. By reducing delays and improving reliability through transit signal priority program, residents in LIDACs can experience the benefits of reduced travel time and increased dependability. Expanding public transit will reduce private vehicles on the road and encourage sustainable modes of commute. LIDACs face higher rates of air pollution and decreasing traffic congestion in LIDACs can lower GHG emissions while improving public health conditions.

[22] https://bikeleague.org/wp-content/uploads/2023/03/equityreport2015-1.pdf

T-5 Funding and Technical Assistance for Agricultural Equipment Decarbonization

- **Community Co-Benefits:** Transitioning away from fossil-fuels by decarbonizing agricultural equipment will reduce GHG emissions and improve air quality. Decarbonizing agricultural equipment can eliminate the emissions of air pollutants from fuels that can pose health risks to operators and farmworkers, protecting their health and safety.
- **Equity Considerations:** LIDAC-owned agricultural businesses may not have financial access to replace fossil-fuel-powered agricultural equipment with carbon-free alternatives. This measure aims to provide decarbonization incentives that will ensure a just transition to clean agricultural technologies. Decarbonized off-road and agricultural equipment will benefit agricultural workers, who are often from LIDAC communities, reducing their exposure to diesel and other pollutants.

T-6 Enact a Zero-Emission Transit and Charger Program

- **Community Co-Benefits:** Replacing diesel-fuel buses with battery-electric buses will reduce diesel pollution and exposure to bus riders and communities served by these buses. While electric busses are more expensive up front, they also provide significant operational cost reductions for the agency.[23]
- **Equity Considerations:** Zero-emission public transit and bus chargers can be a transformative step towards climate mitigation and public health improvements in LIDACs. Because LIDACs are disproportionately impacted by respiratory illnesses due in-part to higher rates of air pollution exposure, transitioning to zero emission vehicles in the transit sector will improve public health disparities. Lowering GHG emissions, reducing local air pollution, and shifting away from fossil fuel dependence in LIDACs serves as a climate justice strategy.

Carbon Sequestration, Organics, and Materials Reuse

COM-1 Expand Incentive Programs for Compost Application

- **Community Co-Benefits:** Incentivizing the use of compost provides several co-benefits to agricultural practices including improving water retention, enhancing soil properties, reducing weed germination, and negating the need for expensive synthetic fertilizers. Increasing the use of compost as a method for carbon sequestration will also reduce the need for pesticide use.[24]
- **Equity Considerations:** Composting and carbon sequestration programs in LIDACs are often underfunded and oversubscribed.[25] The regional compost broker program will strengthen composting efforts in LIDACs by expanding composting access and offering financial incentives for agricultural operators.

[23]https://www.transportation.gov/sites/dot.gov/files/images/Life%20Cycle%20Cost%20Overview%20for%20Different%20Transit%20Technologies.pdf
[24] https://calrecycle.ca.gov/organics/compostmulch/benefitsof/
[25] https://www.biocycle.net/community-composting-california/

COM-2 Enhance the Existing Food Recovery and Organics Diversion Program

- **Community Co-Benefits:** By recovering surplus flood that would otherwise go to waste, food recovery programs help provide food to those who need it while reducing methane emissions from the landfill, mitigating GHG emissions and conserving resources. Reducing food waste also reduces upstream emissions related to growing and transporting food. This program would divert significant amounts of organic materials from landfills as food is recovered and distributed to local communities. This reduces the amount of methane emitted into the atmosphere. [26]
- **Equity Considerations:** Food recovery programs can provide recovered food to members of a community that face socioeconomic and mobility constraints by establishing distribution points in LIDACs and providing transportation options for those with limited mobility. Implementing culturally appropriate and multilingual public awareness campaigns will raise awareness about the benefits of organics diversion and increase access to recovered foods. The program will engage CBOs with existing connections and relationships in LIDACs to ensure food recovery and distribution efforts are reaching communities in need.

COM-3 Develop a Community-Scale Reuse System

- **Community Co-Benefits:** Introducing community reuse programs to replace single-use cups and containers with reusable items will extend the lifecycle of products, delaying their entry into the waste stream and maximizing their utility. Purchasing less single-use products will result in long-term cost savings for small or mid-sized businesses. Waste reduction from community-scale reuse systems will lead to GHG emissions savings. Reusing items requires less energy than manufacturing new products, leading to lower GHG emissions associated with production and transportation. Upstream waste will be reduced as less raw materials will be required for production. Downstream waste will be reduced as consumers use and dispose of less products, in turn reducing methane emissions and potential soil contamination. [27]
- **Equity Considerations:** Expanding reuse programs that require establishing a system for the transportation, collection, and sorting of reusable cups and containers will increase green jobs and offer economic opportunities for LIDACs. In addition, this measure will improve health conditions in LIDACs as reusable items often have less toxins. Transitioning away from disposable items means fewer toxins will enter landfills, waterways, drinking water, and food systems, thereby contributing to an overall healthier environment for LIDACs.

[26] https://jointventure.org/images/stories/pdf/Making-the-Most-of-Surplus-Food-in-SCC-2022-06-30.pdf
[27] https://www.perpetualuse.org/vision

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Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

6

Review of Authority

6 Review of Authority

The County of San Benito and the County of Santa Clara have reviewed existing statutory and regulatory authority to implement each priority measure continued in this PCAP. The implementing authority for each measure is included in Table 3 through Table 14. No additional legislation or policies would be required to be adopted and implemented in order to authorize implementation of the various steps outlined in the PCAP.

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Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

7

Coordination and Outreach

7 Coordination and Outreach

The County of San Benito County and the County of Santa Clara conducted intergovernmental coordination and outreach in the development of this PCAP. This section describes coordination and outreach completed for the PCAP which in turn drove the development of the PCAP measures. The outreach approach also includes CCAP planned engagement to support robust and meaningful engagement strategies to ensure comprehensive interested party representation and overcome obstacles to engagement, including linguistic, cultural, institutional, geographic, and other barriers.

7.1 Interagency and Intergovernmental Coordination

Coordination within MSA

The County of Santa Clara formed a CPRG Work Group as part of the Santa Clara County Climate Collaborative (Collaborative), a multi-sector network and community of practice for public agencies, academia, nonprofit and community-based organizations, and business and community leaders to advance regional solutions to climate change through resource and expertise sharing, joint-funding opportunities, and partnership development. The County of Santa Clara invited all members of the Collaborative and key agencies from San Benito County to participate in the CPRG Work Group. The following agencies participated in the CPRG Work Group to support development of the PCAP:

- Association of Monterey Bay Area Governments
- Breathe California
- City of Campbell
- City of Cupertino
- City of Gilroy
- City of Milpitas
- City of Morgan Hill
- City of Mountain View
- City of Palo Alto
- City of San Jose
- City of Sunnyvale
- County of San Benito
- County of Santa Clara
- Joint Venture Silicon Valley
- Lighthouse Silicon Valley
- San Jose Clean Energy
- Santa Clara Valley Transportation Authority
- Santa Clara Valley Water
- Silicon Valley Clean Energy
- Town of Los Gatos
- Valley Water

Additional entities engaged with the CPRG Work Group and the PCAP project team include staff from San Benito COG, City of Hollister, City of San Juan Bautista, ABAG / BayREN, and MTC.

The CPRG Work Group launched in November 2023 and meetings were held monthly. Meeting topics included information on the CPRG Planning Grant, the CPRG Implementation Grant, required grant deliverables, the MSA's approach to developing the PCAP, prior outreach and engagement conducted, planned outreach and engagement, and PCAP measure selection. In addition to group discussions at Work Group meetings, the following approaches were used to gather input:

- Zoom breakout groups to discuss priorities and existing resources
- Survey to learn about prior outreach and engagement conducted
- Survey to get feedback on priority measures to include in the PCAP

Below is a summary of participation in meetings:

- November 14, 2023: 27 attendees
- December 13, 2023: 28 attendees
- January 18, 2024: 35 attendees
- February 15, 2024: 37 attendees

Interested Party Meetings

The County of Santa Clara also held 12 one on one or small group meetings with public agencies and organizations to discuss the PCAP. These agencies include:

- Association of Monterey Bay Area Governments
- Association of Bay Area Governments / BayREN
- Building Electrification Institute
- City of Gilroy
- City of San Jose
- Santa Clara Valley Transportation Authority
- Silicon Valley Clean Energy

Coordination with Neighboring MSA

The County of Santa Clara participated in monthly coordination meetings, beginning in October 2023, with BAAQMD. to discuss coordination on the PCAP BAAQMD serves as the lead agency for the neighboring San Francisco-Oakland Berkeley MSA.

Coordination with the State

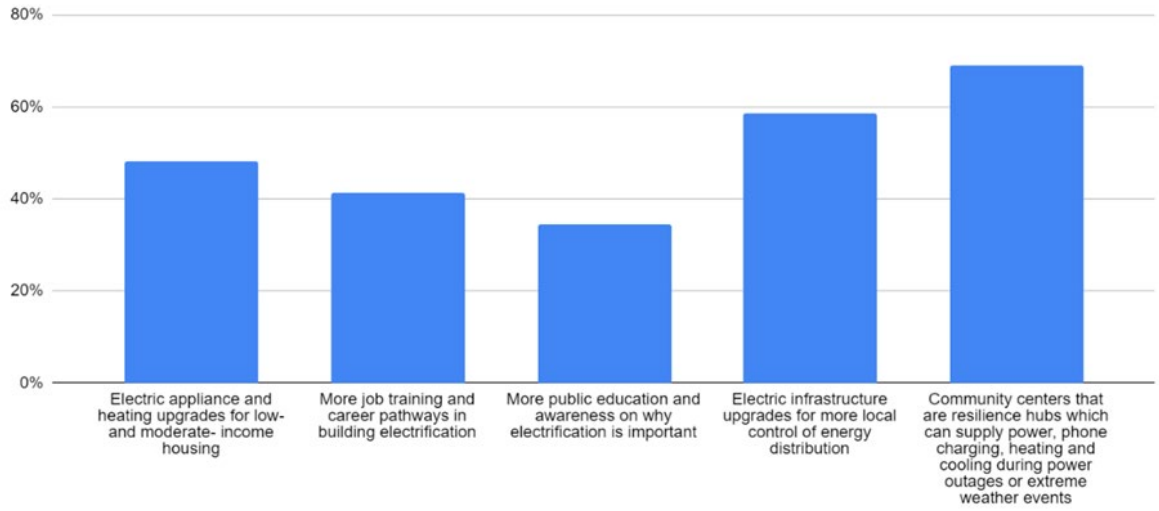
The County of Santa Clara participated in coordination meetings led by CARB for the CPRG program. The County attended meetings on July 19, 2023 and August 31, 2023, focusing on overall coordination efforts. Additionally, the County engaged in sector-specific meetings in December 2023 and January 2024.

7.2 Library Events

The County of Santa Clara engaged LIDAC members by conducting public library sessions in January and February of 2024 in each Supervisor's district to gain community perspective on the potential measures for the PCAP. The County asked for their input on what air pollution reducing topics and actions they would like to see included in the region's PCAP. One tabling event was held per district with the intention to reach a wide audience during popular hours for each location in Gilroy, San Jose, Milpitas, Los Altos and Los Gatos. The community was offered a community survey to gauge their perspective about improvements in local energy and electrification programs, pubic-transit improvements, user-friendly biking options, electrification transitions for their vehicles or business and what improvements they would like to see in our local farming and food systems. The results suggested an overall interest in additional community center resilience hubs, cheaper transit fares, creating bike –friendly infrastructure, increase in regional composting facilities along with replacing disposable food-ware and finally, additional, and efficient electric vehicle chargers along popular highways.

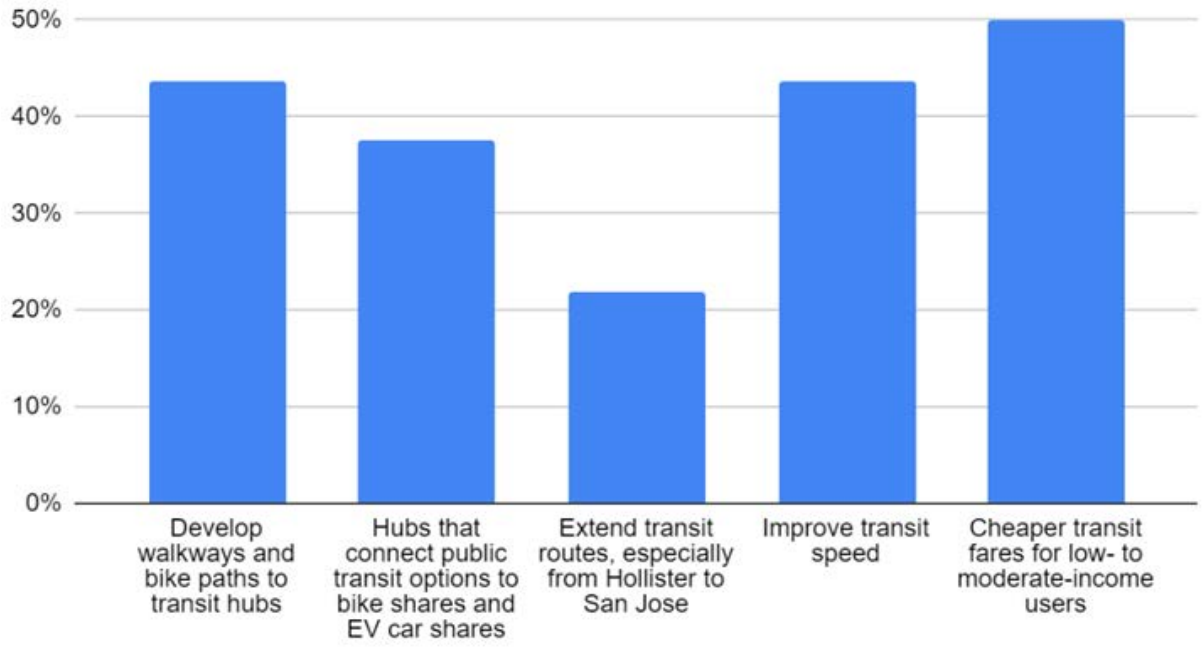
As shown in Figure 7, almost seventy percent of respondents support the increase of resilience hubs in community centers that can supply power, phone charging, heating, and cooling during power outages or extreme weather event. About 60 percent of participants want to see upgrades for electric infrastructure for local control of energy distribution. Almost 50 percent of responses support installing electric appliances in low-income to moderate income housing, and about 34 percent support more public education and awareness on why electrification is important. Forty-one percent of the respondents marked more job training and career pathways in building electrification. These results inform and support the following measures: Regional Holistic Building Decarbonization Program for Low-and-Moderate Income Occupant Housing, including electrification and infrastructure upgrades concierge programs for residents and contractors, and the Municipal Resilient Facility Community Benefit Fund, along with the establishment of Commercial, Agricultural, and Industrial Buildings Decarbonization Program to Support Non-Residential Decarbonization With Incentives and Technical Support.

Figure 7 Regional Community Support for Electrification Measures



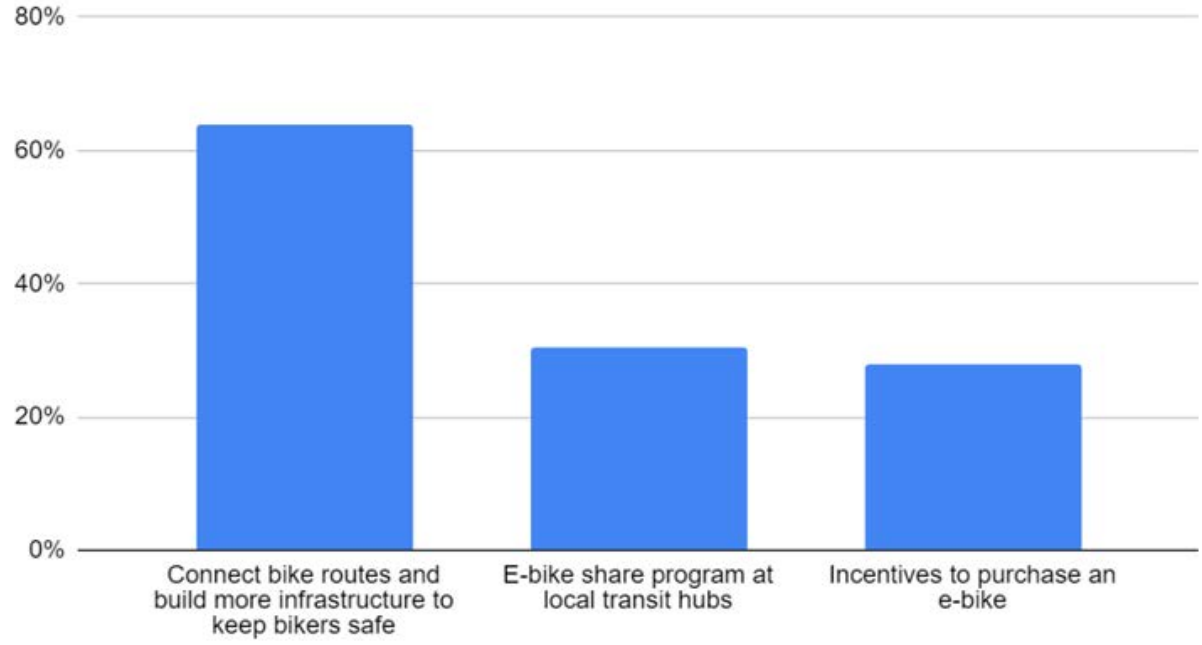
As shown in Figure 8, about 50 percent of survey respondents supported cheaper transit fares to make their experience user-friendly. Almost 45 percent of the participants preferred the development of walkways and bike paths to transit hubs and to improve transit speed for efficient use. A little over 20 percent of people supported the measure to extend transit routes through Hollister and San Jose. These survey responses support the measures by supporting the VTA Visionary Transit Network, Shuttle Connections for Bus Connection to San Jose, and to Implement Transit Signal Priority Programs to Reduce Wait Times and Idling for Public Transit.

Figure 8 Regional Community Support for Transit Measures



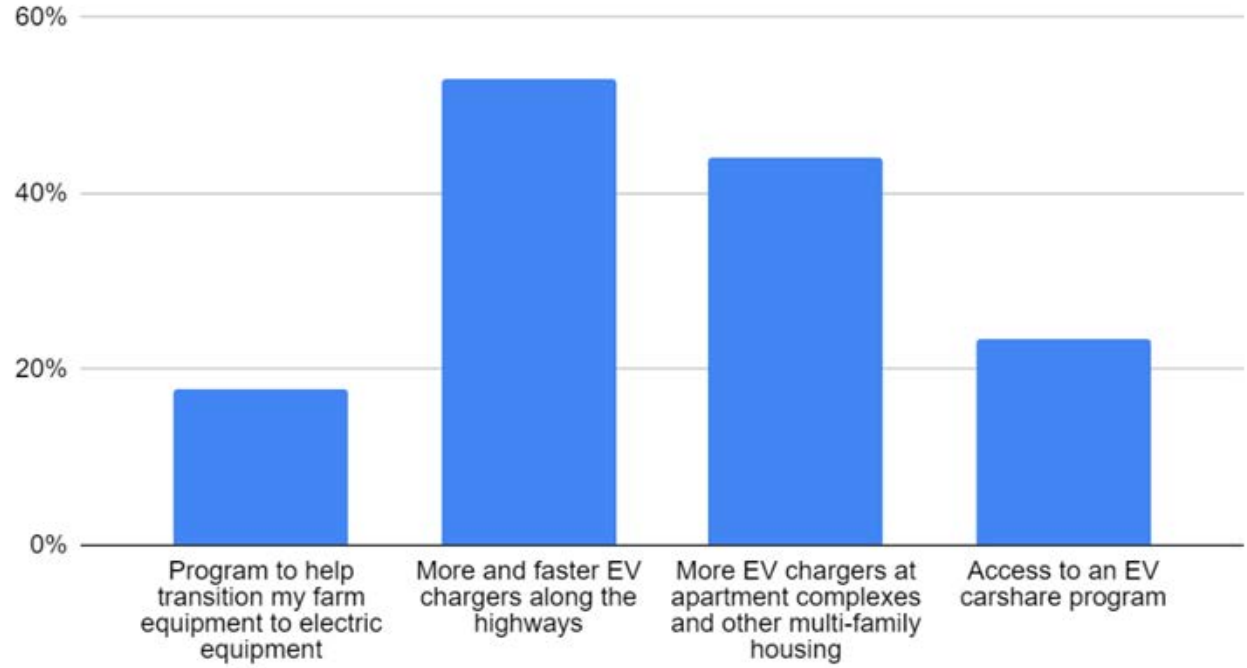
The measure to connect bike routes and build infrastructure to keep bikers safe while commuting was supported by 64 percent of respondents as shown in Figure 9. The electric bike program at local transit hubs was supported by 30 percent of respondents. Efforts to provide additional incentives to purchase electric bikes was supported by about 28 percent of participants. These results support Regional Bike Lane Fund to Build a Bike-Ped Highway and Develop Safe, Accessible, Clean, and Equitable Multi-Modal Mobility Hubs measures in the PCAP.

Figure 9 Regional Community Support for Active Transportation Measures



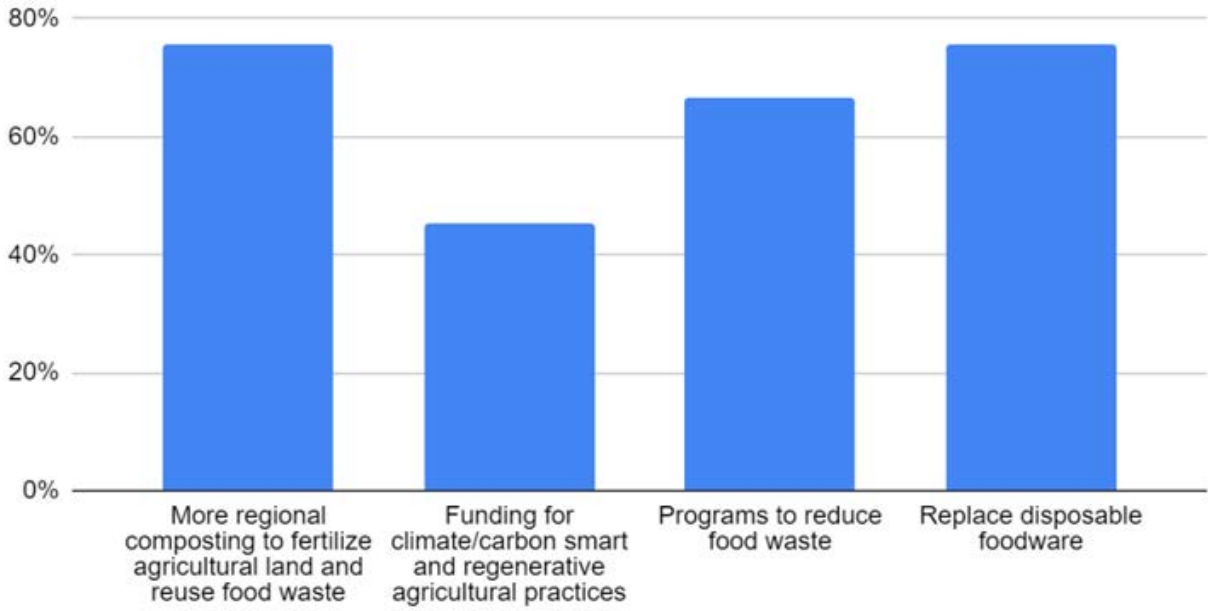
Additional and time efficient electric vehicle chargers along highways was supported by over 50 percent of participants as shown in Figure 10. A similar popular response is the support for more EV chargers stationed at multi-family housing complexes. Measures relating to EV charging network expansion and an EV carsharing program shown in the PCAP will support these responses. Access to EV carshare program was supported by 24 percent of survey. About 18 percent of respondents supported a program to help farm owners transition their farm equipment to electric equipment. Measure T-5 would help farmers transition by providing Funding and Technical Assistance for Agricultural Equipment Decarbonization.

Figure 10 Regional Community Support for EV Measures



Participants in the Santa Clara – San Benito MSA supported the community food waste measures significantly more than other measures as shown in Figure 11. Additional regional composting programs to fertilize agricultural land, reuse food waste, and a reuse program were supported by 76 percent of respondents. Programs to reduce food waste and funding for climate/carbon smart regenerative agricultural practices were supported by 67 percent and 45 percent of respondents, respectively. The Compost Expansion Program, Food Recovery and Organics Diversion Program, and the Community-Scale Reuse System measures all support the need for a sustainable food system.

Figure 11 Regional Community Support for Composting and Food Waste Measures



Each of the library locations were selected because of their proximity to unincorporated areas and low-income and disadvantaged communities in Santa Clara County. Table 17 provides a list of each location and the number of surveys completed. A final outreach event is an Electrification workshop scheduled to take place on Feb. 29 at the Mountain View library, where the PCAP will be explained to the community (approximately twenty participants expected). Additional components of the event include showcasing the use of an induction cooktop, speaking with contractors about electrification, and learning about electric landscaping equipment. Figure 12 displays the unincorporated areas within Santa Clara County. Each pin represents the location of each tabling event.

Table 17 Community Survey Participant Results

Santa Clara County District	Library	Date	Paper Survey
1	Gilroy Library	February 13, 2024	4
2	Joyce Ellington Library	February 21, 2024	8
3	Milpitas Library	January 20, 2024	9
4	Bascom Library	February 8, 2024	2
5	Los Altos Library	February 24, 2024	7
5	Los Gatos Library	February 14, 2024	5
Online Surveys			7
Total Surveys			**42**

Figure 12 Map of Tabling Events in Santa Clara County

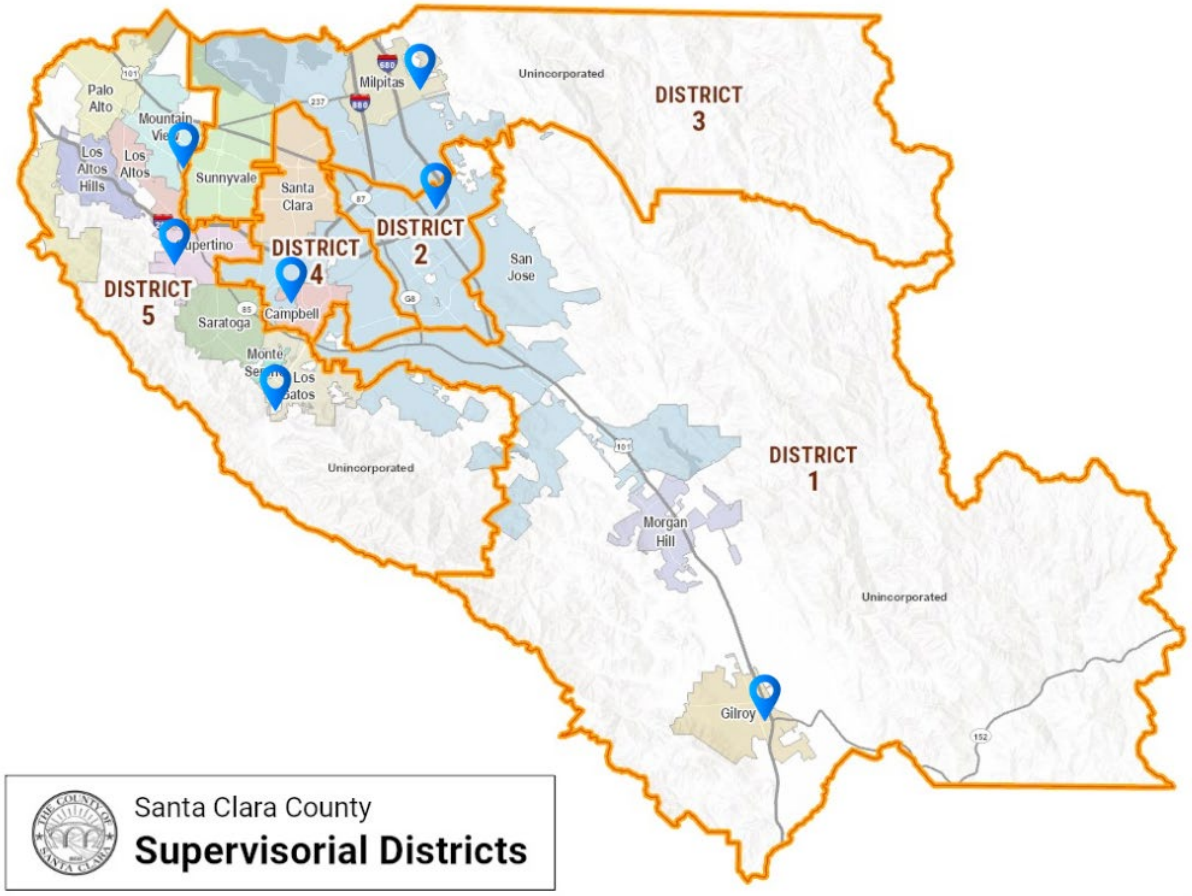


Figure 13 and Figure 14 display the events hosted at Santa Clara County libraries to gain community perspective on the potential PCAP measures.

Figure 13 PCAP Library Event

Figure 14 PCAP Library Event

7.3 Community Outreach Events

Additional community engagement was conducted, which included the following:

- The County of Santa Clara presented on the MSA's CPRG efforts at a virtual public workshop held by BAAQMD on November 14, 2023, as part of a partnership with the neighboring San Francisco-Oakland-Berkeley MSA.
- The County of Santa Clara presented on the MSA's CPPRG efforts at the Dayenu Circle of Jewish Silicon Valley meeting on January 15, 2024.
- The County of Santa Clara presented on the MSA's CPRG efforts and draft PCAP measures at the California Air Resources Board's virtual public webinar for the Northern California region on February 1, 2024.

7.4 Community Climate Roadmap Outreach

The County of Santa Clara's Community Climate Roadmap 2035, currently in development, places a strong emphasis on equity in its community outreach efforts. Employing a diverse array of strategies, the Roadmap seeks to engage with the Santa Clara County community comprehensively and gather input on proposed climate action strategies. Outreach tactics include collaborating with CBOs and compensating them for their contributions through mini-grants, conducting targeted stakeholder outreach, utilizing online input platforms, and implementing multilingual approaches both online and in-person.

A comprehensive Community Outreach Plan has been devised, outlining six primary goals: empowering stakeholders, streamlining efforts, ensuring equitable representation, simplifying information presentation, involving decision-makers, and encouraging participation. These goals are designed to ensure that community priorities are effectively integrated into the Roadmap and to facilitate broader participation across the county.

As of December 2023, the outreach efforts have achieved significant milestones, including:

- Hosting 47 stakeholder meetings
- Receiving 516 online comments
- Collecting 1,488 votes on proposed strategies
- Delivering 22 presentations
- Engaging with a total of 1,096 individuals

These efforts signify a concerted effort to ensure that the voices of the Santa Clara County community are heard and valued throughout the development of the Community Climate Roadmap 2035.

Mini-Grant Program

Through the development of Santa Clara County's Climate Roadmap 2035, $5,000 mini-grants were awarded to local CBO partners to conduct outreach to constituents that cannot be typically reached through virtual/online mechanisms. This tactic was critical for reaching frontline communities and marginalized groups in unincorporated communities. English and Spanish outreach materials were used during in-person outreach which included in-person meetings, surveys, door knocking,

incentives for participation, and tabling at events and central community locations. Mini-grant partners included:

- Support Life Foundation[28]
- Breathe California[29]
- Community Agency for Resources, Advocacy, and Services (CARAS)[30]

The feedback from these initiatives is reflected in the measures identified for the PCAP and will continue to be used through the implementation phase.

7.5 Hollister Climate Action Plan Outreach

As part of the 2021 update to the City of Hollister's Climate Action Plan and General Plan, the City conducted a series of workshops and an online survey to gather input on priority topics for the policy development process. The workshops, consisting of two sessions conducted in English and one in Spanish, attracted a total of 82 attendees in March and May 2021. Additionally, 27 respondents provided feedback through the online survey, which was open from March to May 2021. To facilitate community engagement, the City collaborated with a local community-based organization, Youth Alliance. Youth Alliance assisted in promoting the events through social media outreach and facilitated canvassing efforts. During the workshops and through survey responses, participants expressed interest in addressing environmental justice issues and reducing GHG emissions. Many attendees highlighted the importance of creating local job opportunities whilst aligning with the State's goals for GHG reduction as key priorities. [31]

The Hollister Climate Action Plan identifies GHG reduction strategies, including sustainable community-wide building standards, expanding building electrification, developing active and public transportation infrastructure, electrifying construction and landscaping equipment, reducing waste generation, and implementing composting education programs. These measures are in alignment with the initiatives identified in this PCAP. [32]

7.6 CERF Central Coast Effort

Uplift Central Coast, comprising the Uplift-Economic Development Collaborative, Monterey Bay Economic Partnership, and Regional Economic Action Coalition (REACH), is an organization based in the Monterey Bay Area. Uplift Central Coast administers funding opportunities through California's Community Economic Resilience Fund (CERF) to implement initiatives aimed at fostering an inclusive economic development process. This process prioritizes equity, sustainability, job quality, economic competitiveness, and resilience. As a component of this initiative, Uplift Central Coast is actively engaged in inclusive outreach and is in the process of developing a regional plan in collaboration with various partners. The completion of this plan is anticipated by June 2024. As part of these efforts, outreach has been conducted with LIDACs and other interested parties in San Benito County.

[28] https://supportlives.org/
[29] https://lungsrus.org/
[30] https://www.caras-southcounty.org/
[31] Placeworks. 2021. Policy Options Public Input from Workshop and Online Survey. https://hollister2040.org/wp-content/uploads/2021/05/PolicyOptions_Input_Sum_052121.pdf
[32] https://hollister.ca.gov/wp-content/uploads/2023/04/Hollister_PublicReviewDraft_CAP_2023-03.pdf

7.7 Other Engagement from Previous Climate Action Planning

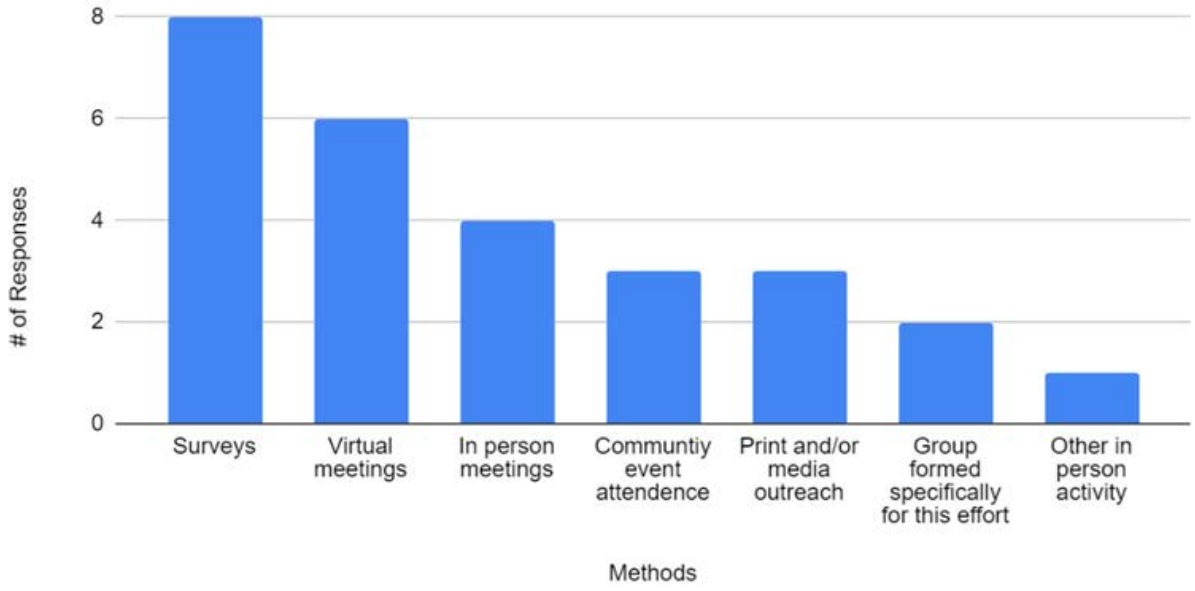
Background

Many jurisdictions within the Santa Clara - San Benito MSA have completed climate planning processes in the last 5 years. When choosing what measures to include, many jurisdictions reflected the community choices that emerged in their own climate planning into their votes on the CPRG PCAP Measures. Below is a summary of the engagement conducted by the jurisdictions during their climate action planning processes. These plans and the resulting insights demonstrate the history of community engagement in the region around climate priorities that has been ongoing and predates the CPRG work.

Methods Used to Engage

Figure 15 shows the methods used by jurisdictions in San Benito and Santa Clara Counties to engage communities. Jurisdictions in the Santa Clara – San Benito MSA most frequently used surveys as a method of engagement, but always paired surveys with other engagement methods, often virtual and/or in person meetings. Of the responding public agencies, three of eight responses indicated that the agency met the communities where they already gathered at community events such as farmer's markets and food distribution events. They also tended to use a blend of in-person and virtual engagement to maximize accessibility.

Figure 15 Methods Used by Jurisdictions to Engage the Community

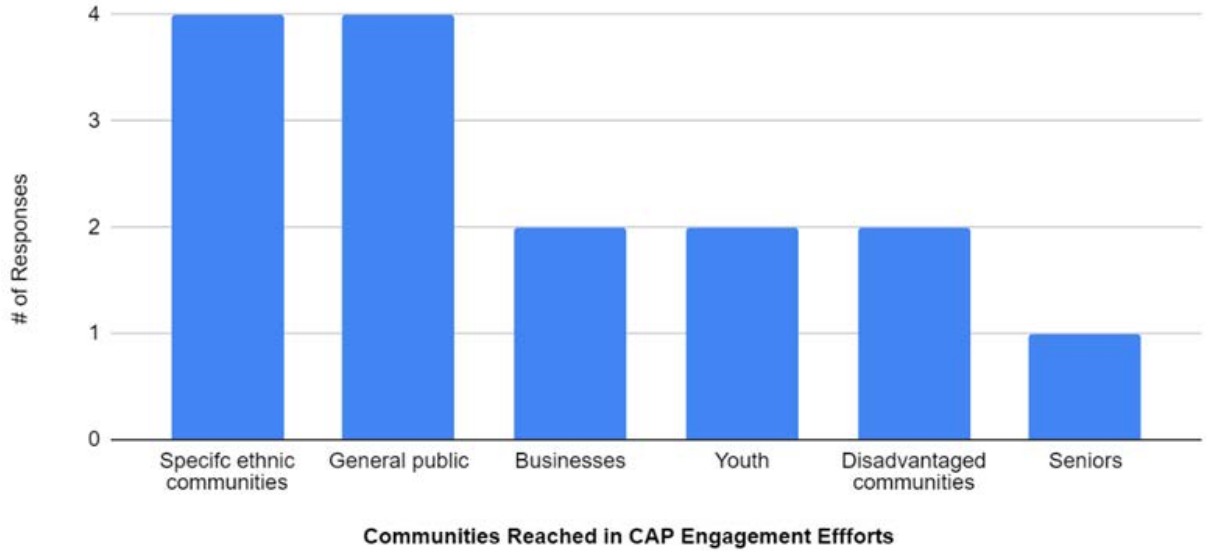


Communities Reached

Figure 16 shows the communities engaged by San Benito County and Santa Clara County jurisdictions. Almost fifty percent of jurisdictions in the Santa Clara – San Benito MSA reached specific ethnic communities when they engaged their communities. Almost fifty percent of jurisdictions also said they reached the general public as part of their outreach efforts, and three of

the nine responses described the communities as only the general public. Two of the nine responses noted that they reached their jurisdiction's disadvantaged communities. Responses also identified businesses, youth, and seniors as descriptors of the communities with which they engaged, with one to two responses for each of those categories.

Figure 16 Communities Engaged



Priorities in Disadvantaged Communities

Figure 17 shows the priorities based off of engagement in disadvantaged communities. For three of the four survey respondents, more than one sector or topic emerged as a priority. Housing cost and other challenges was identified by three of the four survey respondents. One response focused on transportation (EV chargers and ride share programs). Two respondents mentioned jobs or employment as a priority, and the same respondents mentioned public health, among other priority sectors or topics. Other priority topics identified include the cost of utilities, air quality, clean and reliable energy, and economic justice.

Figure 17 Priorities in Disadvantaged Communities

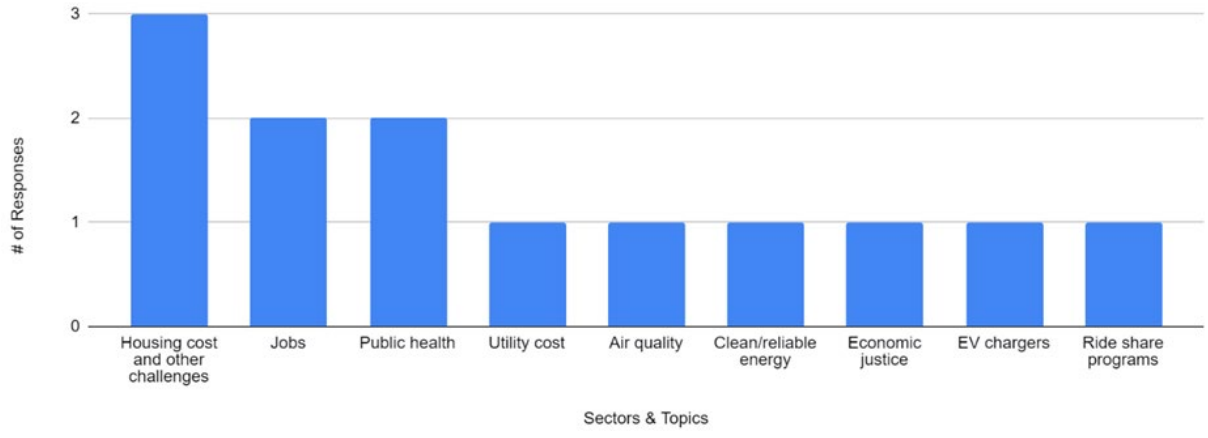
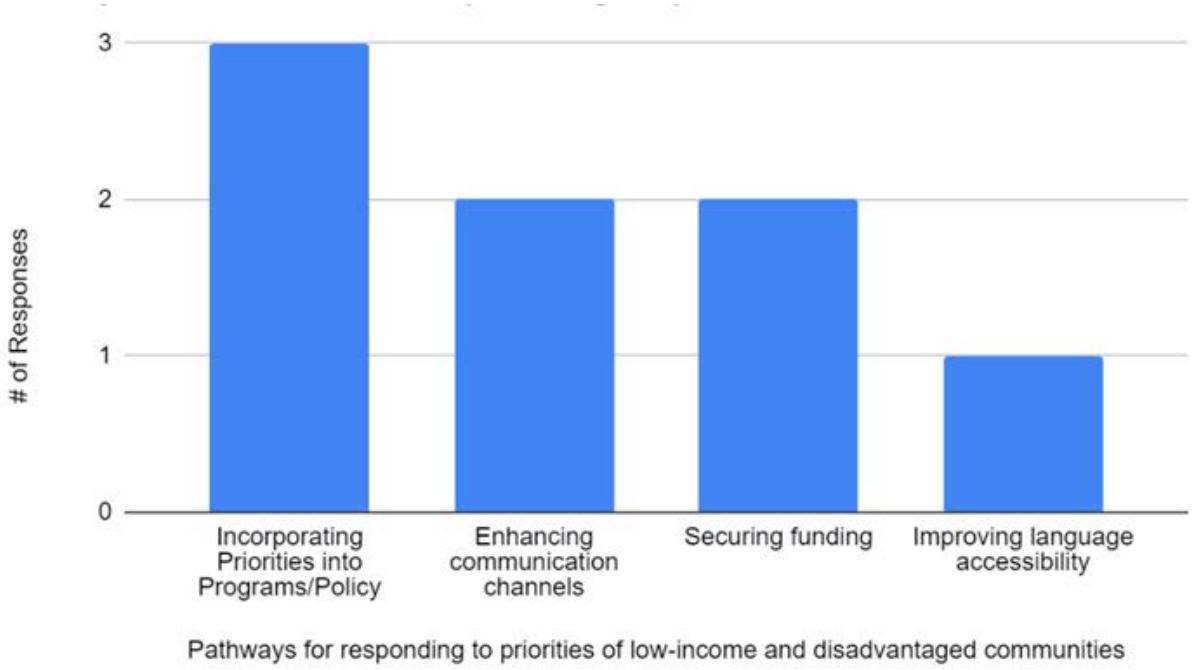


Figure 18 shows the ways in which jurisdictions in San Benito and Santa Clara Counties are responding addressing the priorities of disadvantaged communities. Seven respondents provided responses on how their jurisdictions are actively responding to the priorities of low-income and disadvantaged communities within their jurisdictions. Three responses noted that they are incorporating priorities into their planning processes and design. Two respondents indicated that they are enhancing the communication channels to better address the priorities. One of the two respondents indicated they are identifying and establishing communication channels between the City and low-income and disadvantaged communities. Another respondent indicated they are developing internal processes to receive feedback from low-income and disadvantaged communities. Two respondents of the seven provided responses related to securing more funding to address the priorities. One respondent indicated specific activities they are implementing to better reach Spanish-speaking community members.

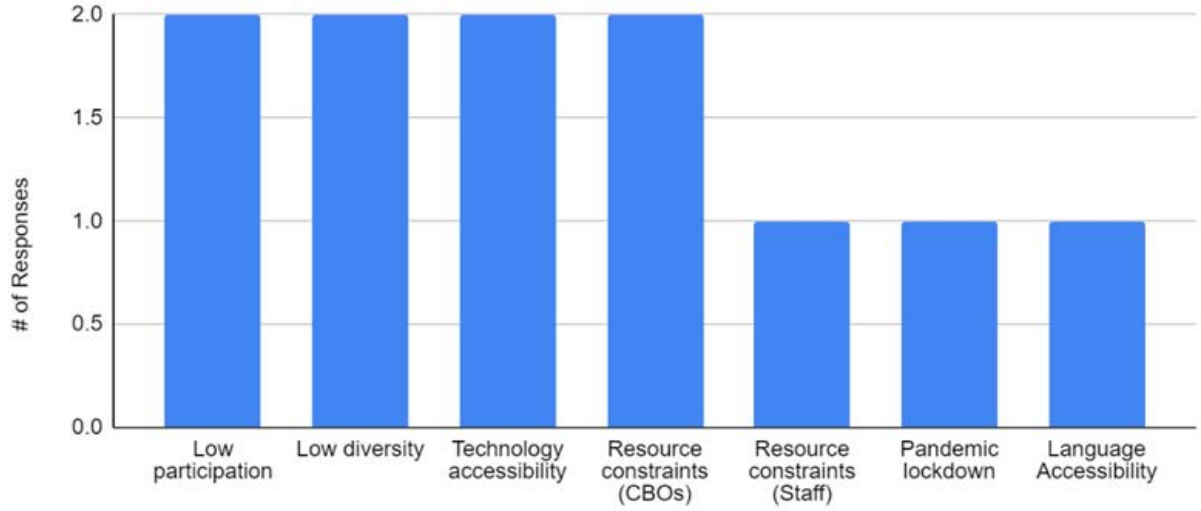
Figure 18 How Jurisdictions Are Responding to Priorities



Challenges in Engagement

Figure 19 shows notable challenges jurisdictions in San Benito and Santa Clara Counties experienced during engagement. Two of the nine respondents referenced low participation as a challenge when conducting engagement. Jurisdictions noted that low participation could be due to resource constraints of community-based organizations and due to conflicting Holiday commitments. Two respondents identified attracting a diverse set of voices, including from disadvantaged communities, as a challenge. Additionally, with remote virtual meetings, two respondents identified technology accessibility as being a barrier for participating in online activities. One participant identified a challenge being that “the committee wanted to own the plan without staff’s supervision or management.”

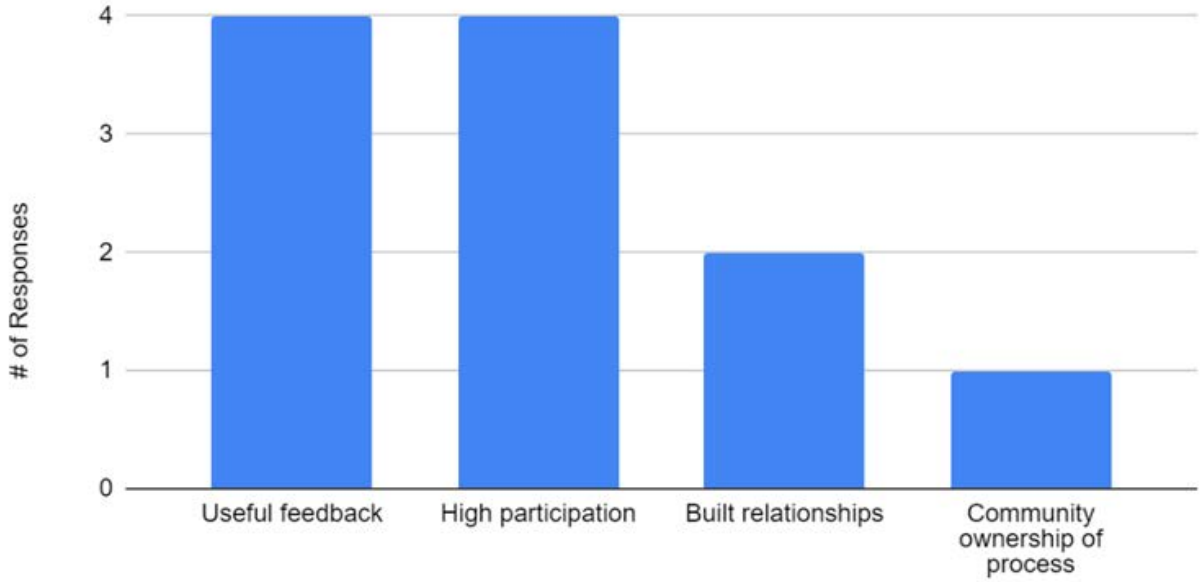
Figure 19 Notable Challenges During Engagement



Successes in Engagement

Figure 20 shows notable successes during engagement efforts conducted by jurisdictions in San Benito and Santa Clara Counties. Four of the eight responses to the question about notable successes during engagement were related to receiving useful feedback. Useful feedback included thoughtful suggestions for future engagement, feedback on desired outcomes, and input on upcoming plans, programs, and policies. Four of the eight responses also identified high participation as a success of engagement. Two responses identified establishing relationships and partnerships through community engagement. One response noted a notable success of the engagement was that it is "a community-led process with minimal staff interaction."

Figure 20 Notable Successes During Engagement



Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

8

Next Steps

8 Next Steps

This PCAP is the first deliverable under the CPRG Planning Grant awarded to the County of Santa Clara. The County of San Benito, the County of Santa Clara, and their partners will continue planning, engagement, and action to reduce emissions; invest in sustainable infrastructure, technologies, and practices; build our economy; and enhance the quality of life in the San Benito and Santa Clara County communities. In 2025, San Benito County and Santa Clara County will publish a CCAP that establishes equitable and sustainable economic development strategies that reduce emissions across all sectors. The CCAP will include near- and long-term emissions projections, a suite of emission reduction measures, a robust analysis of measure benefits, plans to leverage federal funding, and a workforce planning analysis. In 2027, San Benito County and Santa Clara County will publish a status report that details implementation progress for measures included in the PCAP and CCAP, any relevant updates to PCAP and CCAP analyses, and next steps and future budget and staffing needs to continue implementation of CCAP measures.

8.1 Upcoming Engagement

San Benito and Santa Clara Counties are planning a series of engagement activities aimed at involving communities, particularly those historically underrepresented in the civic engagement process, as well as LIDACs and areas with high pollution levels, as part of the CCAP process. Given that many LIDACs have a significant number of households with non-English or limited English proficiency, it is crucial that engagement materials and activities related to the implementation of these measures remain accessible to the diverse communities of both counties.

To ensure equitable engagement practices within the CCAP, actions such as translating materials and deliverables into languages such as Spanish, Mandarin, Vietnamese, Tagalog, and other prominent languages spoken in the region are essential. Collaborating with organizations in San Benito and Santa Clara Counties that have existing relationships with non-English speaking communities is vital to this effort. These partnerships will help to foster greater inclusivity and participation in the planning and implementation of the CCAP. Potential outreach and engagement tactics to be used for the CCAP may include the following actions outlined below.

Online Surveys

Surveys have proven to be effective tools for engaging historically underserved and overburdened residents and communities, providing an accessible avenue to gather input and encouraging broader participation in the climate action process. Frequently, low-income and LIDAC communities encounter obstacles to attending traditional public engagement forums held by cities or counties, such as transportation limitations, conflicts with work schedules, and other stressors.

Online surveys offer an alternative for residents who face barriers in attending in-person events. Additionally, these surveys can include questions about demographics, neighborhood location, and length of residency in the city, providing valuable insights into which demographic groups are providing input on the project. By disseminating online surveys through various channels, including targeted outreach to LIDAC communities, the survey can gather feedback from a diverse range of interested parties, enhancing the inclusivity of the CCAP process.

Equity Focus Groups

Equity focus groups can be strategically targeted toward various demographic groups that are impacted by or at risk of experiencing environmental and climate inequities. This approach allows for the customization of the CCAP to address specific needs and concerns. Potential focus demographic groups may include youth, non-English speaking community members, farmworkers, and residents of low-income or affordable housing within the MSA.

Furthermore, the equity focus groups can also encompass stakeholders proposed by the CCAP to collaborate with in order to achieve its measures and goals. This could include organizations such as BayREN, MTC, VTA, and others.

To maximize engagement, it is recommended that these focus group meetings be conducted virtually or in a hybrid format, providing participants with the option to attend either in-person or online. This approach ensures accessibility and inclusivity while accommodating varying preferences and circumstances.

Climate Action Advisory Committee

Establishing a Climate Action Advisory Committee (CAAC) offers a valuable opportunity to unite engaged stakeholders and gather input pertinent to the development of GHG reduction measures. By assembling a panel comprising individuals from diverse backgrounds and demographic groups affected by systemic climate inequities, the plan stands to benefit significantly from their direct insights garnered through regular meetings and consultations.

Key organizations and community groups that would offer valuable perspectives as part of the CAAC include farmworkers, youth, and low-income residents. Their inclusion ensures a holistic and inclusive approach to addressing climate challenges within the jurisdiction.

To enhance participation, it is recommended that CAAC meetings be conducted virtually or in a hybrid format. This approach accommodates individuals with varying schedules, such as youth and farmworkers, thereby maximizing engagement from a broader range of stakeholders.

While Santa Clara County has established a Sustainability Commission, there is opportunity for San Benito County to establish a CAAC or similar entity.

Educational Forums

Educational forums serve as effective platforms for employing impactful approaches and strategies to establish a common vocabulary surrounding complex issues like climate change, housing affordability, energy efficiency, and waste reduction. These forums play a crucial role in building a solid foundation of knowledge, enabling community members and residents in LIDACs to comprehend these issues and contribute input on effective implementation actions for CCAP measures.

To maximize attendance and engagement, it is recommended that the educational forums be conducted either virtually or in a hybrid format. This approach accommodates diverse schedules and preferences, ensuring broader participation from the community.

Pop-Ups

In-person pop-up/intercept events can be organized to connect with the community at convenient times and locations. These informal workshops are expected to serve as valuable resources for sharing information about the planning effort and collecting input through engaging interactive activities. Collaborating with jurisdictions in the MSA to identify frequented community areas will be a crucial aspect of organizing these engagement activities.

Workshops

Workshops can be scheduled to provide community members additional opportunities to gain insights on the planning process, share their perspectives, and contribute to the sustainable development of their communities and the region's clean energy economy. Workshops will feature interactive engagement opportunities designed for a diverse and multi-lingual audience. Similar to pop-up events, collaborating with jurisdictions in the MSA to identify areas frequented by community members will be a crucial aspect of this engagement event.

If you have questions about this PCAP or suggestions for the upcoming CCAP and status report, contact the County of Santa Clara Office of Sustainability at Sustainability@ceo.sccgov.org.

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Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

Appendix A:

Emissions Inventory and QAPP

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1 Introduction

In support of developing a Priority Climate Action Plan (PCAP) and associated priority measures, this greenhouse gas (GHG) emissions inventory was developed to identify the major sources of emissions within the Santa Clara/San Benito Metropolitan Statistical Area (MSA). This Inventory provides a combined perspective on regional GHG emissions which focuses on the emissions stemming from major sources within the community to inform the development of specific climate mitigation measures in the PCAP. The sectors selected for the PCAP analysis were driven both by the largest emissions sectors as well as those sectors for which priority GHG emissions reduction actions were developed as required by the Climate Pollution Reduction Grant (CPRG) PCAP Guidelines. The inventories developed in this report draw upon existing county GHG inventories and readily available data to provide an accurate and current representation of emissions within the MSA. The sections below outline the methodology and data utilized to construct an inventory of priority GHG emissions sectors for San Benito County and Santa Clara County.

1.1 GHG Inventories Approach

The PCAP GHG emissions inventory was guided by the Quality Assurance Project Plan (QAPP) submitted by the County of Santa Clara on behalf of the MSA in November of 2023 and approved by the EPA in January 2024. Rincon followed the requirements of the QAPP throughout this document. Under each specific sector, Rincon has provided an analysis of the quality of the data used for the emissions calculations as it pertains to section 2.3 of the QAPP, specifically Table 3.1 which is shown below in Table 1. All of the data used in this PCAP inventory was of a quality rank of Highest or Second highest.

Table 1 Quality Rank of Source Data

Quality Rank	Source Type
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

While all of the data leveraged for the PCAP analysis was of a “highest” or “second” quality based on the existing data quality ranking hierarchy, not all data sources were consistent across the MSA based on data availability. Based on the CPRG requirements for the PCAP, metropolitan areas may use a variety of available GHG data from national or state level agencies to complete the PCAP. A more detailed and consistent inventory will be developed as part of the CCAP as detailed below.

1.1.1 Baseline Inventory Year Selection

A baseline GHG emissions inventory provides a reference from which future inventories can be compared. It is important to establish a baseline inventory as part of the PCAP process to be able to evaluate the future GHG reduction progress made from the implementation of the PCAP measures. The choice of the baseline inventory year was determined by leveraging the existing GHG

inventories and data accessible for each county. Santa Clara County has produced GHG inventories for the years 2017 and 2022 as integral components of their Community Climate Roadmap.[1] San Benito County has GHG inventories spanning the years 2018 to 2020 that were developed by the Association of Monterey Bay Area Governments (AMBAG). However, upon further analysis of the San Benito County data it appeared that significant data gaps were present due to the methodologies employed. Therefore, Rincon identified more complete, highest and second highest quality, data sources to complete a 2017 inventory for the PCAP as described below. To establish a cohesive approach and alignment across county inventories, careful consideration was given to readily available data which could be utilized to provide an updated county inventory for the purpose of aligning inventory years. An updated inventory for 2022 will be completed for the MSA as part of the CCAP and will include all available sectors.

1.1.2 GHG Emissions Accounting Protocol

San Benito County and Santa Clara County's 2017 community GHG inventories were developed in accordance with established accounting protocols developed by the Local Governments for Sustainability International Council for Local Environmental Initiatives (ICLEI) as recommended by the Association of Environmental Professionals (AEP) and the California Office of Planning and Research (OPR).[2] ICLEI protocols are designed for local-scale accounting of GHG emissions that contribute to climate change and provide authoritative guidance to account for GHG emissions accurately and consistently. The ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 (Community Protocol) serves to guide the measurement and reporting of GHG emissions in a standardized manner and is widely used by jurisdictions to support their own inventory, forecast, and climate action planning efforts. Use of Community Protocol methodology for GHG accounting aligns with California's GHG inventory methods and focuses on analyzing sectors which are within jurisdictional control of cities or counties. The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory.

GHG emissions were calculated by multiplying the activity data in each GHG emissions sector (e.g., transportation, energy, and waste) by an associated emission factor. Activity data refer to the relevant measured or estimated level of GHG-generating activity (e.g., energy consumption, miles traveled). Emission factors are observation-based conversion factors used to equate activity data to generated GHG emissions. The 2017 community GHG Inventories serve to provide an understanding of each community's current GHG emissions. The following sections contain further information on the inventory approach, calculation methodologies, data used, and results.

1.1.3 Emissions Geographic Boundary

The priority community inventories developed for San Benito County and Santa Clara County cover the high impact emissions sources within the boundary of each county (i.e., county limits). The inventory thereby reflects emissions sectors over which each county has some level of jurisdictional control and influence. Sectors and sources where the jurisdictions have limited influence are generally excluded from the community GHG inventories. This method of exclusion for the

[1] County of Santa Clara. 2024. Office of Sustainability, Community Climate Roadmap 2035. Available at: https://sustainability.sccgov.org/community-climate-roadmap-2035#Inventory

[2] Association of Environmental Professionals (AEP). 2013. AEP Climate Change Committee's "The California Supplement to the United States Community-Wide Greenhouse Gas (GHG) Emissions Protocol". Available at: https://califaep.org/docs/California_Supplement_to_the_National_Protocol.pdf

emissions boundary aligns with Community Protocol standards and is recommended by State and Federal guidance for inventory, forecast, and targets accounting.[3]

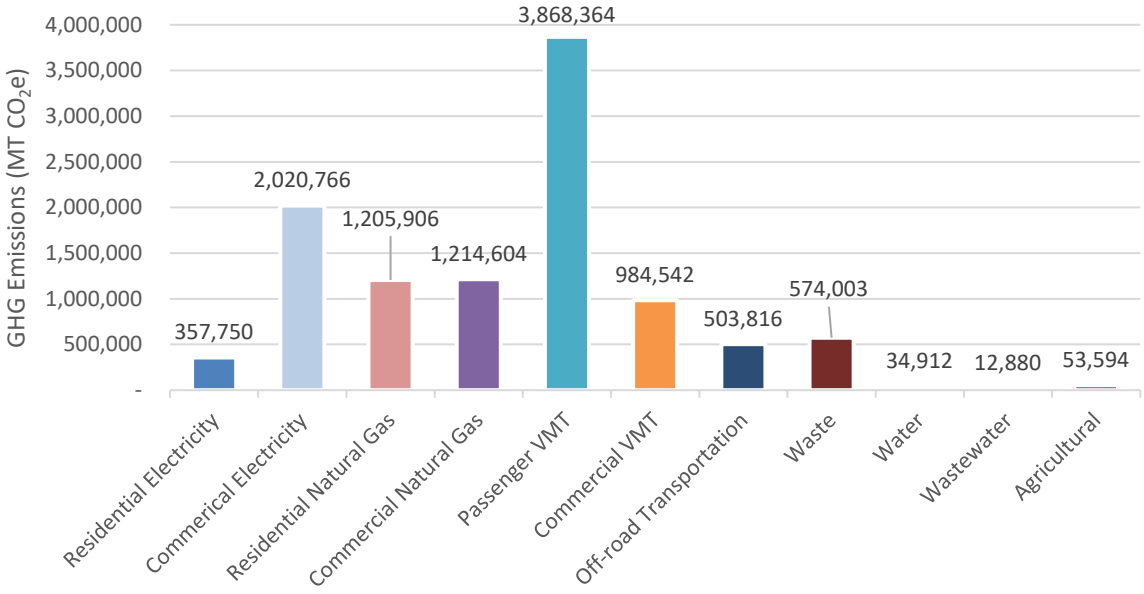
1.1.4 Emissions Inventory Scope and Identification of Priority Sectors

The Community Protocol recommends reporting GHG emissions from five basic reporting activities in a community inventory that include:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment
- On-road passenger and freight motor vehicle travel
- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

These sectors are the largest sources of GHG emissions. Santa Clara County previously completed a countywide inventory which included all of the sectors listed above. This inventory was used as a proxy to identify the priority sectors. Based on the 2017 Santa Clara County Community Climate Roadmap inventory, these five sectors make up 94% of countywide emissions as shown in Figure 1. In addition to these primary drivers, the PCAP also focuses on reducing offroad vehicle emissions related to agricultural vehicles, construction equipment, and other fuel combusting equipment not covered by the on-road category. Offroad emissions accounted for another 5% of countywide emissions. Therefore, the sectors included in this priority inventory cover an estimated 99% of total emissions within the MSA.

Figure 1 County of Santa Clara GHG Emissions for 2017[1]



[1] County of Santa Clara. 2024. Office of Sustainability, Community Climate Roadmap 2035. Available at: https://sustainability.sccgov.org/community-climate-roadmap-2035#Inventory

[3] Governor's Office of Planning and Research (OPR). 2023. Chapter 8, Climate Change. Available at: https://www.opr.ca.gov/docs/OPR_C8_final.pdf

While future development of a Comprehensive Climate Action Plan (CCAP) will include an in-depth analysis of additional sectors including water, wastewater, and agricultural practices, for the purposes of this PCAP the priority sectors of building energy (electricity & natural gas), transportation (on-road & off-road), and solid waste sector emissions were assessed. The community GHG inventory assessment presented here-in provides an accurate representation of the majority of GHG emissions attributable to San Benito and Santa Clara counties and will serve as the basis for future CCAP GHG inventory development.

1.2 Global Warming Potential

The Community Protocol assess GHG emissions associated with the six internationally recognized GHGs, as outlined in Table 2. The inventory focuses on the three GHGs most relevant to local government operations: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The other gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) are emitted primarily in private sector manufacturing and electricity transmission and are therefore omitted from the inventory. These primary greenhouse gasses align with the 2023 EPA inventory of U.S. Greenhouse Gas Emissions and Sinks. This approach is consistent with typical community inventory approaches, as industrial emissions are typically outside of local governments' jurisdictional control. The inventory uses the 100-year global warming potentials (GWP) for each gas that are consistent with the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report,[4] which were also used by California in their latest GHG emissions inventory. The use of 100-year GWP values from the IPCC Fifth Assessment Report also aligns with EPA methodologies and the Paris Agreement. The GWP refers to the ability of each gas to trap heat in the atmosphere. For example, one pound of methane gas has 28 times more heat capturing potential than one pound of carbon dioxide gas. GHG emissions are reported in metric tons of CO_2 equivalent (MT CO_2e). Table 2 also includes the global warming potentials (GWP) for each gas.

Table 2 2017 Inventory GHGs and GWPs

Greenhouse Gas	Primary Source	100-year GWP
Carbon dioxide (CO_2)	Combustion	1
Methane (CH_4)	Combustion, anaerobic decomposition of organic waste (e.g., in landfills, wastewater treatment plants)	28
Nitrous Oxide (N2O)	Leaking refrigerants and fire suppressants	265
Hydrofluorocarbons	Leaking refrigerants and fire suppressants	4 - 12,400
Perfluorocarbons	Aluminum production, semiconductor manufacturing, HVAC equipment manufacturing	6,630 - 11,100
Sulfur Hexafluoride (SH6)	Transmission and distribution of power	23,500

Source: Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[4] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Accessed January 5, 2023 at: https://www.ipcc.ch/report/ar5/syr/

2 2017 San Benito County Community GHG Inventory

2.1 2017 Community GHG Emissions Inventory Activity Data and Emissions Factors

2.1.1 Energy

Energy: Residential and Nonresidential Electricity

Electric utility services for San Benito County are provided by Pacific Energy and Gas (PG&E). However, the activity data provided by PG&E in previous inventories were limited due to California Public Utilities Commission (CPUC) 15/15 rule[5]and therefore the inventories underestimated emissions from electricity consumption in the region. To better estimate GHG emissions from electricity consumption, total county-wide activity data was sourced from the California Energy Commission (CEC). The CEC is a state agency and therefore, this data is considered highest quality. To quantify the emissions associated with this electricity use a PG&E average emission factor was provided which averages the various carbon intensities of the electricity packages PG&E provides within the County. A PG&E reported average CO_2 emissions factor verified by The Climate Registry[6] was used and supplemented with average CAMX (eGRID subregion) grid CH_4 and N_2O emissions as reported by eGRID[7] to estimate GHG emissions. Both the verified and PG&E emissions data and eGRID data are utilized at the state/federal level and are considered highest quality. Emissions from residential and nonresidential electricity were calculated using Community Protocol Equation BE.2.1. Equation 2.1 and Table 3 provide the equation and data sources used to quantify GHG emissions associated with community electricity consumption. The dataset used includes all residential and commercial electricity as well as all industrial and agricultural uses.

Equation 2.1

BE.2.1 RESIDENTIAL/NONRESIDENTIAL ELECTRICITY SECTOR EMISSIONS

$$CO_2e_{electricity,j} = \sum_i \left(Elec_{i,j} \times EF_{elec,i,j}\right) \quad 2.1$$

[5] The 15/15 Rule is a policy put in place by the California Public Utilities Commission which protects the privacy of energy users. Aggregated energy information must have more than 15 customers, with no one customer representing 15 percent of the aggregated energy consumption. SCE reports kWh usage for the agricultural sector to be between 8,000,000 – 9,000,000 kWh annually.

[6] https://theclimateregistry.org/

[7] https://www.epa.gov/egrid

Table 3 Emissions Parameters and Data Sources – Community Electricity Use BE.2.1

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from electricity consumption per building type	$CO_2e_{electricity,j}$	See Table 11	MT CO_2e/year	Calculated
Electricity consumption per building type per energy provider	$Elec_{i,j}$	See Table 11	kWh/year	CEC[1]
Electricity emission factor based on energy provider	$EF_{elec,i,j}$	See Table 11	MT CO_2e/kWh	i. The Climate Registry[2] ii. EPA eGRID[3]
Energy Providers	i	PG&E	Categorical	–
Building type	j	Residential Nonresidential[4]	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

[1] California Energy Commission (CEC). 2023. California Energy Consumption Database. Available at: https://ecdms.energy.ca.gov/Default.aspx

[2] The Climate Registry (TCR). 2023. Utility-Specific Emission Factors, Pacific Gas & Electric, 2017. Available at: https://docs.google.com/spreadsheets/d/1MY2dNo_5VXCvppDA3nIpnMDhH3FG2MlxBcLiOggj-xQ/edit#gid=283732541

[3] Environmental Protection Agency (EPA). 2024. Frequent Questions About eGRID. Available at: https://www.epa.gov/egrid/frequent-questions-about-egrid

[4] Nonresidential includes kWh consumption from commercial and industrial sources.

Energy: Electricity Transmission and Distribution Losses

Electricity Transmission and Distribution (T&D) losses account for the electricity lost during delivery to the buildings and associated end-uses in San Benito County. Electricity T&D losses occur in the electricity transmission and distribution system and are therefore upstream of the delivery endpoints located within San Benito jurisdictional boundaries. This means this electricity is lost before it is counted by retail meters. However, T&D losses are estimated and included in the 2017 Community GHG Inventory as they are associated with energy usage in San Benito and thereby directly impacted by the community's electricity consumption. The data utilized for quantifying T&D losses were obtained from state and federal agencies and therefore are considered highest quality. Additionally, emissions from T&D losses are recommended for inclusions in community GHG inventories by the Community Protocol. Equation 2.2 and Table 4 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions associated with community T&D losses from electricity consumption.

Equation 2.2

BE.4 ELECTRICITY T&D LOSS SECTOR EMISSIONS

$$CO_2e_{T\&D,j} = \sum_i Elec_{i,j} \times L_{T\&D} \times EF_{elec,i,j} \qquad 2.2$$

Table 4 Emissions Parameters and Data Sources – Community Electricity T&D Loss

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from transmission and distribution losses per building type	$CO_2e_{T\&D,i}$	See Table 11	MT CO_2e/year	Calculated
Electricity consumption per energy provider and building type	$Elec_{i,j}$	See Table 11	kWh/year	CEC[1]
Electricity emissions factor per energy provider and building type	$EF_{elec,i,j}$	See Table 11	MT CO_2e/kWh	The Climate Registry[2]
Electricity loss factor	$L_{T\&D}$	4.23%	Percent	EPA eGRID[3]
Energy Providers	i	PG&E	Categorical	–
Building type	j	Residential Nonresidential[4]	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

[1] California Energy Commission (CEC). 2023. California Energy Consumption Database. Available at: https://ecdms.energy.ca.gov/Default.aspx

[2] The Climate Registry (TCR). 2023. Utility-Specific Emission Factors, Pacific Gas & Electric, 2017. Available at: https://docs.google.com/spreadsheets/d/1MY2dNo_5VXCvppDA3nIpnMDhH3FG2MlxBcLiOggj-xQ/edit#gid=283732541

[3] Environmental Protection Agency (EPA). 2023. Data Explorer, grid loss rates, 2016. Available at: https://www.epa.gov/egrid/historical-egrid-data

[4] Nonresidential includes kWh consumption from commercial and industrial sources.

Energy: Residential and Nonresidential Natural Gas

GHG emissions from natural gas result from stationary combustion in both the residential and nonresidential building sectors. San Benito's natural gas is supplied by PG&E. However, activity data provided directly by PG&E for the region is subject to 15/15 rule reporting restrictions which are meant to protect privacy but can result in missing data for GHG emissions calculations. Similar to electricity sector activity data, information on county-wide consumption of natural gas was sourced from CEC reported data to better estimate regional consumption. Emissions from residential and nonresidential natural gas use were calculated using Community Protocol Equation BE.1.1. Equation 2.3 and Table 5 provide the equation used, associated parameters, and data sources used to quantify GHG emissions associated with community natural gas consumption in residential and nonresidential buildings. The data provided by the CEC includes all natural gas consumption within the county including residential, commercial, and industrial sources. Since this data is provided by a state agency, it is considered highest quality. The emission factor was provided by the EPA Emissions Factor Hub and is likewise considered highest quality.

Equation 2.3

BE.1.1 RESIDENTIAL/NONRESIDENTIAL NATURAL GAS SECTOR EMISSIONS

$$CO_2e_{NatGas,i} = Fuel_{NG,i} \times \left[\left(EF_{NG,CO_2} \times GWP_{CO_2}\right) + \left(EF_{NG,CH_4} \times GWP_{CH_4}\right) + \left(EF_{NG,N_2O} \times GWP_{N_2O}\right)\right] \times 10^{-1} \times 10^{-3} \quad (2.3)$$

Table 5 Emissions Parameters and Data Sources – Community Natural Gas Use BE.1.1

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	$CO_2e_{NatGas,i}$	See Table 11	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 11	therms/year	CEC[1]
Carbon dioxide emission factor for natural gas combustion	EF_{NG,CO_2}	53.06	kg CO_2/mmBTU natural gas	EPA Emission Factors Hub[2]
Methane emission factor for natural gas combustion	EF_{NG,CH_4}	0.001	kg CH_4/mmBTU natural gas	EPA Emission Factors Hub
Nitrous oxide emission factor for natural gas combustion	EF_{NG,N_2O}	0.0001	kg N_2O/mmBTU natural gas	EPA Emission Factors Hub
Global warming potential of carbon dioxide	GWP_{CO_2}	See Table 2	–	IPCC Fifth Assessment Report[3]
Global warming potential of methane	GWP_{CH_4}	See Table 2	–	IPCC Fifth Assessment Report
Global warming potential of nitrous oxide	GWP_{N_2O}	See Table 2	–	IPCC Fifth Assessment Report
Conversion factor	10^{-1}	0.1	mmBTU/therm	
Conversion factor	10^{-3}	0.001	MT/kg	
Building type (i.e. residential or nonresidential)	i	Residential Nonresidential[4]	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

[1] California Energy Commission (CEC). 2023. California Energy Consumption Database. Available at: https://ecdms.energy.ca.gov/Default.aspx

[2] Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub (April, 2022). Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

[3] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[4] Nonresidential includes natural gas consumption from commercial and industrial sources.

2.1.2 Transportation

Transportation: On-road

On-road vehicles in the community produce GHG emissions from the mobile combustion of fossil fuels (i.e., internal combustion engines) and up-stream from the production of electricity (i.e., electric vehicles (EVs)). However, as EV electricity consumption is captured under building electricity emissions, the GHG emissions from EV VMT are not included in on-road transportation emissions. GHG emissions from the on-road transportation sector were calculated in accordance with Community Protocol TR.1.A and TR.2.B. The Community Protocol recommends the use of regional travel demand models to differentiate passenger, commercial, and bus vehicle miles travelled activity data. The reginal model operated by the Association of Monterey Bay Area Governments (AMBAG) only provides "in-boundary" VMT which undercounts trips that do not occur entirely within the county boundary. Therefore, this assessment utilizes Regional Transportation Advisory

Committee (RTAC) consistent origin/destination data provided by Replica.[8] Using this methodology allows the MSA to capture a full range of trips, including those that leave the MSA area, which is common in this region. This change of methodology to be consistent with best practices (and Santa Clara County inventories) resulted in the capture of over 2x more VMT within San Benito County as compared to the in-boundary method. The Replica model uses big data sources such as GPS, cell phone, credit card transactions, real estate data, and ground truthing along with powerful machine learning techniques to generate a nationwide land use and VMT model that is then scaled with census data and updated on a quarterly basis. For this assessment, Replica provided origin-destination average daily weekday and weekend VMT for the year 2019[9] for San Benito County with internal – external and external – internal trips already reduced by 50 percent in alignment with SB 375 Regional Targets Advisory Committee (RTAC) methodology.[10] Daily VMT provided by Replica was averaged and scaled[11] to determine annual VMT, then back-cast based on population to estimate 2017 VMT activity data for the county. Replica data is extensively used throughout the industry to quantify VMT and GHG emissions and has been calibrated against local and state travel demand models. While Rincon considers Replica to provide the "best available data" since it uses the closest thing available to directly measured VMT, to be conservative it was identified as second highest quality based on the EPA data quality ranking hierarchy. Equation 2.4 and Table 6 define the equations, parameters, and data sources used to convert resulting Replica VMT activity data to GHG emissions from on-road transportation fuel combustion.

Equation 2.4

TR.1.A & TR.2.B ON-ROAD TRANSPORTATION COMBUSTION EMISSIONS

$$CO_2e_{onroad,i} = \left(T + \frac{1}{2}T_O + \frac{1}{2}T_D\right) \times EF_{auto,i} \qquad 2.4$$

[8] https://www.replicahq.com/

[9] Replica was founded in 2017 with current VMT data models available beginning in 2019 (https://www.replicahq.com/about)

[10] California Air and Resources Board (CARB). 2018. Appendix F, Final Environmental Analysis. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Final_Target_Staff_Report_%202018_AppendixF.pdf

[11] Weekend daily VMT is scaled assuming 104 weekends in a year, while weekday daily VMT was scaled assuming 261 weekdays in a year.

Table 6 Emissions Parameters and Data Sources – Community On-road Transportation TR.1.A and TR.2.B

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road GHG emissions per vehicle class	$CO_2e_{Onroad,i}$	See Table 11	MT CO_2e/year	Calculated
VMT occurring within jurisdictional boundaries	T	See Table 7	miles	Replica Model[1]
VMT originating within and terminating outside of jurisdictional boundaries	T_O	See Table 7	miles	Replica Model
VMT originating outside of and terminating within jurisdictional boundaries	T_D	See Table 7	miles	Replica Model
Emissions factor for on-road vehicles per vehicle class	$EF_{auto,i}$	See Table 11	MT CO_2e/mile	EMFAC2021 v1.0.1[2]
Vehicle class	i	Passenger Commercial Bus	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

[1] Replica weekday and weekend daily VMT data for jurisdictions in San Benito County pulled from subscription-based service in 2023; further information available at: https://www.replicahq.com/. Weekend daily VMT was scaled assuming 104 weekends in a year, while weekday daily VMT was scaled assuming 261 weekdays in a year.

[2] California Air Resources Board (CARB). 2023. EMission FACtor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

Table 7 summarizes resulting activity data and allocation method used to estimate county-wide on-road 2017 VMT data.

Table 7 San Benito County 2017 Transportation Activity Data Allocation

Vehicle Class	2019 VMT [miles]	2019 Population[1]	VMT/capita	2017 Population[1]	2017 VMT [miles]
Passenger	499,446,554	62,486	7,674	59,994	479,528,159
Commercial	83,366,861		1,281		80,042,113
Bus	7,215,575		111		6,927,812

[1] State of California Department of Finance (DOF). 2021. E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011-2020. Available at: https://dof.ca.gov/forecasting/Demographics/estimates/estimates-e5-2010-2020/

Transportation: Off-road

Off-road equipment and vehicles in the community generate GHG emissions from the mobile combustion of fossil fuels. Off-road fuel usage results from equipment operation for sectors such as agricultural, construction, lawn and garden, or recreational equipment. Community Protocol Equation TR.8 was used to quantify GHG emissions from off-road equipment fuel consumption and is shown under Equation 2.5 below. Table 8 lists the parameters, values, and data sources used to quantify emissions in according with the Community Protocol. Off-road fuel data was provided by the OFFROAD 2021 model which is developed and maintained by CARB.[12] Since this data was provided by a state agency, it is considered highest quality. EPA Emission Factors Hub data was also used for fuel emissions and is also considered highest quality.

[12] https://ww2.arb.ca.gov/msei-road-documentation

Equation 2.5

TR.8 OFF-ROAD EQUIPMENT SECTOR EMISSIONS

$$CO_2e_{offroad,j} = \sum_i Fuel_{offroad,i,j} \times EF_{i,j} \quad 2.5$$

Table 8 Emissions Parameters and Data Sources – Community Off-Road Equipment TR.8

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from offroad equipment	$CO_2e_{offroad,j}$	See Table 11	MT CO_2e/year	Calculated
Annual fuel consumption in the County per sector per fuel type	$Fuel_{offroad,i,j}$	See Table 11	Gallons/year	OFFROAD2021[1]
Emission factor per fuel type	EF_j	See Table 11	MT CO_2e/gallon	EPA Emission Factors Hub[3]
Equipment Type	i	Multiple	Categorical	OFFROAD2021
Fuel type	j	Gasoline Diesel Natural Gas	Categorical	OFFROAD2021

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California Air Resource Board (CARB). Mobile Source Emissions Inventory Off-road (OFFROAD2021) v.1.0.5. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0

[2] As this GHG inventory covers County-wide emissions sources, all fuel consumption reported by OFFROAD2021 is attributed to San Benito's 2017 Community GHG Inventory

[3] Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

2.1.3 Solid Waste

GHG emissions associated with the waste sector result from the decomposition of waste at a landfill as well as landfill operation processes. Tons of solid waste activity data was sourced from California's Department of Resources Recycling and Recovery (CalRecycle)[13] which reports facility, jurisdiction, and county-wide waste data across the State. Since CalRecycle is a state agency, this data is considered highest quality. Additional emission factors and assumptions were derived from both the EPA Emissions Factor Hub and the ICLEI reporting protocol. GHG emissions from waste decomposition were calculated using Community Protocol Method SW.4.1. Equation 2.6 and Table 9 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions in accordance with Community Protocol SW.4.1.

Equation 2.6

SW.4.1 SOLID WASTE FUGITIVE EMISSIONS

$$CO_2e_{Waste,fugitive} = GWP_{CH_4} \times (1 - CE) \times (1 - OX) \times M \times \sum_i P_i \times EF_i \quad 2.6$$

[13] https://www2.calrecycle.ca.gov/LGCentral/Home/slcp/capacityplanning/recycling/DisposalReporting

Table 9 Emissions Parameters and Data Sources – Community Solid Waste SW.4.1

Definition	Parameter	Value	Unit	Data Source
Annual community generated waste GHG emissions	$CO_2e_{Waste,fugitive}$	30,335	MT CO_2e/year	Calculated
Methane global warming potential	GWP_{CH_4}	See Table 2		IPCC Fifth Assessment Report[1]
Default LFG collection efficiency	CE	0.75	Fraction	ICLEI Community Protocol
Oxidation rate	OX	0.10	Fraction	ICLEI Community Protocol
Total mass of waste entering landfill	M	80,252	Wet short tons	Calrecycle[2]
Proportion of total waste material per material type	P_i	1	Fraction	–
Emission factor per material type	EF_i	0.060	MT CH_4/wet short ton	ICLEI Community Protocol[3]
Material type	i	Multiple	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[2] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility, San Benito County Integrated Waste Management Regional Agency, 2017. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

[3] For mixed municipal waste streams where the proportion of material type is unknown, ICLEI specifies a default value of 0.060 MT CH_4 per wet short ton may be used.

Landfill process emissions were quantified according to Equation SW.5 of the Community Protocol. Equation 2.7 and Table 10 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions from landfill operations.

Equation 2.7

SW.5 SOLID WASTE PROCESS EMISSIONS

$$CO_2e_{Waste,process} = M \times EF_p \qquad 2.7$$

Table 10 Emissions Parameters and Data Sources – Community Solid Waste SW.5

Definition	Parameter	Value	Unit	Data Source
Annual landfill process GHG emissions	$CO_2e_{Waste,process}$	883	MT CO_2e/year	Calculated
Total mass of solid waste that enters the landfill in the inventory year	M	80,252	Wet short tons/year	Calrecycle[1]
Emissions factor for landfill process emissions	EF_p	0.011	MT CO_2e/wet short ton	ICLEI Community Protocol

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility, San Benito County Integrated Waste Management Regional Agency, 2017. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

2.2 2017 San Benito County Community GHG Emissions Inventory Results

The 2017 priority GHG community inventory provides San Benito County with emissions estimates following the Community Protocol and current best practices for GHG accounting for the major sources of emissions within the county. The results of the 2017 community GHG inventory are shown in Figure 2 and Figure 3 summarized in detail in Table 11.

Figure 2 San Benito County 2017 GHG Emissions by Sector

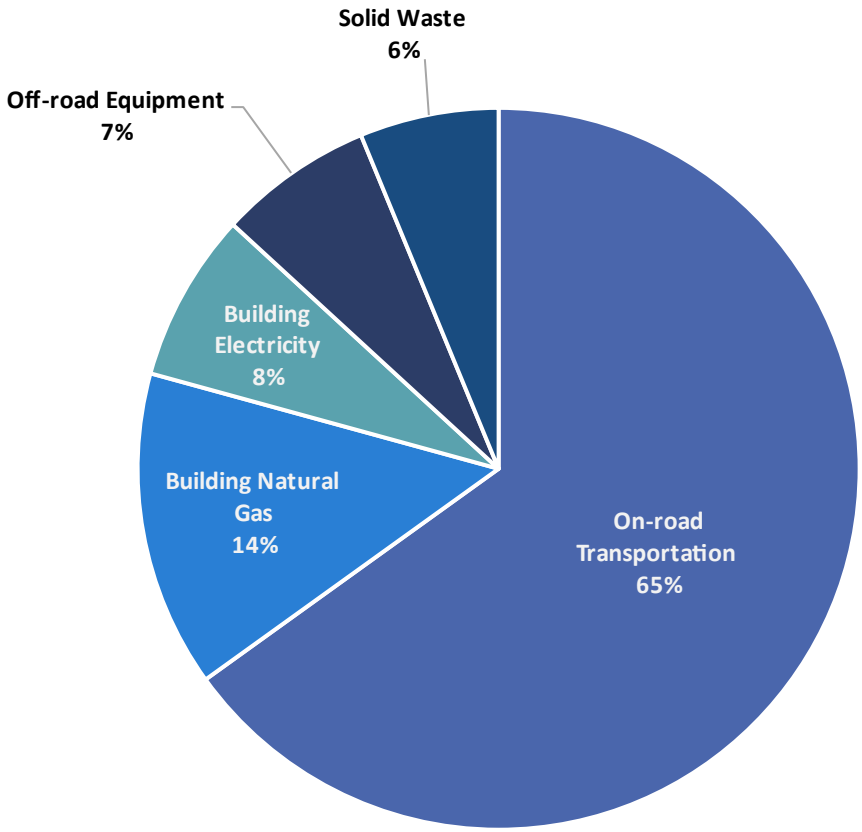


Figure 3 San Benito County 2017 GHG Emissions by Sub-Sector

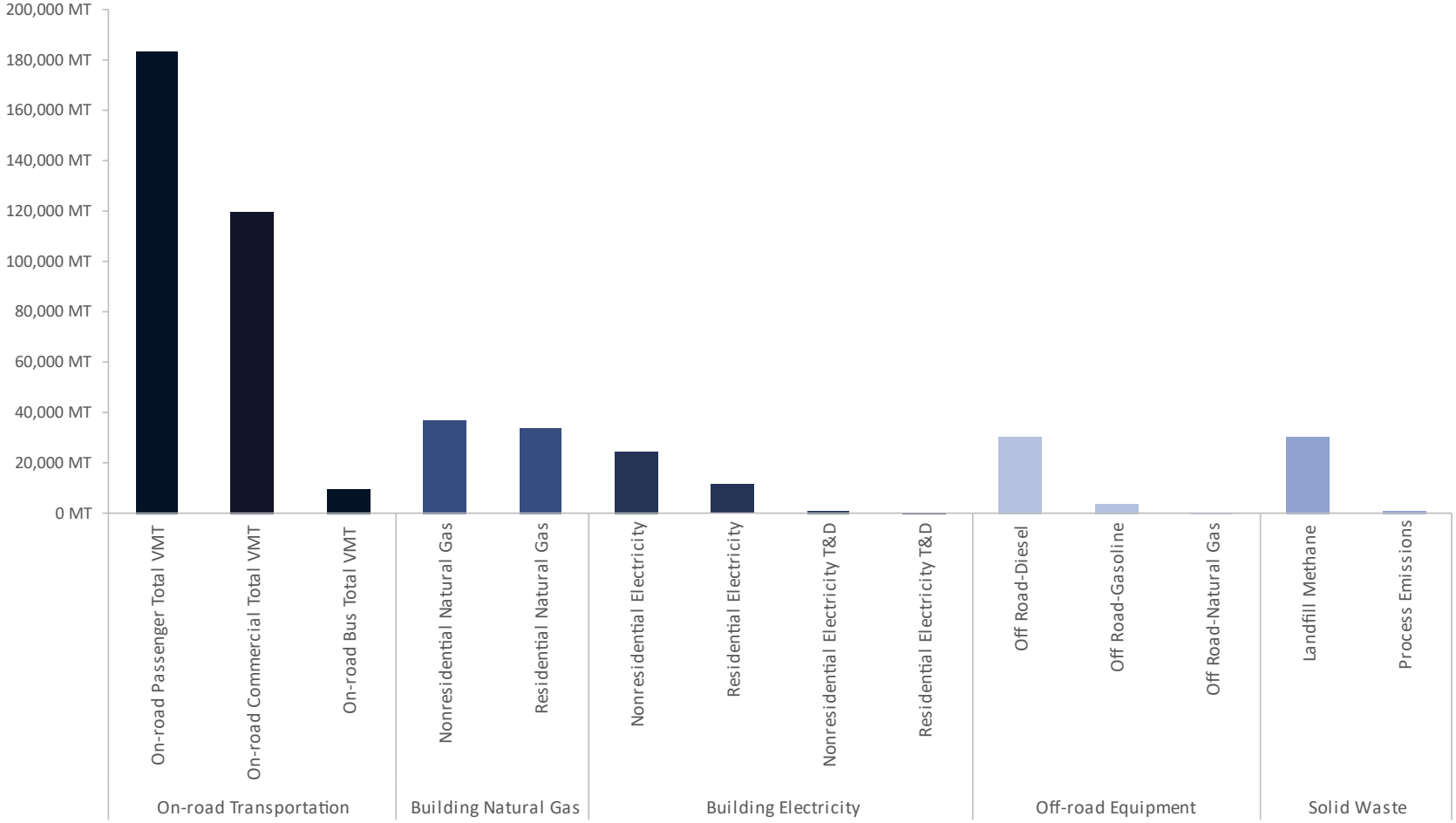


Table 11 San Benito County 2017 Community GHG Emissions Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy	Residential Electricity	123,385,200	kWh	0.000096	MT CO_2e/kWh	11,889
	Residential Electricity T&D	5,219,194	kWh	0.000096	MT CO_2e/kWh	503
	Nonresidential Electricity	254,564,900	kWh	0.000096	MT CO_2e/kWh	24,528
	Nonresidential Electricity T&D	10,768,095	kWh	0.000096	MT CO_2e/kWh	1,038
	Residential Natural Gas	6,399,008	therms	0.005311	MT CO_2e/therm	33,988
	Nonresidential Natural Gas	6,988,275	therms	0.005311	MT CO_2e/therm	37,118
Transportation	Passenger VMT	479,528,159	VMT	0.000382	MT CO_2e/mile	183,180
	Commercial VMT	80,042,113	VMT	0.001498	MT CO_2e/mile	119,903
	Bus VMT	6,927,812	VMT	0.001461	MT CO_2e/mile	10,122
	Off-road Diesel	2,884,100	Gallons	0.010500	MT CO_2e/gal	30,284
	Off-road Gasoline	434,962	Gallons	0.009224	MT CO_2e/gal	4,012
	Off-road Natural Gas	99,021	Gallons	0.005883	MT CO_2e/gal	583
Solid Waste	Landfill Methane	80,252	Wet short tons	0.378000	MT CO_2e/ton	30,335
	Process Emissions	80,252	Wet short tons	0.011000	MT CO_2e/ton	883
Total						**488,278**

Notes: VMT = vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

3 2017 Santa Clara County Community GHG Inventory

3.1 2017 Community GHG Emissions Inventory Activity Data and Emissions Factors

3.1.1 Energy

Energy: Residential and Nonresidential Electricity

Electric utility services for Santa Clara County are provided by Silicon Valley Clean Energy (SVCE), City of Palo Alto Utilities (CPAU), Silicon Valley Power (SVP), and Pacific Energy and Gas (PG&E). Emissions from residential and nonresidential electricity were calculated using Community Protocol Equation BE.2.1. Equation 2.1 and Table 12 provide the equation and data sources used to quantify GHG emissions associated with community electricity consumption. Electricity consumption includes all residential and commercial electricity use countywide. The data also includes some industrial/agricultural electricity use from the unincorporated county. This data was not available from the incorporated cities. Data for kWh consumption and emission factors was provided directly by the utilities and is therefore considered highest quality.

Equation 2.1

BE.2.1 RESIDENTIAL/NONRESIDENTIAL ELECTRICITY SECTOR EMISSIONS

$$CO_2e_{electricity,j} = \sum_i \left(Elec_{i,j} \times EF_{elec,i,j}\right) \quad 3.1$$

Table 12 Emissions Parameters and Data Sources – Community Electricity Use BE.2.1

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from electricity consumption per building type	$CO_2e_{electricity,j}$	See Table 21	MT CO_2e/year	Calculated
Electricity consumption per building type per energy provider	$Elec_{i,j}$	See Table 13	kWh/year	i. SVCE[1] ii. CPAU[2] iii. PG&E via City of San Jose[3] iv. SVP via City of Santa Clara[4]
Electricity emission factor based on energy provider	$EF_{elec,i,j}$	See Table 13	MT CO_2e/kWh	i. SVCE[1] ii. The Climate Registry[5] iii. EPA eGRID[6] iv. CPAU[2] v. SVP[4]
Energy Providers	i	SVCE CPAU PG&E SVP	Categorical	–
Building type	j	Residential Nonresidential[7]	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kWh = kilowatt hour

[1] Silicon Valley Clean Energy (SVCE) activity data and emissions factor provided by SVCE via email.

[2] City of Palo Alto Utility (CPAU) activity data provided by the City of Palo Alto via email. According to CPAU, all CPAU electricity is generated from carbon neutral sources, therefore the emissions factor for CPAU was assumed to be zero. Palo Alto's inventory reported electricity and natural gas usage data for 2017 as a lump-sum, which was disaggregated into residential and commercial usage using Palo Alto's 2016 electricity and natural gas data ratios accessed at the City of Palo Alto's Sustainability Dashboard at https://data.cityofpaloalto.org/dashboards/8842/sustainability/

[3] Pacific Energy and Gas (PG&E) activity data provided by the City of San Jose via email.

[4] Silicon Valley Power (SVP) activity data and emissions factor provided by the City of Santa Clara via email. Activity data was not available for the 2017 inventory year; therefore the 2016 data from Santa Clara's inventory was used as a proxy for 2017 data

[5] The Climate Registry (TCR). 2023. Utility-Specific Emission Factors, Pacific Gas & Electric, 2017. Available at: https://docs.google.com/spreadsheets/d/1MY2dNo_5VXCvppDA3nIpnMDhH3FG2MlxBcLiOggj-xQ/edit#gid=283732541

[6] Environmental Protection Agency (EPA). 2024. Frequent Questions About eGRID. Available at: https://www.epa.gov/egrid/frequent-questions-about-egrid

[7] Nonresidential includes kWh consumption from commercial and excludes industrial sources.

Table 13 provides a summary of regional activity data and emissions factors used to quantify GHG emissions within Santa Clara County. Because Santa Clara County is served by multiple utilities, each utility and associated emission factor has been provided.

Table 13 Santa Clara 2017 Electricity Activity Data and Emissions Factors by Jurisdiction

Territory	Provider	End-user	Activity Data [kWh]	EF [MT CO_2e/kWh]	MT CO_2e
SVCE Service Territory - Incorporated County	SVCE	Residential	1,250,099,429	0.000077	96,553
Unincorporated County	SVCE	Residential	189,808,407	0.000072	13,697
SVCE Service Territory - Incorporated County	SVCE	Commercial	4,233,913,323	0.000106	449,273
Unincorporated County	SVCE	Commercial			
Palo Alto	CPAU	Residential	151,612,376	–	–
Palo Alto	CPAU	Commercial	794,912,624	–	–
San Jose	PG&E[1]	Residential	1,794,638,836	0.000096	172,945
San Jose	PG&E	Commercial	2,130,855,532	0.000096	205,345
San Jose	PG&E	DA	1,270,463,928	0.000240	305,370
Santa Clara	SVP	Residential	194,252,567	0.000309	60,037
Santa Clara	SVP	Commercial	3,166,836,762	0.000309	978,769

[1] PGE reported average CO_2 emissions factor verified by The Climate Registry was used and supplemented with average CAMX grid CH_4 and N_2O emissions as reported by eGRID to estimate GHG emissions.

Energy: Electricity Transmission and Distribution Losses

Electricity Transmission and Distribution (T&D) losses arise from electricity lost during delivery to the buildings and associated end-uses in Santa Clara County.[14] Equation 2.2 and Table 14 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions associated with community T&D losses from electricity consumption. Data for T&D losses were based on utility data and EPA eGRID estimates. Therefore, this data is considered highest quality.

Equation 2.2

BE.4 ELECTRICITY T&D LOSS SECTOR EMISSIONS

$$CO_2e_{T\&D,j} = \sum_i Elec_{i,j} \times L_{T\&D} \times EF_{elec,i,j} \quad 3.2$$

[14] For more information regarding the inclusion of T&D losses, see Section 2.1.1, *BE.4 Electricity T&D Loss Sector emissions*

Table 14 Emissions Parameters and Data Sources – Community Electricity T&D Loss

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from transmission and distribution losses per building type	$CO_2e_{T\&D,i}$	See Table 21	MT CO_2e/year	Calculated
Electricity consumption per energy provider and building type	$Elec_{i,j}$	See Table 13	kWh/year	i. SVCE[1] ii. CPAU[2] iii. PG&E via City of San Jose[3] iv. SVP via City of Santa Clara[4]
Electricity emissions factor per energy provider and building type	$EF_{elec,i,j}$	See Table 13	MT CO_2e/kWh	i. SVCE[1] ii. The Climate Registry[5] iii. EPA eGRID[6] iv. CPAU[2] v. SVP[4]
Electricity loss factor	$L_{T\&D}$	4.23%	Percent	EPA eGRID[7]
Energy Providers	i	SVCE CPAU PG&E SVP	Categorical	–
Building type	j	Residential Nonresidential[8]	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kWh = kilowatt hour

[1] Silicon Valley Clean Energy (SVCE) activity data and emissions factor provided by SVCE via email.

[2] City of Palo Alto Utility (CPAU) activity data provided by the City of Palo Alto via email. According to CPAU, all CPAU electricity is generated from carbon neutral sources, therefore the emissions factor for CPAU was assumed to be zero. Palo Alto's inventory reported electricity and natural gas usage data for 2017 as a lump-sum, which was disaggregated into residential and commercial usage using Palo Alto's 2016 electricity and natural gas data ratios accessed at the City of Palo Alto's Sustainability Dashboard at https://data.cityofpaloalto.org/dashboards/8842/sustainability/

[3] Pacific Energy and Gas (PG&E) activity data provided by the City of San Jose via email.

[4] Silicon Valley Power (SVP) activity data and emissions factor provided by the City of Santa Clara via email. Activity data was not available for the 2017 inventory year; therefore the 2016 data from Santa Clara's inventory was used as a proxy for 2017 data

[5] The Climate Registry (TCR). 2023. Utility-Specific Emission Factors, Pacific Gas & Electric, 2017. Available at: https://docs.google.com/spreadsheets/d/1MY2dNo_5VXCvppDA3nIpnMDhH3FG2MlxBcLiOggj-xQ/edit#gid=283732541

[6] Environmental Protection Agency (EPA). 2024. Frequent Questions About eGRID. Available at: https://www.epa.gov/egrid/frequent-questions-about-egrid

[7] Environmental Protection Agency (EPA). 2023. Data Explorer, grid loss rates, 2016. Available at: https://www.epa.gov/egrid/historical-egrid-data

[8] Nonresidential includes kWh consumption from commercial and excludes industrial sources.

Energy: Residential and Nonresidential Natural Gas

PG&E provides natural gas for all cities within Santa Clara County and the unincorporated county, with the exception of Palo Alto, which receives natural gas from CPAU. Emissions from residential and nonresidential natural gas use were calculated using Community Protocol Equation BE.1.1. Equation 2.3 and Table 15 provide the equation used, associated parameters, and data sources used to quantify GHG emissions associated with community natural gas consumption in residential and nonresidential buildings. Like electricity, data for natural gas includes residential and commercial natural gas use from the incorporated cities, but also includes unincorporated industrial and agricultural gas use. Data was provided by the utilities and EPA Emission Factors Hub was utilized for emission factors. Therefore, this data is considered highest quality.

Equation 2.3

BE.1.1 Residential/Nonresidential Natural Gas Sector Emissions

$$CO_2e_{NatGas,i} = Fuel_{NG,i} \times \left[\left(EF_{NG,CO_2} \times GWP_{CO_2}\right) + \left(EF_{NG,CH_4} \times GWP_{CH_4}\right) + \left(EF_{NG,N_2O} \times GWP_{N_2O}\right)\right] \times 10^{-1} \times 10^{-3} \quad 3.3$$

Table 15 Emissions Parameters and Data Sources – Community Natural Gas Use BE.1.1

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	$CO_2e_{NatGas,i}$	See Table 21	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 21	therms/year	i. PG&E[1] ii. CPAU[2]
Carbon dioxide emission factor for natural gas combustion	EF_{NG,CO_2}	53.06	kg CO_2/mmBTU natural gas	EPA Emission Factors Hub[3]
Methane emission factor for natural gas combustion	EF_{NG,CH_4}	0.001	kg CH_4/mmBTU natural gas	EPA Emission Factors Hub
Nitrous oxide emission factor for natural gas combustion	EF_{NG,N_2O}	0.0001	kg N_2O/mmBTU natural gas	EPA Emission Factors Hub
Global warming potential of carbon dioxide	GWP_{CO_2}	See Table 2	–	IPCC Fifth Assessment Report[4]
Global warming potential of methane	GWP_{CH_4}	See Table 2	–	IPCC Fifth Assessment Report
Global warming potential of nitrous oxide	GWP_{N_2O}	See Table 2	–	IPCC Fifth Assessment Report
Conversion factor	10^{-1}	0.1	mmBTU/therm	–
Conversion factor	10^{-3}	0.001	MT/kg	–
Building type (i.e. residential or nonresidential)	i	Residential Nonresidential[5]	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

[1] Pacific Energy and Natural Gas (PG&E) natural gas activity data provided by SVCE, City of San Jose, and City of Santa Clara via email. Santa Clara did not have this data for 2017; therefore The 2016 data from Santa Clara's inventory was used as a proxy for 2017 data

[2] City of Palo Alto Utility (CPAU) activity data provided by the City of Palo Alto via email. Palo Alto's inventory reported electricity and natural gas usage data for 2017 as a lump-sum, which was disaggregated into residential and commercial usage using Palo Alto's 2016 electricity and natural gas data ratios accessed at the City of Palo Alto's Sustainability Dashboard at https://data.cityofpaloalto.org/dashboards/8842/sustainability/

[3] Environmental Protection Agency (EPA). 2018. GHG Emission Factors Hub (March, 2018). Available at: https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

[4] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[5] Nonresidential includes natural gas consumption from commercial and excludes industrial sources.

3.1.2 Transportation

Transportation: On-road

On-road vehicles in the community produce GHG emissions from the mobile combustion of fossil fuels (i.e., internal combustion engines) and up-stream from the production of electricity (i.e., EVs). However, as EV electricity consumption is captured under building electricity emissions, the GHG emissions from EV VMT are not included in on-road transportation emissions. GHG emissions from the on-road transportation sector were calculated in accordance with Community Protocol TR.1.A and TR.2.B. The Community Protocol recommends the use of regional travel demand models to differentiate passenger, commercial, and bus vehicle miles travelled activity data attributed to the community. This assessment uses 2017 vehicle miles travelled (VMT) data provided by SVCE which was produced using the Metropolitan Transportation Commission (MTC)[15] travel demand model, as well as data available through regional city CAPs which used regional travel demand models such as 2017 data from the City of San Jose travel demand model, 2016 data from the City of Palo Alto travel demand model[16], and 2016 data from the City of Santa Clara travel demand model.[17] VMT data sourced for this inventory was produced using the SB 375 Regional Targets Advisory Committee (RTAC) origin-destination methodology.[18] Equation 2.4 and Table 16 define the equations, parameters, and data sources used to convert resulting MTC VMT activity data to GHG emissions from on-road transportation fuel combustion. All commercial and passenger vehicle VMT is captured in the reported VMT numbers. The data utilized for VMT and associated emission factors were provided by government agencies (MTC and CARB respectively). Therefore, this data is considered highest quality.

EQUATION 2.4

TR.1.A & TR.2.B ON-ROAD TRANSPORTATION COMBUSTION EMISSIONS

$$CO_2e_{onroad,i} = \left(T + \frac{1}{2}T_O + \frac{1}{2}T_D\right) \times \%Share_i \times EF_{auto,i} \qquad 3.4$$

[15] https://mtc.ca.gov/

[16] On-road transportation data was not available from Palo Alto's 2017 CAP GHG inventory; 2016 data was used as a proxy for 2017 data

[17] On-road transportation data for 2017 was not available for the City of Santa Clara; the 2016 data from Santa Clara's CAP GHG inventory was therefore used as a proxy for 2017 data.

[18] California Air and Resources Board (CARB). 2018. Appendix F, Final Environmental Analysis. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Final_Target_Staff_Report_%202018_AppendixF.pdf

Table 16 Emissions Parameters and Data Sources – Community On-road Transportation TR.1.A and TR.2.B

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road GHG emissions per vehicle class	$CO_2e_{Onroad,i}$	See Table 21	MT CO_2e/year	Calculated
VMT occurring within jurisdictional boundaries	T	See Table 17	miles	i. MTC Travel Demand Model[1] ii. City of San Jose Travel Demand Model[2] iii. City of Palo Alto Travel Demand Model[3] iv. City of Santa Clara Travel Demand Model[4]
VMT originating within and terminating outside of jurisdictional boundaries	T_O	See Table 17	miles	MTC Travel Demand Model
VMT originating outside of and terminating within jurisdictional boundaries	T_D	See Table 17	miles	MTC Travel Demand Model
Percent share of total VMT for each vehicle class	$\%Share_i$	See Table 17	%	EMFAC2021 v1.0.1[5]
Emissions factor for on-road vehicles per vehicle class	$EF_{auto,i}$	See Table 17	MT CO_2e/mile	EMFAC2021 v1.0.1
Vehicle class	i	Passenger Commercial[6]	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

[1] Metropolitan Transportation Commission (MTC) Travel Demand Model activity data provided by SVCE via email. Further information regarding the regional transportation model is available at: https://mtc.ca.gov/

[2] City of San Jose Tavel Demand Model activity data from the San Jose 2017 CAP

[3] City of Palo Alto Travel Demand Model activity data from the Palo Alta 2016 CAP

[4] City of Santa Clara Travel Demand Model activity data from the Santa Clara 2016 CAP

[5] California Air Resources Board (CARB). 2023. EMission FACtor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

[6] Commercial vehicles include light, medium, and heavy duty trucks as well as buses.

Table 17 summarizes resulting activity data, emissions factors, and GHG emissions calculations for county-wide on-road transportation.

Table 17 Santa Clara County 2017 Transportation Emissions Calculations

Vehicle Class	Vehicle Type	Annual VMT [miles]	% VMT	Annual VMT by Type	EF [g CO_2e/mile]	MT CO_2e
Passenger	LDA	12,463,179,407	93.83%	11,694,811,389	331	3,868,364
Commercial	Light Trucks		2.60%	323,969,437	894	289,750
	Medium Trucks		1.34%	167,062,308	1,270	212,154
	Heavy Trucks		2.09%	261,079,645	1,741	454,468
	Urban Buses		0.13%	16,256,629	1,733	28,168

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

Transportation: Off-road

Off-road equipment and vehicles in the community generate GHG emissions from the mobile combustion of fossil fuels. Off-road fuel usage results from equipment operation for sectors such as agricultural, construction, lawn and garden, or recreational equipment. Community Protocol Equation TR.8 was used to quantify GHG emissions from off-road equipment fuel consumption and is shown under Equation 2.5 below. Table 18 lists the parameters, values, and data sources used to quantify emissions in according with the Community Protocol. Off-road fuel data was provided by the OFFROAD 2021 model which is developed and maintained by CARB.[19] Since this data was provided by a state agency, it is considered highest quality. EPA Emission Factors Hub data was also used for fuel emissions and is also considered highest quality.

Equation 2.5

TR.8 OFF-ROAD EQUIPMENT SECTOR EMISSIONS

$$CO_2e_{offroad,j} = \sum_i Fuel_{offroad,i,j} \times EF_{i,j} \quad 3.5$$

Table 18 Emissions Parameters and Data Sources – Community Off-Road Equipment TR.8

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from offroad equipment	$CO_2e_{offroad,j}$	See Table 21	MT CO_2e/year	Calculated
Annual fuel consumption in the County per sector per fuel type	$Fuel_{offroad,i,j}$	See Table 21	Gallons/year	OFFROAD2021[1]
Emission factor per fuel type	EF_j	See Table 21	MT CO_2e/gallon	EPA Emission Factors Hub[3]
Equipment Type	i	Multiple	Categorical	OFFROAD2021
Fuel type	j	Gasoline Diesel Natural Gas	Categorical	OFFROAD2021

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California Air Resource Board (CARB). 2023. Mobile Source Emissions Inventory Off-road (OFFROAD2021) v.1.0.5. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0

[2] As this GHG inventory covers County-wide emissions sources, all fuel consumption reported by OFFROAD2021 is attributed to Santa Clara's 2017 Community GHG Inventory

[3] Environmental Protection Agency (EPA). 2018. GHG Emission Factors Hub (March, 2018). Available at: https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf

[19] https://ww2.arb.ca.gov/msei-road-documentation

3.1.3 Solid Waste

GHG emissions associated with the waste sector result from the decomposition of waste at a landfill as well as landfill operation processes and waste added in 2017. GHG emissions from waste decomposition were calculated using Community Protocol Method SW.4.1. Equation 2.6 and Table 19 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions in accordance with Community Protocol SW.4.1. Since CalRecycle is a state agency, this data is considered highest quality. Additional emission factors and assumptions were derived from both the EPA Emissions Factor Hub and the ICLEI reporting protocol.

Equation 2.6

SW.4.1 SOLID WASTE FUGITIVE EMISSIONS

$$CO_2e_{Waste,fugitive} = GWP_{CH_4} \times (1 - CE) \times (1 - OX) \times M \times \sum_i P_i \times EF_i \quad 3.6$$

Table 19 Emissions Parameters and Data Sources – Community Solid Waste SW.4.1

Definition	Parameter	Value	Unit	Data Source
Annual community generated waste GHG emissions	$CO_2e_{Waste,fugitive}$	557,772	MT CO_2e/year	Calculated
Methane global warming potential	GWP_{CH_4}	See Table 2		IPCC Fifth Assessment Report[1]
Default LFG collection efficiency	CE	0.75	Fraction	ICLEI Community Protocol
Oxidation rate	OX	0.10	Fraction	ICLEI Community Protocol
Total mass of waste entering landfill	M	1,475,587	Wet short tons	Calrecycle[2]
Proportion of total waste material per material type	P_i	1	Fraction	–
Emission factor per material type	EF_i	0.060	MT CH_4/wet short ton	ICLEI Community Protocol[3]
Material type	i	Multiple	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[2] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Multiyear Countywide Origin Summary Report, 2017. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Origin/CountywideSummary

[3] For mixed municipal waste streams where the proportion of material type is unknown, ICLEI specifies a default value of 0.060 MT CH_4 per wet short ton may be used.

Landfill process emissions were quantified according to Equation SW.5 of the Community Protocol. Equation 2.7 and Table 20 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions from landfill operations.

Equation 2.7

SW.5 SOLID WASTE PROCESS EMISSIONS

$$CO_2e_{Waste,process} = M \times EF_p \quad 3.7$$

Table 20 Emissions Parameters and Data Sources – Community Solid Waste SW.5

Definition	Parameter	Value	Unit	Data Source
Annual landfill process GHG emissions	$CO_2e_{Waste,process}$	16,231	MT CO_2e/year	Calculated
Total mass of solid waste that enters the landfill in the inventory year	M	1,475,587	Wet short tons/year	Calrecycle[1]
Emissions factor for landfill process emissions	EF_p	0.011	MT CO_2e/wet short ton	ICLEI Community Protocol

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Multiyear Countywide Origin Summary Report, 2017. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Origin/CountywideSummary

3.2 2017 Santa Clara County Community GHG Emissions Inventory Results

The 2017 community GHG inventory for this PCAP provides the updated Santa Clara community-wide GHG emissions estimates following the Community Protocol and current best practices for GHG accounting of major emissions sources in the county. The results of the 2017 community GHG inventory are shown in Figure 4 and Figure 5 summarized in detail in Table 21.

Figure 4 Santa Clara County 2017 GHG Emissions by Sector

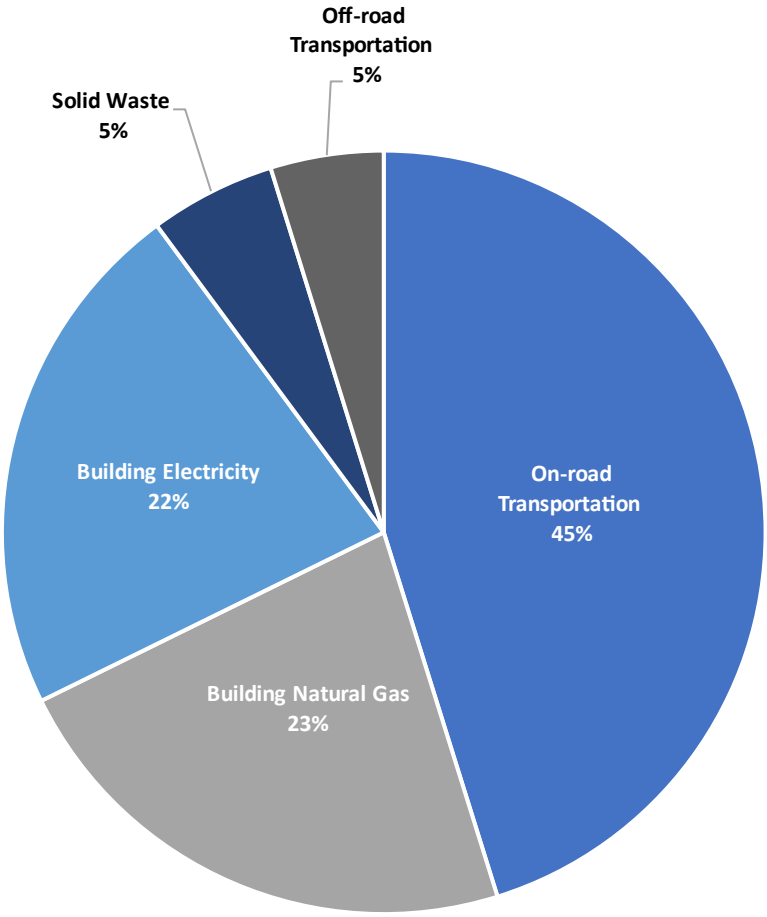


Figure 5 Santa Clara County 2017 Inventory GHG Emissions by Sub-Sector

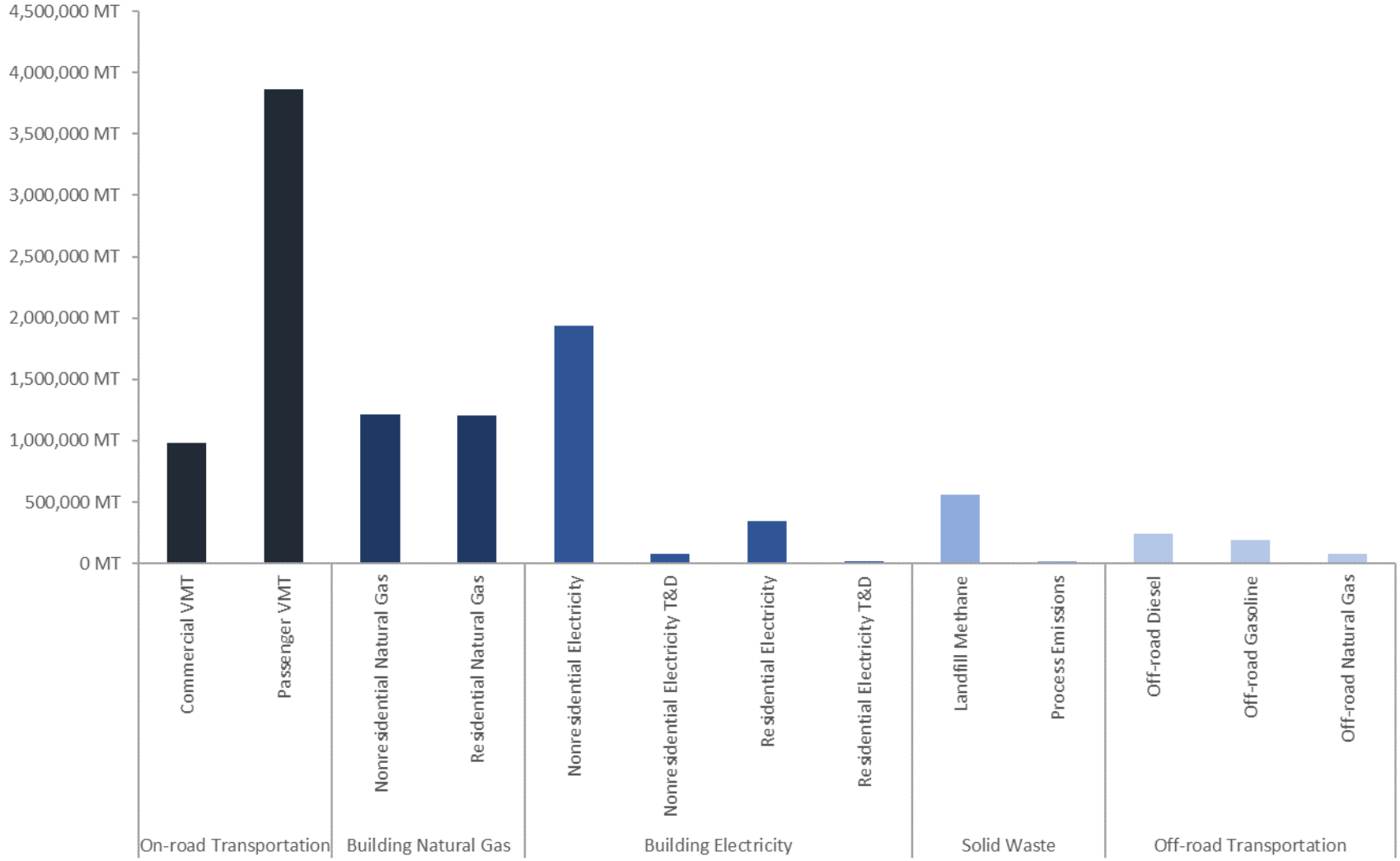


Table 21 Santa Clara County 2017 Community GHG Emissions Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy	Residential Electricity	3,580,411,615	kWh	0.00010	MT CO_2e/kWh	343,232
	Residential Electricity T&D	151,451,411	kWh	0.00010	MT CO_2e/kWh	14,518.70
	Nonresidential Electricity	11,596,982,169	kWh	0.00017	MT CO_2e/kWh	1,938,757
	Nonresidential Electricity T&D	490,552,346	kWh	0.00017	MT CO_2e/kWh	82,009
	Residential Natural Gas	227,038,881	therms	0.005311	MT CO_2e/therm	1,205,906
	Nonresidential Natural Gas	228,676,456	therms	0.005311	MT CO_2e/therm	1,214,604
Transportation	Passenger VMT	11,694,811,389	VMT	0.000331	MT CO_2e/mile	3,868,364
	Commercial VMT[1]	768,368,018	VMT	0.001281	MT CO_2e/mile	984,542
	Off-road Diesel	23,258,545	Gallons	0.010333	MT CO_2e/gal	240,340
	Off-road Gasoline	21,003,147	Gallons	0.009242	MT CO_2e/gal	194,112
	Off-road Natural Gas	17,292,879	Gallons	0.004621	MT CO_2e/gal	79,910
Solid Waste	Landfill Methane	1,475,587	Wet short tons	0.378000	MT CO_2e/ton	557,772
	Process Emissions	1,475,587	Wet short tons	0.011000	MT CO_2e/ton	16,231
Total						**10,740,296**

Notes: VMT = vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

[1] Commercial VMT in the Santa Clara 2017 Community GHG Inventory includes commercial and bus activity data and associated emissions.

4 MSA Results Summary

The combined 2017 county-wide GHG emissions inventory for the San Benito and Santa Clara County MSA is presented in Figure 6 and Figure 7, with a summary provided in Table 22 below. On-road transportation emissions present the largest source of emissions, comprising 46 percent of total GHG emissions county-wide. Building energy is the next largest source of emissions in the region with electricity and natural gas consumption contributing a combined 44 percent of total emissions.

Figure 6 San Benito/Santa Clara MSA 2017 GHG Emissions by Sector

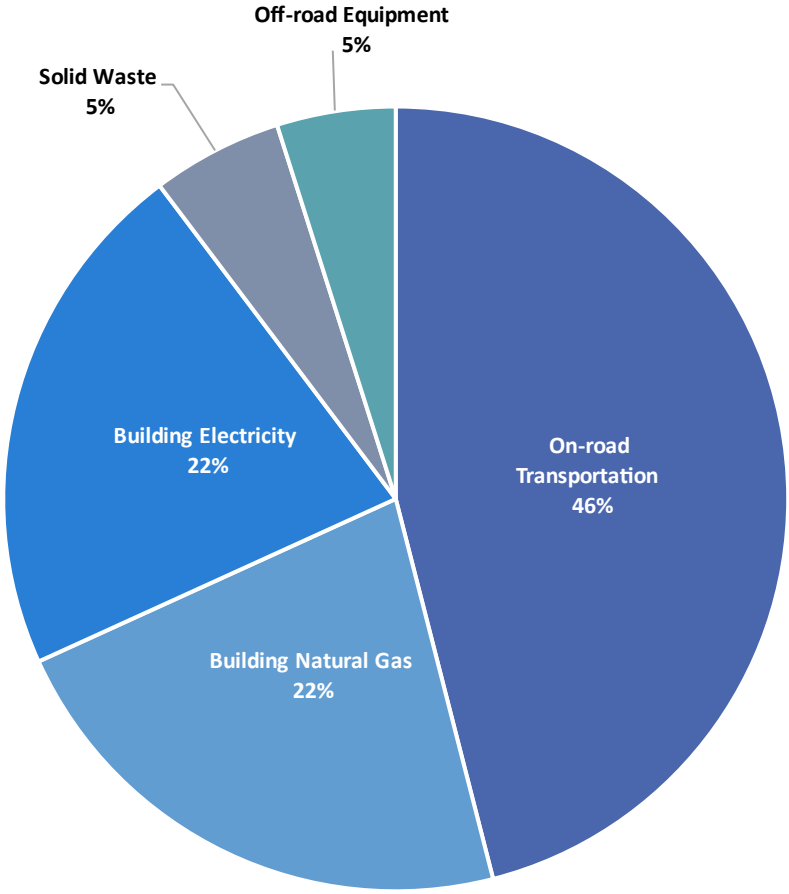


Figure 7 San Benito/Santa Clara MSA 2017 GHG Emissions by Sub-Sector

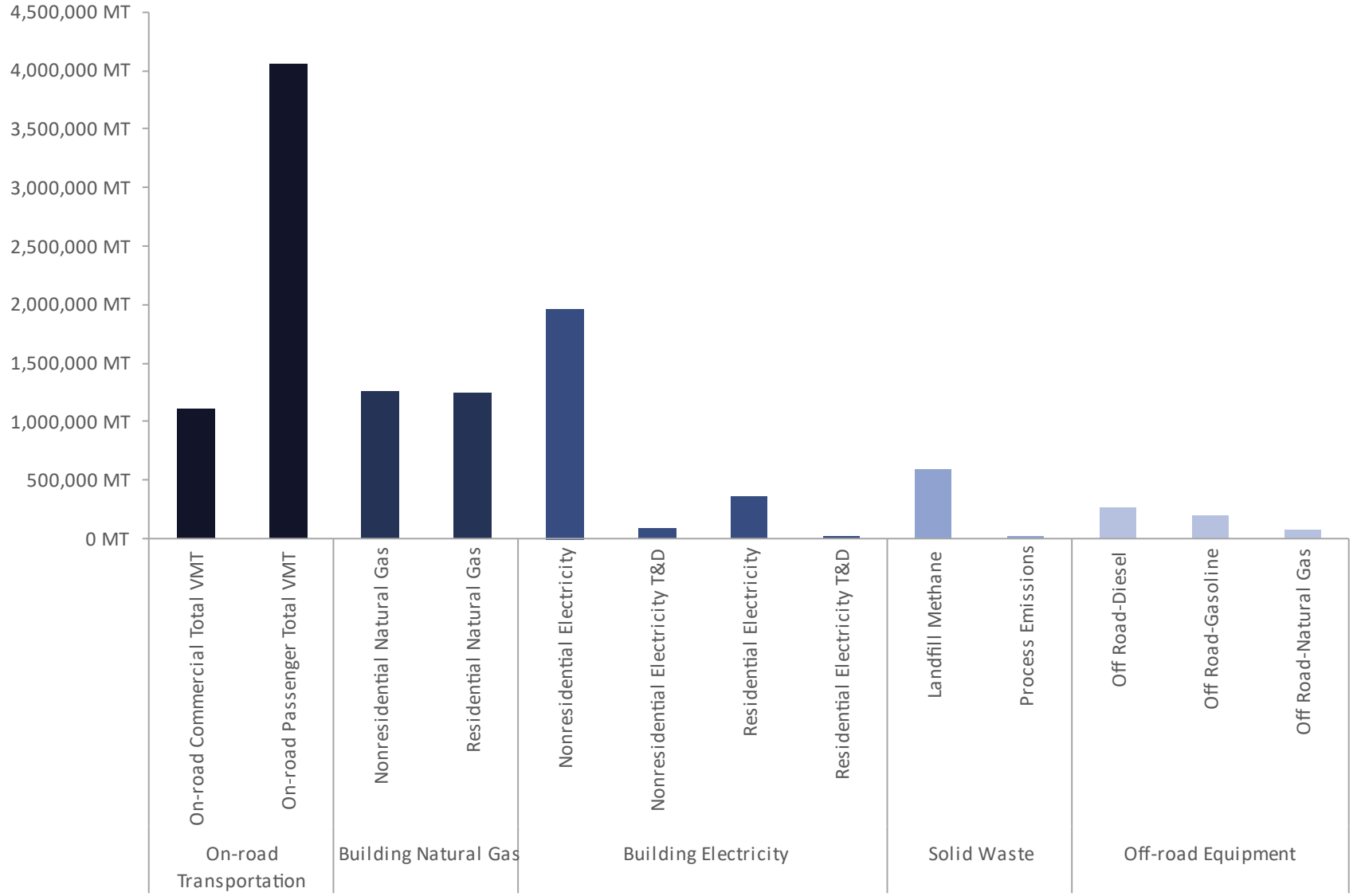


Table 22 San Benito/Santa Clara MSA 2017 Community GHG Emissions Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy	Residential Electricity	3,703,796,815	kWh	0.000096	MT CO_2e/kWh	355,120
	Residential Electricity T&D	156,670,605	kWh	0.000096	MT CO_2e/kWh	15,022
	Nonresidential Electricity	11,851,547,069	kWh	0.000166	MT CO_2e/kWh	1,963,285
	Nonresidential Electricity T&D	501,320,441	kWh	0.000166	MT CO_2e/kWh	83,047
	Residential Natural Gas	233,437,889	therms	0.005311	MT CO_2e/therm	1,239,894
	Nonresidential Natural Gas	235,664,731	therms	0.005311	MT CO_2e/therm	1,251,721
Transportation	Passenger VMT	12,174,339,548	VMT	0.000333	MT CO_2e/mile	4,051,544
	Commercial VMT	855,337,943	VMT	0.001303	MT CO_2e/mile	1,114,566
	Off-road Diesel	26,142,644	Gallons	0.010349	MT CO_2e/gal	270,547
	Off-road Gasoline	21,438,109	Gallons	0.009241	MT CO_2e/gal	198,117
	Off-road Natural Gas	17,391,900	Gallons	0.004628	MT CO_2e/gal	80,490
Solid Waste	Landfill Methane	1,555,839	Wet short tons	0.378000	MT CO_2e/ton	588,107
	Process Emissions	1,555,839	Wet short tons	0.011000	MT CO_2e/ton	17,114
Total						**11,228,575**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

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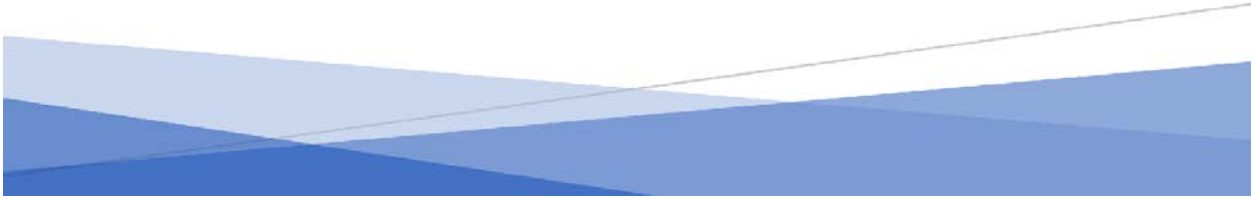
Climate Pollution Reduction Grants Program:

San Jose – Sunnyvale – Santa Clara MSA

Quality Assurance Project Plan

Prepared by the County of Santa Clara

November 2023



1. Project Management (Group A)

1.1. Title and Approval Page

Quality Assurance Project Plan for
CPRG Planning Grant for Santa Clara and San Benito Counties MSA
Grant Number 98T76501

Prepared by:
County of Santa Clara
Office of Sustainability
2310 N. First Street
Suite 106
San Jose, CA 95131

Prepared for:
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105

November 21, 2023

APPROVALS:

County of Santa Clara Project Manager: Date:

DocuSigned by:
Breann Boyle
F193715C36094E7...

1/4/2024

Rincon Principal, QA Manager: Date:

DocuSigned by:
Erik Feldman
867D33CD128F414...

1/11/2024

USEPA Region 9 Grants Project Officer: Date:

USEPA Region 9 Quality Assurance Manager: Date:

QAPP Revision History

Revision No.	Description	Author	Date
0	Original Version	Breann Boyle	11/21/2023
1	Revised to address comments from EPA	Breann Boyle	1/3/2024

1.2. Table of Contents[1]

[1] For grantees who are not familiar with using MS Word's TOC functions, please review the video at https://www.youtube.com/watch?v=0cN-JX6HP7c. Accessed on 6/23/2023.

List of Tables

List of Exhibits

Abbreviations

BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
NEI	EPA's National Emissions Inventory
OAR	EPA Office of Air and Radiation
PCAP	Priority Climate Action Plan
PG&E	Pacific Gas and Electric
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance

POR	EPA Project Officer's Representative
PWP	Project Work Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
QAMD	Quality Assurance Manager Delegate
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCC	Quality Control Coordinator
LGGIT	Community - GHG Inventory Tool (provided by the EPA)
TL	Task Leader

1.3. Distribution List

This section presents the primary staff who will be working on the project. These staff will be identifying existing[2] data resources for evaluation and potential use under the project or serving in project-specific roles for implementing the Quality Assurance Project Plan (QAPP). The listing in **Table 1.1** includes staff responsible for implementing independent internal quality management steps and staff serving in external oversight roles.

This QAPP and, as applicable, all major deliverables relying on existing data will be distributed to the staff presented in **Table 1.1.** Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP will be maintained in the project files under the SharePoint QAPP folder.

Table 1.1 QAPP Distribution List

Name	Organization	Role
Asia Yeary	US EPA, Region 9	EPA Project Officer (PO)
Audrey Johnson	US EPA, Region 9	EPA Quality Assurance Manager or Delegate
Gilian Corral	County of Santa Clara	Grantee Sr. Approver, Sustainability Manager
Breann Boyle	County of Santa Clara	Project Manager, Senior Management Analyst
Ryan Gardner	Rincon Consultants	Rincon Project Manager
Emily Saul	Rincon Consultants	Task Leader, Assistant Project Manager
Forrest Abbott Lum	Rincon Consultants	Task Leader, Climate Analyst
Lauren Collar	Rincon Consultants	Task Leader, Climate Analyst
Erik Feldman	Rincon Consultants	Quality Assurance Manager, Principal

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the County of Santa Clara Project Manager (PM), Rincon PM, Quality Assurance Manager (QAM), and Task Leaders (TL). Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

Breann Boyle is the County of Santa Clara PM and will provide senior-level oversight as needed. The PM is responsible for County of Santa Clara's technical and financial performance as well as maintaining communications with the EPA to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures; managing oversight and conduct of project activities including allocation of resources to specific tasks; ensuring that quality procedures are incorporated into all aspects of the project; developing, conducting, and/or overseeing QA plans as necessary; ensuring that any corrective actions are implemented; operating project activities within the documented and approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

[2] The term "existing data" is defined by the EPA's *Environmental Information Quality Policy* (CIO 2105.3) as "… data that have been collected, derived, stored, or reported in the past or by other parties (for a different purpose and/or using different methods and quality criteria). Sometimes referred to as data from other sources." The term "secondary data" may also be used to describe "existing data" in historical EPA quality-related documents.

Rincon Consultants, Inc. is responsible for conducting the GHG emissions inventory, and Ryan Gardner is Rincon's PM. The Rincon PM has assigned an Assistant Project Manager to the project and a TL for each technical task with instructions to complete a baseline emissions inventory for the relevant sectors, develop options for potential emissions reductions with estimated reductions per option, and develop uncertainty estimates for each reduction estimate. Staff were selected based on their position within Rincon's dedicated Climate Action and Resilience team, their experience on similar projects, and their technical skillsets. **Table 1.1** presents the TLs. Each TL is responsible for the day-to-day technical activities under their assigned tasks, including planning, reporting, and controlling of technical and financial resources allocated to the task by the PM. Accordingly, each TL is primarily responsible for implementing the Quality Program and this QAPP on task-level assignments.

Task-level management system. For each of the major deliverables under each task, the assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the QA Manager (or delegate) for review and approval. Each TL is responsible for ensuring that quality procedures are implemented at the task level and for maintaining the official, approved, task-level QAPP content. Each TL will discuss any concerns about quality or any proposed revisions to task-level QAPP content with the QA Manager (or delegate) to identify, resolve, or preclude problems or to amend task-level plans, if necessary. In addition, each TL will work with the Rincon PM and the QA Manager to identify and implement quality improvements. The County of Santa Clara PM is responsible for ensuring the consistency of similar or related QA measures across tasks, and the TLs are responsible for overseeing task-level work performed by technical staff and providing assurance that all required QA/QC procedures are being implemented.

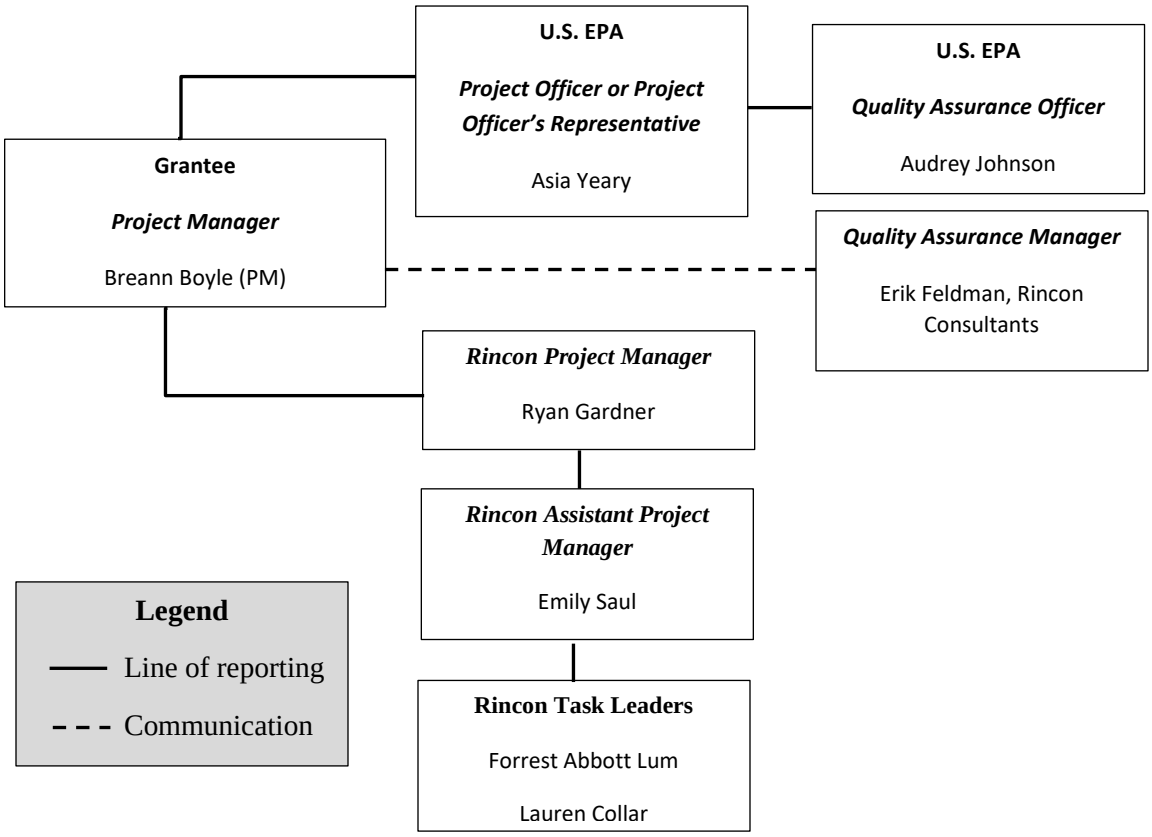
Project-level management system. Tasks are expected to proceed concurrently, in parallel. The Rincon PM will maintain close communications with each TL and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The PM is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO or POR, who provides the EPA's primary oversight function for this project at EPA OAR Region 9 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from the Rincon PM) will be responsible for consulting with the EPA PO or POR, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

The QA Manager is responsible for overseeing the quality system, monitoring and facilitating QA activities on tasks, and generally helping the County of Santa Clara PM, Rincon PM, and TLs understand and comply with EPA QA requirements. The QA Manager will not be involved with any of the data collection, calculations, or initial reviews of the GHG inventory. The QA Manager will perform his independent review once the core project team completes their initial round of work. This is consistent with the CARB verification guidelines and how Rincon operates their other GHG verification projects. At the request of the County of Santa Clara PM the QA Manager is responsible for conducting periodic independent audits of this project's QA program, at a minimum on a yearly basis, and they will produce written documentation of the audit results and recommendations. The QA Manager has been selected from Rincon Consultants, not the County of Santa Clara due to the expedited timeline of the project and because of Rincon Consultants' extensive experience and expertise conducting QA/QC processes for environmental data. The QA Manager has more than 20 years of experience completing environmental and sustainability assessments and has been completing Mandatory Greenhouse Gas Reporting Regulations (MRR) and Low Carbon Fuel Standard (LCFS) verifications as the California Air Resource Board (CARB)-accredited lead verifier since the inception of California's GHG verification program. The County of Santa Clara Sustainability Manager, Gilee Corral, will provide oversight over the QA/QC process and will serve in some capacities of the QA Manager as needed. The County of Santa Clara is a

member of ICLEI – Local Governments for Sustainability, and the Sustainability Manager will utilize support from ICLEI to conduct an independent technical review if needed.

In addition, QC functions will be carried out by other technical staff and will be carefully monitored by the PM, who will work with the Rincon PM and QA Manager to oversee this plan and implement quality improvements. For work done under this project, technical staff may include persons with expertise in the local residential, commercial, and industrial activities. Technical staff may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors. The PM will ensure that technical staff do not review work in a QA capacity for which they were a primary or contributing author. **Exhibit 1** presents the organizational chart for the project.

Exhibit 1. Project Organization[3]



[3] Under the EPA's QAPP standard (CIO 2105-S-02.0, section 3) the organization chart must also identify any contractor relationships relevant to environmental data operations.

1.5. Problem Definition / Background

Under this project, County of Santa Clara will identify, evaluate, and utilize existing data resources[4] to develop a local inventory of the major sources of greenhouse gas (GHG) emissions within San Jose – Sunnyvale – Santa Clara MSA and use that inventory data to develop a climate action plan. This QAPP focuses on the handling of environmental information under sector-specific tasks by technical staff charged with completing the following subtasks in a future planning project implemented in accordance with this QAPP:

1. Develop a comprehensive GHG inventory for the largest sources within each sector,
2. Develop options for reducing emissions within each sector,
3. Develop estimates or ranges of estimates for reductions achievable under each option,
4. Develop uncertainty analyses for each option's emissions reduction estimate, and
5. Present these analyses and options in technical reports consistent with the deliverables required under the CPRG planning grants.

The GHG inventory may utilize the EPA's Local – GHG Inventory Tool (LGGIT),[5] facility-specific GHG data published by the EPA in the Facility Level Information on Greenhouse gases Tool (FLIGHT),[6] data reported to the EPA's Greenhouse Gas Reporting Program (GHGRP),[7] EPA's National Emissions Inventory (NEI),[8] DOE's State and Local Planning for Energy (SLOPE) Platform,[9] the Global Protocol for Community-Scale (GPC) Greenhouse Gas Inventories,[10] the Local Government Operations (LGO) Protocol,[11] and/or 3rd party data or tools, together with any independent, sector-specific estimates prepared by the County of Santa Clara. The FLIGHT and GHGRP datasets can be downloaded and filtered by state, city, county, and/or zip code. Any independent local or MSA estimates or ratios (e.g., electricity usage per customer by customer class) will be validated and reviewed. Significant differences between primary estimates and validation estimates will be evaluated and discussed in the inventory report with the underlying data and methodologies used for the estimates. As applicable, the local inventory will include the following sources and gases (divided into the Residential, Commercial/Institutional, Industrial, and Energy Generation sectors):

LGGIT Source Categories	***Greenhouse Gases (across all sectors)***
1. Mobile Combustion 2. Stationary Combustion 3. Electricity Consumption 4. Solid Waste 5. Urban Forestry 6. Agriculture & Land Management 7. Water Use 8. Waste Generation	carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases (F-gases) including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)

[4] EPA, *Environmental Information Quality Policy*, CIO 2105.3, 03/07/2023 (p. 8) provides common examples of environmental information used to support the EPA's mission at https://www.epa.gov/system/files/documents/2023-04/environmental_information_quality_policy.pdf.

[5] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool

[6] Facility Level Information on Greenhouse gases Tool (FLIGHT) at https://ghgdata.epa.gov/

[7] https://www.epa.gov/ghgreporting/data-sets

[8] https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-ne

[9] https://www.energy.gov/scep/slsc/state-and-local-planning-energy-slope-platform

[10] https://ghgprotocol.org/ghg-protocol-cities

[11] https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf

9. Wastewater Treatment

The EPA LGGIT has two modules: the Local Government Operations Module is specific to municipal governments and evaluating GHG emissions by their departments, and the Community Module, which could also include local government information. The LGGIT User Guides state the two modules are companion tools, and any totals estimated in the Government Operations Module can be included in the Community Module. For example, a county could use the Community Module and incorporate data from the Government Operations Modules completed by the cities within the county. Grantees using both modules should conduct a quality check to ensure that emissions do not get double-counted.

1.5.1. Rationale for Selection of Sectors

For each sector included in the local inventory, **Table 1.2** briefly describes why the sector was included in the inventory and the relative significance of the sector in terms of the magnitude of air emissions from existing inventories, the associated geographic distribution of the sources, and recent trends in readily available activity data for the source category.

Table 1.2 Rationale for Sector Selection

Sectors Included in Inventory	**Rationale for Including in GHG Inventory**
Mobile combustion	Transportation activities were the largest source (29 percent) of total U.S. greenhouse gas emissions in 2021. From 1990 to 2021, transportation CO_2 emissions from fossil fuel combustion increased by 19 percent. Transportation activities occur in all communities.
Electricity	The electric power sector accounted for 25 percent of total U.S. greenhouse gas emissions in 2021. Power generation and/or consumption occurs among all communities.
Urban forestry[12]	This sector includes fluxes of carbon from activities such as converting forests to agricultural use and practices that remove CO_2 from the atmosphere and store it in long-term carbon sinks like forests. In 2021, the net CO_2 removed from the atmosphere by natural and working lands was 12% of total U.S. greenhouse gas emissions. Between 1990 and 2021, total carbon sequestration in this sector decreased by 14%, primarily due to a decrease in the rate of net carbon accumulation in forests, as well as an increase in CO_2 emissions from urbanization.
Agriculture & land management	Agriculture accounted for about 10 percent of U.S. greenhouse gas emissions in 2021, and agricultural soil management was the largest source of N_2O emissions. Enteric fermentation was the largest source of CH_4 emissions.
Stationary combustion (including for	In 2021, the commercial and residential sectors accounted for 7 and 6 percent of total U.S. greenhouse gas emissions, respectively. Emissions from the commercial and residential sectors have increased since 1990. Total residential and commercial greenhouse gas emissions, including direct and indirect emissions, in 2021 have

[12] Under international GHG inventory protocols this category is called “Land use, land-use change, and forestry.”

commercial and residential heating)	increased by 2% since 1990. In 2021, an increase in heating degree days (0.5 percent) increased energy demand for heating in the residential and commercial sectors, however, a 1.8 percent decrease in cooling degree days compared to 2020 reduced demand for air conditioning in the residential and commercial sectors.
Solid waste and waste generation	This sector includes landfills, composting, and anaerobic digestion. Landfills were the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9 percent of total U.S. greenhouse gas emissions.
Wastewater treatment	Wastewater treatment, both domestic and industrial, was the third largest anthropogenic source of N_2O emissions in 2021, accounting for 5.2 percent of national N_2O emissions and 0.3 percent of total U.S. greenhouse gas emissions. Emissions from wastewater treatment increased by 6.1 MMT CO_2e (41.6 percent) since 1990 as a result of growing U.S. population and protein consumption.
Water	This sector includes indirect emissions associated with the electricity used to deliver water to local communities.

1.5.2. Decisions to be Made

The EPA's recommended tool for local GHG inventories (the LGGIT) covers categories of GHG emissions by source category (e.g., mobile combustion, stationary combustion, electricity consumption, solid waste, etc.). The LGGIT provides many default values to facilitate developing local estimates using methods consistent with the Global Protocol for Community-Scale GHG Emissions.[13] There are four primary decisions to be made under each task of this project for each source category, and the County of Santa Clara will be charged with the following decisions:

1. Determine (for each major activity) if the LGGIT estimate, a different federal estimate or tool, or a non-federal estimate should be used for the local GHG baseline estimate.
2. Determine the best options for reducing emissions of air pollution and achieving the following Congressional objectives under the Inflation Reduction Act:
    a. Reduce climate pollution while supporting creation of good jobs and lowering energy costs for families.
    b. Accelerate work addressing environmental injustice and empowering community driven solutions in overburdened neighborhoods.
    c. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.
3. Develop an estimate or a range of estimates for reductions achievable under each option.
4. Estimate the uncertainty of the emissions reduction estimate(s) or ranges under each option.

1.5.3. Actions to be Taken, Action Limits, and Expected Outcomes

Estimates will be derived from existing local inventories, existing local activity data, or from other EPA or state resources. Calculated estimates derived from local activity data will be compared to downscaled state estimates for validation. The rationale for including any emissions estimates that show significant discrepancies from state estimates will be documented in the community's GHG inventory report along with the underlying data and calculation methodology.

When identifying the best options for reducing air pollution, the County of Santa Clara will consider the activities affecting the largest numbers of families, business establishments, recreation areas,

[13] https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

and schools. Options may include potential reductions in task-level activities impacting nonattainment areas and impacting residential, commercial, and school districts near the largest sources of air pollution. The County of Santa Clara expects that each task will produce multiple options for sector-specific emissions reduction projects for further consideration by management and policymakers.

1.5.4. Reason for Project

The baseline GHG inventory and options analyses developed under this local community project will be utilized by the County of Santa Clara and the Bay Area Air Quality Management District (BAAQMD) for planning purposes to support the San Jose – Sunnyvale – Santa Clara's development of the following three CPRG planning deliverables:

- San Jose – Sunnyvale – Santa Clara's **Priority Climate Action Plan** (PCAP), which is due April 1, 2024. This plan will include near-term, implementation-ready, priority GHG reduction measures and is a prerequisite for any implementation grant.
- San Jose – Sunnyvale – Santa Clara's **Comprehensive Climate Action Plan** (CCAP), which is due in 2025. This plan will review all sectors that are significant GHG sources or sinks, and include both near- and long-term GHG emission reduction goals and strategies.
- San Jose – Sunnyvale – Santa Clara's **Status Report** on progress towards goal, which is due in 2027. This progress report will include updated analyses, plans, and next steps for key metrics.

This QAPP describes in detail the necessary QA and QC requirements and technical activities that will be implemented to ensure the baseline GHG inventory and the sector-specific emissions reduction options are reliable for the PCAP and CCAP. As necessary, revisions to the QA and QC requirements defined in this QAPP will be updated in the 2027 Status Report.

1.5.5. Relevant Clean Air Act Mandates and Authorizations

The inventory produced under this project will support the deliverables required under EPA's Climate Pollution Reduction Planning Grants. The inventory will be used to evaluate opportunities for reducing GHG emissions from all major-emitting sources including both mobile source categories and stationary source categories. This project will include the fundamental research necessary to evaluate and plan new programs (and amendments to existing Clean Air Act [CAA] programs) for reducing emissions from fossil fuel combustion activities. Many activities in the GHG inventory (and subsequent emissions reductions options analyses) include major sources of criteria and toxic pollutants. Accordingly, the purpose of this project (to evaluate and plan for reductions in GHG emissions, including reductions from usage or production of fossil fuels) is also consistent with the following statutory mandates and authorizations under Clean Air Act Title I:

- ***§ 7403. Research, investigation, training, and other activities***
  (a) Research and development program for prevention and control of air pollution
  The Administrator shall establish a national research and development program for the prevention and control of air pollution ….
    (1) conduct, and promote the coordination and acceleration of, research, investigations … and studies related to the causes … extent, prevention, and control of air pollution;
    (2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities ….
  (b) Authorized activities of Administrator in establishing research and development program
  In carrying out the provisions of [paragraph (a)] the Administrator is authorized to–

(1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;….
(2) make grants to air pollution control agencies … for purposes … in subsection (a)(1) ….

- ***§ 7404. Research related to fuels and vehicles***
  (a) Research programs; grants; ….
  The Administrator shall give special emphasis to research and development into new and improved methods, having industry-wide application, for the prevention and control of air pollution and control of air pollution resulting from the combustion of fuels… he shall–
  (1) conduct and accelerate research programs directed toward development of improved , cost-effective techniques for–
  (A) control of combustion byproducts of fuels, ….
  (B) improving efficiency of fuels combustion so as to decrease atmospheric emissions ….

- ***§ 7405. Grants for support of air pollution planning and control programs***
  (a) Amounts; limitations; assurances of plan development capability.
  (1)(A) The Administrator may make grants to air pollution control agencies … in an amount up to three-fifths of the cost of implementing programs for the prevention and control of air pollution …. For the purpose of this section, "implementing" means any activity related to the planning, developing, establishing, carrying out, improving, or maintaining of such programs….
  (C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 7410 … grants under subparagraph (A) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

1.5.6. Information Provided by the EPA under § 7403(b)(1)

Under authority of CAA § 7403(b)(1) the EPA has provided the following resources to ensure reliable air emissions inventories are produced to support plans for reducing emissions.

- Agency-wide Quality Program Documents
- Quality Assurance-specific Directives
  - CIO 2105.3 – Environmental Information Quality Policy, April 10, 2023
  - CIO 2105-P-01.3 – Environmental Information Quality Procedure, March 7, 2023
  - CIO 2105-S-02.0 – EPA's Environmental Information QA Project Plan (QAPP) Standard
  - EPA Regional Sites for Quality Management Plans and Guidance:
    - Region 1
    - Region 2
    - Region 3
    - Region 4
    - Region 5
    - Region 6
    - Region 7
    - Region 8
    - Region 9
    - Region 10
- QA Guidance
  - EPA QA/G-4 – *Guidance on Systematic Planning Using Data Quality Objectives Process*
  - EPA QA/G-5 – *Guidance for Quality Assurance Project Plans*

The County of Santa Clara will utilize these resources, as applicable, to ensure evaluation of existing data and utilization of those data are consistent with the EPA's relevant directives and guidance.

1.6. Project / Task Description

An example schedule of deliverables for the technical tasks (Tasks 1-5) for GHG inventory QAPPs is presented in **Tables 2.1** through **2.5.** The work to be performed under this project involves preparing a local GHG emissions inventory for the San Jose – Sunnyvale – Santa Clara MSA. The organization of the work is based on the use of the EPA's Local – GHG Inventory Tool (LGGIT)[14] under the following sector-specific tasks:

Task 1: Local inventory of mobile combustion GHG emissions.

Task 2: Local inventory of electric power consumption (indirect) GHG emissions.

Task 3: Local inventory of solid waste GHG emissions.

Task 4: Local inventory of GHG emissions from other sectors.

- 4.1 Stationary combustion
- 4.2 Agriculture and land management
- 4.4 Waste generation
- 4.5 Water
- 4.6 Wastewater treatment

Task 5: Local inventory of urban forestry resources.

For each sector-specific task, **Tables 2.1–2.5** provide planned activities and a schedule of deliverables for use by communities preparing GHG inventories. The EPA's LGGIT, other resources, and answers to frequently asked questions are also located on the Local GHG Inventory Tool Page Greenhouse Gas Data and Resources webpage.[15] The LGGIT User's Guides provide a summary of required data inputs for each module (Table 1 of each LGGIT User's Guide).

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
1. For the PCAP, staff will validate the existing baseline GHG inventories that have been completed for Santa Clara County (2017) and San Benito County (2018, 2019, and 2020). 2. The existing baseline GHG inventory used on-road and off-road transportation (vehicle miles traveled) data from local sources such as the Metropolitan Transportation Commission, local travel demand models, and the California Air Resources Board. 3. For the CCAP, the GHG inventories will be updated using VMT data from local and state sources such as the Metropolitan Transportation Commission, local travel demand models, and the California Air Resources Board.	Within 60 days of QAPP approval by EPA (for PCAP)

[14] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool .
[15] Ibid.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	**Schedule**
Task 1. Mobile Combustion (Transportation)	
4. To validate GHG emission calculations and provide quality assurance and control, Rincon will first trace all activity data and emission factors to the measurement or calculation source. For example, on-road transportation emission factors will be traced back to the state emissions model and recalculated to determine accuracy. Second, all calculations will be reviewed in a stepwise manner. The calculations will be provided through transparent equations that will allow for easy review of the calculation steps and identification of all inputs. Each equation will also reference the appropriate GHG emissions reporting protocol such as the International Council for Local Environmental Initiatives' (ICLEI) US Community Protocol. 5. Any assumptions used to estimate activity data and emission factors or calculate GHG emissions will be validated against best practices outlined in protocols and best practices used across California. The validation process will be performed by a Rincon analyst and reviewed by the Project Manager. The final step of the process will be an independent review by the QAM. 6. In the GHG inventory report or in a separate report based on the GHG inventory, the County of Santa Clara will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors.	.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
1. For the PCAP, staff will validate the existing baseline GHG inventories that have been completed for Santa Clara County (2017) and San Benito County (2018, 2019, and 2020). 2. The existing baseline GHG inventory used electricity data from local electricity providers, such as Silicon Valley Clean Energy (SVCE), Pacific Gas & Electric (PG&E), City of Palo Alto Utilities (CPAU), Silicon Valley Power (SVP), and Central Coast Community Energy (3CE). 3. For the CCAP, the GHG inventories will be updated using electricity data from local sources such as Silicon Valley Clean Energy (SVCE), Pacific Gas & Electric (PG&E), City of Palo Alto Utilities (CPAU), Silicon Valley Power (SVP), and Central Coast Community Energy (3CE). 4. To validate GHG emission calculations and provide quality assurance and control, Rincon will first trace all activity data and emission factors to the measurement or calculation source. For example, electricity consumption will be traced back to and validated against a representative sample of utility invoices or meter readings. Second, all calculations will be reviewed in a stepwise manner. The calculations will be provided through transparent equations that will allow for easy review of the calculation steps and identification of all inputs. Each equation will also reference the appropriate GHG emissions reporting protocol such as the International Council for Local Environmental Initiatives' (ICLEI) US Community Protocol. 5. Any assumptions used to estimate activity data and emission factors or calculate GHG emissions will be validated against best practices outlined in protocols and best practices used across California. The validation process will be performed by a Rincon analyst and reviewed by the Project Manager. The final step of the process will be an independent review by the QAM.	Within 60 days of QAPP approval by EPA (for the PCAP).

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
6. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment). f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
1. For the PCAP, staff will utilize the existing baseline GHG inventories that have been completed for Santa Clara County (2017) and San Benito County (2018, 2019, and 2020). 2. The existing baseline GHG inventory used ICLEI method SW.4 and local tonnage data. 3. For the CCAP, the GHG inventories will be updated using local tonnage data, and/or ICLEI method SW.4, and/or other relevant data sources. 4. To validate GHG emission calculations and provide quality assurance and control, Rincon will first trace all activity data and emission factors to the measurement or calculation source. Second, all calculations will be reviewed in a stepwise manner. The calculations will be provided through transparent equations that will allow for easy review of the calculation steps and identification of all inputs. Each equation will also reference the appropriate GHG emissions reporting protocol such as the International Council for Local Environmental Initiatives' (ICLEI) US Community Protocol. 5. Any assumptions used to estimate activity data and emission factors or calculate GHG emissions will be validated against best practices outlined in protocols and best practices	Within 60 days of QAPP approval by EPA (for the PCAP).

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	**Schedule**
Task 3. Solid Waste (Landfills)	
used across California. The validation process will be performed by a Rincon analyst and reviewed by the Project Manager. The final step of the process will be an independent review by the QAM. 6. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
1. For the PCAP, staff will utilize the existing baseline GHG inventories that have been completed for Santa Clara County (2017) and San Benito County (2018, 2019, and 2020). Not every sector may be included in the PCAP inventory. 2. The existing baseline GHG inventory used natural gas data from local providers such as PG&E and the U.S. Community Protocol; agriculture data from local sources such as CARB, the Santa Clara County Crop Report, and BAAQMD and national sources such as California Department of Food and Agriculture (CDFA); water data from local sources such as Valley Water; and wastewater data from local wastewater treatment plants. 3. For the CCAP, the GHG inventories will be updated using local and state data sources, with national data sources as needed. 4. To validate GHG emission calculations and provide quality assurance and control, Rincon will first trace all activity data and emission factors to the measurement or calculation source. Second, all calculations will be reviewed in a stepwise manner. The calculations will be provided through transparent equations that will allow for easy review of the calculation steps and identification of all inputs. Each equation will also reference the appropriate GHG emissions reporting protocol such as the International Council for Local Environmental Initiatives' (ICLEI) US Community Protocol. The below equation (written following ICLEI Equations BE.1.1.1, BE.1.1.2, BE.1.1.4, and BE.1.1.6) and table demonstrate how the calculations will be presented using GHG emission calculations from residential and nonresidential natural gas as an example.	Within 60 days of QAPP approval by EPA (for sources included in the PCAP).

GHG Emissions from Natural Gas Combustion

$$CO_2e_{NatGas,i} = \left(Fuel_{NG,i} - [1 - L_{enduse}]\right) \times \left[\left(EF_{NG,CO_2} \times GWP_{CO_2}\right) + \left(EF_{NG,CH_4} \times GWP_{CH_4}\right) + \left(EF_{NG,N_2O} \times GWP_{N_2O}\right)\right] \times 10^{-1} \times 10^{-3}$$

GHG Emissions Parameters and Data Sources

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	$CO_2e_{NatGas,i}$	See Calculation Table.	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Calculation Table.	therms/year	Utility Company
Percent natural gas lost during consumer end-use	L_{enduse}	0.50%	Percent	Environmental Defense Fund[1]

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables					Schedule
Task 4. Inventory of GHG Emissions for Other Sources					
Carbon dioxide emission factor for natural gas combustion	EF_{NG,CO_2}	53.06	kg CO_2-/mmBTU natural gas	EPA Emission Factors Hub[2]	
Methane emission factor for natural gas combustion	EF_{NG,CH_4}	0.001	kg CH_4/mmBTU natural gas	EPA Emission Factors Hub	
Nitrous oxide emission factor for natural gas combustion	EF_{NG,N_2O}	0.0001	kg N_2O/mmBTU natural gas	EPA Emission Factors Hub	
Global warming potential of carbon dioxide	GWP_{CO_2}	1		IPCC Fourth Assessment Report[3]	
Global warming potential of methane	GWP_{CH_4}	25		IPCC Fourth Assessment Report	
Global warming potential of nitrous oxide	GWP_{N_2O}	298		IPCC Fourth Assessment Report	
Conversion factor	10^{-1}	0.1	mmBTU/therm		
Conversion factor	10^{-3}	0.001	MT/kg		
Building type (i.e. residential or nonresidential)	i	Residential; Nonresidential	Categorical		

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

1. Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Available at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

2. Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub (April, 2022). Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

3. Intergovernmental Panel on Climate Change (IPCC). 2007. AR4 Synthesis Report: Climate Change 2007. Available at: https://www.ipcc.ch/assessment-report/ar4/

5. Any assumptions used to estimate activity data and emission factors or calculate GHG emissions will be validated against best practices outlined in protocols and best practices used across California. The validation process will be performed by a Rincon analyst and reviewed by the Project Manager. The final step of the process will be an independent review by the QAM.

6. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:

    a. The specific source categories and activities affected by the proposed option.
    b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate.
    c. The quantity of criteria emissions reduced by the options with an associated

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.5 Technical Task Descriptions for Task 5.

<table>
<tr><th>Tasks and Deliverables</th><th>Schedule</th></tr>
<tr><td colspan="2">Task 5. Urban Forestry (Natural Working Lands and Forestry)</td></tr>
<tr><td>1. For the CCAP, carbon sequestration potential from natural and working lands may be calculated using LANDFIRE and/or local vegetation data through the use of ArcGIS pro and RStudio. These parameters may be used in combination with CARB’s carbon estimates developed for the State’s Natural and Working Lands Inventory, which are based off of LANDFIRE data descriptions. The 2022 LANDFIRE update has been completed for Santa Clara and San Benito Counties and it is anticipated that Rincon will utilize this publicly available dataset. LANDFIRE is a national data set and commonly requires a robust QA/QC process with local experts to improve the accuracy of the data when used for carbon accounting purposes. Therefore, Rincon will develop an ArcGIS online mapping tool that will assist the County of Santa Clara, and their interested parties, in reviewing the data and providing corrections. This has been an effective method to identify and correct any major discrepancies in the vegetation data. A high-level overview of the carbon stock calculation methodologies that will be used is provided in the table below. This methodology aligns with the methods developed for the CARB scoping plan.
<table>
<tr><th>Carbon Type</th><th>Calculation Methodology and Data Sources</th></tr>
<tr><td>Land Cover & Above and Below-ground biomass (e.g., living trees, crops, bushes, standing dead trees, leaf-litter)</td><td>Data Source: LANDFIRE (supplemented by NLCD); i-Tree Canopy Tool; California Air Resources Board (CARB) provides volumetric estimates of carbon mass (metric tons per hectare), which are provided for every combination of existing vegetation type, height, and cover (CARB, 2020).

Quantification Methodology: Values are then assigned to the 30-by-30-meter cells in the GIS map in the county. Carbon values are then summed by land cover class.</td></tr>
<tr><td>Soil Carbon</td><td>Data Source: Values for soil carbon are obtained using the National Cooperative Soil Survey (NCSS) Characterization Database, the National Soil Information System (NASIS), the Rapid Carbon Assessment (RaCA) datasets, and Soil Survey Geographic Database (SSURGO).

Quantification Methodology: Soil organic carbon from depths of 0-30 centimeters are calculated according to the Quantification Guidance for use with the Forest Carbon Projects Report (Climate Action Reserve, 2017)</td></tr>
<tr><td>Wetland Emissions</td><td>Data Source: California Coastal Commission (GIS data); IPCC; San Francisco Estuary Institute (SFEI) (Vaughn et al., 2022).

Quantification Methodology: Emission factors from the San Francisco Estuary Institute and IPCC were applied to San Francisco Bay and Coastal wetlands acreages to estimate annual emissions. Emission factors for coastal and Bay Area wetlands were negative, indicating that these wetlands sequestered more carbon than they emitted each year.</td></tr>
</table>
</td><td>Within 365 days of QAPP approval by EPA.</td></tr>
</table>

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
2. To validate GHG emission calculations and provide quality assurance and control, Rincon will first trace all activity data and emission factors to the measurement or calculation source. Second, all calculations will be reviewed in a stepwise manner. The calculations will be provided through transparent equations that will allow for easy review of the calculation steps and identification of all inputs. Each equation will also reference the appropriate GHG emissions reporting protocol such as the International Council for Local Environmental Initiatives' (ICLEI) US Community Protocol. 3. Any assumptions used to estimate activity data and emission factors or calculate GHG emissions will be validated against best practices outlined in protocols and best practices used across California. The validation process will be performed by a Rincon analyst and reviewed by the Project Manager. The final step of the process will be an independent review by the QAM. 4. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. Specific source categories and activities affected by the proposed option. b. Quantity of GHG emissions reduced by option with uncertainty estimate. c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation.	

1.7. Quality Objectives / Criteria

The primary objectives for this project are to develop reliable inventories for each of the GHG-emitting sectors in the San Jose – Sunnyvale – Santa Clara, CA MSA and to identify options for reducing emissions from those sectors. Accordingly, all quality objectives and criteria are aligned with these objectives. The quality system used for this project is the joint responsibility of the County of Santa Clara PM, Rincon PM, Task Leaders, and QA Manager. As discussed in section 1.4, an organizationally independent QA Manager will maintain oversight of all required measures in this QAPP. QC functions will be carried out by technical staff and will be carefully monitored by the responsible Task Leaders, who will work with the QA Manager to identify and implement quality improvements. All activities under this project will conform to this QAPP.

1.7.1. Data Quality, Management, and Analyses

For this project Rincon will use a variety of QC techniques and criteria to ensure the quality of data and analyses. Data of known and documented quality are essential components for the success of the project, as these data will be used to inform the decision-making process for the PCAP and CCAP as discussed in Section 1.5.4. The table in **Appendix A** lists by task the specific QC techniques and criteria that are part of this QAPP.

The data quality objectives and criteria for this project are accuracy, precision, bias, completeness, representativeness, and comparability. *Accuracy* is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias). *Precision* is a measure of how reproducible a measurement is or how close a calculated estimate is to the actual value. *Bias* is a systematic error in the method of measurement or calculation. If the calculated value is consistently high or consistently low, the value is said to be biased. Our goal is to ensure that information and data generated and collected are as accurate, precise, and unbiased as possible within project constraints. It is not anticipated that this project will include primary data collection. Generally, existing data and tools provided by the EPA and other qualified sources will be used for project tasks. A subject matter specialist familiar with technical reporting standards (such as a permit writer or compliance engineer with knowledge of the community's facilities operating in the sector) will be used to QA all data utilized for developing the local GHG inventory. Rincon will verify the accuracy of all data by checking for logical consistency among datasets. All existing environmental data shall meet the applicable criteria defined in CFR and associated guidance, such as the validation templates provided in the *EPA QA Handbook Volume II*.

Uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific project activity being evaluated.

When available, data originally gathered using published methods whose applicability, sensitivity, accuracy, and precision have been fully assessed, such as EPA reference methods, will be preferred and considered to be of acceptable quality. Project decisions may be adversely impacted if, for example, existing data were used in a manner inconsistent with the originator's purpose. Metadata can be described as the amount and quality of information known about one or more facets of the data or a dataset. It can be used to summarize basic information about the data (e.g., how, why, and when the existing data were collected), which can make working with specific data or datasets easier and provides the user with more confidence. Metadata are valuable when evaluating existing data, as well as when planning for collection of primary data that may be required in the future. However, the effort needed to locate and obtain original source materials can be costly. Accordingly, a graded approach to planning will be applied and ongoing discussions with the EPA will be held to determine what magnitude and rigor of QA effort are appropriate and affordable for the project.

For the data analysis completed under this project, analytical methods will be reviewed to ensure the approach is appropriate and calculations are accurate. Spreadsheets will be used to store data and complete necessary analyses. Design of spreadsheets will be configured for the intended use. All data and methodologies specific to each analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

The draft inventory will be evaluated for GHG-emitting-sector and geographic completeness. The County of Santa Clara will utilize the framework of sectors in the EPA's LGGIT tool, previous local inventories, or previous inventories completed by similar communities to ensure that the inventory prepared under this project includes all major GHG-emitting sectors. To ensure the inventory is geographically complete, the draft inventory will also be submitted for review by County of Santa Clara staff who are familiar with all activities subject to local or federal standards issued under Title I of the CAA to ensure that all major-emitting, local activities are included in the inventory.

Representativeness is a qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. The County of Santa Clara and Rincon will use the most complete and accurate information available to compile representative data for the community's GHG-emitting activities.

Data comparability is a qualitative term that expresses the measure of confidence that one dataset can be compared to another and can be combined for the decision(s) to be made. The County of Santa Clara and Rincon will compare datasets when available from different sources to check for the quality of the data. This QA step will also ensure that any highly correlated datasets or indicators are identified. Supporting data, such as information on reference methods used and complete test reports, are important to ensure the comparability of emissions data.

1.7.2. Document Preparation

All documents produced under this project will undergo internal QC review, as well as technical review and an editorial review, prior to submission to the EPA PO. QC will be performed by an engineer, scientist, or economist, as appropriate, with sufficient knowledge. The technical reviewer will review the document for accuracy and integrity of the technical methodologies, analyses, and conclusions.

An editorial review of all final documents will be performed. Editors will verify clarity, spelling, and grammatical correctness, and ensure documents are free of typographical errors. Editors will verify that references are cited correctly. This will include a comparison against the original documents.

The *QC Documentation Form* (**Appendix B**) will be used to track the approval process. The form must be completed and signed for all document deliverables. The signatures required include those of the TL and technical and editorial reviewers. Completion of this form certifies that technical review, editorial review, and all required QC procedures have been completed to the satisfaction of the TL and QAM or QCC. Copies of these signed forms will be maintained in the project files.

1.8. Special Training / Certifications

All County of Santa Clara and Rincon staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. Rincon staff serving in the QAM role under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities. The PM and all TLs under this project will have completed an online training course on air emissions inventories on the Air Knowledge website at https://airknowledge.gov/EMIS-SI.html.

Calculation of carbon sequestration and emissions of vegetation from the LANDFIRE database will require use of ARCGIS. Rincon has a dedicated GIS team who has completed similar carbon sequestration quantification projects throughout the State of California using CARB methodologies.

Similar projects include the Contra Costa County Healthy Lands, Healthy People Report[16] and the Sonoma County Carbon Inventory and Sequestration Potential Study[17]. No additional training is necessary to complete this work.

No additional technical training is required. If training is required for new staff or for particular segments of the GHG inventory, the PM in coordination with the associated TL will identify available training resources for the inventory segment and incorporate the required training into the project schedule.

[16] https://www.contracosta.ca.gov/DocumentCenter/View/79768/Healthy-Lands-Healthy-People-Final-Report
[17] https://sonoma-county.legistar.com/LegislationDetail.aspx?ID=6399747&GUID=42EF9CFA-1B23-4B80-BE5C-6DC2B882A484

1.9. Documents and Records

The County of Santa Clara and Rincon> will document in electronic form QC activities for this project. The TL is responsible for ensuring that copies of all completed QC forms, along with other QA records (including this QAPP), will be maintained in the project files. Project files will be retained by the County of Santa Clara for 5 years after the QAPP is approved. The types of documentation that will be prepared for this project include:

- Planning documentation (e.g., QAPP)
- Implementation documentation (i.e., Review/Approval Forms and QC records)
- Assessment documentation (i.e., audit reports and independent calculations).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the *QC Documentation Form* shown in **Appendix B**. This form will document the completion of the QC techniques planned for use on this project as listed in the table in **Appendix A**. One or more completed versions of these forms, as necessary, will be maintained in the project files. The types of documents and activities for which QC will be conducted and documented may include raw data, data from other sources such as data bases or literature, data entry into the LGGIT tool, calculations necessary to transform raw data into forms required for LGGIT entry, and comparisons of primary estimates with QC estimates.

Technical reviews will be used along with other technical assessments (i.e., QC checks) and QA audits, at a minimum on a yearly basis, to corroborate the scientific defensibility of any data analyses. A technical review (i.e., internal senior review) is a documented critical review of a specific technical work product. It is conducted by subject matter experts who are collectively equivalent (or senior) in technical expertise to those who performed the work. Given the nature of the deliverables under this project, a technical review is an in-depth assessment of the assumptions, calculations, extrapolations, alternative interpretations, and conclusions in technical work products. Technical review of proposed methods and associated data will be documented in the *QC Documentation Form* shown in **Appendix B**. The form will include the reviewer's charge, comments, and corrective actions taken.

Additionally, the County of Santa Clara has developed and instituted document control mechanisms for the review, revision, and distribution of QAPPs. Each QAPP has a signed approval form, title page, table of contents, and an EPA-approved document control format (see header at top of the page). The distribution list for this QAPP was presented in **Table 1.1**. During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list, as well as to any additional staff supporting this project. Any revision to the QAPP will be documented in a QAPP addendum, approved by the same signatories to this QAPP, and circulated to everyone on the distribution list by the County of Santa Clara PM.

At this time, the County of Santa Clara does not know if the project will collect or handle personally identifiable information (PII) subject to the Privacy Act of 1974. However, if during the course of this project technical staff determine that PII is required to support project objectives, the County of Santa Clara will meet all requirements of the Privacy Act of 1974. **Appendix C** indicates the status of our determination regarding applicability of the Privacy Act of 1974 under this project.

2. Existing Data Acquisition and Management Protocols (Group B)

2.1. Sampling Process Design

2.1.1. Need and Intended Use of Data Used

As indicated in **Tables 2.1 – 2.5**, a wide range of data for a diverse set of GHG-emitting activities is necessary to prepare a local inventory. Existing data resource may include sector-specific or facility-specific GHG emissions estimates, emissions factors, or activity data for use with emissions factors. The experimental design for this inventory project relies on local, state, and national data together with independent estimates prepared by County of Santa Clara and Rincon assigned QC staff. Existing data resources (including but not limited to data from previously completed inventories) will be utilized to develop GHG emissions estimates.

2.1.2. Identification of Data Sources and Acquisition

The following data sources may be evaluated for use under each task to develop estimates for the major-emitting sectors in the San Jose – Sunnyvale – Santa Clara MSA or for use in validation of estimates:

- Task 1:
  - Vehicle registration data from the California DMV.
  - State or federal averages on vehicle miles traveled and miles per gallon from the U.S. Department of Transportation.
  - National Emissions Inventory (NEI) county-level estimates for mobile sources.
  - VMT data from local sources such as the Metropolitan Transportation Commission, local travel demand models, and the California Air Resources Board
- Task 2:
  - U.S. Department of Energy's (DOE's) SLOPE Platform which reports county-level electricity usage in million British thermal units.
  - DOE's EIA Form 861 which reports sub-county-level usage in MWh and customer counts as reported by the different distribution utilities operating within each county.
  - Electricity consumption by customer class obtained directly from Silicon Valley Clean Energy (SVCE), Pacific Gas & Electric (PG&E), City of Palo Alto Utilities (CPAU), Silicon Valley Power (SVP), and Central Coast Community Energy (3CE).
- Task 3:
  - Number of community landfills and information on landfill gas (LFG) collection systems, as applicable, from local solid waste management authorities.
  - Landfill emissions data reported to the EPA's GHGRP.
- Task 4:
  - Data published by the EPA under the Greenhouse Gas Reporting Program for fossil fuel consumption by customer class from PG&E.
  - Water usage data from local sources such as Valley Water.
  - County-level natural gas consumption data from DOE's SLOPE Platform.
  - Wastewater management data from local water utility(ies).
  - Agriculture data from local sources such as CARB, the Santa Clara County Crop Report, and BAAQMD and national sources such as CDFA.

- Task 5:
    - Area calculations from web-based map applications.
    - Tree cover estimates from local surveys or forestry databases.
    - Existing vegetation type, height, and cover from LANDFIRE.
    - CARB's carbon estimates developed for the State's Natural and Working Lands Inventory

2.2. Quality Control

All data operations conducted for this project will involve existing, non-direct measurement data. All data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use. In addition to reviewing and assessing the data collected, all data entered into spreadsheets and all calculations completed for analyses will be reviewed by a senior technical QC reviewer. The QC reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The QC reviewer will also confirm all data were entered correctly and that calculations are complete and accurate. Calculations will be checked by repeating each calculation, independently, and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for the draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

Where calculations are required to assess the data/datasets, QC calculations will be performed using computer spreadsheets and calculators to reduce typographical or translation errors–mathematical/ statistical calculations are performed using spreadsheets or software programs with predefined formulas and functions. The County of Santa Clara and Rincon will ensure that any manipulations performed on the data/dataset were done correctly. Such calculations could involve statistical checks to look for data outliers. One approach, for example, that may be used to identify outliers or unusual data points is sorting a datasheet for one or more data variables. This approach is a simple but effective way to highlight unusually high or low values. Graphing data using boxplots, histograms, and scatterplots is another method that may be used to identify gaps in the data (missing data), outliers, or unusual data points. Another approach that may be used is the use of Z-scores, which can quantify the unusualness of an observation when data follow a normal distribution. A Z-score for a particular value indicates the number of standard deviations above and below the mean that the value falls. For example, a Z-score of 2 indicates that an observation is two standard deviations above the average while a Z-score of -2 indicates the value is two standard deviations below the mean. A Z-score of zero represents a value that equals the mean. As appropriate, we will also use hypothesis tests to find outliers, or an interquartile range (IQR) to calculate boundaries for what constitutes minor and major outliers. The methods used will be driven by the scale and type of data. The County of Santa Clara will determine outlier detection methods to be used based on the initial review of the data. Identified outliers will be highlighted to the PM, TL, QAM, or delegate with options for treatment.

2.3. Non-direct Measurements for GHG Inventory and Options Identification

All data operations conducted on this project will involve existing, non-direct measurement data. All existing data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use.

Consistent with the EPA's QA requirements, this QAPP describes the procedures that will be used to ensure the selection of appropriate data and information to support the goals and objectives of this project. Specific elements addressed by this QAPP include:

- Identifying the sources of existing data,
- Presenting the hierarchy for data selection,
- Describing the review process and data quality criteria,
- Discussing quality checks and procedures should errors be identified, and
- Explaining how data will be managed, analyzed, and interpreted.

Data presented in the GHG inventory will be traced to its source (e.g., database input and output). Key resources include data collected by the EPA (e.g., GHGRP data), and data from EPA-approved data

sources (e.g., Department of Energy and other federal data sources). These sources may include primary literature (i.e., peer-reviewed journal articles and reports) or databases. We may also use approved existing sources (e.g., handbooks, databases). Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. When peer-reviewed literature or EPA-approved data sources cannot be used, we will document any significant limitations to the data sources used.

We will document information regarding each dataset and our rationale/selection criteria for selecting the data sources used in the inventory. The TL will be responsible for overseeing and confirming the selection of the data for the project tasks.

Table 3.1 provides a hierarchy for data quality when identifying and reviewing available sources of data and information. When evaluating data resources, efforts will be made to identify and select data sources that most closely conform to the highest ranked criteria. Data quality metrics and documentation may not be provided by each source, and as necessary, we may consult with subject matter experts from permitted facilities or trade associations operating in the San Jose – Sunnyvale – Santa Clara MSA to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by the County of Santa Clara and Rincon and project advisors to ensure that the data represent full-scale designs and commercial processes, and that they are applicable to economic and regulatory conditions in the United States. The County of Santa Clara and Rincon will document data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data; the review will include examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The Rincon TL is responsible for verifying the usability of data and related information.

Table 3.1 Existing Data Quality Ranking Hierarchy

Quality Rank	**Source Type**
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

The County of Santa Clara will work with EPA to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the vintage and quality of the data (based on peer review). The quality of the data will consider the credibility of the source, and the QA documentation provided by the data source. Senior technical staff will also evaluate the availability of alternative datasets, and suitability of the selected data for the intended purpose.

The County of Santa Clara will use the Secondary Data Quality Ranking Hierarchy when identifying and reviewing available sources of data and information. The source types in **Table 3.1** appear in the order in which they are likely to meet the data quality criteria. For example, federal government data are more likely to be from a credible source, thoroughly reviewed, suitable, available, and representative, and any exceptions to these data criteria are likely to be noted in the government data, providing transparency. Data from individuals are expected to be less reliable, not peer reviewed, and may not be suitable or representative of local activities.

If it is determined that data meeting the fourth (i.e., conference proceedings and other trade literature: non peer-reviewed) or fifth (i.e., individual estimates such as personal communications with vendors) level compose the best or only available data source, the TL will include in the inventory a description of these data with associated limitations for review and approval by the PM and QAM.

These measures of data quality will be used to judge if the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will include in the inventory a discussion for review and approval by the PM and QAM.

We will also consider, for example, the age (i.e., date of the source dataset) and the representativeness of the data and will include in the inventory report for review and approval by the PM and QAM any quality concerns or uncertainties introduced with use of these data, such as data gaps or inconsistencies with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the inventory report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, that the data are current, and that the data are descriptive of similar processes within the San Jose – Sunnyvale – Santa Clara MSA. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine if data are missing or confusing and if they meet secondary-use quality objectives.

Key screening criteria will be used to screen the sources identified. The Rincon TL will provide oversight to the screening process to ensure sources collected are the most relevant and meet quality requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted out of the information sources to develop the required output for each of the project tasks.

2.3.1. Criteria for Accepting Existing Data for Intended Use

The criteria for determining if the data are acceptable for use in developing the local inventory will be based on the following:

- Data Source – Was the data originated by a credible source that is generally accepted as the experts or authority in the relevant field?
- Transparency – Are the data collection, cleaning, and calculation methods and assumptions clearly documented?
- Data Completeness – Is the data reasonably complete? If the data isn't complete, are there explanations for why, and can reasonable assumptions be made to fill in data gaps?

All data sources will be reviewed by experts and/or staff familiar with each data type to ensure the data aligns with expectations and are within reasonable ranges.

While some differences between the primary calculations and independent calculations are expected, differences of more than 10 percent must be accompanied by an explanation subject to approval by the PM and QAM prior to using the estimate in the community's inventory.

2.3.2. Criteria for Options Identification

Review of activities under each task and identification of options for emissions reductions to be considered by policymakers will be based on the following criteria:

1. Quantity of reductions in emissions of climate pollution under the option.
2. Number of jobs likely to be created by the option.
3. Environmental justice benefits of the project including the number of people living in overburdened neighborhoods that will benefit from the option.
4. Quantity of reductions in criteria and toxic air pollutants that can be achieved by option.
5. Number of people living, working, recreating, and going to school in the area(s) benefiting from the option.

2.4. Data Management

Data management procedures include file storage and file transfer. All project and data files will be stored on the County of Santa Clara project servers. Files will be organized and maintained by the TL in folders by project, task, and function, including a system of file labeling to ensure version control. Any files containing confidential business information will be stored on secure computers. The TL will make sure that staff are trained and adhere to the project file organization and version control labeling to ensure that files are placed in consistent locations. All files will be backed up each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Typically, records will be archived once the project is completed. Record retention times will be based on contractual and statutory requirements or will follow County of Santa Clara practices for storing materials of up to two years after the end of the period of performance (POP). Multiple project staff are granted access rights to the archived file system for each project. Records may be retrieved from archived file system by the TL, PM, or other project staff with access during the records retention period. As soon as allowed by applicable regulations or the grant agreement, records will be destroyed according to County of Santa Clara policies and procedures. For any sensitive information that is gathered under the project, County of Santa Clara's policy is consistent with EPA–recommended methods of destruction, which include degaussing, reformatting, or secure deletion of electronic records; physical destruction of electronic media; recycling; shredding; incineration; and pulping. Should the grant specify some other manner of disposition (e.g., transfer to the client), the County of Santa Clara will comply with that directive. As noted above, the County of Santa Clara has developed a file naming convention/ nomenclature for electronic file tracking and record keeping. Foremost, all files must be given a short but descriptive name. For those records and files gathered or provided to the County of Santa Clara, the filename may include the identification of "original" in its filename.

Similarly, files that have undergone a review by an independent, qualified person will include, at the end of the filename, the initials of the reviewer or the suffix "rev" (in lieu of initials) if more than one reviewer reviewed the file, along with the date reviewed and version number, as a way to track which staff person(s) reviewed the file and when. Filenames of draft versions will follow an incremental, decimal numbering system. More specifically, each successive draft of a document is numbered sequentially from version 0.1, 0.2, 0.3… until a final version is complete. Final versions will be indicated by whole numbers (e.g., version 1.0). Final versions of documents that undergo revisions will be labeled version X.1 for the first set of revisions. While the document is under review, subsequent draft versions will increase incrementally (e.g., 1.2, 1.3, 1.4) until a revised final version is complete (e.g., version 2.0).

In the event data retrieval is requested and to prevent loss of data, all draft and final file versions will be retained electronically—that is, superseded versions will not be deleted.

Note that changes made to deliverables will be documented using the software's *track changes* feature, which allows a user to track and view all changes that are made to the document version. All

deliverable reviews will be documented in a QC Documentation Form (see **Appendix B**) for the project. This form will be maintained in the project files.

ArcGIS Pro will also be utilized for this project. The software will be necessary to QA/QC the LANDFIRE data and complete the carbon sequestration analysis for the Counties. Rincon will host this data using ArcGIS Online web viewer which provides access to view and comment on the data without requiring the download of the software. A description of this process and how the carbon inventory was calculated will provided in a technical memorandum to be used as an appendix of the study.

Besides ArcGIS, it is not anticipated that any additional special hardware or software will be used. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work (described in **Tables 2.1 – 2.5)** for this project.

3. Assessment and Oversight (Group C)

The County of Santa Clara is committed to preparing a comprehensive and reliable inventory of GHG emissions for the San Jose – Sunnyvale – Santa Clara MSA. Under this project our senior management team has dedicated the necessary resources to ensure we deliver an inventory that can be relied upon for future policy decisions. Accordingly, under this project, we will concurrently implement existing quality management systems that the County of Santa Clara has previously utilized for submissions to the EPA under Title I of the Act where task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the EPA PO's and QAM's expectations for handling and producing deliverables that reflect high-quality environment data. This section discusses Elements C1 (assessments and response actions) and C2 (reporting) applicable to this project.

3.1. Assessments and Response Actions

The QA program includes periodic review of data files and draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The TL will provide day-to-day oversight of the quality system. Periodic project file reviews will be carried out by the QA Manager, at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The QAM will ensure that problems found during the review are brought to the attention of the TL and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The TLs, Rincon PM, and QA Manager are responsible for determining if the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the TL and, if necessary, with direction from the QA Manager or PM, as appropriate. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or TL, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the QA Manager and discussed with the TL as needed. Depending on the severity of the deficiency, the TL may consult the QA Manager and stop work until the cited deficiency is resolved. Deficiencies identified and their resolution will be documented. The QA Manager and TL will comply and respond to all internal and EPA audits on the project, as needed. The QA Manager will produce a report outlining any corrective actions taken.

3.2. Reports to Management

The periodic progress reports (to the EPA PO) required in the grant agreement will be reviewed by the PM and the PM's manager (Gilian Corral, Sustainability Manager) to ensure the project is meeting milestones and that the resources committed to the project are sufficient to meet project objectives. These periodic progress reports will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including any QA/QC issues. Reports to the EPA will be drafted by the PM or other project staff familiar with project activities during the reporting period.

Any QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned TL and the PM or QAM as appropriate. All significant findings will be included in monthly reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA's PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the TL), prior to submitting to the PM. The PM will conduct a final review of the report before transmitting the progress report to the EPA PO, and the PM's manager will be cc'd on all progress reports.

4. Data Validation and Usability (Group D)

4.1. Data Review, Verification, Validation

All work conducted under this project will be subject to technical and editorial review. When existing data for the same GHG-emitting activity are available from multiple sources, the background information documents will be reviewed for all sources to determine the dataset that is the most representative of local operations. Additionally, the inventory report will include the vintage of the existing data resource and preference will be given to the most recent dataset that is representative of similar GHG-emitting local activities. Reviews will be conducted by an independent, qualified person—or a person not directly involved in the production of the deliverable. The term "validation" refers to whether the data meet the QAPP-defined user requirements while the term "verification" refers to whether conclusions can be correctly drawn from the data. The quality of data used and generated for the project will be reviewed and verified at multiple levels by the project team. This review will be conducted by the Rincon TL or a senior technical reviewer with specific, applicable expertise. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all units of measure will be checked for consistency. Any potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These corrections will be documented in project records. These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will document these findings in the inventory along with corrective actions or use of alternative data sources.

4.2. Verification and Validation Methods

As a standard operating procedure, all data (retrieved and generated) will be verified and validated through a review of data files by an independent, qualified technical staff member (i.e., someone other than the document originator), and ultimately, the Rincon TL. A checklist of QC activities for deliverables under this project is provided as **Appendix A**. Forms for documenting QC activities and review of deliverables are included in **Appendix B**. Documentation of calculations will be included in spreadsheet work products and in supporting memoranda, as appropriate.

The TL is responsible for day-to-day technical activities of tasks, including planning, data gathering, documentation, reporting, and controlling technical and financial resources. The TL is the primary person responsible for quality of work on tasks under this project and will approve all-related plans and reports. These reports will be transmitted by the TL to the QAM for final review and approval.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Reviews of analyses will include a thorough evaluation of content and calculated values. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all measurement units will be checked for consistency. Any potential issues identified through this review process will be evaluated, errors corrected, and analysis repeated using the corrected data. All corrections will be documented in project records.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Typical data verification reviews can include checks of the following:

- Data sources are clearly documented,
- Calculations are appropriately documented,

- All relevant assumptions are clearly documented,
- Conclusions are relevant and supported by results,
- Text is well-written and easy to understand.

The documented review process will be stored with deliverables for the project. For the narrative describing the methodologies used for the inventory, all comments on drafts will be clearly and concisely summarized including a description of how substantive issues raised by commenters were resolved.

As discussed in Section 1.7, QC objectives include verification that data in database tables are stored and transferred correctly, algorithms call data correctly, units are internally consistent, and reports pull the required data. These data management issues will be addressed as part of the QC checks of data acquisition and document preparation.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be used to perform most of the work for this project. However, ArcGIS Pro and RStudio will also be utilized to help quantify the carbon sequestration and emissions associated with vegetation as described in Section 1.6 for this project.

4.3. Reconciliation with User Requirements

All data (retrieved and generated) and deliverables in this project will be analyzed and reconciled with project data quality requirements. To ensure deliverables meet user requirements, the TL or senior technical lead will review all data and deliverables throughout the project to ensure that the data, methodologies, and tools used meet data quality objectives, are clearly conveyed, and represent sound and established science.

The County of Santa Clara will review each project with the EPA at the planning stage to ensure the approach is fundamentally sound and will meet the project objectives. The TL or senior technical lead will evaluate data continuously during the life term of the project to ensure they are of sufficient quality and quantity to meet the project goals. Prior to submission of draft and final products, the TL or senior technical lead will make a final assessment to determine if the objectives have been fulfilled in a technically sound manner. Assumptions made in preparing project analyses will be clearly specified in the inventory.

As discussed in Section 1.7.1, uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific inventory activity being evaluated.

5. References

EPA, Chief Information Officer's Policy Directive on Information Technology / Information Management available at EPA IT/IM Directive: Environmental Information Quality Policy, Directive # CIO 2105.3

EPA, *Chief Information Officer's Policy Directive on Information Technology / Information Management: Quality Assurance Project Plan (QAPP) Standard*, Directive # CIO 2105-S-02.0. Available at https://www.epa.gov/irmpoli8/quality-assurance-project-plan-qapp-standard. Accessed on 7/24/2023.

EPA, EPA-454/B-17-001, *Quality Assurance Handbook for Air Pollution Measurement Systems, Ambient Air Quality Monitoring Program, Volume II*. Available at https://www3.epa.gov/ttnamti1/files/ambient/pm25/qa/Final%20Handbook%20Document%201 17.pdf. Accessed on 6/23/2023.

EPA, Fact Sheet: Areas where differences between state GHG inventories and the EPA's Inventory of U.S. GHG Emissions and Sinks by State: 1990-2020 estimates may occur. Available at https://www.epa.gov/system/files/documents/2022-03/fact-sheet-differences-epa-and-offical-state-ghgi.pdf. Accessed on 6/23/2023.

EPA, US GHG Inventory by State. Available at https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals. Accessed on 6/23/2023.

EPA, GHG Reporting Program Facility-level Local Information. Available at https://ghgdata.epa.gov/ghgp/main.do. Accessed on 7/18/2023.

EPA, Data reported to EPA's Greenhouse Gas Reporting Program (GHGRP) at https://www.epa.gov/ghgreporting/data-sets

EPA, National Inventory at https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021

EPA, Publications, Tools, and Data for State, Local, and Tribal Governments at https://www.epa.gov/statelocalenergy/publications-tools-and-data-state-local-and-tribal-governments. Accessed on 7/27/2023.

EPA, Fuel heating values and CO2 emission factors at eCFR :: 40 CFR Part 98 -- Mandatory Greenhouse Gas Reporting

EPA, Global warming potentials at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A?toc=1

USDA, Forest Service at https://www.fs.usda.gov/research/treesearch/62418

US DOT, Federal Highway Administration Transportation Statistics at https://www.fhwa.dot.gov/policyinformation/statistics/2021/vm1.cfm

Appendix A. Example Check Lists of Quality Control Activities for Deliverables

Deliverables	Quality Control Procedures
Local inventory of GHG emissions with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate. 2. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate) 3. Editor review—writing is clear, free of grammatical and typographical errors.

Appendix B: Example QC Documentation Form

Appendix B. **Example QC Documentation Form**

County of Santa Clara
Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical and editorial accuracy, and presentation clarify as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client: EPA Region 9
Grant Number: 98T76501
EPA Project Officer: Asia Yeary
Project Name: San Jose – Sunnyvale – Santa Clara CPRG
Grantee Org. Project Manager: Breann Boyle

QA Form Details

Item Number	File Name (Copy the name of the file reviewed)	Deliverable Description	Date Sent to Client	Deliverable (Draft)	Deliverable (Final)	Document Originator	QA Review Information (Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	QA Review Information (Have all Findings Been Resolved?)	(Originator Signature)	(Reviewer Signature)	(File Location) *Copy Long Folder Path Name*
01				☐	☐		***Technical***				☐ Yes			
02				☐	☐		***Technical***				☐ Yes			
03				☐	☐		***Technical***				☐ Yes			
04				☐	☐		***Technical***				☐ Yes			
05				☐	☐		***Technical***				☐ Yes			
06				☐	☐		***Technical***				☐ Yes			

Appendix C: Compliance with Requirements Under the Privacy Act of 1974

Important Note about Personally Identifiable Information (PII)

The Privacy Act of 1974 (5 U.S.C. § 552a) mandates how federal agencies maintain records about individuals. Per OMB Circular A-130, Personally Identifiable Information (PII) is "information that can be used to distinguish or trace an individual's identity, either alone or when combined with other information that is linked or linkable to a specific individual."

EPA systems/applications that collect PII must comply with EPA's Privacy Policy and procedures to guard against unauthorized disclosure or misuse of PII in all forms. For more information click here. If PII are collected, then the QAPP will describe how the PII are managed and controlled.

Personally identifiable information (PII):

Please verify one of the following two options by checking the corresponding box:

1. This project **will not** collect Personally Identifiable Information (PII) ☒:
2. This project **will** collect Personally Identifiable Information (PII): ☐

This QAPP will comply with 5 U.S.C. § 552a and EPA's Privacy Policy.

Change Log

This section highlights changes which were made for the GHG inventory to enhance data quality and improve overall results which were not specifically identified in the QAPP.

1. **Mobile Combustion Quantification**

   In the QAPP the project team anticipated using existing GHG inventories for both Santa Clara and San Benito Counties. However, once the inventories for San Benito were reviewed in detail, it became clear that there were significant data gaps. The San Benito inventories only included in-boundary vehicle miles traveled (VMT), leaving out significant VMT associated with trips beginning or ending outside the County.

   To correct this issue, the project team leveraged the Replica data model. Replica uses several data sets including location data from phones and vehicles to develop a national origin-destination model. The Replica data for 2019 was pulled for the County of San Benito and then scaled back to 2017 based on population (VMT per capita). This change increased the overall accuracy of the PCAP inventory.

2. **Natural Gas and Electricity Data**

   In the QAPP the project team anticipated using electricity and natural gas data from the utility (PG&E). However, once the inventories were reviewed, it became clear that there were several data gaps. In order for a utility to provide consumption data, it must pass the 15/15 rule. This refers to the requirement that there be at least 15 customers and that no single customer makes up more than 15% of the total. This rule caused several portions of the data to “fail”.

   To solve this issue the project team leveraged countywide data provided by the California Energy Commission (CEC). This aggregated total for natural gas (in therms) and electricity use (in kWh) provided a complete look at the countywide consumption and related emissions. This data increased the overall quality of the PCAP inventory.

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Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program

Appendix B:

Measure Supporting Documentation

Building Electrification

Renewable Grid Mix Forecast

Utility Provider	Units	2017	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Source
Combined Inventory weighted average	percentage	33%	50%	52%	54%	56%	58%	60%	66%	72%	78%	84%	90%	91%	92%	93%	94%	95%	96%	97%	98%	99%	100%	100%	100%	100%	100%	100%	SB/SCC Inventories, SB 100, SB 1020

Note - there are a variety of electricity providers within the MSA that supply electricity to the Santa Clara community, while 100% of San Benito electricity is provided by PG&E. Each utility provider also provides different renewable rate plans which customers may opt into. Due to lack of information regarding customer rate choices for Santa Clara County, PG&E's verified percentage of renewable electricity procurement was used to estimate the impacts of SB 100 as a conservative estimation.

Forecasted Emission Factors

Utility Provider	Units	2017	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Source
Combined Inventory weighted average	MT CO2e/kWh	0.00009188	0.00007210	0.00006913	0.00006616	0.00006319	0.00006021	0.00005724	0.00004866	0.00004007	0.00003148	0.00002290	0.00001431	0.00001288	0.00001145	0.00001002	0.00000859	0.00000716	0.00000572	0.00000429	0.00000286	0.00000143	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	Calculated from SB/SCC Inventories

Measure 1: Building Decarbonization for LMI Occupant Housing

Percent

Building Decarbonization for LMI Occupant Housing Data Sources

Definition	Units		Data Source	Notes
LIDAC Households Affected by Measure				
Population in LIDAC census tracts	population	492,110	SB/SCC LIDAC Analysis	High pollution census tracts excluded
Regional persons per household	persons/household	2.7771	Department of Finance E-5 2023 Estimates	Calculated as 5+ unit households in SB and SCC divided by total households in SB and SCC
Equipment per Household				
Gas boiler	# of equipment	0.0100	U.S. Highlights for "Space Heating" in U.S homes by state, 2020 https://www.eia.gov/consumption/residential/data/2020/state/pdf/State%20Space%20Heating.pdf	
Gas furnance	# of equipment	0.7800	2019 California Residential Appliance Saturation Study https://www.energy.ca.gov/publications/2021/2019-california-residential-appliance-saturation-study-rass	Assume 70% of space heating is gas, split between furnace and boiler
Propane furnance	# of equipment	0.0000		
Small gas hot water heater	# of equipment	0.6388	Calculated	
Large gas hot water heater	# of equipment	0.2512	2019 California Residential Appliance Saturation Study https://www.energy.ca.gov/publications/2021/2019-california-residential-appliance-saturation-study-rass and Department of Finance E-5 2023 Estimates	Assume 89% have gas water heating (split between small and large). Split calculated as 5+ unit households in SB and SCC divided by total households in SB and SCC, following BAAQMD assumption that large heaters are for households of 5+ units
Gas oven and range	# of equipment	0.6300	2019 California Residential Appliance Saturation Study https://www.energy.ca.gov/publications/2021/2019-california-residential-appliance-saturation-study-rass	
Gas dryer	# of equipment	0.3000	2019 California Residential Appliance Saturation Study https://www.energy.ca.gov/publications/2021/2019-california-residential-appliance-saturation-study-rass	

BAAQMD Rule 9-6 and Rule 9-4 Adjustments

Equipment	Useful Life [Years]	Year Begin Decline	Notes	Data Source
Small gas hot water heaters	13	2027	Assumed for all single family houses, all multifamily houses with less than 4 units, and half of multifamily houses with 5 or more units	BAAQMD/ICF PCAP Measure Modeline Methodology
Large gas water heaters	13	2031	Assumed for half of all multifamily houses with 5 or more units	BAAQMD/ICF PCAP Measure Modeline Methodology
Residential furnances	18	2029	Assumed for all housing	BAAQMD/ICF PCAP Measure Modeline Methodology

Measure Implementation Inputs

Input	Units	Percent Replaced Each Year	Data Source
Year of implementation start	year	2026	Input
Year of implementation end	year	2045	Input
Annual ohase-in rate	% of equipment replace	5%	Assume linear expansion of program. Calculated from implementation start and end year.
Level of implementation (% of total buildings	percentage	95%	Input

Energy Consumption Reduction Rate per Equipment

Energy Consumption Reduction Rates by Equipment	Change in kWh per Install	Change in therms per Install	
Air-source HP replaced for gas boiler	2,146.7	-255.9	BAAQMD/ICF PCAP Measure Modeline Methodology
Air-source HP replaced for gas furnance	2,342.0	-272.4	BAAQMD/ICF PCAP Measure Modeline Methodology
Air-source HP replaced for propane furnance	2,679.4	-294.3	BAAQMD/ICF PCAP Measure Modeline Methodology
Electric central HP replacement of gas hot water heater	1,708.8	-145.8	BAAQMD/ICF PCAP Measure Modeling Methodology
Electric oven and induction stovetop replacement of gas oven and range	318.2	-28.6	BAAQMD/ICF PCAP Measure Modeling Methodology
ENERGY STAR Electric Dryer replacement for a Gas Dryer	742.5	-25.3	BAAQMD/ICF PCAP Measure Modeline Methodology
Efficiency measures - thermostats	-132.4	-13.8	BAAQMD/ICF PCAP Measure Modeline Methodology
Efficiency measures -tehtine	-828.3	0.0	BAAQMD/ICF PCAP Measure Modeline Methodology
Weatherization	-126.7	-25.9	BAAQMD/ICF PCAP Measure Modeline Methodology
Deep enerev	-253.5	-51.8	BAAQMD/ICF PCAP Measure Modeline Methodology

Building Decarbonization for LMI Occupant Housing Calculations

Definition	Units		Data Source
LIDAC Households Affected by Measure			
LIDAC Households	households	177,206	Calculated
Total Equipment in LIDAC Communities			
Gas boiler	# of equipment	1,772	Calculated
Gas furnance	# of equipment	138,220	Calculated
Propane furnance	# of equipment	0	Calculated
Small gas hot water heater	# of equipment	113,203	Calculated
Large gas hot water heater	# of equipment	44,510	Calculated
Gas oven and range	# of equipment	111,640	Calculated
Gas dryer	# of equipment	53,162	Calculated

Total Equipment Available for Replacement in LIDAC Communities

Equipment	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Gas boiler	# of equipment	1,772	1,772	1,772	1,772	1,772	1,772	1,636	1,499	1,363	1,227	1,090	954	818	682	545	409	273	136	0	0	0	0	0	0	0	0
Gas furnance	# of equipment	138,220	138,220	138,220	138,220	138,220	130,541	122,863	115,184	107,505	99,826	92,147	84,468	76,789	69,110	61,431	53,752	46,073	38,395	30,716	23,037	15,358	7,679	0	0	0	0
Propane furnance	# of equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small gas hot water heater	# of equipment	113,203	113,203	113,203	106,495	95,787	87,079	78,371	69,663	60,955	52,247	43,540	34,832	26,124	17,416	8,708	0	0	0	0	0	0	0	0	0	0	0
Large gas hot water heater	# of equipment	44,510	44,510	44,510	44,510	44,510	44,510	41,086	37,662	34,239	30,815	27,391	23,967	20,543	17,119	13,695	10,272	6,848	3,424	0	0	0	0	0	0	0	0
Gas oven and range	# of equipment	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640	111,640
Gas dryer	# of equipment	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162	53,162
Households - thermostats, lighting, weatherization, and deep-energy	# of equipment	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206	177,206

Total Equipment Replaced in LIDAC Communities

Equipment	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Cumulative Replaced	%	0%	0%	5%	11%	16%	21%	26%	32%	37%	42%	47%	53%	58%	63%	68%	74%	79%	84%	89%	95%	100%	100%	100%	100%	100%	100%
Gas boiler	# of equipment	0	0	89	177	266	354	443	491	525	545	552	545	525	491	443	382	307	218	116	0	0	0	0	0	0	0
Gas furnance	# of equipment	0	0	6,911	13,822	20,733	26,108	30,716	34,555	37,627	39,930	41,466	42,234	42,234	41,466	39,930	37,627	34,555	30,716	26,108	20,733	14,590	7,295	0	0	0	0
Propane furnance	# of equipment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Small gas hot water heater	# of equipment	0	0	5,660	10,669	16,368	17,416	19,593	20,899	21,334	20,899	19,593	17,416	16,368	10,449	5,660	0	0	0	0	0	0	0	0	0	0	0
Large gas hot water heater	# of equipment	0	0	2,226	4,451	6,677	8,902	11,128	12,326	13,182	13,695	13,867	13,695	13,182	12,326	11,128	9,587	7,704	5,478	2,910	0	0	0	0	0	0	0
Gas oven and range	# of equipment	0	0	5,582	11,164	16,746	22,328	27,910	33,492	39,074	44,656	50,238	55,820	61,402	66,984	72,566	78,148	83,730	89,312	94,894	100,476	106,058	106,058	106,058	106,058	106,058	106,058
Gas dryer	# of equipment	0	0	2,658	5,316	7,974	10,632	13,290	15,948	18,607	21,265	23,923	26,581	29,239	31,897	34,555	37,213	39,871	42,529	45,187	47,846	50,504	50,504	50,504	50,504	50,504	50,504
Households - thermostats, lighting, weatherization, and deep-energy	# of equipment	0	0	8,860	17,721	26,581	35,441	44,301	53,162	62,022	70,882	79,743	88,603	97,463	106,323	115,184	124,044	132,904	141,764	150,625	159,485	168,345	168,345	168,345	168,345	168,345	168,345

Change in Annual Electricity GHG Emissions

Replacement Type	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Air-source HP replaced for gas boiler	MT CO2e	0	0	13	24	34	44	46	42	35	27	17	10	8	6	4	2	1	0	0	0	0	0	0	0	0	0
Air-source HP replaced for gas furnance	MT CO2e	0	0	1,025	1,958	2,799	3,351	3,351	3,104	2,656	2,050	1,330	1,220	1,084	931	769	604	443	296	168	67	0	0	0	0	0	0
Air-source HP replaced for propane furnance	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric central HP replacement of gas hot water heater	MT CO2e	0	0	640	1,128	1,678	1,704	1,629	1,431	1,148	818	479	383	281	179	83	0	0	0	0	0	0	0	0	0	0	0
Electric oven and induction stovetop replacement of gas oven and range	MT CO2e	0	0	47	89	128	162	172	157	132	100	63	56	48	39	30	22	14	7	3	0	0	0	0	0	0	0
ENERGY STAR Electric Dryer replacement for a Gas Dryer	MT CO2e	0	0	274	524	769	949	1,008	996	913	759	534	534	522	498	463	415	356	285	202	107	0	0	0	0	0	0
Efficiency measures - thermostats	MT CO2e	0	0	-21	-44	-64	-81	-86	-85	-78	-64	-45	-45	-44	-42	-39	-35	-30	-24	-17	-9	0	0	0	0	0	0
Efficiency measures -tehtine	MT CO2e	0	0	-686	-927	-1,326	-1,680	-1,795	-1,764	-1,617	-1,344	-945	-945	-924	-882	-819	-735	-630	-504	-357	-189	0	0	0	0	0	0
Weatherization	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deep enerev	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**MT CO2e**	**0**	**0**	**1,490**	**2,752**	**3,799**	**4,448**	**4,321**	**3,882**	**3,190**	**2,346**	**1,433**	**1,217**	**979**	**734**	**494**	**276**	**117**	**62**	**-2**	**-21**	**0**	**0**	**0**	**0**	**0**	**0**

Change in Annual Natural Gas GHG Emissions

Replacement Type	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Air-source HP replaced for gas boiler	MT CO2e	0	0	-120	-241	-361	-482	-602	-667	-713	-741	-750	-741	-711	-647	-602	-519	-417	-296	-157	0	0	0	0	0	0	0
Air-source HP replaced for gas furnance	MT CO2e	0	0	-9,999	-19,998	-29,997	-37,774	-44,441	-49,996	-54,440	-57,773	-59,995	-61,106	-61,106	-59,995	-57,773	-54,440	-49,996	-44,441	-37,774	-29,997	-21,109	-10,555	0	0	0	0
Air-source HP replaced for propane furnance	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric central HP replacement of gas hot water heater	MT CO2e	0	0	-4,383	-8,092	-11,127	-13,687	-15,173	-16,184	-16,522	-16,184	-15,173	-13,487	-11,127	-8,092	-4,383	0	0	0	0	0	0	0	0	0	0	0
Electric oven and induction stovetop replacement of gas oven and range	MT CO2e	0	0	-338	-676	-1,014	-1,352	-1,690	-1,872	-2,032	-2,080	-2,106	-2,080	-2,002	-1,872	-1,690	-1,456	-1,170	-832	-442	0	0	0	0	0	0	0
ENERGY STAR Electric Dryer replacement for a Gas Dryer	MT CO2e	0	0	-750	-1,500	-2,250	-3,000	-3,751	-4,501	-5,251	-6,001	-6,751	-7,501	-8,251	-9,001	-9,751	-10,501	-11,252	-12,002	-12,752	-13,502	-14,252	-14,252	-14,252	-14,252	-14,252	-14,252
Efficiency measures - thermostats	MT CO2e	0	0	-195	-390	-584	-779	-974	-1,169	-1,364	-1,559	-1,753	-1,948	-2,143	-2,338	-2,533	-2,728	-2,922	-3,117	-3,312	-3,507	-3,702	-3,702	-3,702	-3,702	-3,702	-3,702
Efficiency measures -tehtine	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weatherization	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Deep enerev	MT CO2e	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**MT CO2e**	**0**	**0**	**-15,786**	**-30,897**	**-45,334**	**-56,875**	**-66,631**	**-74,389**	**-80,292**	**-84,338**	**-86,529**	**-86,864**	**-85,343**	**-81,966**	**-76,733**	**-69,644**	**-61,757**	**-60,488**	**-54,438**	**-47,006**	**-39,063**	**-28,508**	**-17,954**	**-17,954**	**-17,954**	**-17,954**

Cumulative GHG Emission Reductions

Years	MT CO2e
Cumulative 2030 GHG Emission Reductions	**136,406**
Cumulative 2050 GHG Emission Reductions	**1,277,330**

Measure 2: Municipal Resilient Facility Community Benefit Fund

GHG Emission Reductions from Natural Gas Avoided

Estimate Number of Municipal Buildings in SB and SCC	Number of Municipal Buildings in SB and SCC to be Decarbonized	Municipal Building Type	Source for Buildings Estimate	Square Footage	End Use	Annual Natural Gas Intensity (scf/building	Source for Square Footage and Natural Gas Intensity	Annual Natural Gas for Targeted	Annual Natural Gas Emissions (MT CO2e)
	181	Public Order and Safety - Average	SB County and incorporated city buildings sourced from SB Coutny's website (https://www.countyoffice.org/ca-san-benito-county-fire-departments/) and grouped by NAICS code. Number of SCC County buildings sourced from PG&E municipal electricity accounts and distributed to NAICS code using SB's distribution. Number of San Jose buildings by NAICS code sourced from City. Number of incorporated buildings estimated by assuming 6 buildings per incorporated city (14 cities) and distributed to NAICS codes using SB'd distribution.		Space heating	28.5000	Square Footage: EIA Commercial Consumption Data Table B15. Building activity subcatefories: total and means of floorspace, number of workers, and hours of operation, 2018. Natural Gas Intensities: EIA Commercial Consumption Data Table E8. Natural gas consumption and conditional energy intensities (in cubic feet) by end use, 2018. https://www.eia.gov/consumption/commercial/data/2018/ce/pdf/e8.pdf	97,738,043	5,326
	181				Water heating	9.4000		32,236,407	1,757
	181				Cooking	4.7000		16,118,204	878
191	181			18,900	Other	N/A			
	178	Public Assembly - Average			Space heating	41.1000		107,330,801	5,849
	178				Water heating	0.9000		2,350,310	128
	178				Cooking	6.7000		17,496,749	953
187	178			14,700	Other	16.1000		42,044,426	2,291
	239	Office - Government			Space heating	22.7000		106,513,848	5,805
	239				Water heating	1.1000		5,161,464	281
	239				Cooking	4.1000		19,238,184	1,048
252	239			19,600	Other	5.9000		27,684,216	1,509
					Total			473,912,649	25,826

Building Type / End Use	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%	100%	100%	100%	100%	100%
Public Order and Safety - Space heating	0	232	468	706	947	1,191	1,455	1,727	2,007	2,296	2,593	2,860	3,128	3,398	3,669	3,942	4,216	4,492	4,768	5,047	5,326	5,326	5,326	5,326	5,326	5,326
Public Order and Safety - Water heating	0	77	154	233	312	393	480	569	662	757	855	943	1,032	1,121	1,210	1,300	1,391	1,481	1,573	1,664	1,757	1,757	1,757	1,757	1,757	1,757
Public Order and Safety - Cooking	0	38	77	116	156	196	240	285	331	379	428	472	516	560	605	650	695	741	786	832	878	878	878	878	878	878
Public Order and Safety - Other																										
Public Assembly - Space heating	0	255	514	775	1,040	1,308	1,597	1,896	2,204	2,521	2,847	3,141	3,435	3,732	4,030	4,329	4,630	4,932	5,236	5,542	5,849	5,849	5,849	5,849	5,849	5,849
Public Assembly - Water heating	0	6	11	17	23	29	35	42	48	55	62	69	75	82	88	95	101	108	115	121	128	128	128	128	128	128
Public Assembly - Cooking	0	42	84	126	170	213	260	309	359	411	464	512	560	608	657	706	755	804	854	903	953	953	953	953	953	953
Public Assembly - Other	0	100	201	304	407	512	626	743	863	988	1,115	1,230	1,346	1,462	1,578	1,696	1,814	1,932	2,051	2,171	2,291	2,291	2,291	2,291	2,291	2,291
Office - Government - Space heating	0	253	510	769	1,032	1,298	1,585	1,882	2,187	2,502	2,826	3,117	3,409	3,703	3,999	4,296	4,595	4,895	5,197	5,500	5,805	5,805	5,805	5,805	5,805	5,805
Office - Government - Water heating	0	12	25	37	50	63	77	91	106	121	137	151	165	179	194	208	223	237	252	267	281	281	281	281	281	281
Office - Government - Cooking	0	46	92	139	186	234	286	340	395	452	510	563	616	669	722	776	830	884	939	993	1,048	1,048	1,048	1,048	1,048	1,048
Office - Government - Other	0	66	132	200	268	337	412	489	568	650	734	810	886	963	1,039	1,117	1,194	1,272	1,351	1,429	1,509	1,509	1,509	1,509	1,509	1,509
Total	0	1,127	2,268	3,423	4,592	5,775	7,053	8,372	9,731	11,131	12,572	13,867	15,169	16,477	17,792	19,114	20,443	21,778	23,121	24,470	25,826	25,826	25,826	25,826	25,826	25,826

GHG Emission Reductions from Grid Electricity Avoided

Estimate Number of Municipal Buildings in SB and SCC	Number of Municipal Buildings in SB and SCC to Install Microgrids	Municipal Building Type	Source for Buildings Estimate	Square Footage	End Use	Annual Electricity Intensity (kWh/building	Source for Electricity Intensity	Annual Electricity for Targeted Buildings w/
	181	Public Order and Safety - Average	SB County and incorporated city buildings sourced from SB Coutny's website (https://www.countyoffice.org/ca-san-benito-county-fire-departments/) and grouped by NAICS code. Number of SCC County buildings sourced from PG&E municipal electricity accounts and distributed to NAICS code using SB's distribution. Number of San Jose buildings by NAICS code sourced from City. Number of incorporated buildings estimated by assuming 6 buildings per incorporated city (14 cities) and distributed to NAICS codes using SB'd distribution.		Space heating	2.0	EIA Commercial Consumption Data Table E6. Electricity consumption intensities (in kilowatthours [kWh]) by end use, 2018 https://www.eia.gov/consumption/commercial/data/2018/ce/pdf/e6.pdf	6,858,810
	181				Cooling	2.7		9,259,394
	181				Ventilation	1.8		6,172,929
	181				Water heating	1.9		6,515,870
	181				Lighting	3.4		11,659,977
	181				Cooking	0.5		1,714,703
	181				Refrigeration	0.6		2,057,643
	181				Office equipment	0.2		685,881
	181				Computing	0.8		2,743,524
191	181			18,900	Other	3.1		10,631,156
	178	Public Assembly - Average			Space heating	2.8		7,312,074
	178				Cooling	4.6		12,012,693
	178				Ventilation	1.2		3,133,746
	178				Water heating	0.1		261,146
	178				Lighting	1.5		3,917,183
	178				Cooking	0.5		1,305,728
	178				Refrigeration	0.9		2,350,310
	178				Office equipment	0.1		261,146
	178				Computing	0.3		783,437
187	178			14,700	Other	3.1		8,095,511
	239	Office - Government			Space heating	1.5		7,038,360
	239				Cooling	1.5		7,038,360
	239				Ventilation	3.8		17,830,512
	239				Water heating	0.2		938,448
	239				Lighting	2.3		10,792,152
	239				Cooking	0.2		938,448
	239				Refrigeration	0.5		2,346,120
	239				Office equipment	0.2		938,448
	239				Computing	1.5		7,038,360
252	239			19,600	Other	3.1		14,545,944
					Total			167,178,008

Building Type / End Use	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Public Order and Safety - Space heating	0	10	18	26	33	40	41	39	35	29	20	20	19	18	17	15	13	10	7	4	0	0	0	0	0	0
Public Order and Safety - Cooling	0	5	10	15	19	22	23	22	19	16	11	11	11	10	9	8	7	6	4	2	0	0	0	0	0	0
Public Order and Safety - Ventilation	0	4	7	10	12	15	15	14	13	11	7	7	7	7	6	6	5	4	3	1	0	0	0	0	0	0
Public Order and Safety - Water heating	0	6	11	15	20	23	24	23	20	17	12	12	11	11	10	9	7	6	4	2	0	0	0	0	0	0
Public Order and Safety - Lighting	0	7	13	18	23	28	28	27	24	20	14	14	13	13	12	10	9	7	5	3	0	0	0	0	0	0
Public Order and Safety - Cooking	0	2	4	5	7	8	8	8	7	6	4	4	4	4	3	3	3	2	1	1	0	0	0	0	0	0
Public Order and Safety - Refrigeration	0	1	2	3	4	5	5	5	4	4	2	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0
Public Order and Safety - Office equipment	0	0	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Public Order and Safety - Computing	0	2	3	4	6	7	7	6	6	5	3	3	3	3	3	2	2	2	1	1	0	0	0	0	0	0
Public Order and Safety - Other	0	6	12	17	21	25	26	25	22	18	13	13	12	12	11	10	8	6	5	2	0	0	0	0	0	0
Public Assembly - Space heating	0	10	20	29	36	43	44	42	38	31	22	21	21	20	18	16	14	11	8	4	0	0	0	0	0	0
Public Assembly - Cooling	0	7	13	19	24	29	29	28	25	21	14	14	14	13	12	11	9	7	5	3	0	0	0	0	0	0
Public Assembly - Ventilation	0	2	3	5	6	7	8	7	7	5	4	4	4	3	3	3	2	2	1	1	0	0	0	0	0	0
Public Assembly - Water heating	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Public Assembly - Lighting	0	2	4	6	8	9	10	9	8	7	5	5	4	4	4	4	3	2	2	1	0	0	0	0	0	0
Public Assembly - Cooking	0	2	3	5	6	7	7	7	6	5	4	4	4	3	3	3	2	2	1	1	0	0	0	0	0	0
Public Assembly - Refrigeration	0	1	3	4	5	6	6	5	5	4	3	3	3	3	2	2	2	1	1	1	0	0	0	0	0	0
Public Assembly - Office equipment	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Assembly - Computing	0	0	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
Public Assembly - Other	0	7	14	19	25	29	30	29	26	21	15	15	14	13	12	11	9	7	5	3	0	0	0	0	0	0
Office - Government - Space heating	0	10	20	28	36	42	43	41	37	30	21	21	20	19	18	16	14	11	8	4	0	0	0	0	0	0
Office - Government - Cooling	0	4	8	11	14	17	17	16	15	12	8	8	8	8	7	6	5	4	3	2	0	0	0	0	0	0
Office - Government - Ventilation	0	10	20	28	36	43	43	42	37	31	21	21	20	19	18	16	14	11	8	4	0	0	0	0	0	0
Office - Government - Water heating	0	1	2	2	3	3	4	3	3	3	2	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0
Office - Government - Lighting	0	6	12	17	22	26	26	25	23	19	13	13	12	12	11	10	8	7	5	2	0	0	0	0	0	0
Office - Government - Cooking	0	2	3	5	6	7	7	7	6	5	3	3	3	3	3	3	2	2	1	1	0	0	0	0	0	0
Office - Government - Refrigeration	0	1	3	4	5	6	6	5	5	4	3	3	3	3	2	2	2	1	1	1	0	0	0	0	0	0
Office - Government - Office equipment	0	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Office - Government - Computing	0	4	8	11	14	17	17	16	15	12	8	8	8	8	7	6	5	4	3	2	0	0	0	0	0	0
Office - Government - Other	0	10	19	27	35	41	42	40	36	30	21	20	20	19	17	15	13	11	7	4	0	0	0	0	0	0
Total	0	124	237	339	431	512	522	502	451	369	256	254	246	233	215	192	164	131	92	49	0	0	0	0	0	0

GHG Emission Reductions from EV Chargers

Variable	Units	Data Source	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
EV Chargers Installed	chargers	Calculated	0	60	120	180	239	299	359	419	479	539	599	658	718	778	838	898	958	1,017	1,077	1,137	1,197	1,197	1,197	1,197	1,197	1,197
EF	g CO2/mile	BAAQMD PCAP Mobility Hub Measure Calculations	298.9703	291.6933	284.9549	278.7718	273.1273	267.9795	263.7567	259.6107	255.9254	252.6631	249.8009	247.3117	245.1674	243.3379	241.7890	240.4885	239.4097	238.5035	237.7536	237.1305	236.6021	236.1621	235.8015	235.5047	235.2566	235.0587
GHG Emission Reductions	MT CO2e	Calculated	0	999	1,951	2,863	3,741	4,588	5,418	6,222	7,010	7,786	8,553	9,314	10,073	10,831	11,590	12,351	13,115	13,882	14,653	15,426	16,202	16,172	16,147	16,127	16,110	16,096

Inputs and Cumulative GHG Emission Results

Variable	Value	Units	Data Source	
Natural Gas and Electricity Assumptions				
Natural gas combustion EF	0.0001	MT CO2e/scf		
Natural gas therms to scf conversion	97.25	scf/therm	Conversion	
Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions	https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm
Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute. Heat Pumps: Integrating technologies to decarbonise	https://help.leonardo-energy.org/hc/en-
EV Charger Assumptions				
Level 2 EV Chargers per Decarbonized Building	2.0	chargers	Input	
Level 2 charger power level	19.2	kW	BAAQMD PCAP Mobility Hub Measure Calculations	
Average L2 charger utilization rate	10.00%	percent	BAAQMD PCAP Mobility Hub Measure Calculations	
Annual hours in use of facility	8,760	hours	BAAQMD PCAP Mobility Hub Measure Calculations	
Average EV energy efficiency	0.2940	kWh/mile	BAAQMD PCAP Mobility Hub Measure Calculations	
Measure Inputs				
Year of Implementation Start	2025	year	Input	
Year of Implementation End	2045	year	Input	
Annual Phase in Rate	5%	percentage	Assume linear expansion of program. Calculated from implementation start and end year	
Level of Implementation (% of total buildings	95%	percentage	Input	
Hours per day microgrid online	4	hours/day	Input	Representative of a ~164 kwh battery for each building
Measure Results				
Cumulative 2030 Emission Reductions	**32,970**	**MT CO2e**	**Calculated**	
Cumulative 2050 Emission Reductions	**655,774**	**MT CO2e**	**Calculated**	

Measure 3: Commercial, Agricultural, and Industrial Building Decarbonization Program

Estimate Number of Nonresidential Buildings in SB and SCC	Number of Nonresidential Buildings in SB and SCC to be Decarbonized	Building Type	Source for Buildings Estimate	Square Footage	End Use	Annual Natural Gas Intensity (scf/building sf)	Source for Square Footage and Natural Gas Intensity	Annual Natural Gas for Targeted	Annual Natural Gas Emissions (MT CO2e)	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
										0%	4%	8%	13%	17%	21%	25%	29%	33%	38%	42%	46%	50%	54%	58%	63%	67%	71%	75%	79%	83%	88%	92%	96%	100%
	32,034				Space heating	24.2		##########	1,042,804	0	38,153	76,781	115,886	155,466	197,771	243,450	286,504	332,934	380,738	424,189	467,868	511,776	555,914	600,281	644,877	689,702	734,757	780,040	825,553	869,003	912,453	955,903	999,354	1,042,804
	32,034	Commercial Building			Water heating	4.7		3,432,731,292	187,068	0	6,844	13,774	20,789	27,889	35,478	43,314	51,396	59,725	68,300	76,085	83,931	91,807	99,725	107,684	115,684	123,725	131,807	139,931	148,095	155,860	163,684	171,479	179,273	187,068
	32,034				Cooking	13.7	EIA Commercial Consumption	##########	545,283	0	19,950	40,169	60,587	81,294	103,414	126,254	149,813	174,091	199,088	221,809	244,648	267,608	290,688	313,887	337,207	360,646	384,205	407,884	431,682	454,462	477,122	499,843	522,563	545,283
35,593	32,034				Other	8.8	Data Table 4E5: Building	6,427,341,568	350,255	0	12,815	25,789	38,923	52,218	66,427	81,098	96,230	111,825	127,882	142,476	157,146	171,894	186,719	201,621	216,600	231,656	246,789	261,998	277,285	291,879	306,473	321,067	335,661	350,255
	81				Space heating	24.2	activity subcategories: total	24,730,704	1,348	0	49	99	150	201	256	312	370	430	492	548	605	661	718	776	833	891	950	1,008	1,067	1,123	1,179	1,235	1,292	1,348
	81	Agricultural Building	Number of buildings estimated from US Census Economic Survey Table C82100CBP by NAICS code		Water heating	4.7	and means of floorspace,	4,436,424	242	0	9	18	27	36	46	56	66	77	88	98	108	119	129	139	150	160	170	181	191	201	212	222	232	242
	81				Cooking	13.7	number of workers, and hours	13,931,704	705	0	26	52	78	105	134	163	194	225	257	287	316	346	376	406	436	466	497	527	558	587	617	646	675	705
46	81			22,800	Other	8.8	of operation, 2018.	8,306,496	453	0	17	33	50	67	86	105	124	145	165	184	203	222	241	261	280	299	319	338	358	377	396	415	434	453
	2,026				Space heating	24.2		1,210,191,624	65,950	0	2,413	4,866	7,329	9,832	12,508	15,270	18,119	21,056	24,079	26,827	29,589	32,366	35,158	37,963	40,784	43,619	46,468	49,332	52,210	54,958	57,706	60,454	63,202	65,950
	2,026	Industrial Building	https://www.eia.gov/consumption/commercial/data/2018/bc/pdf/b15.pdf		Water heating	4.7		217,095,444	11,831	0	433	871	1,315	1,764	2,244	2,739	3,250	3,777	4,320	4,812	5,308	5,806	6,307	6,810	7,316	7,825	8,336	8,850	9,366	9,859	10,352	10,845	11,338	11,831
	2,026				Cooking	13.7		632,810,124	34,485	0	1,262	2,539	3,832	5,141	6,540	7,985	9,475	11,010	12,591	14,028	15,472	16,924	18,384	19,851	21,326	22,808	24,298	25,796	27,301	28,738	30,175	31,611	33,048	34,485
2,261	2,026			22,800	Other	8.8		606,476,576	22,151	0	810	1,631	2,462	3,302	4,201	5,129	6,086	7,072	8,088	9,011	9,938	10,871	11,809	12,751	13,698	14,651	15,608	16,569	17,536	18,459	19,382	20,305	21,228	22,151
					Total			##########	**2,242,573**	**0**	**82,780**	**166,002**	**251,438**	**337,216**	**429,103**	**523,874**	**621,629**	**722,367**	**826,089**	**920,363**	**1,015,134**	**1,110,402**	**1,206,168**	**1,302,431**	**1,399,191**	**1,496,448**	**1,594,203**	**1,692,454**	**1,791,204**	**1,885,477**	**1,979,751**	**2,074,025**	**2,168,299**	**2,262,573**

Natural gas combustion EF	0.0001	MT CO2e/scf		
Natural gas therms to scf conversion	97.25	scf/therm	Conversion	
Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions	https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm
Efficiency factor of electric equipment relative	3	unitless	European Copper Institute, Heat Pum	https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-
Electricity transmission and distribution loss percentage	0.00%	percentage	Inventory & Forecast	N/A
Year of Implementation Start	2026	year	Input	
Year of Implementation End	2050	year	Input	
Annual Phase in Rate	4%	percentage	Assume linear expansion of program. Calculated from implementation start and end wear.	
Level of Implementation (% of total buildings	90%	percentage	Input	
Cumulative 2030 Emission Reductions	**838,126**	**MT CO2e**	Calculated	
Cumulative 2050 Emission Reductions	**27,859,310**	**MT CO2e**	Calculated	

Measure 4: Multi-modal Mobility Hubs

Mobility Hub model Results

San Benito County

Measure	Project Lifetime	Time Frame	Assumed # of Projects	Deployment	Cumulative GHG Emissions Reductions (2025 - 2030)	Cumulative GHG Emissions Reductions (2025 - 2050)	Source:	Notes:
Bike Infrastructure								
Light Rail	15	2027 - 2042	[redacted]		0	0		No rail in the county
Commuter Rail	15	2027 - 2042	[redacted]		0	0		No rail in the county
BRT	15	2027 - 2042	4		1	4	ty.html; San Benito County Express Spring Schedulehttp://www.sanbenitocountyexpress.org/pdf/2024/IC_Schedule_Spring%201.29.24.pdf; San Benito County Bus Routes https://www.arcgis.com/apps/mapviewer/index.html?layers=6c9ad0c5bc234ef6b91f8e6030241645	Assume building 1 hub in San Juan Batista and Ridgemark, 2 in Hollister with priority along intercounty county express routes which connect to Caltrain in Santa Clara County
Pedestrian Infrastructure								
Light Rail	15	2027 - 2042	[redacted]		0	0		No rail in the county
Commuter Rail	15	2027 - 2042	[redacted]		0	0		No rail in the county
BRT	15	2027 - 2042	4		0	1	ty.html; San Benito County Express Spring Schedulehttp://www.sanbenitocountyexpress.org/pdf/2024/IC_Schedule_Spring%201.29.24.pdf; San Benito County Bus Routes https://www.arcgis.com/apps/mapviewer/index.html?layers=6c9ad0c5bc234ef6b91f8e6030241645	Assume building 1 hub in San Juan Batista and Ridgemark, 2 in Hollister with priority along intercounty county express routes which connect to Caltrain in Santa Clara County
E-Bike Share	**12**	2026 - 2039	1	100 e-bikes	**113**	**256**		Assume 25 bikes per project
E-Bike Incentive	**12**	2026 - 2039	1	100 e-bikes	**139**	**316**		Assume 25 bikes per project
EV Car Share	**12**	2026 - 2039	1	100 EV cars	**8,008**	**22,344**		Assume regional capacity for 100 EV car share fleet (with expansion of EV charging infrastructure with this program)
Transit Subsidy	**5**	2026 - 2032	1	20% and 50% discount	**1**	**2**		Adjusted to use Santa Benito County LTA Profile bus annual ridership rather than AC Transit data used by the model; no change to % discount
Light Duty EV Charging Infrastructure	**10**	2027 - 2037	[redacted]	Each project comprised of 10 Level 2 and 10 D	**12,404**	**29,571**		All projects, brings SB County into alignment with 2030 EV charging infrastructure needs (see Analyst Updates Tab)
				Total	**20,667**	**52,494**		

Santa Clara County

Measure	Project Lifetime	Time Frame	Assumed # of Projects	Deployment	Cumulative GHG Emissions Reductions (2025 - 2030)	Cumulative GHG Emissions Reductions (2025 - 2050)	Source:	Notes:
Bike Infrastructure								
Light Rail	15	2027 - 2042	15		582	2,026	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Regional/Urban/Emerging Urban/Suburban project hubs along VTA (see pg 20)
Commuter Rail	15	2027 - 2042	7		2,023	7,037	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Regional/Urban/Emerging Urban/Suburban project hubs along Caltrans (see pg 20)
BRT	15	2027 - 2042	8		31	108	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Pulse hubs project hubs and individual projects along Frequent Bus Routes (see pg 20)
Pedestrian Infrastructure								
Light Rail	15	2027 - 2042	15		193	673	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Regional/Urban/Emerging Urban/Suburban project hubs along VTA (see pg 20)
Commuter Rail	15	2027 - 2042	7		898	3,126	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Regional/Urban/Emerging Urban/Suburban project hubs along Caltrans (see pg 20)
BRT	15	2027 - 2042	8		9	32	MTC Mobility Hub Advisory Services: Siting Criteria, Screening Methodology, and Prioritization https://mtc.ca.gov/sites/default/files/Web_MTC%20Mobility%20Hubs_Siting%20Analysis%20Methodology%20FINAL.pdf	Estimated based on Pulse hubs project hubs and individual projects along Frequent Bus Routes (see pg 20)
E-Bike Share	**12**	2026 - 2039	1	500 e-bikes	**563**	**1,279**	BAAQMD/ICF PCAP Measure Modeling Methodology	BAAQMD methodology states that based on SF reported average daily e-bike share trips and NTD average trips/day, there are an estimated 3,200 e-bikes in the area. BAAQMD concludes that an initial fleet of 500 bikes would be a reasonable starting point
E-Bike Incentive	**12**	2026 - 2039	1	500 e-bikes	**697**	**1,582**	BAAQMD/ICF PCAP Measure Modeling Methodology	BAAQMD assumes a cost of approx $2000 per bike.
EV Car Share	**12**	2026 - 2039	1	300 EV cars	**24,025**	**67,031**	SFMTA On-Street Car Sharing Pilot Program Evaluation Report https://www.sfmta.com/sites/default/files/projects/2017/Carshare_eval_final.pdf	Referenced by BAAQMD in their writeup estimating 650 EV's based on Zipcar and Getaround maintaining a fleet of 800+ and 500 cars respectively in the SF area. The SFMTA report specifies a City carshare fleet of 255
Transit Subsidy	**5**	2026 - 2032	1	20% and 50% discount	**2,050**	**5,720**		Adjusted to use VTA bus annual ridership rather than AC Transit data used by the model; no change to % discount
Light Duty EV Charging Infrastructure	**10**	2027 - 2037	30	Each project comprised of 10 Level 2 and 10 D	**93,031**	**221,783**		Santa Clara County is ahead in required number of EV chargers to support current and projected EV populations through 2050. Assuming alignment with BAAQMD number of chargers per project
				Total	**124,103**	**310,397**		

Measure 5: VTA Visionary Transit Network

Percent Implementation

VTA Outputs

Variable	Units	2030	2040	2045	2050	Source
Reductions from Extending Transit Network Coverage or Hours						
Percent reduction in GHG emissions from plan/community VMT	percent	0.07%	0.27%	0.40%	0.54%	VTA
Total Communitywide onroad vehicle emissions	MT CO2e	2,654,587	1,194,896	810,104	649,078	VTA
Total emissions increases from increased bus VMT	MT CO2e	1,040	87	0	0	VTA
Reductions from Increasing Transit Service Frequency						
Percent reduction in GHG emissions from plan/community VMT	percent	0.20%	0.76%	1.11%	1.50%	VTA
Total Communitywide onroad vehicle emissions	MT CO2e	2,654,587	1,194,896	810,104	649,078	VTA
Total emissions increases from increased bus VMT	MT CO2e	3,532	294	0	0	VTA

VTA Measure Annual GHG Emission Calculations

Replacement Type	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Assumptions
Reductions from Extending Transit Network Coverage or Hours																												
Percent reduction in GHG emissions from plan/community VMT	percent	0	0	0.07%	0.09%	0.11%	0.12%	0.14%	0.15%	0.17%	0.18%	0.20%	0.21%	0.23%	0.24%	0.26%	0.27%	0.30%	0.32%	0.35%	0.37%	0.40%	0.42%	0.45%	0.48%	0.51%	0.54%	Assuming early implementation due to EPA funding. 2030 GHG reduction achieved in 2027.
Total Communitywide onroad vehicle emissions	MT CO2e	0	0	3,092,494	2,946,525	2,800,556	2,654,587	2,508,617	2,362,648	2,216,679	2,070,710	1,924,741	1,778,772	1,632,803	1,486,834	1,340,865	1,194,896	1,117,938	1,040,979	964,021	887,063	810,104	777,899	745,694	713,489	681,283	649,078	
Total emissions increases from increased bus VMT	MT CO2e	0	0	1,040	1,040	1,040	1,040	945	850	754	659	563	468	373	277	182	87	69	52	35	17	0	0	0	0	0	0	
GHG Emission Reductions	MT CO2e	0	0	1,267	1,607	1,903	2,155	2,457	2,715	2,928	3,097	3,221	3,301	3,336	3,327	3,273	3,174	3,258	3,304	3,312	3,282	3,213	3,303	3,376	3,430	3,466	3,484	
Reductions from Increasing Transit Service Frequency																												
Percent reduction in GHG emissions from plan/community VMT	percent	0	0	0.20%	0.21%	0.22%	0.22%	0.23%	0.23%	0.24%	0.24%	0.25%	0.25%	0.26%	0.26%	0.27%	0.76%	0.83%	0.90%	0.97%	1.04%	1.11%	1.18%	1.26%	1.34%	1.42%	1.50%	Assuming early implementation due to EPA funding. 2030 GHG reduction achieved in 2027.
Total Communitywide onroad vehicle emissions	MT CO2e	0	0	3,092,494	2,946,525	2,800,556	2,654,587	2,508,617	2,362,648	2,216,679	2,070,710	1,924,741	1,778,772	1,632,803	1,486,834	1,340,865	1,194,896	1,117,938	1,040,979	964,021	887,063	810,104	777,899	745,694	713,489	681,283	649,078	
Total emissions increases from increased bus VMT	MT CO2e	0	0	3,532	3,532	3,532	3,532	3,209	2,885	2,561	2,237	1,913	1,589	1,266	942	618	294	235	176	118	59	0	0	0	0	0	0	
GHG Emission Reductions	MT CO2e	0	0	0	0	0	2,324	2,457	2,574	2,677	2,764	2,836	2,893	2,934	2,961	2,971	8,750	9,006	9,154	9,195	9,128	8,955	9,218	9,429	9,589	9,699	9,756	

VTA Measure Cumulative GHG Emission

Measure	Units	2030	2050
Cumulative reductions from Extending Transit Network Coverage or Hours	MT CO2e	6,932	71,191
Cumulative reductions from Increasing Transit Service Frequency	MT CO2e	2,324	129,270
Total Cumulative GHG Reductions	**MT CO2e**	**9,256**	**200,461**

TRANSPORTATION

Measure 6: Bike-Ped Highway

Percent Implementation

Bike-Ped Highway Inputs

Variable	Units	Value	Data Source	Notes
Equation Variables				
Percent of VMT on roadway	percent	0.72%	Based on VTA VMT reduction information	
Active transportation adjustment factor	unitless	0.0019	CAPCPA Table T-18.1	Assuming at least 24,001 vehcile trips per day, project longer than 2 miles, and non-university
Credits for key destinations near project	unitless	0.0015	CAPCPA Table T-18.2	Assuming at least 7 key destinations within 1/2 mile of project
Growth factor adjustement for facility type	unitless	1.5400	CAPCPA Table T-18.3	Assuming project is a Class 1 or Class IV bikeway
San Benito annual days of use of new facility	days	315	CAPCPA Table T-18.4	
Santa Clara annual days of use of new facility	days	307	CAPCPA Table T-18.4	
One-way bicycle trip length	miles	1.5	CARB Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks: https://ww2.arb.ca.gov/sites/default/files/classic/cc/ca	
San Benito miles/passenger trip	miles/trip	8.1855	EMFAC2021	For 2022
Santa Clara miles/passenger trip	miles/trip	7.7534	EMFAC2021	For 2022
Days per year	days	365		
Inputs				
Year of implementation start	year	2025	Input	
Year of implementation end	year	2045	Input	
Annual phase-in rate	% of equipment replacements	5%	Assume linear expansion of program. Calculated from implementation start and end year.	
Inventories				
MSA Passenger GHG Emissions	MT CO2e	3,868,363.7	SCC GHG Inventory	

Bike-Ped Highway Calculations

Variable	Units	2030	2050
Annual days of use of new facility	days	307	307
Regional miles/passenger trip	miles/trip	7.7705	7.7705
Percent annuanl reduction in VMT from displaced	percent	0.00%	0.00%
Annual GHG emissions reduced	MT CO2e	24	24
Effective implementation factor	unitless	15	210
Post implementation factor	unitless	0	5
Cumulative GHG Emission Reductions	**MT CO2e**	**356**	**5,096**
Annual VMT reduction cross-check	miles	71,657	71,657

Measure 7: Transit Signal Priority Programs

Percent Implementation

Traffic Signal Priority Programs Inputs and Data Sources

Variable	Units	Percent Replaced Each Year	Data Source
Equation Variables			
Percent reduction in transit travel time due to trea	percent	10.00%	CAPCOA T-26
Elasticity of transit ridership with respect to trans	unitless	-0.4	CAPCOA T-26
San Benito transit mode share	percent	0.80%	2022 ACS 5-Year Estimate, https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=050XX00US06069&tid=ACSST1Y2022.S0801
Santa Clara transit mode share	percent	2.90%	2022 ACS 5-Year Estimate, https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=050XX00US06085
San Benito vehicle mode share	percent	87.60%	2022 ACS 5-Year Estimate, https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=050XX00US06069&tid=ACSST1Y2022.S0801
Santa Clara vehicle mode share	percent	72.70%	2022 ACS 5-Year Estimate, https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=050XX00US06085
Statewide mode shift factor	percent	57.80%	CAPCOA T-26
Inputs			
Year of implementation start	year	2025	Input
Year of implementation end	year	2040	Input
Annual phase-in rate/Percent of community transit routes that receive treatments	% of equipment replacements	7%	Assume linear expansion of
Inventories			
Passenger GHG Emissions	MT CO2e	3,868,363.7	SCC GHG Inventory

Traffic Signal Priority Programs Calculations

Variable	Units	2030	2050
Transit mode share in community	percent	2.82%	2.82%
Vehicle mode share in community	percent	73.29%	73.29%
Annual percent reduction in GHG emissions from v	percent	0.01%	0.01%
Annual GHG emission reductions from vehicle tra	MT CO2e	229	229
Effective implementation factor	unitless	15	120
Post implementation factor	unitless	0	10
Cumulative percent reduction in GHG emissions fro	**MT CO2e**	**3,438**	**25,797**

GHG Emission Reductions from VTA Bus Speed Improvements - VTA Model Outputs

Item	Units	2030	2040	2045	2050	Data Source
Diesel Buses						
Change in fuel usage	gallons	-88,452	0	0	0	VTA
Emissions factor	lbs CO2e/unit of fuel	23	0	0	0	VTA
Annual Diesel GHG Reductions	MT CO2e	941	0	0	0	VTA
Electric Buses						
Change in kWh usage	kWh	-378,145	-4,008,602	-5,344,803	-6,681,004	VTA
Emissions factor	lbs CO2e/kWh	0	0	0	0	VTA
Annual Electricity GHG Reductions	MT CO2e	2	6	0	0	VTA

GHG Emission Reductions from VTA Bus Speed Improvements - Interpolation

Replacement Type	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Assumptions
Diesel Buses																												
Change in fuel usage	gallons	0	0	-88,452	-88,452	-88,452	-88,452	-79,606	-70,761	-61,916	-53,071	-44,226	-35,381	-26,535	-17,690	-8,845	0	0	0	0	0	0	0	0	0	0	0	Assuming early implementation due to EPA funding. 2030 fuel reduction achieved in 2027.
Emissions factor	lbs CO2e/unit of fuel	0	0	23	23	23	23	21	19	16	14	12	9	7	5	2	0	0	0	0	0	0	0	0	0	0	0	
Annual Diesel GHG Reductions	MT CO2e	0	0	941	941	941	941	762	602	461	339	235	151	85	38	9	0	0	0	0	0	0	0	0	0	0	0	
Electric Buses																												
Change in kWh usage	kWh	0	0	-378,145	-378,145	-378,145	-378,145	-741,191	-1,104,236	-1,467,282	-1,830,328	-2,193,374	-2,556,419	-2,919,465	-3,282,511	-3,645,557	-4,008,602	-4,275,843	-4,543,083	-4,810,323	-5,077,563	-5,344,803	-5,612,043	-5,879,284	-6,146,524	-6,413,764	-6,681,004	Assuming early implementation due to EPA funding. 2030 electricity increase achieved in 2027.
Emissions factor	lbs CO2e/kWh	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Annual Electricity GHG Reductions	MT CO2e	0	0	2	2	2	2	3	5	6	6	7	7	7	7	7	6	5	4	3	2	0	0	0	0	0	0	

GHG Emission Reductions from VTA Bus Speed Improvements - Cumulative GHG Emission Reductions

Measure	Units	2030	2050
Cumulative reductions from Extending Transit Neb	MT CO2e	3,762	6,443
Cumulative reductions from Increasing Transit Ser	MT CO2e	7	83
Total Cumulative GHG Reductions	**MT CO2e**	**3,769**	**6,526**

Measure 8: Agricultural Equipment Decarbonziation

Equipment Population

Effective number of years (finite sum): $N_e = (Y_n * (Y_n + 1))/2$

Offroad Decarbonization Parameters and Data Sources

Definition	Unit	Value	Data Source
Offroad fuel GHG emission reductions	MT CO_2e	See calculation table	Calculated
Off-road fuel avoided	gallon	See calculation table	Calculated
Weighted emission factor for all off-road fuels	MT CO2e/gallon	See calculation table	Inventory & Forecast
Agricultural Emissions	MT CO_2e	10,064	Inventory
Agricultural Equipment	population	1,501	Inventory
Avg Emissions per equipment	MT CO2e/population	7	Inventory
Number of agricultural equipment pieces decarbonize	population	1,351	Assume 90% decarbonization of sector by 2050
Year in which measure is implemented	year	2027	Year in which EPA funding is awarded
Year in which program is completed	year	2050	

Offoad Decarbonization Emission Reduction Calculations

Definition	Units	2030	2050
Agricultural Emissions	MT CO2e	10,064	10,064
Agricultural Equipment	population	1,501	1,501
Avg Emissions per equipment	MT CO2e/population	7	7
Number of agricultural equipment pieces decarbonize	population	1,351	1,351
Target agrigultural equipment replacements per year	population/year	59	59
Effective implementation factor	unitless	6	276
Post implementation factor	unitless	0	0
CO2e Reduction during implementation	MT CO2e	2,363	108,691
CO2e Reduction post implementation	MT CO2e	0	0
Cumulative Emissions Reductions	**MT CO2e**	**2,363**	**108,691**

Measure 9: Zero-emission Transit and Charger Program

Percent Implementation

GHG Emission Reductions from ZEV Transit - VTA Model Outputs

Category	Subcategory	Subcategory 2	Item	2021	2030	2040	2045	2050	Data Source
Bus VMT Electrified per Year [VMT/year]									
Revenue Fleet VMT		All Bus and Paratransit	Electric Bus VMT	0	5,248,892	18,547,323	18,547,323	18,547,323	VTA
Revenue Fleet VMT	ICE Bus and Paratransit	All Bus and Paratransit	Paratransit VMT	0	0	4,673,240	4,825,484	4,977,727	VTA
ICE VMT Emission Factor [MT CO2e/VMT]									
Revenue Fleet VMT		All Bus and Paratransit	Electric Bus VMT	N/A	0.001253	N/A	N/A	N/A	VTA
Revenue Fleet VMT	ICE Bus and Paratransit	All Bus and Paratransit	Paratransit VMT	N/A	0.000514	N/A	N/A	N/A	VTA
Leg-adjusted GHG Emissions per Year from Electricity [MT CO2e/Year]									
Revenue Fleet VMT		All Bus and Paratransit	Electric Bus VMT	0	426	483	0	0	VTA
Revenue Fleet VMT	ICE Bus and Paratransit	All Bus and Paratransit	Paratransit VMT	0	0	0	0	0	VTA

GHG Emission Reductions from ZEV Transit - Annual GHG Emissions

Replacement Type	Units	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
GHG Emission Reduction from Diesel Avoided																											
Bus VMT Converted	miles	2,332,841	2,916,051	3,499,262	4,082,472	4,665,682	5,248,892	6,578,735	7,908,579	9,238,422	10,568,265	11,898,108	13,227,951	14,557,794	15,887,637	17,217,480	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323	18,547,323
Paratransit VMT Converted	miles	0	0	0	0	0	0	467,324	934,648	1,401,972	1,869,296	2,336,620	2,803,944	3,271,268	3,738,592	4,205,916	4,673,240	4,703,688	4,734,137	4,764,586	4,795,035	4,825,484	4,855,932	4,886,381	4,916,830	4,947,279	4,977,727
GHG Emission Reduction from Fuel Avoided	MT CO2e	2,922	3,653	4,383	5,114	5,844	6,575	8,481	10,387	12,293	14,199	16,105	18,011	19,917	21,823	23,729	25,635	25,651	25,666	25,682	25,698	25,713	25,729	25,745	25,760	25,776	25,791
GHG Emissions Increase from Electricity Added																											
GHG Emissions Increase from Electricity Added	MT CO2e	0	0	0	0	0	426	432	437	443	449	454	460	466	471	477	483	386	290	193	97	0	0	0	0	0	0

GHG Emission Reductions from ZEV Transit - Cumulative GHG Emissions

Measure	Units	2030	2050
Total Cumulative GHG Reductions	**MT CO2e**	**28,065**	**450,316**

Solid Waste

Measure 10: Compost Expansion Program

Percent

Organic Waste Diversion Parameters and Data Sources

Definition	Value	Unit	Data Source	Link
Landfilled organic waste GHG emission reductions	See calculation table	MT CO2e	Calculated	N/A
Landfilled organic waste GHG emissions	See calculation table	MT CO2e	Calculated	N/A
Landfilled organic waste reduction target	75.00%	percentage	Assume SB 1383 Requirement	N/A
Year in which program is implemented	2027	Year	Year in which EPA grant is awarded	

Organic Waste Diversion Emission Reduction Calculations

Definition	Units	Sector	2030	2050
Landfilled organic waste GHG emissions	MT CO2e	Community	605,221	605,221
Landfilled organic waste reduction target	percentage	Community	75%	75%
Cumulative GHG Reductions	**MT CO2e**		**1,361,748**	**10,440,066**

Note: Quantification assesses cumulative GHG emissions reductions based on annual diversion targets

Note: Quantification assumes all GHG emissions from landfilled waste are the result of organic waste which would be diverted by SB 1383

Measure 11: Food Recovery and Diversion Program

Perpetual

Food Reuse Parameters and Data Sources

Definition	Value	Unit	Data Source	Link
Community Protocol (transport, SW.6)				
Miles travelled to disposal site	26.8800	miles	Google maps (average distance of landfills from applicable County center)	
Emissions factor for collection systems (diesel)	0.0200	MT CO2e/ton	ICLEI Community Protocol, SW.6 assuming diesel transport	
Emissions factor for tansport emissions (diesel)	0.0001	MT CO2e/ton/mile	ICLEI Community Protocol, SW.6 assuming diesel transport	
Community Protocol (landfill fugitive, SW.4.1)				
LFG Collection Efficiency	0.7500	Fraction	ICLEI Community Protocol, SW.4.1	
Oxidation Rate	0.1000	Fraction	ICLEI Community Protocol, SW.4.1	
Emission factor for material	0.0600	mt CH4/ton	ICLEI Community Protocol, SW.4.1 assuming mixed waste	
Community Protocol (landfill process, SW.5)				
Landfill process EF	0.0110	MT CO2e/ton	ICLEI Community Protocol, SW.5 assuming CNG operations	
Community Protocol (water)				
Conversion factor	325,851	gallons/AF		
Energy Intensity	1,314	kWh/AF	Santa Clara 2017 Inventory	
Electricity emissions factor	0.0001	MT CO2e/kWh	Weighted average of combined Santa Clara and San Benito 2017 Inventories	
Perpetual data				
Waste diverted from landfill	334.0000	MT	Perpetual	See Perpetual LCA estimates emailed on 2/14/24
Washing impact of reuse foodware	4,100,000	gallons	Perpetual	See Perpetual LCA estimates emailed on 2/14/24
Transportation emissions from collection of reused	31	MT CO2e	Perpetual	See Perpetual LCA estimates emailed on 2/14/24
Implementation				
Implementation year	2027	year	Year in which EPA funding is awarded	
Full-scale implementation achievement	2030	year	Assume target full scale ramp up year	
Waste diverted from landfill	33%	percent	Assume linear expansion of program. Calculated from implementation start and end year.	

Food Reuse Emission Reduction Calculations

Definition	Units	2030	2050
Waste Emissions			
Fugitive landfill waste emission diverted	MT CO2e	126	126
Landfill process emissions diverted	MT CO2e	4	4
Washing Emissions			
Washing impact of reuse foodware	AF	12.58	12.58
Energy Intensity	kWh/AF	1,314	1,314
Electricity emissions factor	MT CO2e/kWh	0.000096	0.000096
Reuse foodware washing emissions	MT CO2e	-1.59	-1.59
Transportation Emissions			
Transportation emissions from waste to landfill trar	MT CO2e	7.94	7.94
Transportation emissions from collection of reused	MT CO2e	-31.00	-31.00
Implementation Scale GHG Reductions			
Linear program expansion annual GHG reductions	MT CO2e/year	35.09	35.09
Full-scale annual GHG reductions	MT CO2e/year	105.28	105.28
Years of implementation			
Effective implementation factor	unitless	6	6
Post implementation factor	unitless	0	20
Cumulative GHG Reductions	**MT CO2e**	**211**	**2,316**

Note: negative values denote GHG emissions rather than reductions

Carbon Sequestration

Measure 12: Community-Scale Reuse System via CA Green Business Network

Percent

Compost Procurement Parameters and Data Sources

Definition	Value	Unit	Data Source	Link
Carbon sequestered from compost procurement an	See calculation table	MT CO2e	Calculated	N/A
Compost procurement required to meet organic waste procurement target	See calculation table	tons	CalRecycle	Procurement Calc Tool; https://calrecycle.ca.gov/organics/slcp/reporting/
Carbon sequestration factor for mixed organic compost application	0.2300	MT CO2e/ton	CARB	https://ww2.arb.ca.gov/sites/default/files/classic/cc/waste/cerffinal.pdf
Compliance target with procurement requirement	100%	percentage	Assume 100 percent compliance with SB 1382 procurement targets by 2030	
Year in which program is implemented	2027	Year	Year in which EPA funding is awarded	
Forecasted population	See calculation table	people	Inventory & Forecast	N/A
Organic waste procurement required per capita	0.08	tons/people	CalRecycle	Procurement Calc Tool; https://calrecycle.ca.gov/organics/slcp/reporting/
Conversion factor to convert organic waste procurement target into compost quantity	0.5800	compost tons/organic waste tons	CalRecycle	Procurement Calc Tool; https://calrecycle.ca.gov/organics/slcp/reporting/

Compost Procurement Carbon Sequestration Calculations

Definition	Units	2030	2050
Forecasted population	people	2,002,170	2,002,170
Organic waste procurement required per capita	tons/people	0.08	0.08
Conversion factor to convert organic waste procurement target into compost quantity	compost ton/organic waste ton	0.58	0.58
Compost procurement required to meet organic waste procurement target	ton	92,901	92,901
Compliance target with procurement requirement	percentage	100%	100%
Cumulative GHG Reductions	**MT CO2e**	**64,101**	**491,445**

Note: Quantification assesses cumulative GHG emissions reductions based on annual procurement and application targets

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Priority Climate Action Plan

EPA Climate Pollution Reduction Grant Program