City of San Mateo
Climate Action Plan




City of San Mateo
Climate Action Plan

Adopted CAP

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City of San Mateo

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List of Abbreviations

Acronym	Term
AB	Assembly Bill
ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
BAU	business-as-usual
CALGreen	California Green Building Standards
CAP	Climate Action Plan
CARB	California Air Resources Board
CCA	Community Choice Aggregation
C/CAG	City/County Association of San Mateo County
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO_2	carbon dioxide
CSI	California Solar Initiative
EIR	environmental impact report
GHG	greenhouse gas
kW	Kilowatt
kWh	kilowatt-hour
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy Efficiency and Design
MJ	Megajoule
MPO	metropolitan planning organization
MTC	Metropolitan Transportation Commission
$MTCO_2e$	metric tons of carbon dioxide equivalent
OPR	Office of Planning and Research

List of Abbreviations

Acronym	Term
PG&E	Pacific Gas and Electric
RICAPS	Regionally Integrated Climate Action Planning Suite
RPS	Renewables Portfolio Standard
SB	Senate Bill
SCS	sustainable communities strategy
TDM	Transportation Demand Management
TMA	transportation management agency
TOD	transit-oriented development
VMT	vehicle miles traveled

City of
San Mateo
Climate Action Plan

Executive Summary

This Climate Action Plan (Plan, CAP) serves as the City's strategy to reduce greenhouse gas (GHG) emissions, implementing both General Plan and State guidance.

Purpose of the Climate Action Plan

The City of San Mateo prepared this CAP for the incorporated City of San Mateo. This CAP demonstrates the City of San Mateo's leadership and commitment to reduce GHG emissions. As a tool of the General Plan, this CAP achieves General Plan GHG reduction goals while demonstrating the City's consistency with the California Environmental Quality Act (CEQA) Guidelines Section 15183.5(b) and the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines. Strategies in the CAP exceed a 15% reduction in GHG emissions below 2005 emissions levels by 2020.

This CAP serves as the City's comprehensive strategy to reduce GHG emissions and streamline the environmental review of GHG emissions of future development projects in the City of San Mateo. The City has analyzed this CAP with an addendum to the General Plan Environmental Impact Report. This approach builds on the City's Greenhouse Gas Emissions Reduction Program, adopted as a fully integrated component of the General Plan. By analyzing progress to date and presenting new technical information, this CAP consolidates the City's climate action planning efforts and demonstrates the City's consistency with the CEQA guidelines. The CAP also presents a work plan and monitoring program for the City to track progress over time and maintain status as a qualified GHG reduction strategy, consistent with BAAQMD and CEQA guidance.

What is the Climate Action Plan?

- A plan with tools to save energy and money
- A plan to maintain a healthy environment and livable community
- A strategy to implement the General Plan consistent with State guidance
- An approach to continue San Mateo's leadership toward a sustainable future

Executive Summary

Building on Local Leadership

The City has a long-standing commitment to environmental stewardship and sustainability. The CAP allows City decision-makers and the broader community to understand existing planning efforts and the City's strategy to implement General Plan GHG reduction goals. The CAP compiles the City's early climate and GHG plans to analyze changes in GHG emissions over time and chart a path to achieve General Plan GHG reduction goals. By reviewing the outcomes of early efforts and reconsidering strategies, the City can continue to maintain progress moving forward.

This CAP identifies the City's commitment to exceed the State target of 1990 emissions levels by 2020, implementing a key goal of the City's 2007 Sustainable Initiatives Plan. The General Plan interprets this goal as a 15% reduction below 2005 GHG emissions levels by 2020. As described in the General Plan, major strategies to achieve this target include existing local and regional programs, General Plan policies, and State actions. This CAP compiles these efforts and integrates strategies from the City's multiple plans, drawing on the General Plan, the Sustainable Initiatives Plan, the Greenhouse Gas Emissions Reduction Program, the Climate Action Plan for Operations and Facilities, and local accomplishments to date.

Examples of Early City Actions

Installed solar panels on the roof of the Main Library

Established trip reduction standards for new developments.

Created a curbside composting program

Planning Process

The City developed this CAP in a collaborative manner, closely involving City staff, agency partners, and the public. A key focus of the process was analyzing the impact of early local efforts. The community of San Mateo has achieved notable success in reducing GHG emissions below baseline 2005 levels. Based on a community-wide GHG emissions inventory for the year 2010, the City achieved a 9% reduction in GHG emissions from 2005 levels. Engagement with stakeholders and City staff involved a comprehensive analysis of programs and local activities to understand these accomplishments. The City's early success reducing GHG emissions provided a foundation for strategies in this Plan. Early initiatives include the City's Transportation Demand Management ordinance, a single-family composting program, and improvements at the City's wastewater treatment facility. These local programs along with other reduction efforts have led to a decrease of 9,520 $MTCO_2e$ from the City since implementation, demonstrating significant initiative on the reduction of emissions from San Mateo.

Working from these efforts, the CAP establishes new measures and actions in several key sectors for community-wide activities in the City of San Mateo. The sectors addressed by the CAP are energy, transportation, solid waste, water, and off-road equipment. The CAP also provides an implementation work plan for City staff and a framework to monitor and demonstrate progress.

As shown in Figure **ES-1**, the project initiated in winter of 2014, with adoption planned for early 2015.

Figure ES-1:Climate Action Plan Process

KEY OUTCOMES OF THE CAP

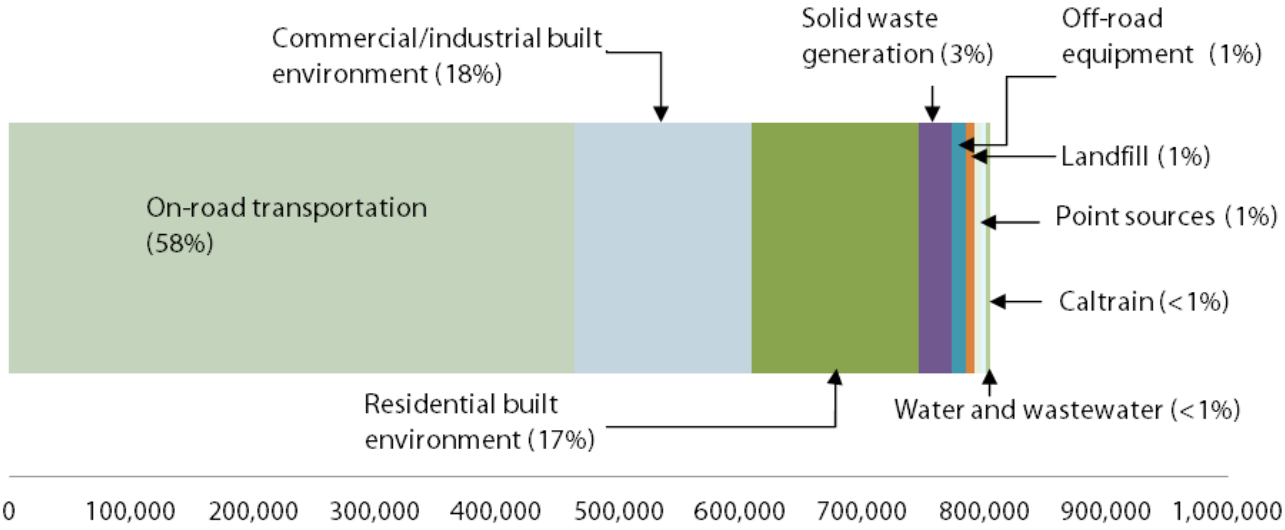
The CAP presents two main pieces of technical information: (1) a GHG emissions inventory, and (2) calculation of the credit for measures and actions. Using these two sets of information, the CAP estimates the long-term impact of San Mateo's efforts to reduce GHGs. This approach allows the City to measure progress toward the General Plan target of a 15% reduction in GHG emissions by 2020. The CAP also identifies the City's ongoing commitment to achieve long-term, post-2020 targets consistent with State guidance.

San Mateo 2005 Community-Wide Inventory

The inventory calculates GHG emissions for activities that take place within the City limits of San Mateo, even if the emissions are physically emitted in another community, such as a community member using electricity generated by a power plant in another part of California. Emissions are calculated using reported activity data (for example, the amount of electricity used in the community) and factors that reflect the local conditions. All GHG emissions in the inventory are shown in a common unit: metric tons of carbon dioxide equivalents, or $MTCO_2e$, which allows the varying potencies of different GHGs to be represented in one number. The GHG emissions inventory included nine sources of emissions, or sectors, for San Mateo in 2005. By understanding where these emissions come from, CAP measures can be targeted to address the largest sources in San Mateo. The community's total emissions in 2005 were 804,290 $MTCO_2e$. More than half of these emissions (58%) came from on-road transportation, and an additional 35% came from energy use in residential, commercial, and industrial buildings. The 2005 inventory is presented in **Figure ES-2**.

Executive Summary

Figure ES-2: 2005 Community Emissions and Sector Explanations ($MTCO_2e$)



2010 Inventory

An inventory for the calendar year 2010, conducted in 2014, showed a 9% decline in GHG emissions from 2005 levels. The distribution of emissions among sources did not change meaningfully between 2005 and 2010, although emissions levels declined in five sectors (particularly in solid waste generation) and rose in four others (most noticeably in off-road equipment). This inventory was used to assess progress since the 2005 baseline year and to inform updates to the community forecast. In response to the more up-to-date methods and sources used in the 2010 inventory, the project team updated the 2005 inventory to reflect the more recent process used in the 2010 inventory and to allow for an "apples-to-apples" comparison of the inventories.

Forecast

State, regional, and local laws, along with agencies tasked with local regulatory oversight, have influenced common methods and provided an impetus for identification of reduction targets in California. A GHG emissions inventory and forecast lays the groundwork for the CAP reduction target planning process. In San Mateo, the Sustainable Initiatives Plan of 2007 and the Greenhouse Gas Reduction Program of 2010 demonstrate that the City has sought to align with the State guidance for GHG reduction targets. Using activity data from the community-wide inventory and growth rates as projected by the General Plan, a forecast of future emissions can be calculated. This forecast, which is called the business as usual (BAU) scenario in this CAP, shows how many GHG emissions San Mateo would emit in 2020 with an increased population and no efforts to reduce emissions.

Existing Accomplishments

As mentioned above, San Mateo's GHG emissions in 2010 declined 9% from 2005 levels. Although some of these reductions may be temporary due to the economic downturn at this time, reductions in energy use and waste generation showed a longer-term trend that persisted even as the economy recovered. These reductions cannot be directly attributed to specific programs. The BAU forecast was revised to account for these trends, a revision known as the "Local Adjustment."

Statewide legislation and initiatives have helped ensure cleaner sources of transportation and energy which have reduced emissions regardless of community participation. A number of distinct local programs, both existing and planned, are expected to lead to additional GHG emissions reductions in 2020 and 2030, even after avoiding any double-counting with the Local Adjustment and State initiatives. **Table ES-1** shows these programs and the emissions reductions expected as a result.

Table ES-1: San Mateo Community-Wide GHG Emissions Reductions from Existing and Planned State and Local Programs

Policy	2020 Reductions ($MTCO_2e$)	2030 Reductions ($MTCO_2e$)
Business-as-Usual (BAU) Emissions	937,310	1,004,460
Local Adjustment	899,070	962,920
Total State Reductions	-173,220	-233,520
Existing Local Actions	-3,950	-5,180
Planned Local Actions	-5,570	-9,550
Total Emissions with Existing and Planned State and Local Programs	716,340	714,670

Note: Due to rounding, totals may not equal the sum of the component parts.

Climate Action Plan Results

Strategies in the CAP to reduce GHG emissions are referred to as measures. The measures proposed in the CAP build on inventory results and key opportunities prioritized by City staff, members of the San Mateo Sustainability Commission, and members of the public. The strategies in the CAP consist of measures and actions, identifying the steps the City will take to support reductions in GHG emissions. San Mateo will achieve these reductions in GHG emissions through a mix of voluntary programs and new strategic standards. All recommended standards presented in this CAP respond to the needs of development, avoiding unnecessary regulation, streamlining new development, and achieving more efficient use of resources. These measures, the level of implementation, and the anticipated 2020 reduction from these measures are summarized in **Table ES-2.**

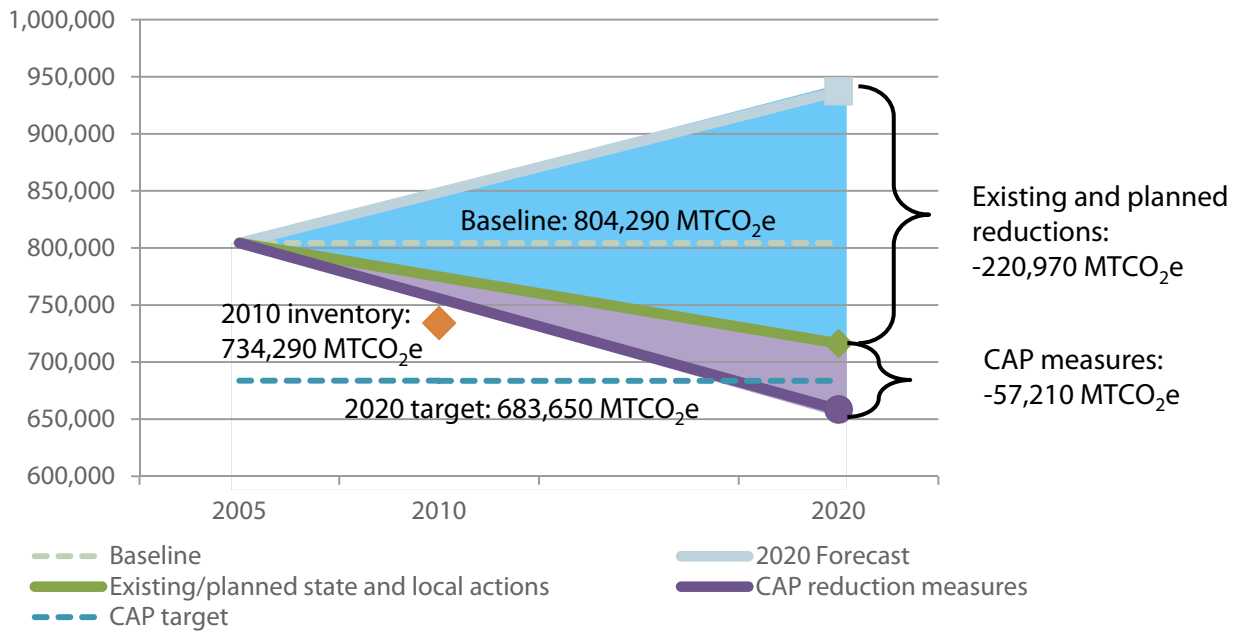
Executive Summary

Table ES-2: New CAP Measures

Measure		Implementation Level	2020 Reductions ($MTCO_2e$)
RE 1	Expanded options to purchase renewable electricity from other sources	Encourage	500
RE 2	Community Choice Aggregation	Require	23,720
RE 3	Renewable energy systems for new residences	Require	140
RE 4	Renewable energy systems for existing residences	Incentivize	3,970
RE 5	Renewable energy systems for new nonresidential buildings	Require	130
RE 6	Renewable energy systems for existing nonresidential buildings	Incentivize	560
RE7	Advanced and emerging renewable energy systems	Encourage	0
EE 1	Residential energy efficiency owner-occupied retrofits	Encourage	440
EE 2	Residential energy efficiency renter-occupied retrofits	Incentivize	650
EE 3	Nonresidential energy efficiency retrofits	Incentivize	3,990
EE 4	Energy efficiency at healthcare centers	Incentivize	1,710
EE 5	Residential energy education and low-cost retrofits	Encourage	230
EE 6	Nonresidential energy education and low-cost retrofits	Encourage	70
ME 1	Energy efficiency for new City buildings	Incentivize	0
ME 2	Energy efficiency at existing City buildings	Incentivize	0
AF 1	Public EV charging stations	Require	40
AF 2	Increased EV adoption	Require	6,110
AT 1	Public shuttles	Encourage	50
AT 2	Transportation Demand Management (TDM)	Require	3,090
AT 3	Expand car share program	Incentivize	2,120
AT 4	Increase bicycle mode share	Incentivize	660
AT 5	Increase pedestrian mode share	Require	0
SW 1	Increase participation in composting program	Require	8,940
WW 1	Water efficiency retrofits for existing buildings	Incentivize	20
WW 2	Water-efficient landscaping	Require	0
WW 3	Develop new sources of nonpotable water	Incentivize	0
OR 1	Alternative fuel lawn and garden equipment	Encourage	40
OR 2	Alternative fuel construction equipment	Encourage	30

Full implementation of all measures in the CAP can result in a reduction of emissions by approximately 18% below 2005 baseline levels by 2020, exceeding both the 2020 goal in San Mateo's adopted General Plan and State guidance for reductions (15%). State actions alone reduce 2020 GHG emissions to 9.8% below baseline levels, while the addition of existing and planned local actions reduce GHG emissions to 10.9% below baseline levels. A significant portion of San Mateo's GHG reductions from the measures in this CAP will be achieved through efforts to substantially increase the amount of electricity in the community from renewable sources of energy, particularly through the creation of a Community Choice Aggregation (CCA) program with Measure RE 2. If implemented, this measure alone will result in a 23,720 $MTCO_2e$ reduction, which translates to an emissions reduction of 2.6% relative to baseline levels. However, in the event that the CCA is not established by 2020, the other measures in this CAP will still allow San Mateo to achieve a reduction of 15.4% below baseline levels. The reductions achieved by the CAP in 2020 are presented in **Figure ES-3**.

Figure ES-3: 2020 CAP Reductions ($MTCO_2e$)



Executive Summary

Climate Action Plan Benefits

The CAP provides a framework for San Mateo to reduce GHG emissions while simplifying the review process for new development. Measures and actions in the CAP identify the City's expectations for new development. This approach allows the CAP to serve as San Mateo's Qualified GHG Reduction Strategy, serving as a resource for GHG analysis and mitigation pursuant to CEQA.

City staff will use the CAP to implement the goal of exceeding a 15% reduction in GHG emissions below baseline 2005 levels by 2020 as identified in San Mateo's General Plan and Sustainable Initiatives Plan. The work plan contained in the CAP identifies the responsibility of key departments, time frames, and processes to complete annual updates to the City Council and Sustainability Commission. The CAP will function as a dynamic tool, equipping City staff to undertake near-term steps toward long-term General Plan objectives. Successful attainment of the CAP reduction target can only be achieved through the broad-based efforts of the community, including residents, employees, employers, and local and regional partnerships. Accordingly, the CAP also serves as a public resource, identifying the City's intent to use creative and collaborative partnerships to leverage resources and work efficiently. The CAP measures also seek to improve the quality of life for residents and businesses locally, improving public health, supporting economic development, and strengthening San Mateo's environmental leadership.

Chapter 1

Introduction

This Climate Action Plan (CAP) demonstrates the City of San Mateo's leadership and commitment to reduce greenhouse gas (GHG) emissions.

This CAP is a comprehensive strategy to reduce GHG emissions and streamline the environmental review of GHG emissions of future development projects in the City of San Mateo, consistent with the California Environmental Quality Act (CEQA) Guidelines Section 15183.5(b) and the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines. The CAP identifies a strategy, reduction measures, and implementation actions the City will use to achieve the State-recommended GHG emissions reduction target of 15% below 2005 emissions levels by 2020.

GHG Reduction Target

This CAP identifies the City's commitment to achieve the State target of 1990 emissions levels by 2020, implementing a key goal of the City's 2030 General Plan.

Purpose

The City of San Mateo developed this CAP based on a long-standing commitment to environmental stewardship and sustainability. This CAP consolidates and updates plans, consistent with the City's 2030 General Plan. Specifically, the CAP builds on existing strategies integrated into the General Plan that address GHG emissions, including the Sustainable Initiatives Plan (adopted in 2007), Greenhouse Gas Emissions Reduction Program (adopted in 2010), and the Climate Action Plan for Operations and Facilities (adopted in 2008). Regionally, the CAP draws on the City's involvement with countywide climate action planning efforts. The CAP integrates early and ongoing efforts into a single plan that supports the General Plan and follows CEQA and air quality guidelines set by the State and BAAQMD. As a result, the CAP provides an updated framework for addressing GHG emissions in the community. New development will benefit from a consolidated framework for the review and analysis of GHG emissions.

The CAP allows City decision-makers and the community to understand the sources and magnitude of local GHG emissions, establish goals to reduce GHG emissions, and prioritize steps to achieve emissions reduction targets. The CAP establishes goals, measures, and actions to addresses GHG emissions from the energy, water, transportation, solid waste, and off-road equipment sectors. It also establishes an implementation program and a framework to monitor and report progress.

Chapter 1

Climate Change Science

In order to make meaningful and effective decisions regarding GHG emissions reductions, it is important to understand the scientific and regulatory framework under which this Plan has been developed. This section provides a brief introduction to the scientific research efforts to understand how climate change occurs and its global implications, and describes the federal, State, regional, and local regulations that provide guidance and inform the development of this Plan.

Since the early 1990s, scientific consensus holds that the world's population is releasing GHGs faster than the earth's natural systems can absorb them. These gases are released as byproducts of fossil fuel combustion, waste disposal, industrial processes, land-use changes, and other human activities. While often used interchangeably, there is a difference between the terms "climate change" and "global warming." According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period of time that can be caused by both natural factors and human activities. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased GHG emissions. The use of the term "climate change" is becoming more prevalent because it encompasses all changes to climate, not just temperature.

> Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.
> – IPCC Fifth Assessment Report

Greenhouse Effect

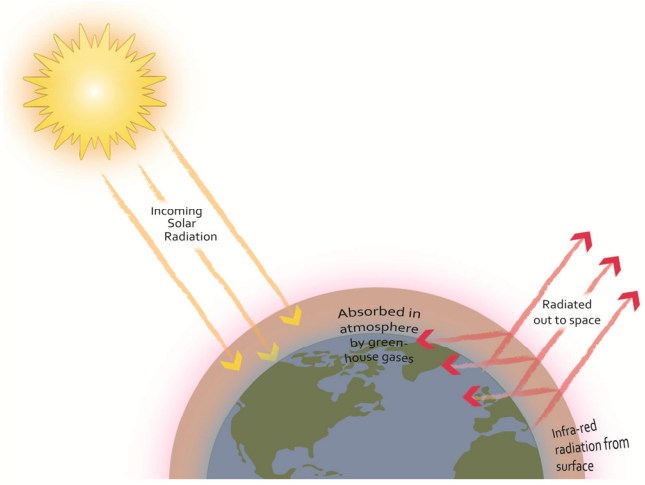
The release of gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), creates a blanket around the earth that allows light to pass through but traps heat at the surface preventing its escape into space (**Figure 1).** These gases function similarly to the glass panes of a greenhouse, which allow sunlight to pass into the building but trap heat inside, hence the name for this process: the greenhouse effect. While the greenhouse effect is a naturally occurring process that is vital for the existence of life, human activities have accelerated the generation of GHGs beyond natural levels. The overabundance of the gases that cause this effect, known as greenhouse gases, in the atmosphere has led to an unexpected warming of the earth and has the potential to severely impact the earth's climate system.

> It is extremely likely [at least a 95% probability] that human influence has been the dominant cause of the observed warming since the mid 20th century.
> – IPCC Fifth Assessment Report

Climate Change Impacts

The continued release of GHGs at or above the current rate will continue to increase average temperatures around the globe. These increases in global temperatures are likely to change our planet's climate in ways that will have significant global, regional, and local long-term effects.

Figure 1: The Greenhouse Effect



Source: National Oceanic and Atmospheric Administration, National Climatic Data Center. 2008. NOAA Satellite and Information Service.

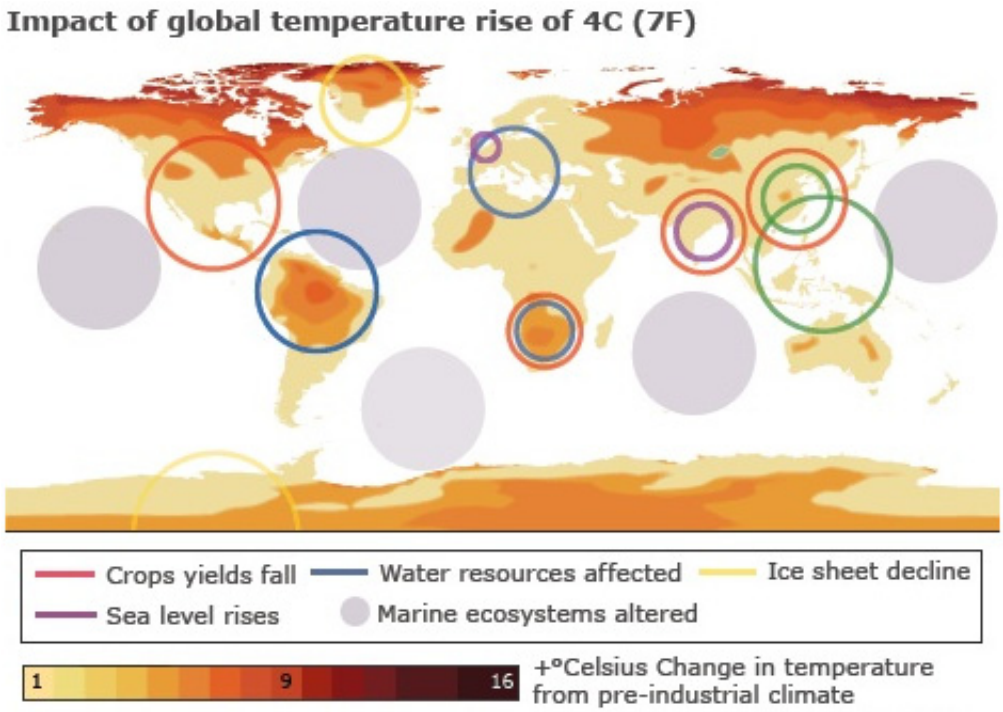
Global Climate Change Impacts

The Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report summarizes the most recent scientific understanding of global climate change and projects future conditions using the most comprehensive set of recognized global climate models. The report, released in 2013, considers all impacts human activities have on global temperature, and states that there is at least a 95% probability that "human influence has been the dominant cause of the observed warming since the mid 20th century." The Fifth Assessment Report projects four different temperature scenarios, all of which project 2016–2035 temperatures 0.54 to 1.26°F warmer than the 1986–2005 average temperature, and potentially over 7.2°F by 2100 under the most aggressive scenario.

As asserted in the IPCC Fifth Assessment Report, if trends remain unchanged, continued GHG emissions above current rates will induce further warming changes in the global climate system and pose even greater risks than those currently witnessed. The impact of additional warming on the global climate is shown in **Figure 2.** Given the scientific basis of climate change and expected trends, the challenge remains to prepare for and mitigate climate change through deliberate global and local action.

CHAPTER 1

Figure 2: Potential Global Climate Change Impacts

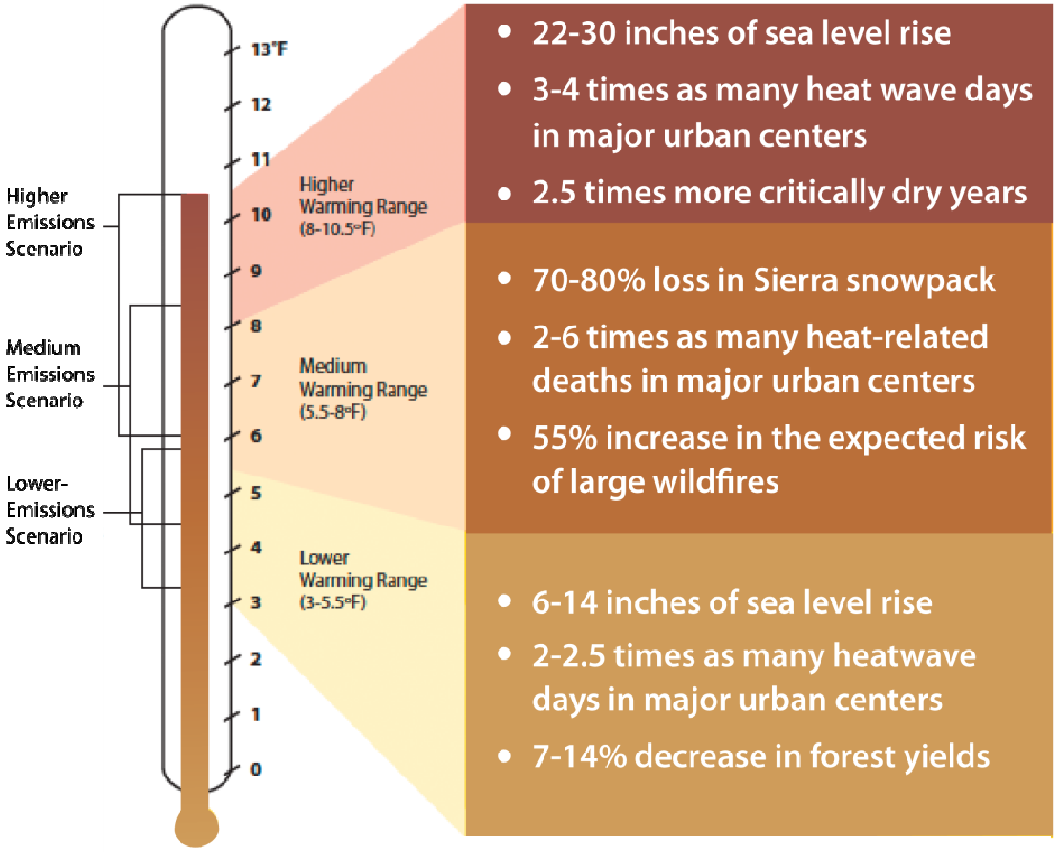


Source: Met Office, Hadley Centre. 2009.

Climate Change Impacts to California and the City of San Mateo

The City of San Mateo, like most communities in California, is expected to experience multiple direct impacts as a result of climate change, including potential water shortages, sea level rise, and negative effects on public health and biodiversity. Research suggests that California will experience hotter and drier conditions, reductions in winter snow and increases in winter rains, sea level rise, significant changes to the water cycle, and an increased occurrence of extreme weather events. Such compounded impacts will affect economic systems throughout the State, with likely ramifications in the City of San Mateo. To refrain from action is costly and risky; the California Climate Adaptation Strategy estimates that no action to address the potential impacts of climate change will lead to economic losses of "tens of billions of dollars per year in direct costs" and "expose trillions of dollars of assets to collateral risk." Potential impacts in California due to climate change are summarized in **Figure 3**.

Figure 3: California Climate Change Impacts, 2070–2099



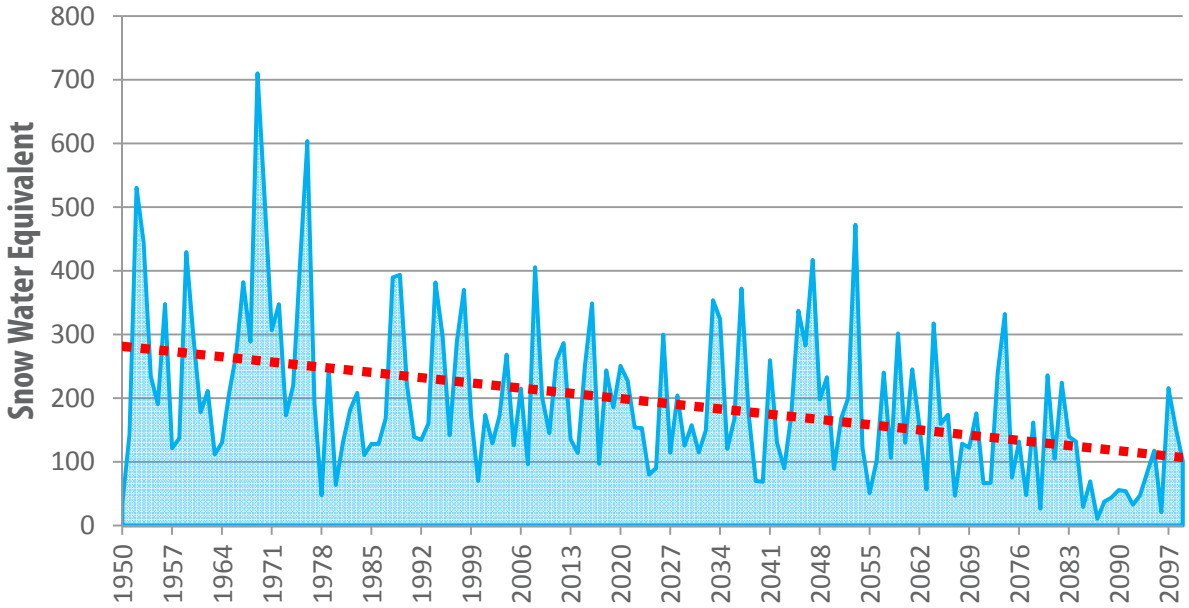
Source: California Energy Commission. 2006. Our Changing Climate: Assessing the Risks to California. Web Document. Sacramento: California Energy Commission.

Decreased Supply of Fresh Water

The State's water supply is already under stress and is anticipated to shrink under even the most conservative climate change scenario. Warmer average global temperatures cause more rainfall than snowfall, making the winter snowfall season shorter and accelerating the rate at which the snowpack melts in the spring. The Sierra snowpack is estimated to experience a 25% to 40% reduction from its average by 2050. **Figure 4** shows anticipated changes in snowpack levels above the Hetch Hetchy reservoir, the source of the water used in San Mateo, under a high GHG emissions scenario. With rain and snow events becoming less predictable and more variable, the rate of flooding could increase

and California's ability to store and transport fresh water for consumption could decrease. Further, warmer weather will lead to longer growing seasons and increased agricultural demand for water.

Figure 4: Historic and Projected Snowpack Levels Impacting San Mateo's Water Supply



Source: Cal-Adapt 2014.

Increased Severity and Frequency of Flood Events

Forecasts indicate more intense rainfall events, generating more frequent or extensive runoff, and flooding may result from a changing climate. Localized flood events may increase in periods of heavy rain. As explained by the Climate Adaptation Strategy, California's water system is structured and operated to balance between water storage for dry months and flood protection during rainy seasons. Although climate change is likely to lead to a drier climate overall, risks from regular, more intense rainfall events can generate more frequent and/or more severe flooding that upsets this managed balance between storage and protection. Additionally, erosion may increase and water quality may decrease as a result of increased rainfall amounts.

Rising Sea Levels

Sea level rise is attributed to the increase of average ocean temperatures and the resulting thermal expansion and the melting of snow and ice contributing to the volume of water held in the oceans. While many effects of climate change will impact the region, sea level rise is one specific impact that has been extensively studied and quantified, and its

effects mapped. The speed and amount of sea level rise will be influenced by the increase in average temperatures and rate of melting of glacial ice. While there is a degree of uncertainty in projections, the actual rate of sea level rise is occurring more quickly than many previous projections had estimated.

The San Francisco Bay Conservation and Development Commission has led research efforts on sea level rise in the Bay Area and issued a report on sea level rise in April 2009, which states that sea levels in the Bay Area will rise 16 inches by mid-century and 55 inches by the end of the century. Approximately 180,000 acres of the Bay Area could be inundated by mid-century, and 213,000 acres could be flooded by the end of the century, including 93% of both the Oakland and the San Francisco airports. Because it is located in a low-lying coastal area, San Mateo is highly vulnerable to this threat. A sea level rise of 16 inches could inundate large portions of San Mateo east of Highway 101. If the level of San Francisco Bay rises 55 inches, water may reach as far into the City as South Delaware Street or El Camino Real.

Shoreline areas of San Mateo, such as Ryder Park, may be vulnerable to sea level rise.

Deteriorating Public Health

Heat waves are expected to have a major impact on public health, as well as decreasing air quality and increasing mosquito breeding and mosquito-borne diseases. Further, climate change is expected to alter the spread and prevalence of disease-carrying insects, organisms, or people, referred to as vectors, in addition to leading to a possible decrease in food quality and security. Vector control districts throughout the State are already evaluating how they will address the expected changes to California's climate.

According to a new report from the California Air Resources Board (CARB), the warming climate will increase ozone levels in California's major air basins, leading to upwards of 6 to 30 more days per year with ozone concentrations that exceed federal clean-air standards.

Cost-effective measures to reduce GHG emissions and protect public health are important for local governments. The new CARB study provides evidence of what is becoming known as the "climate penalty," where rising temperatures increase ground-level ozone and airborne health-damaging particles, despite the reductions achieved by programs targeting smog-forming emissions from cars, trucks, and industrial sources. The elderly, young, and sensitive populations most likely to be impacted by climate change are also those that often lack sufficient resources to adapt. Such vulnerable demographics are likely to need assistance to respond to climate change. Social equity issues related to the unequal distribution of resources and increased costs to address community-wide health risks will need to be addressed proactively to reduce the potential for financial strain on local governments.

Chapter 1

Increased Rate of Wildfires

Wildfire risk is based on a combination of factors including rainfall, winds, temperature, and vegetation. According to a 2012 report from the California Climate Change Center, earlier snowmelt, higher temperatures, and longer dry periods over a longer fire season will directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. Under a higher emissions scenario, the report estimates that the increase in fire occurrence could be substantial, ranging from 58% to 128% above historical levels by 2085.

Negative Impacts on Wildlife

As temperatures rise, species are moving north in California or to higher elevations. This migrational change disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change. The California Office of Emergency Services and the California Natural Resources Agency note that those species that are unable to migrate face the danger of extinction: "The amount of future warming expected in California may likely exceed the tolerance of endemic species (i.e., those that are native to a specific location and that only occur there) given their limited distribution and microclimate."

Reduction in soil moisture will result in early dieback of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes. Many of the potential effects on wildlife are still being studied, but with a limited ability to adapt to new climates, the potential for severe species loss is present.

Several potential hydrological changes associated with global climate change could also specifically influence the ecology of aquatic life in California and have several negative effects on cold-water fish. For example, if a rise in air temperature by just a few degrees Fahrenheit occurs, this change could be enough to raise the water temperatures above the tolerance of salmon and trout in many streams, favoring instead non-native fishes such as sunfish and carp. Unsuitable summer temperatures would be particularly problematic for many of the threatened and endangered fish that spend summers in cold-water streams, either as adults or juveniles or both.

Local Context

The CAP is an implementation program of the City's 2030 General Plan. The City of San Mateo adopted the 2030 General Plan in 2010. As part of the General Plan update, the City prepared and adopted the 2010 Greenhouse Gas Emissions Reduction Program (Program). The 2010 Program was the City's first step to consolidate City efforts into a framework for reducing GHG emissions consistent with the California Global Warming Solutions Act. The 2010 Program was based on the City's Sustainable Initiatives Plan adopted in the early stages of the 2030 General Plan update. Four years later, the City is revisiting its approach to address GHG emissions with this CAP. The CAP demonstrates the City's efforts to prepare a new strategic plan for GHG emissions that responds to evolving guidance and incorporates new protocols. Preparation of the CAP also allows the City to review progress toward GHG reductions since adoption of the 2010 Program.

2030 General Plan

The 2030 San Mateo General Plan presents the City's vision for establishing San Mateo as a diverse community with an exceptional quality and character. The General Plan envisions a preeminent City with balanced commercial and residential growth, with a distinguished downtown and viable, wholesome neighborhoods driven by a solid, healthy economic and financial base.

The City's General Plan contains goals and policies which regulate urban development, the protection of the natural environment, and public safety. It reflects the community's long-term vision and provides a goal and policy framework to guide land use and planning-related decisions, and future funding decisions. The General Plan also enables citizens and those seeking to develop property to understand San Mateo's values and objectives.

A Vision of San Mateo in 2030

The City of San Mateo is a leader in addressing the environmental effects of climate change. The City maintains an active role in promoting, educating, and conducting sustainable practices throughout the San Mateo community.
–San Mateo General Plan, 2010

The General Plan also establishes the City's vision of serving as a leader in addressing the environmental effects of climate change with education, promotion, and fostering sustainable development. The City's update to the General Plan (adopted in 2010) was guided by eight proposals, one of which is to establish and maintain San Mateo as a sustainable City as described in the following excerpt from the General Plan's introduction.

> *The goals and policies of the General Plan reflect the desire to establish the City as an environmentally, socially, and economically sustainable city. A sustainable city efficiently manages and conserves its natural resources while encouraging a strong economy and a healthy community for present and future generations.*
>
> *The Plan's goals and policies incorporate several principles for sustainable communities including: providing a desirable mix of land uses; encouraging a range of household types, sizes, incomes, and ages; creating a livable environment by maintaining defensible streets, buildings, and open spaces; providing community-based economic development; developing services, amenities, and activities that support local residents and attract visitors; providing all residents with access to public transit systems and roadways; encouraging alternative transportation modes; balancing historic preservation with new development; and recycling materials and reducing waste.*

The General Plan provides a set of climate change and GHG reduction goals and accompanying policies in the Land Use Element. Goal 8a directs the City to reduce GHG emissions each year consistent with the Sustainable Initiatives Plan. This CAP will replace the Sustainable Initiatives Plan as the City's community-wide and municipal operations GHG reduction strategy. The City's GHG targets are presented in **Chapter 2** and achievement of the targets are detailed in **Chapter 3**.

The CAP identifies strategies and actions that will support 2030 General Plan goals. The CAP further builds on the goals and policies, demonstrating the benefit of the City's forward-thinking transportation demand management

policies and codes. Through implementation of the General Plan and Development Code, the City has made significant progress to reduce future GHG emissions. The beneficial effects of these efforts are presented in both the City's emissions growth forecast in **Chapter 2** and in the existing measures section of **Chapter 4**.

Sustainable Initiatives Plan

Adopted in 2007, the Sustainable Initiatives Plan was prepared by the City's Sustainability Advisory Committee to the City Council, which was an ad hoc committee created for the sole purpose of developing the plan and has since been disbanded. The Sustainable Initiatives Plan provided the City's overall commitment and framework for reducing GHG emissions and achieving sustainability.

This document established the City's first GHG emissions target to exceed the 2020 State reduction target and to meet the State's 2050 target. The State's 2020 GHG reduction target is presented in Assembly Bill (AB) 32 and directs the State to reduce GHGs to 1990 levels by 2020. Since adoption of the Sustainable Initiatives Plan, the State, through the AB 32 Scoping Plan, has provided guidance to local governments to identify 1990 levels as approximately 15% below 2005 GHG emissions. There is not currently an adopted State target for years beyond 2020. Executive Order S-3-05 signed by then Governor Arnold Schwarzenegger set a goal for State agencies to reduce GHG emissions 80% below 1990 levels by 2050. These targets are adopted in this document along with a goal to reduce emissions by 35% below 2005 levels by 2030. Strategies in the Sustainable Initiatives Plan include a commitment to incorporate sustainability into policies and foster GHG reductions throughout the community. Community strategies suggested in the Sustainable Initiatives Plan address a broad array of issues, from increasing bicycle and pedestrian mode share to facilitating energy efficiency and renewable energy throughout the community.

The City has been implementing the Sustainable Initiatives Plan and its companion GHG Reduction Program (presented below) since adoption. City staff monitored progress and presented annual updates on this document to City Council.

2010 Greenhouse Gas Emissions Reduction Program

As part of the City's General Plan update in 2010, the City prepared the 2010 Program. Adopted as an appendix to the General Plan and General Plan Environmental Impact Report (EIR), the Program supported the General Plan with an analysis of GHG emissions. Building on the 2007 Sustainable Initiatives Plan, the Program responded to new guidance from BAAQMD for GHG emissions. Specifically, the Program quantified strategies in the Sustainable Initiatives Plan for anticipated impacts on GHG reductions. An implementation plan in the Program also identified the City's strategy to monitor GHG reductions and achieve the 2020 reduction target. Preparation of the Program included the development of a monitoring and reporting tool to track progress over time.

By demonstrating consistency with BAAQMD guidance, the Program sought to streamline the review of new development. The City fully analyzed and adopted the Program in the General Plan EIR to facilitate streamlining of new development review. Accordingly, the City used the Program to review and consider new development applications for GHG emissions.

Climate Action Plan for Operations & Facilities

In 2008, San Mateo prepared a Climate Action Plan for Operations & Facilities, which includes a 2006 inventory of emissions from municipal operations and applies the targets identified in the Sustainable Initiatives Plan to the City. It covers emissions from energy use in City buildings, fuel use of City vehicles and equipment, commute habits of City employees, and waste thrown away at City facilities. This plan contains policies and specific capital improvements to help achieve these targets, along with recommendations for adapting to the impacts of climate change and how to educate City staff about reducing emissions. In 2010, the Climate Action Plan for Operations & Facilities was incorporated into San Mateo's General Plan as an appendix.

Regionally Integrated Climate Action Planning Suite

San Mateo has participated in the Regionally Integrated Climate Action Planning Suite (RICAPS) effort. The City/County Association of San Mateo County (C/CAG) has led this project as a countywide effort to support regional climate action planning. RICAPS also included preparation of a template for CAPs in the county. Originally funded by grants from BAAQMD and Pacific Gas and Electric (PG&E), RICAPS provides tools and a forum for ongoing countywide efforts. Tools developed through the RICAPS effort include a template of workbooks and documents available for local use. RICAPS also facilitated preparation of recent year inventories for jurisdictions in San Mateo County, including a 2010 community-wide GHG inventory for each participating jurisdiction. Jurisdictions in RICAPs continue to coordinate for a regional approach to monitoring GHG emissions and progress to local climate action planning targets.

While the City of San Mateo continues to participate in the RICAPS effort, the City has developed this CAP as an independent, customized CAP for the community shaped by the City's unique background and locally adopted priorities.

Regulatory Framework

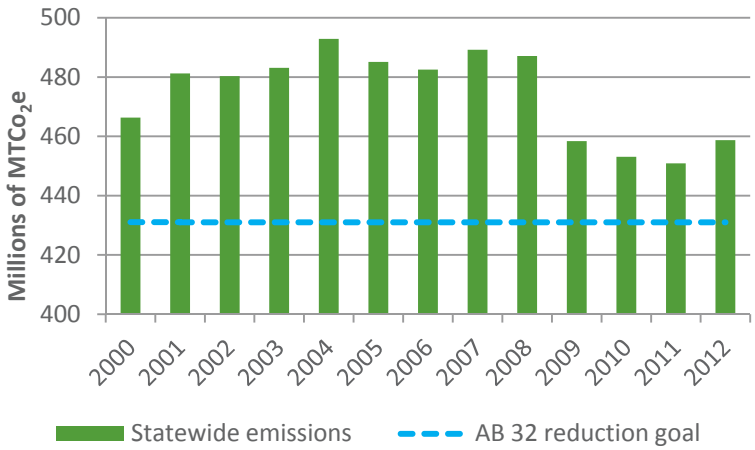
California law first addressed climate change in 1988, when Assembly Bill 4420 directed the State to prepare a GHG inventory and study the impacts of climate change. Since then, California has adopted several laws to assess climate change, analyze GHG emissions and their effects, reduce emissions, and prepare for the impacts of climate change. Many of these laws and associated regulations affect local governments, although only some create specific requirements for individual communities.

Assembly Bill 32 – California Global Warming Solutions Act of 2006

AB 32, the California Global Warming Solutions Act, was approved by the legislature and signed by Governor Schwarzenegger in 2006. The landmark legislation requires the California Air Resources Board (CARB) to develop

regulatory and market mechanisms that will reduce GHG emissions to 1990 levels by 2020. Mandatory actions under the legislation to be completed by CARB include:

- Identification of early action items that can be quickly implemented to achieve GHG reductions. These early action items were adopted by CARB in 2007 and include regulations affecting landfill operations, motor vehicle fuels, car refrigerants, and port operations, among other regulations.
- Development of a scoping plan to identify the most technologically feasible and cost-effective measures to achieve the necessary emissions reductions to reach 1990 levels by 2020. First adopted in 2009, the AB 32 Scoping Plan employs a variety of GHG reduction measures that include direct regulations, alternative compliance mechanisms, incentives, voluntary actions, and market-based approaches like a cap-and-trade program. The plan identifies local governments as strategic partners to achieving the State goal and translates the reduction goal to a 15% reduction of "existing" emissions by 2020.
- Creation and adoption of regulations to require the State's largest industrial emitters of GHGs to report and verify their emissions on an annual basis.



California's 2020 reduction goal under AB 32 is 431 million $MTCO_2e$. In 2012, the State emitted approximately 459 million $MTCO_2e$.

Although "existing emission levels" is not formally defined by the Scoping Plan, agencies throughout California have often interpreted it as referring to emissions occurring between 2005 and 2008. In **Appendix 1**, emissions in San Mateo are evaluated through this understanding with a selected baseline year of 2005. AB 32 requires CARB to update the Scoping Plan at least once every five years, the most recent of which was adopted on May 22, 2014. This update identifies the changes in statewide GHGs since the adoption of AB 32, discusses actions still needed to achieve the 2020 reduction target, and mentions the need for long-term GHG reduction goals beyond 2020.

AB 32 directs public agencies in California to support the State goal of reducing GHG emissions to 1990 levels by 2020. While complying with AB 32 is not a direct requirement for local jurisdictions, demonstrating consistency with State reduction goals can help the City qualify for incentives such as grant funding and simplify the environmental review of the GHG emissions impacts from new development.

Senate Bill 375 – Sustainable Communities and Climate Protection Act of 2008

Senate Bill (SB) 375 builds off of AB 32 and aims to reduce GHG emissions by linking transportation funding to land use planning. It requires metropolitan planning organizations (MPO) to create a sustainable communities strategy (SCS) in their regional transportation plans for reducing urban sprawl. Each SCS will demonstrate strategies each region will use to achieve the GHG emissions reduction target set by CARB for 2020 and 2035. In 2013, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) adopted the final Plan Bay Area, consisting of both the region's SCS and 2040 Regional Transportation Plan.

Bay Area Air Quality Management District CEQA Air Quality Guidelines

Developing a CAP can also provide streamlined environmental review for new projects subject to CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR) to amend the State CEQA Guidelines to address GHG emissions. OPR adopted the CEQA Guidelines in December 2009 and they went into effect March 18, 2010. The updated guidelines include provisions for local governments to use adopted plans for the reduction of GHG emissions to address the cumulative impacts of individual future projects on GHG emissions (see State CEQA Guidelines Section 15183.5(b)(1)).

In response to the updated CEQA Guidelines, BAAQMD amended Section 4 of the BAAQMD Air Quality CEQA Guidelines, allowing a lead agency to prepare a Qualified GHG Reduction Strategy that reduces emissions to a level that is not cumulatively considerable. If the local agency then determines that a project is determined to be consistent with an adopted Qualified GHG Reduction Strategy, the project is assumed to not have a significant GHG emissions impact under CEQA. Air districts such as BAAQMD do not officially certify Qualified GHG Reduction Strategies, but they play a critical role in providing support to local communities. BAAQMD is the air district with jurisdiction over San Mateo.

The San Mateo CAP and accompanying environmental documentation are consistent with the guidelines set forth by BAAQMD for a Qualified GHG Reduction Strategy (which parallel and elaborate upon criteria established in State CEQA Guidelines Section 15183.5(b)(1)). The General Plan seeks to address this guidance with the Greenhouse Gas Emissions Reduction Program, referenced by the General Plan and included as an attachment to it. As stated in the Land Use Element and as previously discussed, the City developed the Greenhouse Gas Emissions Reduction Program to meet the requirements of BAAQMD's guidance and corresponding criteria identified in the CEQA guidelines.

This CAP meets the CEQA guidelines and commitments in the Land Use Element of the General Plan as outlined below.

- Quantify emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area (see **Chapter 2**).
- Establish a level, based on substantial evidence, below which the contribution of emissions from activities covered by the plan would not be cumulatively considerable (see **Chapter 2**). As described in the General Plan Land Use Element (page II-38), the City has identified three targets, consistent with State guidance, that are further addressed in **Chapter 2.**

  - Reduce emissions to 15% below 2005 levels by 2020
  - Reduce emissions to 35% below 2005 levels by 2030
  - Reduce emissions to 80% below 1990 levels by 2050.

- Identify and analyze the emissions resulting from specific actions or categories of actions anticipated within the geographic area (see **Chapter 3** and **Chapter 4**).
- Specify measures or a group of measures, including performance standards that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level (see **Chapter 4**). The General Plan Land Use Element (page II-39) identifies the major sources of measures as General Plan policies, Sustainable Initiatives Plan policies, programs and actions currently being implemented, regional programs and policies in which the City participates, and applicable State policies and programs. The City has analyzed these categories of measures in greater detail in **Chapter 4** of this CAP, consistent with this framework from the General Plan.
- Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specific levels (see **Chapter 4**). As referenced in the General Plan Land Use Element (page II-40), the City has developed a monitoring and implementation tool to track GHG emission changes over time. This CAP expands and updates the City's monitoring framework with an implementation plan, updated monitoring tool, and a checklist for new development as described in **Chapter 4** and **Appendix 3**.
- Adopt the GHG Reduction Strategy in a public process following environmental review. The City is adopting this CAP as an Addendum to the General Plan EIR. The General Plan EIR includes an analysis of the City's 2010 Greenhouse Gas Reduction Program.

Building on the City's adopted Greenhouse Gas Reduction Program, this CAP provides additional information demonstrating the City's strategy to achieve the adopted GHG reduction targets in the General Plan and Sustainable Initiatives Plan. This CAP carries forward measures in the Greenhouse Gas Reduction Program and Sustainable Initiatives Plan, some of which have been revised and expanded upon to help improve their effectiveness. Additionally, this CAP contains new strategies to help address areas not covered by previous documents to help San Mateo achieve its reduction targets. Accordingly, this CAP presents new technical information that further documents its relationship to implementation of the adopted targets. The City will amend the General Plan to reference this CAP as its primary strategy to achieve consistency with CEQA Guidelines Section 15183.5.

Role of the Climate Action Plan in CEQA Implementation

Consistent with the State CEQA Guidelines, lead agencies may use adopted GHG reduction plans to assess the cumulative impacts of discretionary projects on climate change. In addition, the guidelines provide a mechanism to streamline development review of future projects.

Specifically, lead agencies may use adopted plans consistent with State CEQA Guidelines Section 15183.5 to analyze and mitigate the significant effects of GHGs under CEQA at a programmatic level by adopting a plan for the reduction of GHG emissions. Later, as individual projects are proposed, project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review in their cumulative impacts analysis. Project-specific environmental documents prepared for projects consistent with the General Plan and the CAP may rely on the programmatic analysis of GHGs contained in the CAP.

A project-specific environmental document that relies on this CAP for its cumulative impacts analysis must identify specific CAP measures applicable to the project and demonstrate the project's incorporation of the measures. Project applicants and City staff will identify specific measures applicable to each project during project review. If applicable measures are not otherwise binding and enforceable, they must be incorporated as mitigation measures for the project. If substantial evidence indicates that the GHG emissions of a proposed project may be cumulatively considerable, notwithstanding the project's compliance with specific measures in this CAP, an EIR must be prepared for the project. This CAP includes a Consistency Checklist, contained in **Appendix 3**, which City staff can use to keep track of which reduction measures an individual project complies with. This checklist also helps project applicants quickly identify which reduction measures may apply to their project.

Climate Action Planning Process

The City facilitated a collaborative process to prepare the CAP. City staff, the public, and an appointed advisory body, the Sustainability Commission, provided ongoing input on CAP development. Stakeholders in San Mateo vetted and recommended appropriate strategies reflective of the community. The outreach process served to develop a plan that responds to community leadership and priorities. The strategies in this CAP reflect those community priorities and recommendations. Engaging the community also allowed the City to build and nurture partnerships necessary to implement the CAP.

Staff Engagement

Many measures in this CAP rely on the City of San Mateo taking action toward reducing municipal GHG emissions. Interdepartmental engagement was essential in the development of the CAP to ensure that goals are attainable and appropriate for each responsible department. The CAP Technical Advisory Committee (TAC) guided review of existing programs and evaluation of new programs. The TAC included staff from multiple City departments, including Public Works, Community Development, Parks and Recreation, City Attorney, and the City Manager's Office. Drawing on the expertise of these departments helped define actions that the City was both capable and supportive of. Specific measures refined through staff engagement include transit-oriented development, sustainable streets, transportation demand management, recycling and waste reduction, development review, and housing programs.

Chapter 1

Sustainability Commission

At the outset of the CAP planning process, the City Council created the Sustainability Commission and appointed five San Mateo residents. The Sustainability Commission provides recommendations to the City Council for policies and programs that will impact the long-term environmental, economic, and social health of the City. Throughout the CAP development process, the CAP project team met with the City of San Mateo Sustainability Commission to provide updates, answer questions, summarize quantitative analyses, and to collaborate on the development of new GHG reduction measures. The Sustainability Commission was able to lend valuable insight about local priorities and concerns in the development of measures to meet reduction targets. This allowed for refinement of measures that focus on emissions sources and community values specific to San Mateo, helping to shape a CAP that improves the environmental, social, and economic health of the City.

Public Engagement

Residents of San Mateo were invited to contribute ideas and concerns throughout the CAP development process. The three primary avenues for the public to get involved in the process were through outreach events at Concerts in the Park, an online town hall website, and a community forum at the San Mateo Public Library. Additionally, seven public meetings with the Sustainability Commission served as a platform for citizens to continue to voice their thoughts and share their ideas about what a sustainable future for San Mateo meant for them.

San Mateo residents of all ages provide feedback on CAP topics during San Mateo's Summer Concert Series in Central Park.

SanMateoTownHall.org

SanMateoTownHall.org (Town Hall) is the City's community engagement website or virtual Town Hall. The virtual Town Hall provides citizens an opportunity to suggest ideas for the community and to engage with each other, City staff, and decision-makers about key issues of the community in an open-ended and collaborative manner. The online Town Hall included a Sustainable Actions Survey, as well as a forum to share new ideas and support existing thoughts about the CAP. The forum was open for input on topics related to sustainability and the CAP from July through September 2014, and 292 interactions occurred during that time.

Concerts at the Park Pop-Up

The City hosted an outreach booth at the July 24 and August 7, 2014, concerts as part of the City's Summer Concert Series in Central Park. The booth provided an opportunity for residents to learn about the CAP, provide feedback on key topics, identify barriers to implementation and potential remedies to those barriers, and suggest new ideas about what kinds of measures they would like the City to include in the CAP. These booths included interactive activities for community members to vote on topics and fun games to get children involved in the process.

Community Forum

The City hosted a community forum at the San Mateo Public Library on September 4, 2014. The goals of the forum included the following:

- To provide an overview and update of the CAP and community input to date.
- To share draft GHG reduction measures with participants and to gather input for refinement.
- To identify additional opportunities and priorities for reduction measures.

San Mateo residents participate in a community forum on the CAP.

The forum included a presentation and small group discussions. During group discussion, participants were placed into four groups and rotated to discuss four CAP topics: renewable energy, energy efficiency, transportation, and waste and water. Every group had 20 minutes to comment on each topic.

The forum attracted nearly 25 people, though not all participants signed in or stayed for all activities. Based on discussion, most participants worked and/or lived in San Mateo. In addition to members of the public, City staff from several departments attended to support and facilitate CAP discussions.

Chapters 3 and **4** summarize and synthesize community feedback on draft measures collected during group discussions. A measure was considered supported if more than 50% of the group supported it.

Chapter 1

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Chapter 2

2020 Greenhouse Gas Reduction Target

Background

State, regional, and local laws, along with agencies tasked with local regulatory oversight, have influenced common methods and provided an impetus for identification of reduction targets in California. A greenhouse gas (GHG) emissions inventory and forecast lays the groundwork for the Climate Action Plan (CAP) reduction target planning process. As described in **Chapter 1**, with the Sustainable Initiatives Plan in 2007 and the Greenhouse Gas Reduction Program in 2010, the City has sought to align with State guidance for GHG targets. This chapter describes the City's foundation to analyze these reduction targets. The City is committed to achieve 1990 emissions levels by 2020, equivalent to a 15% reduction below 2005 levels by 2020.

Baseline Greenhouse Gas Emission Inventory

A greenhouse gas inventory is a summary of the GHG emissions occurring as a result of activities that take place within a community. In some instances, the emissions themselves may be emitted within the jurisdiction, such as emissions from a car being driven within the community's boundaries. In other cases, the emissions may occur elsewhere but are included because the activity responsible for generating the emissions took place within the jurisdiction, such as a community member using electricity generated by a power plant in another part of California. Inventories help allow elected officials, City staff, and members of the public to understand what activities generate GHG emissions.

Protocols and Guidance

Reduction targets are developed based on a calculation of current and future GHG emissions, called the GHG inventory. The GHG inventory reflects the GHG emissions associated with everyday activities in the community of San Mateo, such as the electricity used in homes, miles traveled in vehicles, and waste sent to landfills, to estimate GHG emissions.

Chapter 2

Creation of the community and government operations inventories is based on emissions factors and methods in an evolving field of science. Over the past several years, organizations in California and throughout the United States have established protocols to assist and guide communities in assessing GHG emissions from government operations and community activities. While these protocols are not regulatory, they identify relevant sources or activities, recommend methods to estimate GHG emissions from each source, and provide consistency in the identification, assessment, and presentation of emission results across multiple jurisdictions.

In California, and as recommended by the Governor's Office of Planning and Research, many communities utilize the 2012 US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, commonly referred to as the US Community Protocol, to identify and assess community activities. The protocol provides guidance on how to measure and report community-wide GHG emissions, including identification of relevant sources or activities, methods to estimate GHG emissions from each source, and consistency in the identification, assessment, and presentation of emissions results across multiple jurisdictions.

The City's community-wide GHG inventory was prepared using protocols and best practices identified within the Local Government Operations Protocol (LGOP) v. 1.1 and the US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.

Prior Inventories

Since beginning to take strides toward measured emissions reductions, three community-wide GHG inventories have been completed for the City of San Mateo: 2005, 2006, and 2010. For the purpose of this CAP, the 2005 inventory was modified to represent the most up-to-date understanding of activities in San Mateo. The updated 2005 inventory and the 2010 inventory allow comparison with the GHG inventories of other neighboring communities in San Mateo County, including those participating in the Regionally Integrated Climate Action Planning Suite (RICAPS) program. However, all three years of inventories serve as important representations of San Mateo's past emissions and help guide the development of appropriate, attainable measures. Here, prior inventories will be described to better frame an understanding of the modified 2005 inventory used for the CAP.

2006 Inventory

The City prepared its first community-wide GHG inventory in 2007, using a calendar year of 2006. This inventory was used in the development of the Sustainable Initiatives Plan (first adopted in 2007), the Greenhouse Gas Emissions Reduction Program (adopted in 2010), the Climate Action Plan for Operations and Facilities, and annual reports on the implementation of sustainability programs. The 2006 inventory relies on the recommended methods at the time of the inventory's development, although it is narrower in scope than GHG inventories following current guidance and omits some sources of emissions. This 2006 baseline inventory does not address all key sectors and used different methods, preventing a direct comparison with inventories for 2005 and 2010. The older methods and the more limited scope used in the 2006 inventory limit its usefulness for monitoring relative to current protocols. Previous annual updates to the City Council on the Sustainable Initiatives Plan identified an inaccurate increase in emissions

since 2006 due to this exclusion of key emissions sectors in the 2006 inventory. Comparisons to recent year emissions presented an inflated estimate of change due to the underestimation of emissions in 2006. The recent updates to the City's 2005 and 2010 inventories confirm that the City has actually achieved a decline in emissions since 2005, as described in further detail below.

2005 Inventory

In 2009, ICLEI-Local Governments for Sustainability prepared a San Mateo GHG emissions inventory for the calendar year 2005, working through the CO_2 San Mateo County program funded in part by the Bay Area Air Quality Management District (BAAQMD). In preparation of the 2005 inventory, ICLEI followed the most up-to-date industry protocol and included sources and methods most applicable and appropriate for inclusion in a CAP. As part of preparation of the CAP, the project team reviewed and updated the 2005 inventory with methods and emissions factors from the US Community Protocol published in 2012, from recent BAAQMD guidance, and with global warming potentials (GWP) published in the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (AR4). The 2005 inventory did not include a number of activities and associated GHG emissions. Prior to the update in 2014, excluded sectors from the 2005 inventory consisted of indirect wastewater, indirect water, point sources, and fuel use from Caltrain. Air travel was not included in the 2005 inventory, as there is no airport in San Mateo and the City has no control over airports in other communities. Air travel is also not included in other RICAPS inventories, and so inclusion in this inventory would prevent an accurate comparison. The US Community Protocol does not recommend including air travel emissions. The Statewide inventory includes emissions from air travel within California only (emissions from interstate trips are excluded from the Statewide inventory, but are included in the United States inventory prepared by the Environmental Protection Agency). Communities with airports evaluate GHG emissions associated with airport emissions and develop reduction strategies accordingly.

Inventories Used for CAP

Community-Wide Baseline GHG Emissions Inventory (2005, Updated)

Development of the CAP first involved updates to the 2005 community-wide inventory to confirm its use as the baseline inventory, consistent with State guidance. The 2005 community-wide inventory provides a foundation for the CAP, consistent with regional climate action planning efforts. The updated 2005 inventory estimates emissions generated by activities occurring in the City. Consistent with the US Community Protocol, the community inventory includes the following sectors:

- **Residential built environment:** electricity and natural gas used in residential settings
- **Commercial/industrial built environment**: electricity and natural gas used in nonresidential settings (e.g., industrial, commercial)
- **Transportation:** local road and State highway on-road vehicle trips that occur within the City boundary of San Mateo

CHAPTER 2

- **Off-road equipment**: the use of portable equipment and vehicles that do not travel on roads (e.g., construction or lawn and garden equipment)
- **Solid waste generation**: material produced by the community that is deposited in landfills which decompose and produce methane
- **Landfills**: emissions that occur in the inventory year as a result of waste-in-place at a landfill that is within the community boundary or operated by the City
- **Water and wastewater**: energy used to treat and pump water used and wastewater created, along with emissions from the processing of wastewater
- **Caltrain**: emissions resulting from Caltrain trips generated by passengers at three stations: San Mateo, Hayward Park, and Hillsdale
- **Point Sources**: stationary source emissions resulting from fossil fuel combustion within the county as reported by BAAQMD

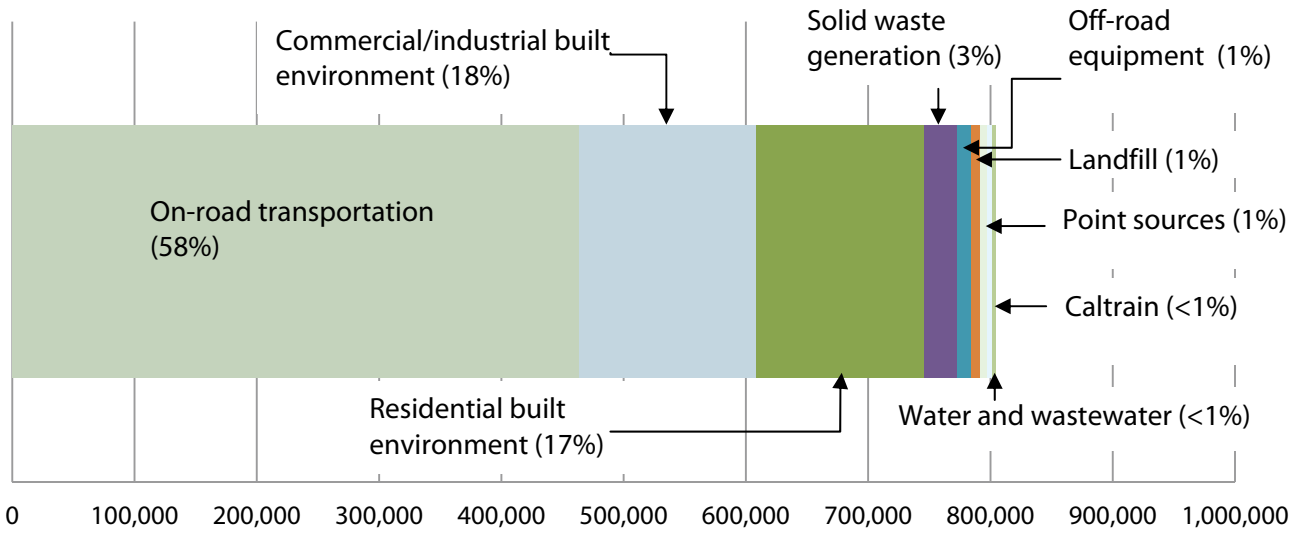
In the baseline year of 2005, the GHG emissions from these activities totaled 804,290 $MTCO_2e$ as shown in **Table 1** and **Figure 5**. The sector with the largest portion of emissions was on-road transportation, which produced 464,070 $MTCO_2e$, or 58% of all community emissions. The next largest sector, commercial/industrial built environment, produced 144,790 $MTCO_2e$, 18% of the total. The residential built environment was the third largest sector with 17% of total emissions (136,790 $MTCO_2e$) followed by the solid waste generation (26,960 $MTCO_2e$ or 3%), off-road equipment (11,690 or 1%), landfills (7,020 $MTCO_2e$ or 1%), and point sources (6,070 $MTCO_2e$ or 1%) sectors. Caltrain (3,870 $MTCO_2e$) and water and wastewater (3,030 $MTCO_2e$) each comprised less than 1% of total emissions.

Table 1: San Mateo 2005 Community-Wide GHG Emissions

Sector	$MTCO_2e$	Percentage
On-road transportation	464,070	58%
Commercial/industrial built environment	144,790	18%
Residential built environment	136,790	17%
Solid waste generation	26,960	3%
Off-road equipment	11,690	1%
Landfill	7,020	1%
Point sources	6,070	1%
Caltrain	3,870	<1%
Water and wastewater	3,030	<1%
Total	**804,290**	**100%**

Note: Due to rounding, totals may not equal the sum of the component parts.

Figure 5: City of San Mateo 2005 Community-Wide GHG Emissions ($MTCO_2e$)



2010 Regionally Integrated Climate Action Planning Suite Inventory

In 2014, the City/County Association of San Mateo County (C/CAG) facilitated preparation of GHG inventories for calendar year 2010 for all jurisdictions in San Mateo County. These efforts were completed through the RICAPS effort. Although the 2010 inventory was not used as the baseline for this CAP, it provided important methods and data sources used to update the 2005 inventory. The 2010 inventory can be compared to the 2005 baseline inventory to show changes in community-wide GHG emissions, particularly any progress toward San Mateo's GHG reduction target. The 2010 inventory also uses more up-to-date methods and sources than the 2005 baseline inventory, providing a process that can be used to update the initial 2005 inventory.

The 2010 inventory facilitated by C/CAG is used for comparison purposes to identify early progress toward the reduction target. Although the 2010 baseline inventory was recently completed, a limited number of updates were completed to ensure consistency between the 2005 and 2010 inventories. This updated understanding of actual emissions in San Mateo provided an important reference point for refinement of the City's GHG emissions forecast, which is discussed further in **Chapter 3**.

Chapter 2

Progress: 2005 to 2010

Emissions in 2010 were 9% below 2005 levels. The three largest sources of emissions (on-road transportation, commercial/industrial built environment, and residential built environment) all had lower emissions in 2010 than in 2005, along with the landfill and solid waste generation sectors. Emission levels increased in four remaining sectors, most noticeably in the off-road equipment sector, although the relatively small size of these sources meant that they had only a limited impact on community-wide emissions. The relative distribution of emissions within the sectors did not change in a meaningful way from 2005 to 2010.

Greenhouse Gas Emissions Forecast

A forecast of future GHG emissions helps to ensure consistency with AB 32 and the guidelines for a Qualified GHG Reduction Strategy put forward by BAAQMD, as described in **Chapter 1**. A forecast allows elected officials, City staff, and community members to identify the amount of reductions necessary in order to achieve future GHG reduction targets, and can help support long-range community planning efforts.

A business-as-usual (BAU) emissions forecast estimates how emissions would grow over time if no action is taken at the federal, State, or local level to reduce them. A set of indicators determines the extent of growth that could occur and how resulting emissions may change. An emissions forecast was prepared for San Mateo using the best available information regarding indicators and growth rates. San Mateo's General Plan contains expected rates of population and employment growth through 2030. The BAU forecast relies on growth assumptions consistent with the General Plan and approved by City staff. Activity data rates in the BAU forecast, such as household energy consumption, vehicle miles travelled, or per person waste disposal, are based on the 2005 emissions forecast. The decision to use 2005 per capita activity data was based on the use of 2005 as the baseline year for consistency with Assembly Bill (AB) 32 and widely accepted BAU forecasting methods (for example, the Association of Environmental Professionals white paper on GHG forecasts).

Table 2 presents these projections for the years 2020 and 2030. These projections report that job growth will spur a 47% increase in emissions by 2030 from 2005. Growth in San Mateo's service population is expected to grow by 30% in 2030, and the number of new homes will grow by 25%. The total number of households expects the lowest growth rate at 19% change between 2008 and 2030. **Table 3** displays the 2020 and 2030 BAU emissions in $MTCO_2e$ with the same sectors that were used for the initial inventory.

Table 2: San Mateo 2020 and 2030 Growth Indicators

Indicator	Sectors/Subsectors	2005 Value	2020 Value	2030 Value	Percentage Change, 2008–2030	Source
Households	Residential built environment; Off-road equipment[1]	37,980	41,690	45,150	19%	CA Dept. of Finance, ABAG
Jobs	Commercial/industrial built environment; Point sources	45,840	63,430	67,380	47%	CA Dept. of Finance, ABAG
New houses	Off-road equipment[2]	80	90	100	25%	Dept. of Housing and Urban Development, ABAG
Service population[3]	On-road transportation; Solid waste generation; Water and wastewater; Caltrain	139,240	167,930	181,180	30%	CA Dept. of Finance, ABAG

[1] Households are used to forecast off-road activity in the lawn and garden subsector.
[2] New houses are used to forecast off-road activity in the construction subsector.
[3] Service population is the sum of the residential population and the number of jobs.
Note: There is no indicator associated with emissions from the Landfill sector. Future estimates of these emissions are based on decomposition rates provided by CARB.

CHAPTER 2

Table 3: San Mateo Community-Wide BAU GHG Emissions Sector Totals

Sector	2005 Emissions	2010 Emissions	2020 Emissions	2030 Emissions	Percentage Change, 2005–2010	Percentage Change, 2005–2030
Residential built environment	136,790	136,670	150,160	162,620	0%	19%
Commercial/industrial built environment	144,790	131,730	200,350	212,830	-9%	47%
On-road transportation	464,070	412,230	520,760	559,420	-11%	21%
Solid waste generation	26,960	14,800	32,520	35,080	-45%	30%
Off-road	11,690	18,450	12,830	13,890	58%	19%
Water and wastewater	3,030	3,580	3,650	3,950	18%	30%
Caltrain	3,870	3,920	4,670	5,040	1%	30%
Landfill	7,020	5,950	3,970	2,710	-15%	-61%
Point sources	6,070	6,960	8,400	8,920	15%	47%
Total	**804,290**	**734,290**	**937,310**	**1,004,470**	**-9%**	**25%**
Percentage Change from 2005	**0%**	**-9%**	**17%**	**25%**		

Note: Due to rounding, totals may not equal the sum of the component parts.

2020 Reduction Target

GHG Emissions Reduction Targets

The California Environmental Quality Act (CEQA) Guidelines Section 15183.5(b) requires that a Qualified GHG Reduction Strategy contain a goal for substantive GHG reductions. The City adopted the following GHG reduction targets in its General Plan.

- Reduce emissions 15% below 2005 levels by 2020, or to 683,650 $MTCO_2e$.
- Reduce emissions 35% below 2005 levels by 2030, or to 522,790 $MTCO_2e$.
- Reduce emissions 80% below 1990 levels by 2050, or to 136,730 $MTCO_2e$.

A reduction target of 15% below 2005 levels is comparable to a return to 1990 levels according to the AB 32 Scoping Plan, making it consistent with the State reduction target of 1990 levels by 2020 as established by AB 32. Both the 2020 and 2050 targets are included in the 2007 Sustainable Initiatives Plan, which also included a goal to reduce 2009 emissions to below 2006 levels and to achieve further GHG reductions each year.

2020 Local Reduction Target

Under the BAU scenario discussed above, San Mateo's 2020 GHG emissions are forecast to be 17% greater than 2005 levels due to anticipated growth in the City's population. The adopted 2020 target sets a goal of 15% below baseline levels, even with the anticipated growth. In order to meet this adopted target, San Mateo must achieve a total reduction of 253,660 $MTCO_2e$ by 2020, as demonstrated in **Table 4**.

Table 4: 2020 Forecast Emissions and Reduction Target

	GHG Emissions ($MTCO_2e$)	Change in GHG Emissions ($MTCO_2e$)
2005 baseline	804,290	
2020 BAU forecast	937,310	+133,020
2020 target	683,650	-253,660

CHAPTER 2

2030 Local Reduction Target

In 2030, additional growth in San Mateo is expected to drive GHG emissions to 1,004,470 $MTCO_2e$, or 25% above baseline levels under the BAU scenario. The City's General Plan and Sustainable Initiatives Plan have set a goal of 35% below 2005 levels by 2030, or 522,790 $MTCO_2e$. In order to meet this goal, the community must achieve a total GHG reduction of 481,680 $MTCO_2e$, as shown in **Table 5**.

Table 5: 2030 Forecast Emissions and Reduction Target

	GHG Emissions ($MTCO_2e$)	Change in GHG Emissions ($MTCO_2e$)
2005 baseline	804,290	
2030 BAU forecast	1,004,470	+200,180
2030 target	522,790	-481,680

2050 Local Reduction Target

San Mateo has a long-term GHG reduction goal of 80% below 1990 levels by 2050. As 1990 levels are comparable to a 15% reduction below 2005 levels, this translates to a 2050 goal of 136,730 $MTCO_2e$. This CAP does not forecast 2050 emissions or reductions from State or local actions in 2050. However, with this CAP the City establishes a long-term trajectory to facilitate ongoing reductions beyond 2020, consistent with State guidance.

As noted in the General Plan, page II-39, the technological improvements and the regulatory framework will continue to evolve over time. New technologies, programs, and State regulations will guide the City's long-term progress toward 2050 targets. New opportunities are anticipated to emerge that could yield additional reductions beyond those identified in this CAP. While this CAP does not identify a 2050 target, the CAP demonstrates the City's commitment to achieve the long-term 2050 goal presented in Executive Order S-3-05. Through annual monitoring and reporting on CAP implementation, the City will continue to monitor progress toward short-, medium-, and long-term goals. Strategies in this CAP also call for the City to update the CAP and reevaluate the post-2020 targets as necessary for consistency with State regulations and guidance. **Chapter 4** presents the City's implementation program.

Chapter 3

Strategies to Achieve the Target

To understand the level of action necessary to achieve the City's reduction target of 15% below baseline greenhouse gas (GHG) emissions by 2020, this Climate Action Plan (CAP) analyzes existing, planned, and future actions. By first looking at accomplishments since 2005, the City can understand progress achieved and outstanding opportunities. Existing and current efforts provide a foundation for this CAP. New measures can further close the gap and guide future programs. Together, these efforts serve as the City's multipronged strategy to achieve the target. A summary of these new measures is included in **Table 6**.

CHAPTER 3

Table 6: New CAP Measures

Measure		Implementation Level	2020 GHG Reductions ($MTCO_2e$)
RE 1	Expanded options to purchase renewable electricity from other sources	Encourage	500
RE 2	Community Choice Aggregation	Require	23,720
RE 3	Renewable energy systems for new residences	Require	140
RE 4	Renewable energy systems for existing residences	Incentivize	3,970
RE 5	Renewable energy systems for new nonresidential buildings	Require	130
RE 6	Renewable energy systems for existing nonresidential buildings	Incentivize	560
RE7	Advanced and emerging renewable energy systems	Encourage	0
EE 1	Residential energy efficiency owner-occupied retrofits	Encourage	440
EE 2	Residential energy efficiency renter-occupied retrofits	Incentivize	650
EE 3	Nonresidential energy efficiency retrofits	Incentivize	3,990
EE 4	Energy efficiency at healthcare centers	Incentivize	1,710
EE 5	Residential energy education and low-cost retrofits	Encourage	230
EE 6	Nonresidential energy education and low-cost retrofits	Encourage	70
ME 1	Energy efficiency for new City buildings	Incentivize	0
ME 2	Energy efficiency at existing City buildings	Incentivize	0
AF 1	Public EV charging stations	Require	40
AF 2	Increased EV adoption	Require	6,110
AT 1	Public shuttles	Encourage	50
AT 2	Transportation Demand Management (TDM)	Require	3,090
AT 3	Expand car share program	Incentivize	2,120
AT 4	Increase bicycle mode share	Incentivize	660
AT 5	Increase pedestrian mode share	Require	0
SW 1	Increase participation in composting program	Require	8,940
WW 1	Water efficiency retrofits for existing buildings	Incentivize	20
WW 2	Water-efficient landscaping	Require	0
WW 3	Develop new sources of nonpotable water	Incentivize	0
OR 1	Alternative fuel lawn and garden equipment	Encourage	40
OR 2	Alternative fuel construction equipment	Encourage	30

Identifying and Quantifying Strategies

Items included in the San Mateo CAP are the outcome of an extensive process to determine strategies that are most appropriate for the City based on community values and objectives, effects on GHG emissions, and feasibility of implementation. The project team compiled a list of potential reduction measures in the summer of 2014 from the following sources:

- An assessment of San Mateo's baseline and forecast GHG emissions.
- A review of existing and planned accomplishments, discussed in greater detail below, noting where substantial opportunities for reductions remained and if successful strategies could be expanded.
- An analysis of San Mateo's existing sustainability plans, including the 2007 Sustainable Initiatives Plan and the 2010 Greenhouse Gas Reduction Program, to carry forward and update existing policies and to note opportunities to address emissions not covered by these existing plans.
- Discussions among City staff to identify past successes and challenges, goals, and priorities.
- An audit of best practices to reduce GHG emissions throughout San Mateo County and in the broader San Francisco Bay Area, particularly strategies being implemented by multiple communities through the Regionally Integrated Climate Action Planning Suite (RICAPS) effort.

The project team revised this initial list through the outreach effort discussed in Chapter 1, particularly from input from community members and the San Mateo Sustainability Commission. The team expanded the revised list of new potential strategies to illustrate one to three approaches for each measure, depending on community preferences. The approaches used are as follows:

- **Encourage:** A program to provide education about reductions through in-person presentations and events, electronic and print media, partnerships with businesses and community organizations, and other outreach efforts.
- **Incentivize:** An effort directly by the City or in partnership with other organizations to provide a tangible benefit or reward, often a financial savings, to individuals who achieve GHG reductions.
- **Mandate:** An approach to require community members to achieve GHG reductions, often through amendments to the City's Municipal Code.

The San Mateo Sustainability Commission and members of the public vetted these options for all proposed measures. Based on several rounds of input and final recommendations from the Sustainability Commission, the project team identified the preferred level of approach for each measure, which became the final list of 28 measures included in this CAP. The descriptions of the new measures include the selected approach.

Chapter 3

Calculating Credit

This CAP uses a process called quantification to determine the amount of GHG emissions reduced by each measure. The foundation for the quantification calculations are the baseline GHG inventory and forecast. Activity data from the inventory, such as vehicle miles traveled (VMT) or kilowatt-hours (kWh), are combined with participation rates and data about the reduction in activity data from each action in order to calculate the GHG reduction benefit of each measure. This approach ensures that the GHG reductions from San Mateo's CAP measures are tied to current and future activities that are actually occurring in the community.

Calculations for reductions in activity data come from tools and reports provided by government agencies; these agencies include the US Environmental Protection Agency (EPA), the California Energy Commission (CEC), the California Air Resources Board (CARB), the California Air Pollution Control Officers Association, the US Department of Energy, and local air districts. If accurate data are not available through these sources, the quantification uses case studies from comparable communities and applicable scholarly research. The specific quantification process for each measure is presented in **Appendix 1**, which includes a list of data sources and assumptions.

Progress to Emissions Reduction: 2005–2013

San Mateo has already achieved progress toward its GHG reduction goal since 2005. These reductions have occurred as a result of specific State and local actions, as well as changes in individual behavior and preferences that are not definitively linked to a particular action.

Local Adjustment

As described in **Chapter 2**, San Mateo's GHG emissions in 2005 totaled 804,290 $MTCO_2e$. In accordance with the 2007 Sustainable Initiatives Plan and other adopted documents, the community has set a goal of reducing GHG emissions to 1990 levels by 2020, or 15% below 2005 levels; this equates to a 2020 goal of 683,650 $MTCO_2e$.

The 2010 RICAPS inventory for the City found that San Mateo's GHG emissions in 2010 declined to 734,290 $MTCO_2e$, or approximately 9% below baseline levels. The 2010 inventory is important to chart progress since the 2005 baseline year; however, the reductions and increases in each sector should be evaluated before crediting or adjusting the community BAU forecast. While the City has been working to implement GHG reduction programs, not all reductions may be able to be attributed to specific State, regional, or local programs. Some factors responsible for the decline, including greater awareness of climate change and resultant behavioral changes, have continued beyond 2010 and are likely to continue to cause a reduction in GHG emissions. However, other factors, such as the economic downturn around this time period, were only temporary and are not expected to continue to reduce GHG emissions.

A review of data for the community from 2005 to 2013 revealed that per capita residential and nonresidential electricity and natural gas use, along with per capita solid waste, have declined consistently since 2005. These two sectors continued to decline even as economic conditions improved. Based on this analysis, the ongoing impact of these reductions was quantified as a "Local Adjustment" to the forecast, reflecting the reductions in per capita energy use and waste generation since 2005. As a result, the Local Adjustment forecast for residential energy use, nonresidential energy use, and solid waste sectors uses 2013 per capita activity data rather than 2005. All other sectors continue to use the 2005 activity data.

The Local Adjustment captures changes as a result of multiple mechanisms, including regulatory, programmatic, technological, and behavioral actions. To ensure that reductions are not double-counted, the method for calculating credit of local programs excludes program-specific reductions from a number of San Mateo's existing accomplishments in the areas of renewable energy, energy efficiency, and waste from the total of reductions counted toward achievement of the target. The individual programs are calculated for information purposes and provided in this chapter and the technical appendix. For example, residents and businesses in San Mateo have installed a number of rooftop solar systems since the baseline year of 2005, which reduces the amount of electricity supplied to the community from PG&E. This reduction in grid-supplied electricity reduced GHG emissions, which the City could credit toward its GHG reduction goal. However, the Local Adjustment forecasts energy use based on 2013 per capita energy usage, which already includes reductions in energy usage caused by solar panels installed between 2005 and 2013. Therefore, the only existing solar panels that the City can credit toward the reduction goal without double-counting are those installed after 2013, which are not reflected in the per capita figures used in the Local Adjustment.

Reductions from State actions were applied to the Local Adjustment, not the BAU as was done previously. This method avoids double-counting, as it ensures that the reductions from State actions are done relative to the more realistic values of the Local Adjustment. The State actions therefore reduce emission levels from where they are forecast to be under the Local Adjustment, not under the BAU scenario. The Local Adjustment has reduced forecast 2020 emissions from 937,310 $MTCO_2e$ under the BAU scenario to 899,070 $MTCO_2e$, a decrease of 38,240 $MTCO_2e$. This adjustment is described in further detail in **Appendix 1**.

CHAPTER 3

Existing Accomplishments

Both State and local efforts have achieved additional progress toward the reduction target, reducing the outstanding gap of emissions to achieve the City's reduction target by 2020.

Existing State Accomplishments

Since passing Assembly Bill (AB) 32, the State enacted regulations and programs to reduce GHG emissions. Although statewide in scope, these actions affect vehicle emissions, the renewable energy content of electricity, energy efficiency in new buildings, and renewable energy systems at the local level, thereby reducing local GHG emissions.

State policies already in place will affect San Mateo's 2020 forecast by reducing emissions through improvements in energy and fuel efficiency. These adopted policies are expected to reduce emissions from 899,070 $MTCO_2e$ under the Local Adjustment to 725,850 $MTCO_2e$, a reduction of 173,220 $MTCO_2e$. **Table 7** presents reductions from these policies.

- **Clean Car Standards:** In 2002, The State adopted AB 1493, the New Passenger Motor Vehicle Greenhouse Gas Emission Standards or Pavley standard. It requires a reduction in tailpipe GHG emissions from new vehicles produced from 2009 to 2020. A companion policy, the Low Carbon Fuel Standard, was adopted in 2009 and requires a 10% reduction in the carbon intensity of all transportation fuels by 2020. Together, these two policies reduce GHG emissions from on-road vehicles.
- **Renewables Portfolio Standard:** The Renewables Portfolio Standard (RPS) in its current form was created by SB X 1-2. It requires all electricity providers in the State to obtain at least 33% of their electricity from eligible renewable resources by the end of 2020. This policy reduces GHG emissions from electricity use, including electricity use to transport and process water and wastewater.
- **Title 24 Energy Efficiency Standards:** Title 24 is California's energy efficiency standards for new buildings, applied at the local level through the project review process. The most recent set of Title 24 standards went into effect on July 1, 2014. This policy will reduce GHG emissions from electricity and natural gas use in new homes and nonresidential buildings.

Table 7: San Mateo Community-Wide GHG Emissions Reductions from State Programs

Policy	2020 Reductions ($MTCO_2e$)	2030 Reductions ($MTCO_2e$)
BAU Emissions	937,310	1,004,460
Local Adjustment	899,070	962,920
Clean Car Standards	-136,200	-190,810
Renewables Portfolio Standard	-34,530	-34,640
Title 24	-2,490	-8,070
Total Reductions	-173,220	-233,520
Total Emissions with Existing State Programs	725,850	729,400

Note: Due to rounding, totals may not equal the sum of the component parts.

Existing and Planned Local Accomplishments

The City of San Mateo has a successful history of developing and implementing sustainability policies. The City's adopted plans, along with leadership from community members and businesses have been partially responsible for the decline in GHG emissions in 2010 and are expected to continue to achieve GHG emissions reductions in the future.

The following items have already led to measurable GHG emissions reductions since the baseline year. These descriptions highlight the City's important progress since the 2010 RICAPS inventory. Yet to avoid double-counting with the Local Adjustment process described in this chapter, any extra GHG reduction credits only reflect those actions in addition to the 2013 Local Adjustment for waste and electricity.[1]

Rooftop solar panel installations have become increasingly common in San Mateo.

Photo by Dennis Schroeder, NREL 19156

- **Community solar panels:** San Mateo has promoted the widespread use of rooftop solar panels through a simplified permitting process and reduced solar permitting fees. Since 2010, San Mateo has processed permits for more than 200 rooftop solar panels, with a total generating capacity of approximately 1.9 megawatts.

[1] For more information on the local adjustment, refer to **Appendix A**.

- **Transportation Demand Management:** San Mateo has designated some areas in the Rail Corridor Plan near the Hillsdale and Hayward Park Caltrain stations as suitable for transit-oriented development (TOD). Development projects in this area are required to implement transportation demand management (TDM) practices to reduce vehicle trips generated by the development. Projects required to comply with TDM policies include Bay Meadows Phase II and Peninsula Station.
- **Municipal energy efficiency and renewable energy:** The City has worked to reduce energy used in its municipal facilities through recent energy efficiency upgrades at City facilities and the installation of an 80-kilowatt (kW) solar panel array on the roof of the Main Library. San Mateo has also already replaced approximately 900 streetlights in the community with energy-efficient LED bulbs.
- **Compost:** San Mateo instituted a voluntary composting program in 2011 as a service provided by the community's waste hauler. This program allows food scraps to be composted and turned into fertilizer, rather than being thrown in a landfill. Currently, approximately 19,430 single-family homes (97% of all single-family homes with waste collection services) and 250 businesses are enrolled in the composting program.
- **Private retrofit programs:** A number of San Mateo homes have participated in the statewide Energy Upgrade California program, which provides rebates for homeowners who complete energy efficiency retrofits. The City conducted the Green House Call program in 2011, which provided energy efficiency education and simple energy-saving appliances to almost 400 homes. A number of nonprofit organizations have also completed retrofits through the San Mateo County Energy Watch program.
- **Green Building Ordinance:** From 2010 until July 2014, San Mateo required all new buildings to exceed the minimum adopted Title 24 standards. While the most recent update to Title 24 has superseded the adopted Green Building Ordinance, the program saw more than 130 homes and 105,000 square feet of nonresidential space built to energy-efficient standards while it was in effect.
- **Caltrain shuttles:** Three public shuttles operated by the regional Peninsula Traffic Congestion Relief Alliance operate in San Mateo, transporting riders from the Hillsdale Caltrain station to employment centers in the community. Currently, these shuttles serve approximately 72,000 riders annually during morning and afternoon commute times.
- **Street trees:** San Mateo has planted more than 600 new street trees in recent years, which help to remove carbon from the atmosphere through photosynthesis. Trees also provide an indirect cooling benefit, helping to reduce the need for air conditioners during warm weather.

Six other actions are planned for San Mateo, but are not yet completed:

1) **Increased density for new housing:** San Mateo's Downtown Area Plan and Rail Corridor Specific Plan both include higher residential densities in their respective areas, and as much of San Mateo's future growth is expected to occur within these areas, this is likely to increase the proportion of San Mateo's housing that is multi-family units. Multi-family units use approximately 16% less electricity and 44% less natural gas in San Mateo than a single-family house, so an increase in the proportion of multi-family units will reduce community energy use. This effort to increase infill residential and mixed use development includes the City's

commitment to increase the supply of below market-rate and affordable housing in these projects. Affordable housing units can also support GHG reductions from higher density infill developments. By locating affordable housing units in areas with a large number of jobs and easy access to public transit, such as the downtown and Rail Corridor areas, San Mateo can help to create a stable jobs/housing balance for individuals at all income levels and support a decrease in transportation-related emissions from commuters.

2) **Streetlight conversion to LED bulbs:** The City is planning to convert an additional 4,400 streetlights to energy-efficient LED bulbs.

3) **Implementation of a digester gas to biomethane program at the wastewater treatment plant:** In November 2014, San Mateo received a State grant of $2.45 million to install a system at the wastewater treatment plant that will convert waste digester gas to biomethane, which can be used as a substitute for natural gas. The City plans to use the biomethane in natural gas–fueled cars. This is a pilot program that the State hopes can be replicated at other wastewater treatment plants across California.

4) **Installation of solar panels on the County Health Building:** The San Mateo County Health Building is planning to install a 1 megawatt solar array over a parking lot. The system is expected to generate approximately 1.5 million kWh of GHG-free electricity each year.

5) **Implementation of the San Mateo Downtown Parking Management Plan:** The San Mateo Downtown Parking Management Plan includes rate increases for surface and garage parking in the downtown area. Current rates are in the low-to-middle range for California cities and below the national average. When the cost of parking increases, individuals are more likely to use a means of travel that does not require parking, including public transit, walking, or biking. Individuals may also consolidate trips or use carpools so they do not have to pay parking fees as often. Increases in parking costs help reduce personal vehicle trips, thereby decreasing GHG emissions.

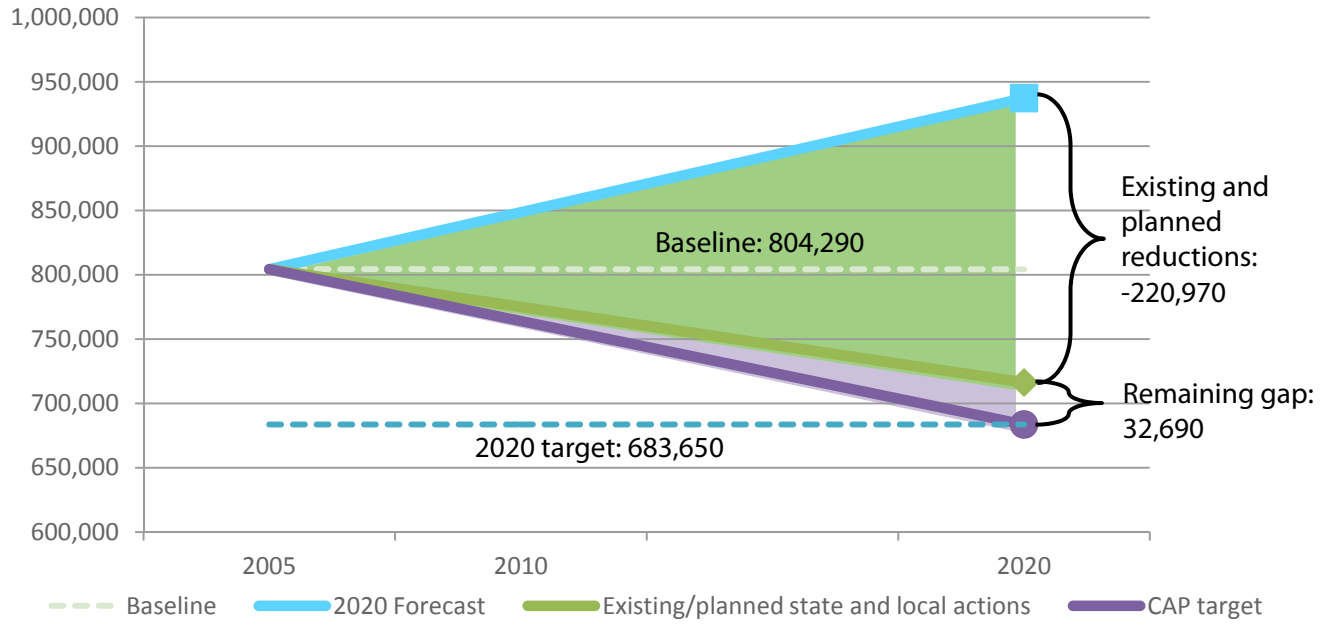
Changes to parking management in downtown San Mateo will significantly reduce GHG emissions in the coming years.

6) **Electrification of the Caltrain commuter rail corridor:** The locomotives on the Caltrain system are currently powered by diesel fuel. The planned Peninsula Corridor Electrification Project will install overhead power lines above the rails, allowing the system to use electric locomotives for most of its service, which results in significantly less emissions than diesel units. Caltrain originally planned to begin electrified service in 2019, but recent reports from project planners indicate that the electrified system may not be operational until

2021.[2] Reductions from Caltrain electrification are therefore not included in 2020, although they are counted in 2030.

Collectively, the existing and planned accomplishments reduce 2020 GHG emissions from 725,850 $MTCO_2e$ after State reductions to 716,330 $MTCO_2e$, a reduction of 9,520 $MTCO_2e$. Reductions from these accomplishments are shown individually in **Table 8.** The remaining emissions reduction needed to achieve the 2020 target is given in **Figure 6**.

Figure 6: 2020 Remaining Reductions ($MTCO_2e$)



In order to ensure accuracy, steps were taken to avoid double-counting reductions from existing and planned local and State accomplishments. Reductions from programs were only credited once; for example, the energy use reductions from the Green Building Ordinance are already included in the lower per capita energy use included in the Local Adjustment and so the City does not receive additional credit from the Green Building Ordinance as a local program. This method also applied reductions only to "expected" forecast activity data as informed by current per capita usage levels, rather than activity data forecast under the BAU scenario. For example, emissions reductions from the State-level RPS program were applied to the amount of electricity use forecast as a result of the Local Adjustment, not the amount of electricity use forecast under the BAU scenario.

[2] "Caltrain: Electrification project costs increase, start date pushed back," *San Francisco Examiner*, November 9, 2014, http://www.sfexaminer.com/sanfrancisco/caltrain-electrification-project-costs-increase-start-date-pushed-back/Content?oid=2911469.

Table 8: Emissions Reductions from Local Programs

Policy	2020 GHG Emissions ($MTCO_2e$)	2030 GHG Emissions ($MTCO_2e$)
Total Emissions with Existing State Programs	**725,850**	**729,400**
Existing Local Actions		
Community solar panels	-370	-220
Transportation Demand Management	-3,280	-4,680
Municipal energy efficiency and renewable energy *	—	—
Composting *	—	—
Private retrofit programs *	—	—
Green Building Ordinance *	—	—
Caltrain shuttles	-140	-120
Street trees	-160	-160
Total Reductions from Existing Local Actions	**-3,950**	**-5,180**
Planned Local Actions		
Increased density for new housing	-1,680	-2,740
LED bulbs for remaining streetlights	-370	-230
Digester gas to biomethane	-1,750	-1,780
County Health Building solar	-200	-120
Downtown Parking Management Plan	-1,570	-1,500
Caltrain electrification †	—	- 3,180
Total Reductions from Planned Local Actions	**-5,570**	**-9,550**
Total Reductions from Existing and Planned Local Actions	**-9,520**	**-14,730**
Total Emissions with State and Local Accomplishments	**716,340**	**714,670**
Remaining Reductions to Achieve Target	**32,690**	**191,880**

** Reductions from these items have already been included as part of the Local Adjustment to the forecast. They are not included here to avoid double-counting.*
† See the discussion on Caltrain electrification for an explanation as to why this item has no 2020 reductions.
Note: Due to rounding, totals may not equal the sum of the component parts.

Chapter 3

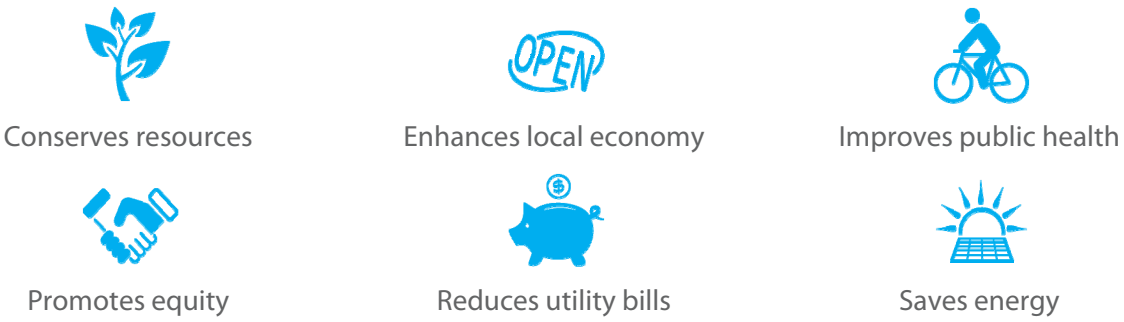
New 2020 Reduction Measures

Collectively, the 28 measures presented in this section include a mixture of actions at the Encourage, Incentivize, and Mandate levels and can reduce emissions to 18.0% below baseline by 2020. The 28 measures in the San Mateo CAP are organized into eight categories:

1) Renewable Energy (RE)
2) Energy Efficiency and Conservation (EE)
3) Municipal Energy Efficiency and Conservation (ME)
4) Alternative Fuels (AF)
5) Alternative Transportation (AT)
6) Solid Waste (SW)
7) Water and Wastewater (WW)
8) Off-Road Equipment (OR)

Each measure entry includes a description of the measure, the anticipated 2020 GHG reduction, and the specific actions necessary to implement it. Assumptions, sources, and metrics used to calculate GHG reductions are given for each measure in **Appendix 1**. Each measure entry also identifies the co-benefits of the measure, which are advantages provided by the measure beyond GHG reduction. **Figure 7** presents the co-benefits assessment for each GHG reduction measure.

Figure 7: CAP Co-Benefits



Energy measures are presented below with two GHG emissions reduction scenarios. For purposes of calculating progress, the City has elected to quantify measures both with and without the implementation of Measure RE 2 (Community Choice Aggregation, or CCA). A community switch to CCA energy would provide a cleaner energy portfolio for the City, which would reduce the emissions generated by energy use. Cleaner energy leads to a lower GHG emissions reduction potential for the energy strategies in the CAP. Accordingly, to avoid overcounting GHG reductions from renewable energy and energy efficiency strategies, GHG reductions for affected measures are presented both with and without implementation of CCA, recognizing the reduced GHG impact due to a cleaner energy source.

Renewable Energy (RE)

Increasing the amount of energy in the community from renewable sources not only reduces GHG emissions but also has the potential to reduce the cost of electricity for residents and enhance the local economy. Through decentralizing the creation of energy through incentivizing on-site generation of power (such as homes that create their own electricity with solar panels), the City of San Mateo also becomes more resilient to grid failures and less dependent on outside resources.

RE 1: Expanded options to purchase renewable electricity from other sources

Implementation Approach: Encourage

San Mateo residents and businesses who are unable or unwilling to install renewable electricity systems at their property, or wish to purchase more renewable electricity than they can generate on-site, can enroll in community solar or green tariff programs. These programs allow participants to purchase shares in renewable energy facilities and receive credits for the power generated by the system, or to voluntarily pay increased electricity costs that go toward generating renewable power.

2020 GHG Reduction: 500 $MTCO_2e$

2020 GHG Reduction (without RE 2): 700 $MTCO_2e$

Recommended Actions:

- Promote community-shared solar programs that allow residents and businesses to buy into medium-scale solar energy facilities.
- Monitor the creation of any green tariff programs, and distribute information about any such programs through digital media and at in-person events.

Co-benefits:

Enhances local economy

Reduces utility bills

CHAPTER 3

RE 2: Community Choice Aggregation

Implementation Approach: Require

Community Choice Aggregation (CCA) is a program that allows local communities to procure their own electricity and distribute it through existing utility-owned infrastructure. Community members are enrolled in CCAs by default, but may opt out. Pacific Gas and Electric (PG&E) continues to deliver the electricity through its transmission and distribution system and provide meter reading, billing, and maintenance services for CCA customers. The two currently active CCAs in California are Marin Clean Energy and Sonoma Clean Power.

2020 GHG Reduction: 23,720 $MTCO_2e$

2020 GHG Reduction (without RE 2): 0 $MTCO_2e$

Community Choice Aggregation allows San Mateo and other participating communities to directly supply renewable energy to residents and businesses.

Photo by Sandia National Laboratory

Recommended Actions:

- If found to be feasible, establish or join a CCA providing a default energy portfolio and at least one "reach" energy portfolio with an increased supply of renewable electricity.
- Establish a community lending partner (such as a local credit union) to establish low rates and promote economic growth within the community.
- Maintain high participation in the CCA by promoting benefits of a program (cleaner energy, lower cost, and/or support for local economy, etc.) to customers.
- Evaluate the program regularly and add additional renewable energy portfolio options consistent with program objectives and customer demand.

Co-benefits:

Enhances local economy

Reduces utility bills

RE 3: Renewable energy systems for new residences

Implementation Approach: Require

The addition of small-scale renewable energy systems to new single- and multi-family residences can often meet (and even exceed) the energy need for the home. Extra energy can be sold back to the grid, which helps reduce the amount of energy needed from nonrenewable sources and can help the homeowner finance the project. New developments that are constructed to be prepared for the possibility of renewables in the future save the homeowner money for infrastructure needed to support such systems.

2020 GHG Reduction: 140 $MTCO_2e$

2020 GHG Reduction (without RE 2): 180 $MTCO_2e$

Recommended Actions:

- Provide educational materials to developers about existing federal, State, and regional programs that support and/or subsidize small-scale or distributed-generation renewable energy systems for local use.
- Develop incentives for developers who install renewable energy systems on their developments, including solar photovoltaics and solar water heating. An incentive program could include reduced or waived fees, rebates, or low/no interest loans, among other mechanisms. The City should explore a revolving loan program or dedicated funding source(s) for the incentives. Funding sources could include the City and/or a combination of public and private resources, such as rebates, grants, and loans. Incentive programs should apply to solar photovoltaics and solar water heating though other feasible options could be supported.
- Partner with PG&E, San Mateo Energy Watch, a CCA, or others to provide rebates and energy buy-back programs for on-site renewable electricity systems.
- Reduce or eliminate existing solar permit fees.
- Require new houses and multi-family developments to be solar ready as defined by the California Building Standards Code, to support the installation of a rooftop solar energy array at a later date.
- Revise the San Mateo urban design guidelines to allow for nontraditional building design elements if necessary to support on-site renewable energy systems.

Co-benefits:

Enhances local economy

Reduces utility bills

CHAPTER 3

RE 4: Renewable energy systems for existing residences

Implementation Approach: Incentivize

The addition of small-scale renewable energy systems to existing single- and multi-family residences can reduce the amount of energy residents need to purchase from utility companies. Extra energy can be sold back to the grid, which helps reduce the amount of energy needed from nonrenewable sources and can help the homeowner finance the project.

2020 GHG Reduction: 3,970 $MTCO_2e$

2020 GHG Reduction (without RE 2): 4,980 $MTCO_2e$

Recommended Actions:

- Provide information to homeowners about existing funding programs for renewable energy systems.
- Offer incentives for applicants who install renewable energy systems on their homes as feasible, including same-day permit approval and participation in revolving loan programs.
- Promote existing financing programs, such as Property Assessed Clean Energy (PACE) programs, allow homeowners to incrementally pay for renewable energy systems, and explore creating or joining additional programs.
- Reduce or eliminate solar permit fees for existing buildings beyond the minimum standards required by Assembly Bill 2188.

Even a small rooftop solar array can lower GHG emissions and home electricity bills.

Photo by Bill Eager, NREL 00568

Co-benefits:

Enhances local economy

Reduces utility bills

RE 5: Renewable energy systems for new nonresidential buildings

Implementation Approach: Require

The addition of distributed-generation renewable energy systems to nonresidential buildings may help reduce the amount of energy from nonrenewable sources the building requires, and in some cases may exceed the amount of electricity needed. New construction that is built to include such systems helps reduce GHG emissions and may save businesses money on utility costs.

2020 GHG Reduction: 130 $MTCO_2e$

2020 GHG Reduction (without RE 2): 170 $MTCO_2e$

Recommended Actions:

- Provide educational materials to developers about existing federal, State, and regional programs that support and/or subsidize distributed-generation renewable energy systems.
- Promote PACE programs to help guide developers and property owners toward fiscally feasible solutions for on-site renewable energy systems.
- Offer direct financial subsidies, participation in a revolving loan program, and other incentives for developers who seek to implement distributed-generation renewable energy systems on new commercial developments.
- Reduce or eliminate existing solar permit fees beyond the minimum standards required by Assembly Bill 2188.
- Provide rebates for on-site renewable energy systems.
- Require new nonresidential buildings to be solar ready as defined by the California Building Standards Code, to support the installation of a rooftop solar energy array at a later date.

Co-benefits:

Enhances local economy

Reduces utility bills

RE 6: Renewable energy systems for existing nonresidential buildings

Implementation Approach: Incentivize

The addition of distributed-generation renewable energy systems to nonresidential buildings may help reduce the amount of energy from nonrenewable sources the building requires, and in some cases may exceed the amount of electricity needed. Building owners, property managers, or triple net tenants may be able to prepare or install distributed-generation renewable energy systems on their buildings, which in turn may reduce business expenditures on utility bills and reduce GHG emissions.

2020 GHG Reduction: 560 $MTCO_2e$

2020 GHG Reduction (without RE 2): 700 $MTCO_2e$

Recommended Actions:

- Provide information about funding sources and technical aspects of renewable energy systems to property owners, property managers, and tenants.
- Promote PACE programs to help building owners and tenants identify fiscally feasible solutions for renewable energy systems.
- Provide funding through a revolving loan program, same-day permit approval, and other incentives for property owners who seek to implement distributed-generation renewable energy systems on existing commercial developments.
- Reduce or eliminate existing solar permit fees beyond the minimum standards required by Assembly Bill 2188.
- Develop a local rebate program for on-site renewable energy systems.

Co-benefits:

Enhances local economy

Reduces utility bills

RE 7: Advanced and emerging renewable energy systems

Implementation Approach: Encourage

Renewable energy is a rapidly advancing field, and new technology is constantly being introduced into the market. Emerging technologies include the integration of solar panels into wall and roofing material, energy storage and microgrid systems, wastewater heat recovery systems (such as SHARC), and more. San Mateo can position itself as a leader in real-world applications of these advances.

2020 GHG Reduction: Supportive

Recommended Actions:

- Educate developers about newly available renewable energy technologies and support efforts to use these technologies in developments.
- Proactively create permitting procedures for emerging renewable energy technologies.
- Identify opportunities to use newly available renewable energy technologies in City facilities as a demonstration project.
- Work with regional partners to support companies developing new renewable energy technologies.
- Promote efforts by San Mateo education and research institutions to develop and market renewable energy technologies.

The solar array on this experimental house can track the sun, allowing for increased electricity production.

Photo by Jim Tetro, NREL 17486

Co-benefits:

OPEN

Enhances local economy

CHAPTER 3

Energy Efficiency and Conservation (EE)

Electricity, natural gas, and propane are used to heat, cool, and light buildings, as well as to operate appliances and machinery. This goal seeks to provide opportunities for businesses and homeowners to conserve energy and maximize efficiency, which in turn reduces energy costs, supports the local economy, and further reduces GHG emissions.

EE 1: Residential energy efficiency owner-occupied retrofits

Implementation Approach: Encourage

Older homes, especially those built before incorporation of energy efficiency and green building standards in local and State building codes (generally before 1980), are less energy efficient than newer buildings. Home retrofit programs address a variety of improvements in existing houses and include upgrades to insulation, windows, heating, ventilating, and air conditioning (HVAC) systems, lighting, and appliances, and may reduce energy use by as much as 45%. San Mateo has already completed a limited number of retrofits through the earlier San Mateo Home Energy and Loan Repair Program.

2020 GHG Reduction: 440 $MTCO_2e$

2020 GHG Reduction (without RE 2): 490 $MTCO_2e$

Recommended Actions:

- Educate homeowners, property managers, and real estate agents about the benefits of residential energy retrofits, the availability of financing options, and how to participate.
- Provide energy retrofit information to project applicants seeking permits for renovation or expansion work on existing houses.
- Host residential energy outreach events such as evening workshops and local learn-at-lunch sessions, provide energy retrofit information at community events, and distribute information on residential energy retrofit online and in public buildings.
- Publicize the available options and financial benefits of PACE programs.

Improvements to exterior insulation, a common home retrofit, help reduce the amount of energy needed for heating and cooling.

Photo by Dennis Schroeder, NREL 28704

Co-benefits:

Enhances local economy

Reduces utility bills

Saves energy

EE 2: Residential energy efficiency renter-occupied retrofits

Implementation Approach: Incentivize

Tenants in rental units often have limited abilities to retrofit their homes, including upgrades to insulation, windows and doors, HVAC systems, and home appliances. Property owners may also be reluctant to make these improvements as electricity bills are usually paid by the tenant and the owners may therefore have limited opportunities to reduce their costs. Energy efficiency programs specifically designed for rental programs can address these issues by distributing the costs and benefits to both parties, providing tenants greater operational control, and allowing owners to promote energy-efficient units to prospective tenants.

2020 GHG Reductions: 650 $MTCO_2e$

2020 GHG Reduction (without RE 2): 720 $MTCO_2e$

Recommended Actions:

- Educate property owners about available financing mechanisms to improve energy efficiency in rental units, such as shared savings programs.
- Support efforts by property owners to make improvements to rental units through PACE programs.
- Encourage property owners to participate in energy benchmarking efforts.
- Work with tenant groups and property management companies to identify actions tenants can take within the bounds of their lease to improve energy efficiency.
- Offer low- or no-cost energy audits to property owners who agree to disclose a unit's energy efficiency results to tenants.
- Provide incentives such as direct subsidies, participation in revolving loan programs, and expedited permitting to property owners who make energy efficiency improvements to their units beyond any minimum actions required by the adopted energy code.

Co-benefits:

Enhances local economy

Promotes equity

Reduces utility bills

Saves energy

CHAPTER 3

EE 3: Nonresidential energy efficiency retrofits

Implementation Approach: Incentivize

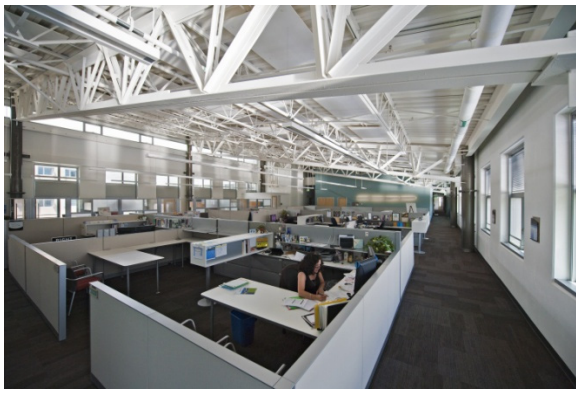
The City of San Mateo predicts that by 2020, a significant portion of its nonresidential building stock will have been constructed before 1990. Energy-efficient retrofits can help the City reduce GHG emissions and save businesses money. Retrofits to these structures can reduce energy use by approximately 30% to 50%.

2020 GHG Reduction: 3,990 $MTCO_2e$

2020 GHG Reduction (without RE 2): 4,790 $MTCO_2e$

Recommended Actions:

- Educate property owners and tenants about retrofit programs and financing options.
- Work with nonresidential property owners to offer green leases for tenants, allowing tenants to specify energy efficiency improvements to the space or to help finance energy efficiency retrofits in exchange for reduced occupancy fees.



The daylighting system in this retrofitted office minimizes the need for always-on electric lights.

Photo by Dennis Schroeder, NREL 17904

- Publicize the available options and financial benefits of PACE programs.
- Support participation in demand-response programs.
- Offer low-cost energy audits for business or office parks, including identification of most cost-efficient savings for weatherization or appliance upgrades.
- Offer reduced-fee and/or expedited permitting to project applicants including energy retrofit measures in an addition or expansion (as defined in San Mateo Municipal Code Section 23.06.012) of existing commercial buildings beyond any minimum actions required by the adopted energy code.

Co-benefits:

Enhances local economy

Reduces utility bills

Saves energy

EE 4: Energy efficiency at healthcare centers

Implementation Approach: Incentivize

The healthcare sector is one of the largest energy users in San Mateo; it is responsible for approximately 8% of the community's nonresidential electricity use and approximately 15% of San Mateo's nonresidential natural gas use. The highly specialized and vital nature of the healthcare sector can also make some energy efficiency upgrades in medical buildings less feasible or impractical compared to offices and retail space. The City can develop energy efficiency actions specifically intended to address the unique energy profile and operational needs of healthcare facilities.

2020 GHG Reduction: 1,710 $MTCO_2e$

2020 GHG Reduction (without RE 2): 1,910 $MTCO_2e$

Recommended Actions:

- Work with building owners of medical, healthcare, and hospital uses to promote cost-effective energy efficiency retrofits through associated financial savings, opportunities to improve patient care, and public image enhancement.
- Collaborate with PG&E and community partners to identify packages of cost-effective energy efficiency retrofits that can be easily applied to different healthcare facilities.
- Educate large healthcare facilities about the availability of energy savings performance contracts as a means to identify and facilitate financing opportunities.
- Share information about available energy efficiency retrofit financing opportunities, including PACE efforts.
- Promote a "staged" energy retrofit system as a way to maximize energy and cost savings.
- Provide low- or no-cost energy audits to healthcare facilities.
- Establish a revolving loan fund for healthcare energy efficiency programs.
- Offer reduced-fee and/or expedited building permits as feasible to healthcare facilities conducting energy retrofit programs as part of a renovation or expansion of existing buildings beyond any minimum actions required by the adopted energy code.

Co-benefits:

Enhances local economy

Improves public health

Reduces utility bills

Saves energy

EE 5: Residential energy education and low-cost retrofits

Implementation Approach: Encourage

Basic energy efficiency retrofits and energy efficiency/conservation education are effective means of reducing energy use with ease and little or no cost. These programs include increased education about how residents can conserve energy through changes to their behavior or through the purchase of low-cost items such as energy-efficient light bulbs and smart power strips. These campaigns are particularly suitable for renters who may be unable to conduct more extensive retrofits, and can reduce home energy use by up to 10%–15%.

2020 GHG Reduction: 230 $MTCO_2e$

2020 GHG Reduction (without RE 2): 320 $MTCO_2e$

Recommended Actions:

- Conduct outreach to homeowners, renters, real estate agents, and property managers about low-cost retrofits and energy-efficient behaviors.

Co-benefits:

Enhances local economy

Reduces utility bills

Saves energy

Energy-efficient lightbulbs are an effective, low-cost retrofit that is suitable for all homes, including rental units.

Photo by US Department of Energy

EE 6: Nonresidential energy education and low-cost retrofits

Implementation Approach: Encourage

Not all businesses are able to make widespread energy-efficiency retrofits due to ownership issues and concerns about cost. Education can achieve savings by encouraging people to change their behaviors, particularly in combination with low-cost energy-efficiency upgrades. The City can partner with local and regional organizations to help improve the effectiveness of educational campaigns.

2020 GHG Reduction: 70 $MTCO_2e$

2020 GHG Reduction (without RE 2): 100 $MTCO_2e$

Recommended Actions:

- Conduct outreach to businesses and nonresidential building owners about low-cost retrofits and energy-efficient behaviors.
- Provide information about local, regional, and green business certification opportunities at time of business license issuance or renewal.
- Modify the City's business license form to allow identification of green businesses to track participation and to identify potential private partners for future GHG reductions.

Co-benefits:

Enhances local economy

Reduces utility bills

Saves energy

CHAPTER 3

Municipal Energy Efficiency and Conservation (ME)

The City of San Mateo strives to serve as an example of efficiency and to embody the commitment to reducing emissions citywide. Measures and actions under this goal save energy and reduce utility bills, which preserves valuable City resources and provides green building case studies for other developments in the community.

ME 1: Energy efficiency for new City buildings

Implementation Approach: Incentivize

The California Energy Commission is considering a goal of having all new nonresidential buildings be zero net energy by 2030. The City can build on its existing ordinance requiring new municipal buildings to meet LEED Silver standards.

2020 GHG Reduction: Supportive

Recommended Actions:

- Seek grant funding or low- or no-interest loans to implement energy saving efforts and renewable energy systems at City facilities at time of construction or substantial renovation.

Co-benefits:

Reduces utility bills

Saves energy

ME 2: Energy efficiency at existing City buildings

Implementation Approach: Incentivize

The San Mateo County Energy Watch identified energy reduction measures at City facilities primarily though variable-frequency drives and upgrades to HVAC systems. Additional opportunities for reducing energy use exist through educating City staff on energy conservation programs and other energy efficiency retrofits.

2020 GHG Reduction: Supportive

Recommended Actions:

- Develop an energy conservation education campaign for City staff.
- Identify sources of funding for energy efficiency retrofits.

Co-benefits:

Reduces utility bills

Saves energy

CHAPTER 3

Alternative Fuels (AF)

The promotion of alternative fuels, such as switching to electric vehicles, can ease a transition away from reliance on traditional fuel vehicles. Providing increased support for alternative fuel vehicles through public and private infrastructure makes it simpler for residents who want to purchase an electric vehicle to feel supported in the community.

Public EV charging stations can be installed indoors or outside, and help make plug-in vehicles more viable in the community.

AF 1: Public EV charging stations

Implementation Approach: Require

Electric vehicle (EV) charging stations in public parking lots and garages, especially those with reserved parking spaces, can improve the overall feasibility of EVs and PHEVs (plug-in hybrids) for community members and can support EVs and PHEVs for use in the municipal fleet.

2020 GHG Reduction: 40 $MTCO_2e$

2020 GHG Reduction (without RE 2): 30 $MTCO_2e$

Recommended Actions:

- Install public EV charging stations in desirable, high-volume, and prominent locations (e.g., near the entrance to a downtown parking garage).

Co-benefits:

Conserves resources

Improves public health

AF 2: Increased EV adoption

Implementation Approach: Require

EVs and PHEVs are becoming increasingly widespread and cost-effective to California residents. San Mateo can improve the adoption of EVs and PHEVs among City residents by promoting these vehicles through media and in-person events and by using EVs and PHEVs in the City fleet. The City can also make EVs and PHEVs more feasible by promoting EV charging stations at private residences and businesses, allowing EV and PHEV owners to recharge their vehicles easily while at home or work.

2020 GHG Reduction: 6,110 $MTCO_2e$

2020 GHG Reduction (without RE 2): 5,760 $MTCO_2e$

Recommended Actions:

- Provide information about the benefits of EVs and PHEVs through the City's electronic media systems and at public events, including creating opportunities for public EV/PHEV test drives.
- Conduct educational outreach to homeowners, commercial property owners, and developers about the benefits of EV charging stations.
- Identify and distribute resources to assist community members seeking to install an EV charging station on their properties.
- Amend the San Mateo Zoning Code to allow EV chargers to encroach into the required parking stall area.
- Decrease permit fees and/or offer expedited permitting for EV charging stations.
- Create an additional rebate, potentially in conjunction with regional communities, for property owners who install EV charging stations.

- Purchase EVs or PHEVs as replacements for gasoline-powered vehicles or conventional hybrids in the City fleet that are not converted to CNG-powered vehicles, as available and cost-effective.
- Require that new projects of at least six multi-family residential units and/or 10,000 square feet of nonresidential square footage, if off-street parking is provided, include a number of EV charging stations with designated parking spaces capable of meeting the California Green Building Code Voluntary Standards at time of new construction or addition or alteration as defined in San Mateo Municipal Code Section 23.06.012.
- Require all new single-family houses and multi-family units with private attached garages or carports to be pre-wired for an EV charging station inside the garage or carport.

Co-benefits:

Conserves resources

Improves public health

Alternative Transportation (AT)

Increasing the number of transportation modes available to San Mateo residents creates a healthier community, promotes equity, and reduces emissions. By providing individuals with a range of safe, reliable options to get to work, school, shopping, and other important destinations, fewer will depend on vehicles, the use of which can contribute to high GHG emissions.

AT 1: Public shuttles

Implementation Approach: Encourage

San Mateo, in association with the Commute Alliance, runs three shuttle routes between the San Mateo Caltrain stations and major employment centers in the community. Private businesses and other transportation operators may run additional shuttles. These shuttle systems serve as a bridge between stations for regional transit system (e.g., Caltrain) and employment centers, allowing individuals who do not work directly next to a transit station to use alternative transportation.

2020 GHG Reduction: 50 $MTCO_2e$

Recommended Actions:

- Conduct an outreach campaign to San Mateo residents and employees about available shuttle and vanpool options to support increased ridership.
- Work with riders and shuttle providers to identify potential improvements to service schedules and route coverage, including possible expansion of routes to locations outside of San Mateo/Foster City.

Co-benefits:

Conserves resources

Improves public health

Promotes equity

AT 2: Transportation Demand Management

Implementation Approach: Require

TDM is a suite of strategies intended to reduce the amount of single-occupancy vehicle trips generated and vehicle miles traveled, particularly during peak commute times. TDM can include increased use of public transit, non-motorized transportation, carpools and ridesharing, and telecommuting, among many others. In San Mateo, standards for TDM measures are established by the local transportation management agency (TMA). New developments in the TOD zoning district or the Bay Meadows Phase II Specific Plan Amendment area within the Rail Corridor TOD Plan area are required to comply with TDM measures as administered by the TMA, and a second TMA is proposed to administer TDM in the downtown area. San Mateo is also developing a citywide TDM plan as a component of the Sustainable Streets Plan project. Organizations implanting TDM measures generally have the freedom to choose the strategies that suit their needs.

2020 GHG Reduction: 3,090 $MTCO_2e$

Recommended Actions:

- Educate developers working on projects in San Mateo about ways to reduce vehicle miles traveled and the resultant benefits.
- Publicize developments and businesses with successful TDM programs.
- Work with regional partners to fund successful TDM strategies for existing developments that can be implemented with little or no cost to property owners (e.g., City-subsidized transit passes).
- Require new developments of at least six multi-family units and/or 10,000 square feet of nonresidential space to implement a suite of TDM strategies to comply with the appropriate trip reduction target identified in applicable area plans and the future San Mateo Citywide TDM Plan (currently under development).
- Require developments of at least 20 multi-family units and/or 50,000 square feet of nonresidential space undergoing additions or alterations (as defined in San Mateo Municipal Code Section 23.06.012) to implement TDM strategies consistent with the targets in relevant area plans and the future San Mateo Citywide TDM Plan.

Co-benefits:

Conserves resources

Improves public health

AT 3: Expand car share program

Implementation Approach: Incentivize

Car share services allow subscribers to access to a car when needed, but without many costs associated with ownership (parking fees, maintenance, etc.). Car share services often have dedicated parking spaces and usually use newer, fuel-efficient vehicles. Through car share services, a small number of cars can meet the needs of a larger number of people.

2020 GHG Reduction: 2,120 $MTCO_2e$

Dedicated parking spots for car share vehicles help make care share systems easier to use.

Recommended Actions:

- Conduct an outreach campaign intended to increase use of car share vehicles.
- Discuss including dedicated car share parking spaces in applications for new construction and additions/alterations of multi-family or nonresidential developments that include off-street parking.
- Seek funding and coordinate with car share operators to offer reduced-cost car share trial memberships for San Mateo residents.
- Provide streamlined permitting for development projects allowing car share vehicles to be parked in required on-site visitor parking spaces.

Co-benefits:

Conserves resources

Improves public health

Promotes equity

AT 4: Increase bicycle mode share

Implementation Approach: Incentivize

Bicycles currently make up an estimated 1.35% of San Mateo commute trips, using approximately 40 miles of dedicated bike trails and lanes within the community. Efforts to increase this are currently under way, with the ongoing implementation of the Bicycle Master Plan adopted in 2011. These efforts include dedicated bicycle parking, new bike lanes, and improvements to existing bicycle infrastructure. Such efforts are supported by the Sustainable Streets Plan currently in development, which includes standards for complete streets.

Sufficient bike parking makes bicycling an easier option for shorter trips. Bike racks can also help support City beautification efforts.

2020 GHG Reduction: 660 $MTCO_2e$

Recommended Actions:

- Host bicycle safety and awareness efforts for bicyclists, pedestrians, and drivers.
- Work to expand bike-to-school commutes through the Safe Routes to School program.
- Work with the Metropolitan Transportation Commission and other regional partners to expand Bay Area Bike Share stations at destinations as identified in the San Mateo Bike Share Feasibility Study, and explore opportunities to reduce Bay Area Bike Share costs for San Mateo residents and employees. Work with project developers to locate Bike Share stations in publicly accessible areas of new developments.
- Install additional bike racks and long-term bike storage lockers at City facilities.
- Continue to secure funding for full implementation of the infrastructure improvements identified in the adopted Bicycle Master Plan, including 40 miles of bike paths/lanes and associated pavement markings (green bike lanes, bike boxes, etc.), improved bicycle parking at Caltrain stations and downtown locations, raised pavement markers, and bicycle detection loops at signalized intersections.

Co-benefits:

Conserves resources

Improves public health

Promotes equity

AT 5: Increase pedestrian mode share

Implementation Approach: Require

The San Mateo Pedestrian Master Plan, adopted in 2012, seeks to create a pedestrian-friendly environment throughout the community to encourage walking. Such efforts are supported by the Sustainable Streets Plan currently in development, which includes standards for complete streets and pedestrian-friendly landscaping improvements such as low-impact development.

2020 GHG Reduction: Supportive

Recommended Actions:

- Improve pedestrian safety through education and outreach efforts.
- Support efforts to walk to school through the Safe Routes to School program.
- Provide development incentives for new buildings that promote a pedestrian-friendly streetscape through minimal setbacks, ground-floor activity, etc., consistent with the San Mateo Urban Design Element and urban design guidelines.
- Secure funding for and fully implement the infrastructure improvements identified in the adopted Pedestrian Master Plan, including green and complete streets, additional sidewalks as needed, lighting and curb improvements, parklets, intersection and crossing improvements, etc.

Co-benefits:

Conserves resources

Improves public health

Promotes equity

CHAPTER 3

Solid Waste (SW)

Efforts to divert waste away from landfills not only reduce emissions, but also provide residents with an opportunity to focus on comprehensive sustainability and exercising awareness of individual impact on the environment. These measures build on the City of San Mateo's active leadership to date reducing waste through innovative programs.

SW 1: Increase participation in composting program

Implementation Approach: Require

Decomposing landfill waste emits methane, which is a potent GHG. Diverting compostable materials from traditional waste streams may reduce these emissions. San Mateo and a number of other surrounding communities instituted a curbside composting program in 2011 in conjunction with the local waste hauler. This voluntary program allows residents and businesses to deposit food scraps into a green bin to be composted and turned into fertilizer. Previously, this material would have gone to the landfill, producing GHGs as it decomposed. A majority of San Mateo's single-family households currently participate in the program. Increasing participation of multi-family residents and businesses in the program may prevent further emissions.

2020 GHG Reduction: 8,940 $MTCO_2e$

Recommended Actions:

- Provide educational outreach materials to multi-family residents about urging HOA/property managers to support composting programs.
- Work with Recology San Mateo County to include information about adding composting services in monthly garbage and recycling bills to existing BizSMART customers.
- Work with food service facilities to understand barriers to utilizing existing composting programs. Use this clearer perception of roadblocks to mitigate concerns and target incentives more specifically at high food-waste facilities.
- Work with multi-family and commercial property owners to minimize any potential health or cleanliness impacts associated with compost collection bins.
- Explore alternative off-site collection or sorting methods to capture compostable materials from multi-family units.

- Provide a diversion discount to participating commercial and multi-family users to incentivize properly and fully utilize compost services.
- Mandate that all commercial properties over 10,000 square feet and multi-family buildings of at least four units with sufficient space to store and access a composting bin participate in curbside or off-site composting by 2020.
- Require that all commercial properties over 10,000 square feet and multi-family buildings of at least four units have an area of sufficient space to store and allow access to a compost bin at time of construction or additions/alterations, as defined in San Mateo Municipal Code Section 23.06.012.

Co-benefits:

Conserves resources

CHAPTER 3

Water and Wastewater (WW)

Increasing the efficiency of water usage reduces emissions and helps conserve valuable resources, saving money for the City and its residents, reducing dependence on outside resources, and increasing resilience to water shortages.

WW 1: Water efficiency retrofits for existing buildings

Implementation Approach: Incentivize

Older buildings often have opportunities to improve water efficiency by replacing old fixtures (sinks, showerheads, toilets, etc.). Especially in periods of drought, optimizing indoor water efficiency may greatly reduce GHG emissions from conveyance and treatment of water. New buildings are required to use water-efficient fixtures under State law. These buildings can incorporate fixtures that exceed California standards to achieve additional water use reductions.

2020 GHG Reduction: 20 $MTCO_2e$

Recommended Actions:

- Provide educational materials at outreach events that include personal actions and technical solutions for minimizing indoor water use.
- Visit local schools and community centers to give presentations about conservation.
- Partner with the Bay Area Water Supply & Conservation Agency (BAWSCA) for efficiency rebate programs on high efficiency toilets, washing machines, and other water-conserving appliances.
- Work with Cal Water to offer low-cost or free water audits to business and homeowners. Provide a list of recommended water-efficient appliances and fixtures that could remedy problem areas found in the audit.

Co-benefits:

Conserves resources

Reduces utility bills

WW 2: Water-efficient landscaping

Implementation Approach: Require

Treating and conveying water requires large amounts of energy. Minimizing the amount of water used on nonessential applications, such as landscaping and turf grass, helps reduce GHG expenditures and increases resiliency in periods of drought.

2020 GHG Reduction: Supportive

Recommended Actions:

- Provide educational materials to the community about drought-tolerant landscaping. Promote the aesthetic and low-maintenance co-benefits of native, water-efficient plants.
- Continue to host and increase frequency of City-offered water-efficient landscaping classes.

Native landscapes require little or no irrigation, saving both natural resources and money.

- Adopt the Sustainability Commission's revisions to the Landscape Water Efficiency Ordinance or formally adopt the BAWSCA ordinance.
- Partner with local nurseries to subsidize drought-tolerant and/or native plants.
- Partner with Cal Water and/or BAWSCA to host a trade-in program for inefficient sprinklers for more efficient drip irrigation systems.
- Retrofit City-owned landscapes to increase the amount of drought-resistant and/or native plant landscaping.

Co-benefits:

Conserves resources

Reduces utility bills

WW 3: Develop new sources of nonpotable water

Implementation Approach: Incentivize

The City has explored the installation of water-recycling equipment at the City's wastewater treatment plant to produce clean water for nonpotable uses (water not intended for people to drink, such as that used for irrigation and dust control). By the City's estimates, there is enough demand in San Mateo to convert about half of the treated wastewater from the plant into recycled water. Additionally, the on-site capture of rainwater may reduce the amount of potable water being used for landscaping.

2020 GHG Reduction: Supportive

Recommended Actions:

- Provide outreach materials for community members about greywater, including potential uses, safety considerations, and relationship to drought protection.
- Partner with Cal Water or BAWSCA to host rain barrel demonstrations for homeowners.
- Explore partnering with another community or water provider to create a multi-jurisdictional wastewater production and distribution system.
- Pursue funding to construct recycled water production and/or distribution system.
- Create a rain barrel rebate program for City residents who want to add rainwater capture systems on their properties for nonpotable use.
- Offer expedited and/or reduced cost permits to new developments and major renovations of existing developments that include greywater systems or pipes for recycled water.

Co-benefits:

Conserves resources

Off-Road Equipment (OR)

Shifting to alternative fuel equipment encourages sustainable thinking across the community and promotes healthier air for all residents, which is especially important for sensitive populations such as children, the elderly, and individuals with chronic respiratory disease.

OR 1: Alternative fuel lawn and garden equipment

Implementation Approach: Encourage

Most lawn and garden equipment, such as lawn mowers, leaf blowers, chippers, etc., are fueled by gasoline or diesel. Many manufacturers produce hybrid and electric models, which use less fuel compared to a conventional model (or none at all). These models produce less pollution and may also be quieter to operate than gasoline or diesel equipment.

2020 GHG Reduction: 40 $MTCO_2e$

Recommended Actions:

- When purchasing new City-owned landscaping equipment, buy hybrid and alternative fuel models as feasible.
- Conduct education campaigns and outreach events to property owners and landscaping companies about the availability of hybrid and alternative fuel landscaping equipment, and available incentives such as the BAAQMD Lawn Mower Exchange.

Co-benefits:

Conserves resources

Improves public health

OR 2: Alternative fuel construction equipment

Implementation Approach: Encourage

Gasoline and diesel fuels are commonly used to power most construction equipment (tractors, excavators, cranes, etc.). As with road vehicles, many companies produce versions of this equipment in hybrid or alternative fuel models, such as battery electric or compressed natural gas.

2020 GHG Reduction: 30 $MTCO_2e$

Recommended Actions:

- Work with local property developers and contractors to promote the availability of hybrid and alternative fuel construction equipment.
- When purchasing new City-owned construction equipment, buy hybrid and alternative fuel models as feasible.

Co-benefits:

Conserves resources

Improves public health

Summary of Total GHG Emissions

This chapter provides a policy framework for San Mateo to achieve a 15% or greater reduction below baseline 2005 GHG emissions by 2020. CAP measures will achieve the adopted target of exceeding the AB 32 target by 2020 and establish a clear path for future and continued emissions reductions. **Table 9** summarizes quantified GHG reductions by measure topic for 2020 and 2030. Providing expected emissions reductions for 2030 demonstrates the City's commitment to ongoing implementation beyond 2020. The CAP is projected to reduce community emissions by approximately an additional 57,210 $MTCO_2e$ by 2020. This number is expected to nearly double by 2030, with continued and expanded measure implementation to achieve a total reduction of 113,680 $MTCO_2e$. **Figure 8** shows the impact of each measure topic, which visually demonstrates the impact of some measures, such as energy, against others, such as water and wastewater. Proposed CAP measures and associated performance metrics identify emissions reductions to be achieved by 2020.

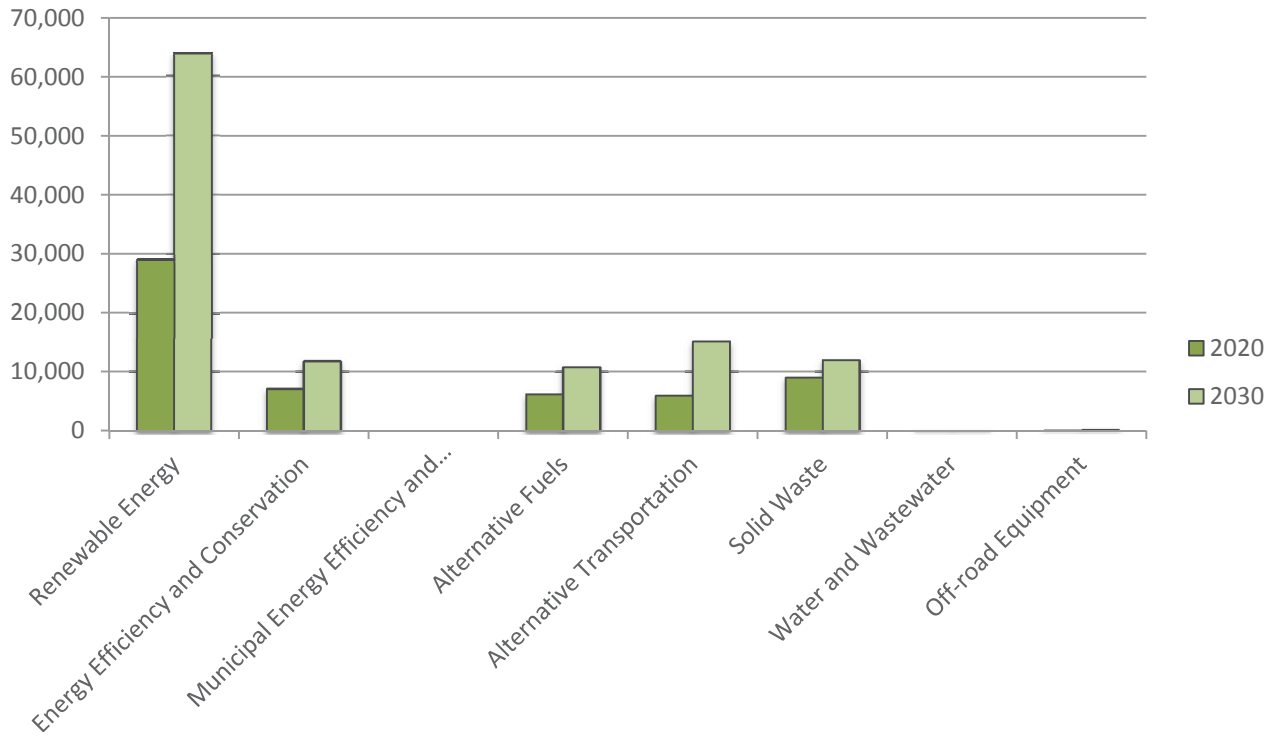
In addition to reaching the 2020 target, the City also recognizes the continued challenges presented by GHG emissions and is committed to continue implementing CAP measures beyond 2020, in lieu of a post-2020 target established by the State. To continue sustained reductions in GHG emissions, the City is committed to implementing measures beyond 2020 consistent with long-term State planning objectives. With the existing proposed measures, San Mateo has the potential to demonstrate a total reduction of 113,680 $MTCO_2e$ by 2030.

Table 9: GHG Emissions Reductions by Measure Topic, 2020 and 2030 ($MTCO_2e$)

	2020	2030
Renewable Energy	-29,020	-64,020
Energy Efficiency and Conservation	-7,090	-11,760
Municipal Energy Efficiency and Conservation	—	—
Alternative Fuels	-6,150	-10,730
Alternative Transportation	5,920	-15,050
Solid Waste	8,940	-11,940
Water and Wastewater	20	-30
Off-Road Equipment	70	-150
Total	**-57,210**	**-113,680**

Note: Due to rounding, totals may not equal the sum of the component parts.

Figure 8: GHG Emissions Reductions by Measure Topic, 2020 and 2030 ($MTCO_2e$)



Together with the impact of State and local accomplishments, measures proposed in this CAP are able to exceed the 15% reduction below 2005 emissions levels by 2020. Total reductions are shown in **Table 10**. Notably, the City is able to exceed the 15% reduction target both with and without CCA, Measure RE 2. With implementation of Measure RE 2, the CAP exceeds an 18% reduction below 2005 levels by 2020. Should the City not implement a CCA program, the CAP would still achieve an estimated 15.4% reduction below 2005 levels by 2020.

Table 10:Summary of 2020 CAP Reductions

	2020 GHG Reductions Without CCA ($MTCO_2e$)	2020 GHG Reductions With CCA ($MTCO_2e$)
2005 baseline emissions	804,290	804,290
2020 forecast	725,850	725,850
2020 forecast with existing State and local accomplishments*	721,770	721,910
2020 forecast with existing State and local accomplishments, and planned activities	715,950	716,340
AB 32 target (15% reduction below 2005 baseline)	683,650	683,650
AB 32 target gap	32,300	32,690
2020 forecast with CAP (new measures, existing State and local accomplishments, and planned activities)	680,150	659,130
2020 target met?	Yes	Yes
Gap remaining	-3,500	-24,520
Reduction below baseline	-15.4%	-18.0%

** Reductions from existing State and local accomplishments vary slightly depending whether CCA is in place. Entries that change depending whether CCA is in place are those which involve electricity use. Although most electricity-related local accomplishments are already accounted for in the Local Adjustment, some existing solar arrays were installed in 2014 and so would not be in the Local Adjustment. The variation in these numbers is accounted for by the difference in emissions reductions from these arrays depending on whether CCA is in place.*

The City's goal of reducing GHG emissions 35% below 2005 levels by 2030 translates to a 2030 target of 522,790 $MTCO_2e$. The measures identified in this CAP (in conjunction with existing State and local accomplishments and planned activities) can help move San Mateo toward this goal, but on their own are not currently anticipated to achieve the 2030 target. Additional actions at the federal, State, regional, and/or local level may be necessary to meet this goal. The City can monitor progress toward the 2030 goal and take new action as needed with the implementation measures identified in **Chapter 4**. Total 2030 reductions are given in **Table 11.** The potential 2030 GHG emissions reductions for each measure are included in **Appendix 1.**

Table 11: Summary of 2030 CAP Reductions

	2030 GHG Reductions Without CCA ($MTCO_2e$)	2030 GHG Reductions With CCA ($MTCO_2e$)
2005 baseline emissions	804,290	804,290
2030 forecast	729,400	729,400
2030 forecast with existing State and local accomplishments *	723,920	724,220
2030 forecast with existing State and local accomplishments, and planned activities	714,720	714,670
Target (35% reduction below 2005 baseline)	522,790	522,790
Target gap	191,930	191,880
2030 forecast with CAP (new measures, existing State and local accomplishments, and planned activities)	644,590	600,990
2030 target met?	No	No
Gap remaining	121,800	78,200
Reduction below baseline	-19.9%	-25.3%

** Reductions from existing State and local accomplishments vary slightly depending whether CCA is in place. Entries that change depending whether CCA is in place are those which involve electricity use. Although most electricity-related local accomplishments are already accounted for in the Local Adjustment, some existing solar arrays were installed in 2014, and so would not be in the Local Adjustment. The variation in these numbers is accounted for by the difference in emissions reductions from these arrays depending on whether CCA is in place.*

Chapter 4

Achieving and Sustaining the Target

Implementing the Climate Action Plan

To ensure the success of this Climate Action Plan (CAP), the City of San Mateo will integrate the goals and strategies of this plan into other local and regional plans, and implement the programs and activities identified herein. As the City moves forward with updating other planning documents such as the General Plan, the San Mateo Municipal Code, or specific plans, staff will ensure that these documents support and are consistent with the CAP.

Implementing the CAP will require City leadership to execute these measures and report progress. This plan identifies a work plan that includes responsible departments, time frames, and relative costs associated with each measure. Staff will monitor progress using an implementation and monitoring tool on an annual basis and will provide an annual update to City decision-makers. The measures in this CAP are accompanied by a list of recommended actions, selected by City staff, members of the Sustainability Commission, and members of the public. Not all of the listed actions may be necessary for the City to achieve its target. As part of the implementation of this CAP, the City may elect to alter or remove individual measures and actions so as to allow San Mateo to meet its greenhouse gas (GHG) reduction goal in a manner that matches community needs and values. The City's sustainability program manager will serve as an ongoing advisor for CAP implementation. As part of annual progress reports, the sustainability program manager and City staff will evaluate the effectiveness of each measure to ensure that anticipated emissions reductions are occurring. In the event that reductions do not occur as expected, the City can modify and add additional measures to the CAP to ensure the reduction target is achieved.

The following programs are designed to guide San Mateo in successfully implementing the CAP.

Chapter 4

Implementation Measures

Implementation Measure 1: Monitor and report progress toward CAP target achievement on an annual basis.

Actions to support Implementation Measure 1:

- Assign responsibility for facilitating and supporting CAP implementation to the City's sustainability program manager.
- Identify key staff from each department responsible for supporting the sustainability program manager with information and updates for annual reporting and monitoring
- Continue to involve the Sustainability Commission or other advisory bodies in reviewing and recommending CAP action items.
- Prepare an annual progress report for review and consideration by the Sustainability Commission and City Council. The annual progress report should identify estimated GHG emissions reductions, current GHG emissions levels, and priorities for CAP implementation.
- Use the CAP implementation and monitoring tool to track GHG benefits from CAP implementation and identify progress toward the CAP reduction target.

Implementation Measure 2: Continue to develop collaborative partnerships with agencies and community groups that support Climate Action Plan implementation.

Action to support Implementation Measure 2:

- Continue formal membership and participate in local and regional organizations that provide tools and support for energy efficiency, energy conservation, GHG emissions reductions, adaptation, public information, and implementation of this Plan.
- Participate as a member of the Regionally Integrated Climate Action Planning Suite (RICAPS) climate action planning effort to monitor available resources, programs, and funding to leverage with City CAP efforts.
- At the direction of City Council, commit to formal membership through joint powers authorities or other partnerships to implement high priority measures from the CAP, such as Community Choice Aggregation (CCA).

Implementation Measure 3: Secure necessary funding to implement the Climate Action Plan.

Actions to support Implementation Measure 3:

- Identify funding sources and levels for reduction measures as part of annual reporting.
- Include emissions reduction measures in department work plans, the capital improvement program, and other plans as appropriate.
- Pursue local, regional, State, and federal grants to support implementation.

- Explore dedicated funding sources for CAP implementation.
- Explore opportunities to allocate a portion of revenues from revenue-generating measures to CAP allocation.

Implementation Measure 4: Update the baseline emissions inventory and Climate Action Plan every five years.

Actions to support Implementation Measure 4:

- Prepare a 2015 emissions inventory no later than 2017.
- Update the CAP no later than 2020 to incorporate new technology, as well as measures to further reduce emissions.

Implementation Measure 5: Achieve ongoing GHG reductions beyond 2020 consistent with State guidance.

Actions to support Implementation Measure 5:

- Review and monitor evolving State guidance for post-2020 targets for 2030, 2050, or other horizon years identified by the State, as new legislation and guidance is available.
- By 2018, review and consider adoption of post-2020 reduction target consistent with long-term State GHG reduction goals.

WORK PLAN

The work plan in **Table 12** contains information to support staff and community implementation of the measures to effectively integrate them into budgets, the capital improvement program, and other programs and projects. Information about the sources of data to monitor implementation of each measure is given in **Appendix 2.** The measures of success included in **Table 12** are defined as follows:

Code: The abbreviation that is used to refer to the measure in the CAP and all corresponding workbooks.

Measure: The language used to guide actions needed for reductions. Also notes whether the City will be encouraging, incentivizing, or requiring the action to be taken.

2020 GHG Reductions ($MTCO_2e$): Amount of GHG emissions release mitigated by 2020. Numbers shown here assume CCA, Measure RE 2, is included.

City Costs: Cost to the City (in staff hours) to complete implementation of the measure, ranked as follows:

- Low (less than 80 hours)
- Medium (80–500 hours)
- High (more than 500 hours)

Time Frame: The year by which a measure should be effective. The exact status of a measure will vary based on its actions, and many measures will be ongoing through and beyond 2020. An effective measure is one that will be actively on track to achieve the targeted GHG emissions reductions in 2020, support adaptation to climate change effects, or achieve long-term resilience. For a measure to be effective, the necessary programs and efforts should be active, and any infrastructure or other capital improvements should be in place. The effective year is not the end year, as many of the measures are programs that are intended to remain in effect for the foreseeable future, and so they do not have end dates. For example, Measure RE 2 directs the City to participate in a CCA program if found to be feasible. While a large share of work may be done to study and establish a CCA, Measure RE 2 cannot be deemed "effective" until a CCA has been set up, and as the measure is ongoing as long as the CCA operates, it cannot not truly be considered "finished" unless the CCA operations cease. Time frames for effectively setting up the measures are described as follows:

- Immediate (by 2015)
- Near-Term (by 2016)
- Mid-Term (by 2018)
- Long-Term (by 2020)

Lead Department: The lead City department tasked with implementing the measure.

Beneficiaries: Identifies whether the measure benefits existing development, new development, the City government, or any combination of these three.

Table 12: CAP Implementation Work Plan

Measure	Measure	2020 GHG Reductions ($MTCO_2e$)	City Staff Time	Time Frame	Lead Department	Beneficiaries
RE 1	Expanded options to purchase renewable electricity from other sources – Encourage	500	Medium	By 2016	City Manager's Office	☒ Existing Development ☒ New Development ☒ City Government
RE 2	Community Choice Aggregation – Require	23,720	High	By 2018	City Manager's Office	☒ Existing Development ☒ New Development ☒ City Government
RE 3	Renewable energy systems for new residences – Require	140	Medium	By 2016	City Manager's Office, Community Development	☐ Existing Development ☒ New Development ☐ City Government
RE 4	Renewable energy systems for existing residences – Incentivize	3,970	Medium	By 2016	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
RE 5	Renewable energy systems for new nonresidential buildings – Require	130	Medium	By 2016	City Manager's Office, Community Development	☐ Existing Development ☒ New Development ☐ City Government
RE 6	Renewable energy systems for existing nonresidential buildings – Incentivize	560	Medium	By 2018	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
RE7	Advanced and emerging renewable energy systems – Encourage	0	Low	By 2016	City Manager's Office, Community Development	☒ Existing Development ☒ New Development ☒ City Government
EE 1	Residential energy efficiency owner-occupied retrofits – Encourage	440	Medium	By 2015	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government

Measure	Measure	2020 GHG Reductions ($MTCO_2e$)	City Staff Time	Time Frame	Lead Department	Beneficiaries
EE 2	Residential energy efficiency renter-occupied retrofits – Incentivize	650	Medium	By 2018	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
EE 3	Nonresidential energy efficiency retrofits – Incentivize	3,990	High	By 2016	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
EE 4	Energy efficiency at healthcare centers – Incentivize	1,710	Medium	By 2016	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
EE 5	Residential energy education and low-cost retrofits – Encourage	230	Medium	By 2015	City Manager's Office, Community Development	☒ Existing Development ☐ New Development ☐ City Government
EE 6	Nonresidential energy education and low-cost retrofits – Encourage	70	Medium	By 2016	City Manager's Office, Finance	☒ Existing Development ☐ New Development ☐ City Government
ME 1	Energy efficiency for new City buildings – Incentivize	0	Low	By 2016	Public Works	☐ Existing Development ☒ New Development ☒ City Government
ME 2	Energy efficiency at existing City buildings – Incentivize	0	Medium	By 2016	Public Works	☒ Existing Development ☐ New Development ☒ City Government
AF 1	Public EV charging stations – Require	40	Medium	By 2015	City Manager's Office, Public Works	☐ Existing Development ☐ New Development ☒ City Government

Measure	Measure	2020 GHG Reductions ($MTCO_2e$)	City Staff Time	Time Frame	Lead Department	Beneficiaries
AF 2	Increased EV adoption – Require	6,110	Low	By 2018	City Manager's Office, Community Development	☐ Existing Development ☒ New Development ☐ City Government
AT 1	Public shuttles – Encourage	50	Low	By 2015	City Manager's Office, Public Works	☒ Existing Development ☒ New Development ☒ City Government
AT 2	Transportation Demand Management (TDM) – Require	3,090	Low	By 2018	Community Development, Public Works	☐ Existing Development ☒ New Development ☐ City Government
AT 3	Expand car share program – Incentivize	2,120	High	By 2015	City Manager's Office, Public Works	☒ Existing Development ☒ New Development ☒ City Government
AT 4	Increase bicycle mode share – Incentivize	660	High	By 2020	Public Works	☒ Existing Development ☒ New Development ☒ City Government
AT 5	Increase pedestrian mode share – Require	0	Medium	By 2020	Public Works, Community Development	☒ Existing Development ☒ New Development ☒ City Government
SW 1	Increase participation in composting program – Require	8,940	High	By 2020	Public Works	☒ Existing Development ☒ New Development ☒ City Government
WW 1	Water efficiency retrofits for existing buildings – Incentivize	20	Medium	By 2018	City Manager's Office	☒ Existing Development ☐ New Development ☐ City Government

Measure	Measure	2020 GHG Reductions ($MTCO_2e$)	City Staff Time	Time Frame	Lead Department	Beneficiaries
WW 2	Water-efficient landscaping – Require	0	Medium	By 2015	Community Development, Parks and Recreation	☒ Existing Development ☒ New Development ☒ City Government
WW 3	Develop new sources of nonpotable water – Incentivize	0	High	By 2020	Public Works, Community Development	☒ Existing Development ☒ New Development ☒ City Government
OR 1	Alternative fuel lawn and garden equipment – Encourage	40	Medium	By 2018	Public Works, Parks and Recreation	☒ Existing Development ☒ New Development ☐ City Government
OR 2	Alternative fuel construction equipment – Encourage	30	Low	By 2016	Community Development, Public Works	☐ Existing Development ☒ New Development ☒ City Government

Glossary

Activity: Any action that directly or indirectly results in GHG emissions. Examples include electricity use, vehicle use, and solid waste disposal. Activity data are a discrete measure of how much of an activity occurred in San Mateo in a certain year (e.g., how much electricity was used in 2005). The measurement unit of activity data varies depending on the activity.

Assembly Bill (AB) 32, California Global Warming Solutions Act of 2006: Establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases (GHG) for the State of California. AB 32 designates the California Air Resources Board as the responsible agency for monitoring and reducing statewide GHG emissions to reduce emissions to 1990 levels by 2020.

Association of Bay Area Governments (ABAG): The regional planning agency for the nine counties and 101 incorporated cities in the San Francisco Bay Area.

Baseline Year: The year against which future changes are measured. Many communities in California use a baseline year of 2005 through 2008 for consistency with AB 32; the San Mateo inventory uses a baseline year of 2005.

Business-as-Usual (BAU): A business-as-usual projection forecasts greenhouse gas (GHG) emissions without regulatory or technical intervention to reduce GHG emissions.

California Air Resources Board (CARB): A division of the California Environmental Protection Agency charged with protecting public health, welfare, and ecological resources through the reduction of air pollutants.

California Environmental Quality Act (CEQA): A State law requiring State and local agencies to regulate activities with consideration for environmental protection. If a proposed activity has the potential for a significant adverse environmental impact, an environmental impact report (EIR) must be prepared and certified as to its adequacy before action can be taken on the proposed project. General plans require the preparation of a program EIR.

GLOSSARY

California Green Building Standards Code (CALGreen): The California Green Building Standards Code, commonly referred to as the CALGreen Code, is a statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt that encourage or require additional measures in the five green building topics. The most recent update to the CALGreen code was adopted in 2013 and went into effect July 1, 2014.

California Solar Initiative (CSI): Allows the California Public Utilities Commission to provide incentives to install solar technology on existing residential, commercial, nonprofit, and governmental buildings if they are customers of the State's investor-owned utilities: Pacific Gas and Electric, San Diego Gas & Electric, or Southern California Edison.

Carbon Dioxide (CO_2): A colorless, odorless gas that occurs naturally in the earth's atmosphere. Significant quantities are also emitted into the air by fossil fuel combustion.

Carbon Dioxide Equivalent (CO_2e): A metric measure used to compare the emissions from various greenhouse gases based on their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.

Car Sharing: A type of car rental where people rent cars for short periods of time, often by the hour.

Clean Car Fuel Standards (AB 1493, Pavley): Signed into law in 2002 and commonly referred to as Pavley standards. Requires carmakers to reduce greenhouse gas (GHG) emissions from new passenger cars and light trucks beginning in 2011. The California Air Resources Board anticipates that the Pavley standards will reduce GHG emissions from new California passenger vehicles by about 22% in 2012 and about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.

Climate Action Plan (CAP): Strategic plans that establish policies and programs for reducing (or mitigating) a community's greenhouse gas emissions and adapting to the impacts of climate change.

Climate Change (also referred to as global climate change): The term "climate change" is sometimes used to refer to all forms of climatic inconsistency, but because the earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, climate change has been used synonymously with the term "global warming"; scientists, however, tend to use the term in the wider sense to also include natural changes in climate.

Climate Change Mitigation: A technical or behavioral intervention to reduce the sources of greenhouse gas emissions in order to reduce the potential effects of climate change.

Climate Zone: The California Energy Commission (CEC) has classified the distinct climates throughout California by climate zone to recognize the variability in energy use based on local weather patterns. The CEC uses these climate zones to determine energy budgets for new and renovated buildings and prescriptive packages for each climate zone to ensure that they meet the State's Title 24 energy efficiency standards.

Glossary

Co-Benefit: An additional benefit occurring from the implementation of a greenhouse gas (GHG) reduction measure that is not directly related to reducing GHG emissions.

Community Choice Aggregation (CCA): Cities and counties can establish or join a Community Choice Aggregation, which allows them to combine (or aggregate) the purchasing power of all of the individual consumers of energy in the area. CCAs then have the power to choose where the community's energy comes from, allowing more flexibility to choose alternative sources of power.

Complete Streets: Complete streets policies ensure that transportation planners and engineers consistently design and operate the entire roadway with all potential users in mind. This includes private vehicles, bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities. In 2007, the State of California adopted Assembly Bill 1358, which directs the legislative body of a city or county, upon revision of the circulation element of its general plan, to identify how the jurisdiction will provide for the routine accommodation of all users.

Emissions Factor: A number that describes the amount of greenhouse gases (GHG) released per unit of a certain activity (e.g., GHGs per unit of natural gas used). Factors are provided by utility companies, State agencies, and guidance documents.

Energy Conservation: Reducing energy waste, such as turning off lights, heating, and motors when not needed.

Energy Efficiency: Doing the same or more work with less energy, such as replacing incandescent light bulbs with compact fluorescent light bulbs or buying an Energy Star appliance to use less energy for the same or greater output.

Energy Efficiency Standards (Title 24, Part 6): Title 24 standards were first adopted in 1978 and established minimum energy efficiency standards for residential and nonresidential buildings. These standards are updated continually by providing more stringent energy budgets for new buildings in an effort to reduce California's energy consumption.

Energy Star: A joint program of the US Environmental Protection Agency and the US Department of Energy to provide consumers with information and incentives to purchase the most energy efficient products available.

Environmental Impact Report (EIR): A report required by the California Environmental Quality Act that assesses all the environmental characteristics of an area and determines what effects or impacts will result if the area is altered or disturbed by a proposed action or project. See California Environmental Quality Act.

Global Warming Potential (GWP): An index used to translate the level of emissions of various gases into a common measure in order to compare the relative potency of different gases without directly calculating the changes in atmospheric concentrations. Greenhouse gases are expressed in terms of carbon dioxide equivalent. Global warming potentials are expressed in terms relative to carbon dioxide, which has a global warming potential of 1.

Green Building: Sustainable or "green" building is a holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants, and the community. See the California Green Building Standards Code (CALGreen) for green building regulations in California.

GLOSSARY

Greenhouse Gas/Gases (GHG): Gases that cause heat to be trapped in the atmosphere, warming the earth. GHGs are necessary to keep the earth warm, but increasing concentrations of these gases are implicated in global climate change. GHGs include all of the following: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The majority of GHGs come from natural sources, although human activity is also a major contributor.

Greenhouse Gas (GHG) Inventory: Provides estimates of the amount of GHGs emitted to and removed from the atmosphere by human activities. A city or county that conducts an inventory looks at both community emissions sources and emissions from government operations. A base year is chosen and used to gather all data from that year. Inventories include data collection from such things as vehicle miles traveled, energy usage from electricity and gas, and waste. Inventories include estimates for carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons, and perfluorocarbons, which are referred to as the six Kyoto gases.

Greywater: Wastewater collected from showers, bathtubs, bathroom sinks, and clothes washing machines that is reused on-site for irrigation purposes.

Low Carbon Fuel Standard (LCFS): An executive order from former Governor Schwarzenegger, the LCFS established the goal of reducing the carbon intensity of transportation fuels in California by 10% by 2020.

Metropolitan Planning Organization (MPO): A federally funded transportation planning organization comprising representatives from local government agencies and transportation authorities.

Quantification: The process of determining the amount of greenhouse gas emissions reduced by each measure.

Recycled Water: Wastewater from tubs, toilets, and sinks inside homes and offices that is cleaned through a treatment process, producing nonpotable water that is safe for landscapes, raw vegetable crops, and agricultural crops.

Reduction Measure: A goal, strategy, program, or set of actions that target and reduce a specific source of greenhouse gas emissions.

Regional Transportation Plan (RTP): A long-term blueprint of the region's transportation systems. The RTP is a federally mandated comprehensive long-range regional planning document that identifies the region's transportation needs, sets forth an action plan of projects, determines actions and programs to address the needs and issues, and documents the financial resources needed to implement the RTP.

Renewable Energy: Energy from sources that regenerate and are less damaging to the environment, such as solar, wind, biomass, and small-scale hydroelectric power.

Renewables Portfolio Standard (RPS): A regulation requiring utility companies in California to increase the production of renewable energy from solar, wind, or biomass, or geothermal sources.

Sector: A category of activities responsible for greenhouse gas (GHG) emissions, such as transportation, water use, or energy use. Sectors may comprise multiple GHG sources and activities.

Glossary

Senate Bill (SB) 97: Requires lead agencies to analyze greenhouse gas emissions and climate change impacts under the California Environmental Quality Act.

Senate Bill (SB) 375: Directs the metropolitan planning organizations in California to create a sustainable communities strategy (SCS) as part of the regional transportation plan. The SCS will demonstrate how the region will achieve the 2020 and 2035 greenhouse gas emissions reduction targets for the region set by the California Air Resources Board.

Sustainability: Community use of natural resources in a way that does not jeopardize the ability of future generations to live and prosper.

Sustainable Communities Strategy (SCS): The land use element of each metropolitan planning organization's regional transportation plan as required by Senate Bill 375. The SCS will demonstrate how the region will achieve the 2020 and 2035 vehicle miles traveled and greenhouse gas emissions reduction targets for the region set by the California Air Resources Board.

Sustainable Development: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Transit-Oriented Development (TOD): A mixed-use residential or commercial area designed to maximize access to transit options.

Transportation Demand Management (TDM) Plan: A voluntary or mandatory program developed by local agencies, large employers, or high traffic commercial services to limit the amount of congestion and pollution related to transportation demand. TDM plans may include incentives, regulations, and education about transportation alternatives.

Triple Net Tenant: A triple net tenant is a tenant who pays three net costs related to the asset being leased (net real estate taxes, net building insurance, and net maintenance and utilities) in addition to the rental fee. Triple net leases can be used to encourage energy efficiency because it allows tenants to directly recover the cost savings from reduced utility bills.

Vehicle Miles Traveled (VMT): A key measure of overall street and highway use. Reducing VMT is often a major objective in efforts to reduce vehicular congestion and achieve regional air quality goals.

Water Conservation: Reducing water use, such as by turning off taps, shortening shower times, and reducing outdoor irrigation demand.

Water-Efficient Landscape: Native or low-water-using landscapes. Water-efficient landscapes are required by law in all cities and counties in California to conserve water.

Water Use Efficiency: Replacing older technologies and practices in order to accomplish the same results with less water, for example, by replacing toilets with new high efficiency models and by installing "smart controllers" in irrigated areas.

Glossary

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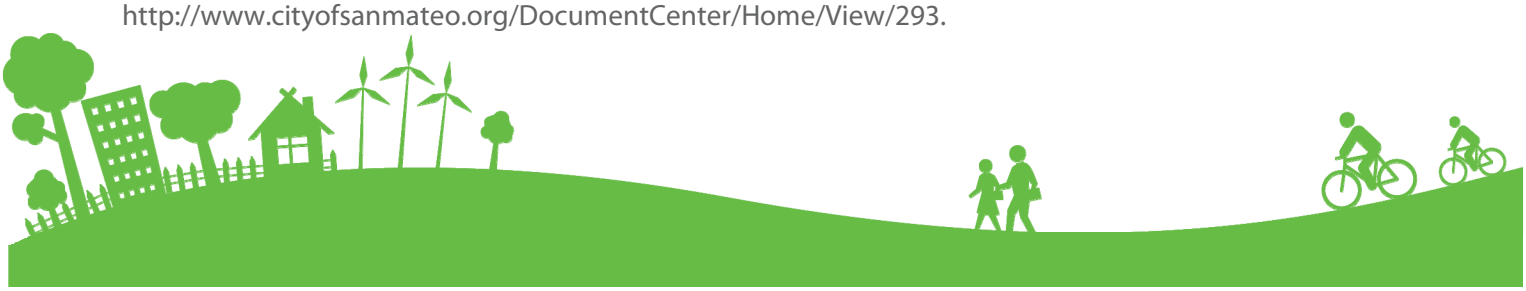

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Appendix I

Technical Appendix: Methods and Assumptions

Local Adjustment Background

In the initial greenhouse gas (GHG) business-as-usual (BAU) forecast prepared as part of the Climate Action Plan (CAP) project, per capita activity data were assumed to remain constant from 2005 levels out to 2020 and 2030. The BAU forecast relies on growth assumptions consistent with the General Plan and approved by City staff. The decision to use 2005 per capita activity data was based on the use of 2005 as the baseline year for consistency with Assembly Bill (AB) 32 and widely accepted BAU forecasting methods (for example, the Association of Environmental Professionals whitepaper on GHG forecasts[3]). Although per capita activity data were also available for 2010, it was not used in the BAU forecast because of concerns that the economic downturn at the time resulted in a temporary decrease in per capita activity, which in turn would potentially underestimate future GHG emissions.

The 2010 GHG inventory showed a 9% decrease in GHG emissions over the 2005 baseline, which is well in advance of the projected progress based on the projected forecast and cannot be entirely accounted for by adopted State, regional, and local programs and policies. Since the CAP is a consolidation of existing plans and update on progress toward a 2020 reduction target, the project team reviewed alternative methods for the BAU forecast as well as methods to apply adjustments to note State and local existing activities to ensure that reductions since 2005 were feasibly included in the analysis. To determine the most feasible method to credit the community for the decrease in emissions and to understand whether the decrease would continue over time, the project team obtained and analyzed socioeconomic and activity data for the years 2005–2013. The team assessed changes in activity data before, during, and after the economic downturn. Some activity data returned to pre-2008 per capita levels as economic conditions improved, but others showed a clearly decreasing trend in per capita activity data that was largely or entirely uninterrupted by the recession. In particular, per capita residential and nonresidential electricity and natural

[3] Association of Environmental Professionals. 2012. *Forecasting Community-Wide Greenhouse Gas Emissions and Setting Reduction Targets*. http://www.califaep.org/images/climate-change/Forecasting_and_Target_Setting.pdf.

gas use, along with per capita solid waste, have declined consistently since 2005 and have continued to decline even as economic conditions improved.

Based on this analysis, the project team opted not to revise the BAU forecast but to instead create a "Local Adjustment" to the forecast, reflecting the reductions in per capita energy use and waste generation since 2005. The forecasts for residential energy use, nonresidential energy use, and solid waste sectors now use 2013 per capita activity data rather than 2005. All other sectors continue to use the 2005 activity data. For example, the BAU forecast assumes that each house in San Mateo will use approximately 5,400 kilowatt-hours (kWh) of electricity in 2020, the same as in 2005. This set of adjustments now assumes that each house in 2020 will use approximately 5,260 kWh of electricity, the same as in 2013. The Local Adjustment does not include revisions to population or employment growth. The annual data used to determine these changes are shown in **Table 1-1**.

Table 1-1: 2005–2013 Activity Data

Activity	2005	2006	2007	2008	2009	2010	2011	2012	2013
Solid Waste (total tonnage)	104,268	93,046	85,293	83,379	73,134	69,298	62,806	75,000	65,385
Residential Electricity (kWh)	205,686,467	211,851,602	211,421,053	211,870,098	213,084,253	211,951,745	210,168,631	204,380,656	201,502,643
Nonresidential Electricity (kWh)	328,710,254	321,717,635	336,547,996	339,782,285	340,990,191	332,698,159	309,412,448	298,278,265	307,822,206
Residential Natural Gas (therms)	17,043,174	17,721,139	17,681,130	17,624,397	17,528,751	17,589,558	18,139,669	16,934,284	16,962,630
Nonresidential Natural Gas (therms)	9,336,385	9,667,312	10,001,485	9,628,463	9,092,625	9,528,787	10,288,816	10,175,540	10,245,722

In order to avoid double-counting, the calculations of expected GHG reductions for existing local accomplishments excluded program-specific reductions in the areas of renewable energy, energy efficiency, and waste reduction that occurred between 2005 and 2013. For example, calculations of the GHG emission reductions from solar panel installations were only credited for those installations that occurred in 2014, which are not reflected in the per capita figures used in the Local Adjustment.

Reductions from State actions were applied to the Local Adjustment, not the BAU forecast as was done previously. This method avoids double-counting, as it ensures that the reductions from State actions are done relative to the more realistic values of the Local Adjustment. The State actions therefore reduce emission levels from where they are forecast to be under the Local Adjustment, not under the BAU scenario. Following the Local Adjustment, 2020 emissions are projected to be 725,850 $MTCO_2e$, or approximately 12% below 2005 levels.

Appendix 1

GHG Reduction Measure Quantification

This appendix summarizes data sources, assumptions, and performance metrics used to calculate greenhouse gas emissions reductions for the City of San Mateo Climate Action Plan. The sources and metrics are organized by measure and rely on four primary types of data and research: (1) San Mateo's GHG emissions inventory and forecast, (2) government agency tools and reports, (3) case studies in similar jurisdictions, and (4) scholarly research.

Further, the quantification approaches are consistent with guidance provided by the Bay Area Air Quality Management District (BAAQMD) for development of a Qualified GHG Reduction Strategy. The baseline GHG inventory and forecast serve as the foundation for the quantification of the City's GHG reduction measures. Activity data from the inventory form the basis of measure quantification, including vehicle miles traveled (VMT), kilowatt-hours (kWh) of electricity or therms of natural gas consumed, and tons of waste disposed. Activity data were combined with the performance targets and indicators identified by the City and consultants. The activity data and performance targets and indicators were used throughout the quantification process to calculate the emissions reduction benefit of each measure. This approach ensures that San Mateo's GHG emissions reductions are tied to the baseline and to future activities occurring within the City.

Emissions Factors

Table 1-2 lists the emissions factors used to quantify emissions reductions in the CAP.

Table 1-2: Emissions Coefficients for CAP Measures

Source	2005	2010	2020	2030	Source
MTCO2e per mile driven (with Pavley)	0.000488	0.000466	0.000360	0.000322	EMFAC 2011
MTCO2e per kWh (PG&E and Direct Access with RPS)	0.000241	0.000211	0.000188	0.000191	PG&E, CPUC
MTCO2e per kWh (CCA)	—	—	0.000136	0.000082	EPA, CEC, Marin Clean Energy, Sonoma Clean Power
MTCO2e per therm	0.005323	0.005317	0.005308	0.005260	LGOP v1.1
MTCO2e per ton of waste	0.234374	0.172414	0.227867	0.227819	CARB Landfill Emissions Tool v1.3

These emissions coefficients were calculated as follows, using data from the GHG inventory and forecast:

- **$MTCO_2e$ per mile driven:** Divide the emissions from on-road transportation by the number of on-road vehicle miles traveled.

- **$MTCO_2e$ per kWh:** Divide the sum of the emissions for residential and commercial electricity use by the sum of the kWh for these two sources.
- **$MTCO_2e$ per therm:** Divide the sum of the emissions from residential and commercial natural gas by the sum of the therms used by these two sources.
- **$MTCO_2e$ per ton of waste.** Divide the sum of the emissions from landfilled waste and waste in place by the sum of the tons of waste in these sources.

TECHNICAL DATA FOR EXISTING AND PLANNED LOCAL ACTIVITIES

Data sources, methods, and assumptions for the quantification of the existing and planned local activities are provided below. All GHG emissions reductions below are presented assuming full implementation of CCA, Measure RE 2. Note that some existing local activities do not show activity and GHG reductions because these reductions are already accounted for in the Local Adjustment, and so are not shown here to avoid double counting. Additionally, some existing and planned local activities may not have assumptions and/or performance metrics.

EA 1 Community solar panels

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	2,697,650	2,697,650
Emissions Reduction ($MTCO_2e$) with CCA	370	220

Performance Indicators

	2020	2030
kW of post-2013 solar arrays	1,830 (120 for residential arrays, 430 for commercial arrays, and 1,280 for government arrays)	1,830 (120 for residential arrays, 430 for commercial arrays, and 1,280 for government arrays)
Number of post-2013 solar arrays installed	17 (6 residential arrays, 9 commercial arrays, and 2 government arrays)	17 (6 residential arrays, 9 commercial arrays, and 2 government arrays)
kWh per kW in San Mateo	1,480	1,480

GHG Method

Data from Go Solar California's California Solar Initiative program on the kW of post-2013 installed solar panel arrays were combined with information from the National Renewable Energy Laboratory to identify the kWh produced annually from post-2013 solar panel arrays installed in San Mateo; all solar panels installed in 2013 or prior are already included in the Local Adjustment. This activity data figure was combined with emissions factors from the inventory to calculate GHG reductions.

GHG Sources

Go Solar California. 2014. "Current Working Dataset – California Solar Initiative." http://www.californiasolarstatistics.ca.gov/current_data_files/.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

EA 2 Municipal energy efficiency and renewable energy

GHG Assumptions

	2020	2030
Annual kWh savings from streetlights converted to LED bulbs	620	620

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	821,320	821,050
Emissions Reduction ($MTCO_2e$) with CCA	110	70

All activity and GHG reductions from this item are included in the Local Adjustment and so are not included in the totals of existing local activities to avoid double-counting.

Technical Appendix: Methods and Assumptions

Performance Indicators

	2020	2030
kWh production from Main Library solar array	117,850	117,580
kWh savings from completed municipal Energy Watch programs	21,930	21,930
Number of streetlights converted to LEDs	880	880
kWh savings from retrofits to Firehouse 21 and Firehouse 27	8,180	8,180

GHG Method

Data on kWh savings from municipal energy efficiency activities were totaled and then multiplied by an emissions factor from the inventory in order to calculate GHG reductions.

GHG Sources

City of San Mateo. 2014. Administrative Report: LED Street Lights and Energy Efficiency Improvements.

Kleinbaum, Kathy. 2014. Senior Management Analyst, City Manager's Office, City of San Mateo. Personal correspondence to Tammy Seale, PMC project manager.

San Mateo County Energy Watch. 2012. Program Results 2010–2012 San Mateo County Energy Watch.

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EA 3 Major home retrofits

GHG Assumptions

	2020	2030
Average reduction in energy use per major retrofit	32%	32%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	3,470	3,470
Natural Gas Savings (therms)	290	290
Emissions Reduction ($MTCO_2e$) with CCA	<10	<10

Most activity and GHG reductions from this item are included in the Local Adjustment and so are not included in the totals of existing local activities to avoid double-counting. This item is part of the Private Retrofit Program existing activity identified in Table 7.

GHG Method

Information on the number of Energy Upgrade California retrofits completed post-2013 was obtained, as any reductions from retrofits completed in 2013 or earlier are already accounted for in the Local Adjustment. This number was combined with information from the inventory about average energy use per house and the average energy savings from Energy Upgrade California retrofits in the San Francisco Bay Area to calculate the total energy savings. This figure was combined with emissions factors from the inventory to determine GHG reductions.

GHG Sources

Association of Bay Area Governments. 2012. "Retrofit Bay Area Final Report."

Energy Upgrade California. 2014. EUC San Mateo Projects Paid in 2010–2014 YTD [data table].

Technical Appendix: Methods and Assumptions

EA 4 Green House Call program

GHG Assumptions

	2020	2030
Energy use reductions from minor retrofits	2%	2%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	41,730	41,730
Emissions Reduction ($MTCO_2e$) with CCA	10	<10

All activity and GHG reductions from this item are included in the Local Adjustment and so are not included in the totals of existing local activities to avoid double-counting. This item is part of the Private Retrofit Program existing activity identified in Table 7.

Performance Indicators

	2020	2030
kWh savings per minor retrofit	110	110
Number of minor retrofits completed	390	390

GHG Method

Data regarding the number of houses that participated in the Green House Call program were combined with estimates of energy savings from similar programs and information on per-household energy use from the inventory to obtain the amount of energy saved from the Green House Call program. This figure was then multiplied by emissions factors from the inventory to determine GHG savings.

GHG Sources

California Energy Commission. 2010. "Residential Appliance Saturation Study." http://www.energy.ca.gov/appliances/rass.

City of San Mateo. 2013. 2013 Annual Update of the Sustainable Initiatives Plan.

US Department of Energy. n.d. "Compact Fluorescent Light Bulbs and Mercury." http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_mercury.

EA 5 Green Building Ordinance

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	125,070	125,070
Natural Gas Savings (therms)	21,710	21,710
Emissions Reduction ($MTCO_2e$) with CCA	130	120

All activity and GHG reductions from this item are included in the Local Adjustment and so are not included in the totals of existing local activities to avoid double-counting.

Performance Indicators

	2020	2030
Energy savings per house	15 kWh and 31 therms	15 kWh and 31 therms
Energy savings per square foot of nonresidential space	1.17 kWh and 0.17 therms	1.17 kWh and 0.17 therms
Number of new buildings/space meeting Green Building Ordinance standards	130 hours and 105,380 square feet of nonresidential space	130 hours and 105,380 square feet of nonresidential space

GHG Method

Information on the number of buildings covered by the Green Building Ordinance was provided by the City of San Mateo. Data from the inventory and the California Air Pollution Control Officers Association were used to determine the energy savings per participating building. These pieces of information were combined to determine total energy savings, which were then multiplied by emissions factors from the inventory to determine total GHG reductions.

GHG Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

City of San Mateo. 2014. City of San Mateo Climate Action Plan – Data Collection Packet, Building Department.

Technical Appendix: Methods and Assumptions

EA 6 Transportation Demand Management

Activity and GHG Reduction

	2020	2030
Transportation Savings (VMT)	9,107,270	14,539,000
Emissions Reduction ($MTCO_2e$) with CCA	3,280	4,680

Performance Indicators

	2020	2030
Average percentage VMT reduction per person	17%	28%
Service population in TDM-compliant developments	8,430	8,080

GHG Method

Information from the San Mateo Rail Corridor Area Transportation Management Agency was used to identify reductions in trip generation as a result of existing and under-construction developments subject to TDM provisions. This was combined with information from the inventory to estimate a total reduction in VMT from existing TDM provisions, which was then combined with emissions factors from the inventory to identify GHG reductions from these provisions.

GHG Sources

San Mateo Rail Corridor Area Transportation Management Agency. 2013. "2013 Annual Report."

Schure, J. T., and M. Alba. 2013. Memorandum: San Mateo Executive Park Trip Reduction Plan. http://www.cityofsanmateo.org/DocumentCenter/View/12150.

EA 7 Caltrain shuttles

Activity and GHG Reduction

	2020	2030
Transportation Savings (VMT)	382,980	382,980
Emissions Reduction ($MTCO_2e$) with CCA	140	120

Performance Indicators

	2020	2030
Average shuttle trip length (miles)	14	14
Net increase in vehicle trips since 2005	27,550	27,550

GHG Method

Data from the Peninsula Traffic Congestion Relief Alliance were used to identify the current shuttle ridership rates, trip lengths, and the estimated savings in vehicle trips. This figure was converted to VMT savings, which were multiplied by emissions factors from the inventory to identify total GHG savings.

GHG Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

Peninsula Traffic Congestion Relief Alliance. 2013. SM Annual Ridership [data table].

———. 2014. "Q3 FY 13/14 Performance Metrics."

San Mateo County Economic Development Association. 2012. "Labor Supply and Commute Patterns in San Mateo County." http://www.bayareaeconomy.org/media/files/pdf/BACEI_Labor_Mobility_110612.pdf.

Technical Appendix: Methods and Assumptions

EA 8 Composting

Activity and GHG Reduction

	2020	2030
Waste Savings	16,980	16,980
Emissions Reduction ($MTCO_2e$) with CCA	6,790	6,790

All activity and GHG reductions from this item are included in the Local Adjustment and so are not accounted for here to avoid double-counting.

Performance Indicators

	2020	2030
Tons of residential compostables collected	13,990	13,990
Tons of commercial compostables collected	2,990	2,990
Number of residential participants	19,430	19,430
Number of commercial participants	250	250

GHG Method

Information about the amount of compost produced from San Mateo's existing composting program was provided by the City of San Mateo. These data were combined with an emissions factor produced by ICLEI to calculate total emissions savings.

GHG Sources

ICLEI – Local Governments for Sustainability. 2013. "Recycling and Composting Emissions Protocol, v 1.0." http://www.icleiusa.org/tools/ghg-protocol/recycling-and-composting-emissions-protocol.

Kleinbaum, Kathy. 2014. Senior Management Analyst, City Manager's Office, City of San Mateo. Personal correspondence to Jennifer Venema, PMC senior planner, and Eli Krispi, PMC assistant planner.

EA 9 Street trees

GHG Assumptions

	2020	2030
Carbon uptake of a single mature tree ($MTCO_2e$)	0.25	0.25

Activity and GHG Reduction

	2020	2030
Emissions Reduction ($MTCO_2e$) with CCA	160	160

Performance Indicators

	2020	2030
Net increase in street trees since 2005	620	620

GHG Method

Information on the net increase in San Mateo's street trees since 2005 was provided by the City of San Mateo. This information was multiplied by a carbon sequestration factor provided by ICLEI to determine the annual amount of carbon sequestered by street trees.

GHG Sources

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

Kleinbaum, Kathy. 2014. Senior Management Analyst, City Manager's Office, City of San Mateo. Personal correspondence to Jennifer Venema, PMC senior planner, and Eli Krispi, PMC assistant planner.

EA 10 Community Energy Watch programs

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	393,180	393,180
Emissions Reduction ($MTCO_2e$) with CCA	50	30

All activity and GHG reductions from this item are included in the Local Adjustment and so are not included in the totals of existing activities to avoid double-counting. This item is part of the Private Retrofit Program existing activity identified in Table 7.

Performance Indicators

	2020	2030
kWh savings from completed community Energy Watch programs	393,180	393,180

GHG Method

Data on kWh savings from completed San Mateo County Energy Watch energy efficiency activities were summed. This figure was then multiplied by an emissions factor from the inventory in order to calculate GHG reductions.

GHG Sources

San Mateo County Energy Watch. 2012. Program Results 2010–2012 [data table].

PA 1 Increased density for new houses

GHG Assumptions

	2020	2030
Percentage of new (post-2014) housing that is multi-family	72%	72%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	811,100	1,117,620
Natural Gas Savings (therms)	295,130	502,810
Emissions Reduction ($MTCO_2e$) with CCA	1,680	2,740

Performance Indicators

	2020	2030
Net energy savings from a new multi-family unit compared to a single-family home	550 kWh and 170 therms	350 kWh and 140 therms

GHG Method

Information on San Mateo's past building activities, current local and regional plans, and discussions with City staff were used to estimate changes in the community's housing stock. Data from PG&E were used to determine the relative energy savings from multi-family units compared to a single-family house. These pieces of information were combined to produce overall energy savings in the community from this planned activity. The energy savings were multiplied by emissions factors from the inventory to determine total emission savings.

GHG Sources

Association of Bay Area Governments. 2013. Plan Bay Area: Strategy for a Sustainable Region. http://onebayarea.org/plan-bay-area/final-plan-bay-area.html.

City of San Mateo. 2010. City of San Mateo General Plan, Land Use Element. http://www.cityofsanmateo.org/index.aspx?NID=2021.

Pacific Gas & Electric. 2013. "City of San Mateo Residential Energy Overview."

US Department of Housing and Urban Development. n.d. State of the Cities Data Systems: Building Permits Database. http://socds.huduser.org/permits.

PA 2 LED bulbs for remaining streetlights

GHG Assumptions

	2020	2030
Percentage of remaining streetlights to be converted to LEDs	100%	100%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	2,744,330	2,744,330
Emissions Reduction ($MTCO_2e$) with CCA	370	230

GHG Method

Data from the City of San Mateo and PG&E were used to estimate the total reductions from converting all 5,300 streetlights in San Mateo to LED bulbs. Any reductions from bulbs already converted (as identified in Existing Activity 2) were removed, and the remaining kWh value was multiplied by an emissions factor from the inventory to determine GHG reductions.

GHG Sources

City of San Mateo. 2014. Administrative Report: LED Street Lights and Energy Efficiency Improvements.

PA 3 Digester gas to biomethane

Activity and GHG Reduction

	2020	2030
Electricity Usage	+472,730	+472,730
Energy from Biomethane (MJ)	59,770	59,770
Emissions Reduction ($MTCO_2e$) with CCA	1,750	1,780

Performance Indicators

	2020	2030
Annual kWh use of project	472,730	472,730
Daily biomethane production (gallon of gasoline equivalents)	500	500

GHG Method

The City of San Mateo's grant application for the program was used to identify the amount of energy produced by the project, the amount of gasoline replaced by the biomethane, and the GHG savings from the replaced gasoline. The grant application was also used to identify the energy savings used to run the project, which was converted to GHG emissions using emissions factors from the inventory. The emissions from the increased electricity use were subtracted from the savings from the biomethane to determine the net GHG reduction.

GHG Sources

City of San Mateo. 2014. PON-13-609 Pilot-Scale and Commercial-Scale Advanced Biofuels Production Facilities. Grant Application, City of San Mateo: Digester Gas to Biomethane for Vehicle Fuel.

PA 4 County Health Building solar

Activity and GHG Reduction

	2020	2030
Effective Electricity Savings (kWh)	1,478,000	1,478,000
Emissions Reduction ($MTCO_2e$) with CCA	200	120

Performance Indicators

	2020	2030
kW of planned array	1,000	1,000

GHG Method

Information on the size of the planned array was provided by the City of San Mateo, which was multiplied by factors from the National Renewable Energy Laboratory to identify total annual kWh production from the array. This figure was combined with an emissions factor from the inventory to determine the GHG reduction.

GHG Sources

Kleinbaum, Kathy. 2014. Senior Management Analyst, City Manager's Office, City of San Mateo. Personal correspondence to Tammy Seale, PMC project manager, and Eli Krispi, PMC assistant planner.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov.

PA 5 Downtown Parking Management Plan

GHG Assumption

	2020	2030
Average increase in parking prices	50%	50%
Percentage of local VMT occurring in the downtown area	25%	25%

Activity and GHG Reduction

	2020	2030
VMT Savings	4,354,400	4,677,670
Emissions Reduction ($MTCO_2e$) with CCA	1,570	1,500

Performance Indicators

	2020	2030
Average percentage reduction in downtown VMT	5.5%	5.5%

GHG Method

Data from the Downtown San Mateo Parking Management Plan were used to estimate proposed changes in downtown parking prices. This information was combined with factors from the California Air Pollution Control Officers Association to identify VMT reduction from the plan. This VMT reduction was multiplied with an emissions factor from the inventory to calculate the GHG reduction.

GHG Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

City of San Mateo. 2013. *Downtown San Mateo Parking Management Plan*. www.cityofsanmateo.org/DocumentCenter/View/39664.

Technical Appendix: Methods and Assumptions

PA 6 Caltrain electrification

Activity and GHG Reduction

	2020	2030
Electricity Usage	+7,384,390	+7,966,990
Emissions Reduction ($MTCO_2e$) with CCA	2,550	3,180

Performance Indicators

	2020	2030
Caltrain system diesel use with electrification (gallons)	1,124,080	1,124,080
Caltrain system electricity use with electrification (kWh)	83,131,140	83,131,140

GHG Method

Activity and emissions savings are not included in total reductions from planned activities due to lack of operational control and uncertainty about the timeline for operation.

Information from the Caltrain electrification project EIR was used to estimate decreases in diesel use and increases in electricity use from electrification. Data from the inventory were used to scale these changes in activity data specifically to San Mateo. This information was then combined with emissions factors from the inventory to determine net GHG reductions from Caltrain electrification.

GHG Sources

Peninsula Corridor Joint Powers Board. 2014. *Peninsula Corridor Electrification Project Draft Environmental Impact Report.* http://www.caltrain.com/projectsplans/CaltrainModernization/Modernization/PeninsulaCorridorElectrificationProject/PCEP_DEIR_2014.html.

Appendix 1

Technical Data for Quantified Measures

Data sources, methods, and assumptions for the quantification of CAP measures are provided below. All GHG emissions reductions below are presented assuming full implementation of CCA, Measure RE 2.

RE 1 Renewable Energy

Expanded options to purchase renewable electricity from other sources – Encourage

Recommended Actions

- Promote community-shared solar programs that allow residents and businesses to buy into medium-scale solar energy facilities.
- Monitor the creation of any green tariff programs, and distribute information about any such programs through digital media and at in-person events.

GHG Assumptions

	2020	2030
Size of community solar share (kW)	2,500	6,000

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	3,695,000	8,868,000
Emissions Reduction ($MTCO_2e$)	500	730

GHG Method

Data from the National Renewable Energy Laboratory's PVWatts calculator were used to determine how much electricity could be produced in San Mateo from a photovoltaic array of the size assumed. This amount of electricity was converted to emissions reductions using emissions factors from the inventory.

GHG Sources

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

Technical Appendix: Methods and Assumptions

RE 2 Renewable Energy

Community Choice Aggregation – Require

Recommended Actions

- If found to be feasible, establish or join a CCA providing a default energy portfolio and at least one "reach" energy portfolio with an increased supply of renewable electricity.
- Establish a community lending partner (such as a local credit union) to establish low rates and promote economic growth within the community.
- Maintain high participation in the CCA by promoting benefits of a program (cleaner energy, lower cost, and/or support for local economy, etc.) to customers.
- Evaluate the program regularly and add additional renewable energy portfolio options consistent with program objectives and customer demand.

GHG Assumptions

	2020	2030
Renewable energy mix from "light green" option	50%	75%
Renewable energy mix from "deep green" option	100%	100%
CCA residential participation rate	80%	85%
CCA nonresidential participation rate	70%	75%
"Deep green" residential participation rate	10%	10%
"Deep green" nonresidential participation rate	5%	5%
Amount of CCA electricity from coal	0%	0%

Activity and GHG Reduction

	2020	2030
Emissions Reduction ($MTCO_2e$) with CCA	23,720	55,010

Performance Indicators

	2020	2030
Average amount of renewables supplied by CCA per participant	52.5%	76.3%
Amount of electricity supplied by CCA (kWh)	453,087,470	506,536,900

GHG Method

Participation rates and electricity portfolios were adapted from Marin Clean Energy and Sonoma Clean Power, the two active CCAs in California. Based on these existing services, it was assumed that a CCA active in San Mateo would offer a 50% renewable electricity portfolio and a 100% renewable electricity portfolio, that 20%–30% of electricity customers in San Mateo would opt out of a CCA, and that 5%–10% of CCA participants would select the 100% renewable electricity option. It was also assumed that a CCA would not procure any electricity from coal, a practice consistent with both Marin Clean Energy and Sonoma Clean Power. These participation rates and energy portfolios were combined to create an "effective" reduction in electricity (e.g., that the electricity supplied by a CCA has the GHG equivalence of decreasing the amount of electricity used by a certain amount). This figure was converted to emissions reductions using factors from the inventory.

GHG Sources

California Energy Commission. 2013. "2012 Total System Power." http://www.energyalmanac.ca.gov/electricity/total_system_power.html.

Farrell, J. 2014. "Choosing Local (Renewable) Power: One California Community A Leader in Collective Action. CleanTechnica. cleantechnica.com/2014/07/28/choosing-local-renewable-power-one-california-community-leader-collective-action/.

Marin Clean Energy. 2014. Marin Clean Energy Technical Committee Meeting: Monday, October 13, 2014 – Meeting Packet. http://marincleanenergy.org/sites/default/files/technical/10.13.14_TechCom_Packet.pdf.

———. 2014. "Power Choices." http://www.mcecleanenergy.org/power-choices/.

Quackenbush, F. 2014. "Clean-power agencies relieved at legislation change." *North Bay Business Journal*, June 24. http://www.northbaybusinessjournal.com/94436/clean-power-agencies-relieved-at-legislation-change/.

Sonoma Clean Power. 2013. Sonoma Clean Power Authority Business Operations Committee: Tuesday, October 29, 2013 – Meeting Packet. http://sonomacleanpower.org/wp-content/uploads/2014/01/SCPA-Business-Operations-Committee-Agenda-and-Materials-10-29-2013.pdf.

———. 2014. "Your Options." http://sonomacleanpower.org/your-options/.

US Environmental Protection Agency. 2014. eGRID 9th edition Version 1.0 Plant File (Year 2010 Data). http://www.epa.gov/cleanenergy/energy-resources/egrid/.

RE 3 Renewable Energy

Renewable energy systems for new residences – Require

Recommended Actions

- Provide educational materials to developers about existing federal, State, and regional programs that support and/or subsidize small-scale or distributed-generation renewable energy systems for local use.
- Develop incentives for developers who install renewable energy systems on their developments, including solar photovoltaics and solar water heating. An incentive program could include reduced or waived fees, rebates, or low/no interest loans, among other mechanisms. The City should explore a revolving loan program or dedicated funding source(s) for the incentives. Funding sources could include the City and/or a combination of public and private resources, such as rebates, grants, and loans. Incentive programs should apply to solar photovoltaics and solar water heating though other feasible options could be supported.
- Partner with PG&E, San Mateo Energy Watch, a CCA, or others to provide rebates and energy buy-back programs for on-site renewable electricity systems.
- Reduce or eliminate existing solar permit fees.
- Require new houses and multi-family developments to be solar ready as defined by the California Building Standards Code, to support the installation of a rooftop solar energy array at a later date.
- Revise the San Mateo urban design guidelines to allow for nontraditional building design elements if necessary to support on-site renewable energy systems.

GHG Assumptions

	2020	2030
Percentage of new houses (post-2014) with solar PV panels	5%	12%
Percentage of new houses (post-2014) with solar water systems	5%	12%
Size of a residential solar array (kW)	5.15	5.15

Activity and GHG Reduction

	2020	2030
Effective Electricity Savings (kWh)	794,080	5,084,650
Natural Gas Savings (therms)	6,600	60,910
Emissions Reduction ($MTCO_2e$)	140	740

Performance Indicators

	2020	2030
Average kWh supplied per household solar array	7,610	7,610
Number of new houses with solar arrays	100	660
Average equivalent energy supplied per household solar water heater	60 kWh and 40 therms	90 kWh and 40 therms
Number of new houses with solar water heaters	100	660

GHG Method

Data on per household electricity and natural gas use by household type were combined with information on reductions in electricity and natural gas use from renewable energy systems as supplied by the California Energy Commission, ICLEI, and the National Renewable Energy Laboratory to obtain per household reductions in electricity and natural gas use. This information was combined with target participation rates to identify the total reductions in energy use. These energy reductions were converted to emissions reductions using factors from the inventory.

GHG Sources

California Department of Finance. 2014. "E-5: Population and Housing Estimates for Cities, Counties, and the State, 2011–2014 with 2010 Census Benchmark." http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/view.php.

California Energy Commission. 2010. "Residential Appliance Saturation Study." http://www.energy.ca.gov/appliances/rass/.

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

RE 4 Renewable Energy

Renewable energy systems for existing residences – Incentivize

Recommended Actions

- Provide information to homeowners about existing funding programs for renewable energy systems.
- Offer incentives for applicants who install renewable energy systems on their homes as feasible, including same-day permit approval and participation in revolving loan programs.
- Promote existing financing programs, such as Property Assessed Clean Energy (PACE) programs, allow homeowners to incrementally pay for renewable energy systems, and explore creating or joining additional programs.
- Reduce or eliminate solar permit fees for existing buildings beyond the minimum standards required by Assembly Bill 2188.

GHG Assumptions

	2020	2030
Percentage of existing (pre-2015) homes with solar PV panels	7%	15%
Percentage of existing (pre-2015) homes with solar water heaters	5%	10%

Activity and GHG Reduction

	2020	2030
Effective Electricity Savings (kWh)	19,449,400	43,838,120
Natural Gas Savings (therms)	248,420	496,850
Emissions Reduction ($MTCO_2e$) with CCA	3,970	6,230

Performance Indicators

	2020	2030
Average kWh supplied per household solar array	7,610	7,610
Number of existing homes with solar arrays	2,770	5,940
Average equivalent energy supplied per household solar water heater	140 kWh and 130 therms	140 kWh and 130 therms
Number of existing homes with solar water heaters	1,980	3,960

GHG Method

Data on per household electricity and natural gas use by household type were obtained from the inventory and PG&E. Information on reductions in electricity and natural gas use from renewable energy systems was provided by the California Energy Commission, ICLEI, and the National Renewable Energy Laboratory. Together, these two sources were used to calculate per household reductions in electricity and natural gas use as a result of measure implementation. This information was combined with target participation rates to identify the total reductions in energy use. These energy reductions were converted to emissions reductions using factors from the inventory.

GHG Sources

California Energy Commission. 2010. "Residential Appliance Saturation Study." http://www.energy.ca.gov/appliances/rass/.

Go Solar California. 2014. "Current Working Dataset – California Solar Initiative." http://www.californiasolarstatistics.ca.gov/current_data_files/.

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

Technical Appendix: Methods and Assumptions

RE 5 Renewable Energy

Renewable energy systems for new nonresidential buildings – Require

Recommended Actions

- Provide educational materials to developers about existing federal, State, and regional programs that support and/or subsidize distributed-generation renewable energy systems.
- Promote PACE programs to help guide developers and property owners toward fiscally feasible solutions for on-site renewable energy systems.
- Offer direct financial subsidies, participation in a revolving loan program, and other incentives for developers who seek to implement distributed-generation renewable energy systems on new commercial developments.
- Reduce or eliminate existing solar permit fees beyond the minimum standards required by Assembly Bill 2188.
- Provide rebates for on-site renewable energy systems.
- Require new nonresidential buildings to be solar ready as defined by the California Building Standards Code, to support the installation of a rooftop solar energy array at a later date.

GHG Assumptions

	2020	2030
Percentage of new (post-2014) businesses with on-site solar array	3%	5%
Percentage of new (post-2014) businesses with on-site solar water heater	2%	3%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	684,990	3,396,140
Natural Gas Savings (therms)	7,450	18,170
Emissions Reduction ($MTCO_2e$) with CCA	130	380

Performance Indicators

	2020	2030
Average kWh supplied per business solar array	52,180	52,180
Number of new businesses with solar arrays	10	60
Average energy equivalents supplied per business solar water heater	630 kWh and 860 therms	390 kWh and 470 therms
Number of new businesses with solar water heaters	10	40

GHG Method

Data on per business energy use were obtained from PG&E and the inventory; information on reductions in business energy use from renewable energy systems was supplied by the California Energy Commission's Commercial End-Use Survey, ICLEI, and the National Renewable Energy Laboratory. This information was combined with estimated participation rates to obtain reductions in nonresidential electricity and natural gas use as a result of this measure. These reductions were combined with emissions factors from the inventory to calculate GHG reductions.

GHG Sources

California Energy Commission. 2006. "California Commercial End-Use Survey." http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF.

Go Solar California. 2014. "Current Working Dataset – California Solar Initiative." http://www.californiasolarstatistics.ca.gov/current_data_files/.

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

Technical Appendix: Methods and Assumptions

RE 6 Renewable Energy

Renewable energy systems for existing nonresidential buildings – Incentivize

Recommended Actions

- Provide information about funding sources and technical aspects of renewable energy systems to property owners, property managers, and tenants.
- Promote PACE programs to help building owners and tenants identify fiscally feasible solutions for renewable energy systems.
- Provide funding through a revolving loan program, same-day permit approval, and other incentives for property owners who seek to implement distributed-generation renewable energy systems on existing commercial developments.
- Reduce or eliminate existing solar permit fees beyond the minimum standards required by Assembly Bill 2188.
- Develop a local rebate program for on-site renewable energy systems.

GHG Assumptions

	2020	2030
Percentage of existing (pre-2015) businesses with solar PV panels	2%	4%
Percentage of existing (pre-2015) businesses with solar water heaters	1.5%	3%

Activity and GHG Reduction

	2020	2030
Effective Electricity Savings (kWh)	2,782,960	7,079,210
Natural Gas Savings (therms)	33,360	66,710
Emissions Reduction ($MTCO_2e$) with CCA	560	560

Performance Indicators

	2020	2030
Average kWh supplied per business solar array	52,180	52,180
Number of existing businesses with solar arrays	80	160
Average energy equivalents supplied per business solar water heater	730 kWh and 550 therms	730 kWh and 550 therms
Number of existing businesses with solar water heaters	60	120

GHG Method

PG&E's inventory and reports were used to obtain the amount of electricity and natural gas used by existing businesses in San Mateo. Data from the California Energy Commission, ICLEI, and the National Renewable Energy Laboratory were used to determine per business reductions in energy use from this measure. This information was combined with estimated participation rates to determine the total reduction in existing business energy use. Lastly, these data were combined with emissions factors from the inventory to calculate emissions reductions.

GHG Sources

California Energy Commission. 2006. "California Commercial End-Use Survey." http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF.

Go Solar California. 2014. "Current Working Dataset – California Solar Initiative." http://www.californiasolarstatistics.ca.gov/current_data_files/.

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

National Renewable Energy Laboratory. 2014. PVWatts Calculator. http://pvwatts.nrel.gov/.

RE 7 Renewable Energy

Advanced and emerging renewable energy systems – Encourage

Recommended Actions

- Educate developers about newly available renewable energy technologies and support efforts to use these technologies in developments.
- Proactively create permitting procedures for emerging renewable energy technologies.
- Identify opportunities to use newly available renewable energy technologies in City facilities as a demonstration project.
- Work with regional partners to support companies developing new renewable energy technologies.
- Promote efforts by San Mateo education and research institutions to develop and market renewable energy technologies.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote the use of renewable energy technologies on individual building sites, including RE 3, RE 4, RE 5, and RE 6. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

EE 1 Energy Efficiency and Conservation

Residential energy efficiency owner-occupied retrofits – Encourage

Recommended Actions

- Educate homeowners, property managers, and real estate agents about the benefits of residential energy retrofits, the availability of financing options, and how to participate.
- Provide energy retrofit information to project applicants seeking permits for renovation or expansion work on existing houses.
- Host residential energy outreach events such as evening workshops and local learn-at-lunch sessions, provide energy retrofit information at community events, and distribute information on residential energy retrofit online and in public buildings.
- Publicize the available options and financial benefits of PACE programs.

GHG Assumptions

	2020	2030
Percentage of existing owner-occupied single-family homes undergoing basic retrofits	3%	5%
Percentage of existing owner-occupied single-family homes undergoing advanced retrofits	0.5%	2%
Percentage of existing owner-occupied multi-family homes undergoing retrofits	2%	5%
Percentage of pool owners upgrading pumps to variable-frequency drives	5%	10%
Percentage of owner-occupied homes upgrading appliances	5%	10%
Home appliance infiltration rate	25%	25%

Technical Appendix: Methods and Assumptions

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	1,011,990	2,171,960
Natural Gas Savings (therms)	57,270	138,280
Emissions Reduction ($MTCO_2e$) with CCA	440	910

Performance Indicators

	2020	2030
Per household energy reductions from home retrofits	870 kWh and 80 therms from basic retrofits to single-family homes, 2,330 kWh and 220 therms from advanced retrofits to single-family homes, and 1,310 kWh and 80 therms from retrofits to multi-family homes	870 kWh and 80 therms from basic retrofits to single-family homes, 2,330 kWh and 220 therms from advanced retrofits to single-family homes, and 1,310 kWh and 80 therms from retrofits to multi-family homes
Number of owner-occupied homes receiving retrofits	350 single-family homes receiving basic retrofits, 60 single-family homes receiving advanced retrofits, and 180 multi-family units receiving retrofits	580 single-family homes receiving basic retrofits, 230 single-family homes receiving advanced retrofits, and 460 multi-family units receiving retrofits
Per-household kWh reductions from pool pump upgrades	1,330	1,330
Number of households upgrading pool pumps	100	220

	2020	2030
Per-household reductions from appliance upgrades	200 kWh and less than 1 therm	200 kWh and less than 1 therm
Number of households upgrading appliances	1,000	1,160

GHG Method

Data from the inventory, PG&E reports, and the US Census were used to determine per household energy use by household type in San Mateo, while information provided by the Energy Upgrade California program, PG&E, the California Energy Commission, and other academic studies was used to determine per household reductions in energy use. This information was combined with participation rates to produce total reductions in electricity and natural gas use, which was combined with emissions factors to calculate GHG reductions.

GHG Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://btech.lbl.gov/sites/all/files/lbnl-1096e.pdf.

California Energy Commission. 2010. "Residential Appliance Saturation Study." http://www.energy.ca.gov/appliances/rass/.

Energy Upgrade California. 2012. "Best Practices Case Study, Energy Upgrade California's Multifamily Initiative: Best Practices for Multifamily Energy Retrofit Program Design." http://www.hprcenter.org/sites/default/files/ec_pro/hprcenter/MultifamilyCaseStudy_California.pdf.

———. 2014. "San Mateo County – Home Upgrade." http://tools.energyupgradeca.org/county/san_mateo/about_basic.

———. 2014. "San Mateo County – Advanced Home Upgrade." http://tools.energyupgradeca.org/county/san_mateo/about_advanced.

Pacific Gas & Electric and Southern California Gas Company. 2006. "Codes and Standards Enhancement Initiative: Draft Report – Residential Swimming Pools." http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-DRAFT_REPORT_RESIDENTIAL_SWIMMING_POOL.PDF.

EE 2 Energy Efficiency and Conservation

Residential energy efficiency renter-occupied retrofits – Incentivize

Recommended Actions

- Educate property owners about available financing mechanisms to improve energy efficiency in rental units, such as shared savings programs.
- Support efforts by property owners to make improvements to rental units through PACE programs.
- Encourage property owners to participate in energy benchmarking efforts.
- Work with tenant groups and property management companies to identify actions tenants can take within the bounds of their lease to improve energy efficiency.
- Offer low- or no-cost energy audits to property owners who agree to disclose a unit's energy efficiency results to tenants.
- Provide incentives such as direct subsidies, participation in revolving loan programs, and expedited permitting to property owners who make energy efficiency improvements to their units beyond any minimum actions required by the adopted energy code.

GHG Assumptions

	2020	2030
Percentage of existing single-family rental units undergoing basic retrofits	5%	10%
Percentage of existing multi-family rental units undergoing retrofits	5%	10%
Percentage of homes upgrading appliances	8%	15%
Home appliance infiltration rate	25%	25%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	1,288,420	2,542,760
Natural Gas Savings (therms)	89,760	179,500
Emissions Reduction ($MTCO_2e$) with CCA	650	1,150

Performance Indicators

	2020	2030
Per household energy reductions from home retrofits	870 kWh and 80 therms from basic retrofits to single-family homes, and 1,310 kWh and 110 therms from retrofits to multi-family units	870 kWh and 80 therms from basic retrofits to single-family homes, and 1,310 kWh and 110 therms from retrofits to multi-family units
Number of rental units receiving retrofits	530 single-family homes and 420 multi-family units	1,060 single-family homes and 850 multi-family units
Per household reductions from appliance upgrades	180 kWh and less than 1 therm	180 kWh and less than 1 therm
Number of rental households upgrading appliances	1,530	2,860

GHG Method

Information from PG&E, the US Census, and the inventory was used to identify per household reductions from renter-occupied units. These data were combined with information on per household reductions in energy use from efficiency actions (supplied by the Energy Upgrade California program, academic studies, the California Energy Commission, and PG&E) to determine per household energy reductions. These results were combined with participation rates to determine total reductions in energy use. Lastly, this information was combined with emissions factors to calculate GHG reductions from this measure.

GHG Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://btech.lbl.gov/sites/all/files/lbnl-1096e.pdf.

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Energy Upgrade California. 2012. "Best Practices Case Study, Energy Upgrade California's Multifamily Initiative: Best Practices for Multifamily Energy Retrofit Program Design." http://www.hprcenter.org/sites/default/files/ec_pro/hprcenter/MultifamilyCaseStudy_California.pdf.

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———. 2014. "San Mateo County – Advanced Home Upgrade." http://tools.energyupgradeca.org/county/san_mateo/about_advanced.

EE 3 Energy Efficiency and Conservation

Nonresidential energy efficiency retrofits – Incentivize

Recommended Actions

- Educate property owners and tenants about retrofit programs and financing options.
- Work with nonresidential property owners to offer green leases for tenants, allowing tenants to specify energy efficiency improvements to the space or to help finance energy efficiency retrofits in exchange for reduced occupancy fees.
- Publicize the available options and financial benefits of PACE programs.
- Support participation in demand-response programs.
- Offer low-cost energy audits for business or office parks, including identification of most cost-efficient savings for weatherization or appliance upgrades.
- Offer reduced-fee and/or expedited permitting to project applicants including energy retrofit measures in an addition or expansion (as defined in San Mateo Municipal Code Section 23.06.012) of existing commercial buildings beyond any minimum actions required by the adopted energy code.

GHG Assumptions

	2020	2030
Percentage of existing businesses undergoing retrocommissioning	8%	15%
Percentage of existing businesses undergoing standard retrofits	4%	10%

	2020	2030
Percentage of existing businesses undergoing deep retrofits	1%	3%
Percentage of businesses upgrading appliances	10%	20%
Business appliance infiltration rate	25%	25%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	15,383,890	34,674,810
Natural Gas Savings (therms)	357,190	805,090
Emissions Reduction ($MTCO_2e$) with CCA	3,990	7,090

Performance Indicators

	2020	2030
Energy savings from retrocommissioning	24,890 kWh and 580 therms per business	24,890 kWh and 580 therms per business
Number of businesses receiving retrocommissioning	300	570
Energy savings from retrofits	39,630 kWh and 920 therms per business from standard retrofits, and 48,850 kWh and 1,130 therms per business from deep retrofits	39,630 kWh and 920 therms per business from standard retrofits, and 48,850 kWh and 1,130 therms per business from deep retrofits

	2020	2030
Number of businesses receiving retrofits	150 businesses receiving standard retrofits, and 40 businesses receiving deep retrofits	380 businesses receiving standard retrofits, and 110 businesses receiving deep retrofits
Energy savings from appliance upgrades	2,410 kWh and 50 therms per business	2,410 kWh and 50 therms per business
Number of businesses receiving appliance upgrades	380	900

GHG Method

The GHG inventory and reports from PG&E were used to identify per business energy use in San Mateo, while data from the Pacific Northwest National Laboratory, the California Energy Commission, and academic studies were used to determine reductions per business. These results were combined with participation rates to calculate total reductions in energy use from this measure. The outcome was then combined with emissions factors from the inventory to determine GHG reductions.

GHG Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://btech.lbl.gov/sites/all/files/lbnl-1096e.pdf.

California Energy Commission. 2006. "California Commercial End-Use Survey." http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF.

Pacific Gas and Electric. 2013. "City of San Mateo Nonresidential Energy Overview."

Pacific Northwest National Laboratory. 2011. "Advanced Energy Retrofit Guides – Office Buildings." http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-20761.pdf.

EE 4 Energy Efficiency and Conservation

Energy efficiency at healthcare centers – Incentivize

Recommended Actions

- Work with building owners of medical, healthcare, and hospital uses to promote cost-effective energy efficiency retrofits through associated financial savings, opportunities to improve patient care, and public image enhancement.
- Collaborate with PG&E and community partners to identify packages of cost-effective energy efficiency retrofits that can be easily applied to different healthcare facilities.
- Educate large healthcare facilities about the availability of energy savings performance contracts as a means to identify and facilitate financing opportunities.
- Share information about available energy efficiency retrofit financing opportunities, including PACE efforts.
- Promote a "staged" energy retrofit system as a way to maximize energy and cost savings.
- Provide low or no-cost energy audits to healthcare facilities.
- Establish a revolving loan fund for healthcare energy efficiency programs.
- Offer reduced-fee and/or expedited building permits as feasible to healthcare facilities conducting energy retrofit programs as part of a renovation or expansion of existing buildings beyond any minimum actions required by the adopted energy code.

GHG Assumptions

	2020	2035
Percentage of healthcare facilities undergoing retrocommissioning	40%	55%
Percentage of healthcare facilities undergoing basic-level retrofits	20%	35%

Technical Appendix: Methods and Assumptions

Activity and GHG Reduction

	2020	2035
Electricity Savings (kWh)	3,858,850	5,800,830
Natural Gas Savings (therms)	223,660	335,430
Emissions Reduction ($MTCO_2e$) with CCA	1,710	2,240

Performance Indicators

	2020	2035
Energy reductions from retrocommissioning	3,292,530 kWh and 190,840 therms	4,759,030 kWh and 275,190 therms
Energy reductions from basic-level retrofits	566,320 kWh and 32,820 therms	1,041,800 kWh and 60,240 therms

GHG Method

The inventory and reports from PG&E were used to calculate energy use from the healthcare sector in San Mateo. Data on energy savings from efficiency measures in the healthcare sector were provided by the Pacific Northwest National Laboratory. These pieces of information were combined with participation rates to determine total energy savings in the healthcare sector, which were then combined with emissions factors from the inventory to calculate GHG reductions.

GHG Sources

Pacific Gas and Electric. 2013. "City of San Mateo Nonresidential Energy Overview."

Pacific Northwest National Laboratory. 2013. "Advanced Energy Retrofit Guides – Healthcare Facilities." http://www.nrel.gov/docs/fy13osti/57864.pdf.

EE 5 Energy Efficiency and Conservation

Residential energy education and low-cost retrofits – Encourage

Recommended Actions

- Conduct outreach to homeowners, renters, real estate agents, and property managers about low-cost retrofits and energy-efficient behaviors.

GHG Assumptions

	2020	2030
Percentage of homes carrying out basic energy efficiency measures	10%	20%
Home appliance infiltration rate	25%	25%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	1,715,510	3,431,030
Emissions Reduction ($MTCO_2e$) with CCA	230	280

Performance Indicators

	2020	2030
Electricity reduction from low-cost retrofits	430 kWh per house	430 kWh per house
Number of existing homes conducting low-cost retrofits	4,000	8,000

GHG Method

Data from the inventory were used to identify per household electricity use, while data from the California Energy Commission and US Department of Energy were used to determine reductions in per household electricity use from low-cost actions. This information was combined with participation rates to calculate total electricity savings, which were converted to GHG emissions reductions using emissions factors from the inventory.

Technical Appendix: Methods and Assumptions

GHG Sources

California Energy Commission. 2010. "Residential Appliance Saturation Study." http://www.energy.ca.gov/appliances/rass/.

US Department of Energy. n.d. "Compact Fluorescent Light Bulbs and Mercury." http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_mercury.

———. n.d. "More IT Energy Saving Tips." http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_more_tips.

EE 6 Energy Efficiency and Conservation

Nonresidential energy education and low-cost retrofits – Encourage

Recommended Actions

- Conduct outreach to businesses and nonresidential building owners about low-cost retrofits and energy-efficient behaviors.
- Provide information about local, regional, and green business certification opportunities at time of business license issuance or renewal.
- Modify the City's business license form to allow identification of green businesses to track participation and to identify potential private partners for future GHG reductions.

GHG Assumptions

	2020	2030
Percentage of businesses carrying out basic energy efficiency actions	5%	10%
Appliance infiltration	25%	25%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	546,150	1,092,310
Emissions Reduction ($MTCO_2e$) with CCA	70	90

Performance Indicators

	2020	2030
Electricity reduction from low-cost retrofits	2,890 kWh per business	2,890 kWh per business
Number of existing businesses conducting low-cost retrofits	190	380

GHG Method

Data from the inventory were used to identify nonresidential electricity use, and data from the California Energy Commission, US Department of Energy, and academic studies were used to determine reductions in per business electricity use from low-cost actions. This information was combined with participation rates to calculate total electricity savings, which were converted to GHG emissions reductions using emissions factors from the inventory.

GHG Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://btech.lbl.gov/sites/all/files/lbnl-1096e.pdf.

California Energy Commission. 2006. "California Commercial End-Use Survey." http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF.

Pacific Gas and Electric. 2013. "City of San Mateo Nonresidential Energy Overview."

US Department of Energy. n.d. "Compact Fluorescent Light Bulbs and Mercury." http://www.energystar.gov/index.cfm?c=cfls.pr_cfls_mercury.

Technical Appendix: Methods and Assumptions

ME 1 Municipal Energy Efficiency and Conservation

Energy efficiency for new City buildings – Incentivize

Recommended Actions

- Seek grant funding or low- or no-interest loans to implement energy saving efforts and renewable energy systems at City facilities at time of construction or substantial renovation.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote sustainable practices in municipal facilities, such as AF 1. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

ME 2 Municipal Energy Efficiency and Conservation

Energy efficiency at existing City buildings – Incentivize

Recommended Actions

- Develop an energy conservation education campaign for City staff.
- Identify sources of funding for energy efficiency retrofits.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote sustainable practices in municipal facilities, such as AF 1. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

AF 1 Alternative Fuels

Public EV charging stations – Require

Recommended Actions

- Install public EV charging stations in desirable, high-volume, and prominent locations (e.g., near the entrance to a downtown parking garage).

GHG Assumptions

	2020	2030
Public EV chargers	25	50

Activity and GHG Reduction

	2020	2030
Electricity Usage	+39,980	+79,970
Effective VMT Savings	117,600	235,200
Emissions Reduction ($MTCO_2e$) with CCA	40	70

Performance Indicators

	2020	2030
Annual VMT per charging station	4,700	4,700

Technical Appendix: Methods and Assumptions

GHG Method

Data from ICLEI were used to identify the VMT supplied per public charging station, while information from the US Environmental Protection Agency was used to determine the amount of electricity needed to power electric vehicles. This information was combined with the number of EV charging stations to determine the reductions in activity data, which was then used with emissions factors from the inventory to calculate net GHG reductions.

GHG Sources

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

US Environmental Protection Agency. 2012. "Fuel Economy and Environment Labels – Electric Vehicles." http://www.epa.gov/carlabel/electriclabelreadmore.htm.

AF 2 Alternative Fuels

Increased EV adoption – Require

Recommended Actions

- Provide information about the benefits of EVs and PHEVs through the City's electronic media systems and at public events, including creating opportunities for public EV/PHEV test drives.
- Conduct educational outreach to homeowners, commercial property owners, and developers about the benefits of EV charging stations.
- Identify and distribute resources to assist community members seeking to install an EV charging station on their properties.
- Amend the San Mateo Zoning Code to allow EV chargers to encroach into the required parking stall area.
- Decrease permit fees and/or offer expedited permitting for EV charging stations.
- Create an additional rebate, potentially in conjunction with regional communities, for property owners who install EV charging stations.
- Purchase EVs or PHEVs as replacements for gasoline-powered vehicles or conventional hybrids in the City fleet that are not converted to CNG-powered vehicles, as available and cost-effective.
- Require that new projects of at least six multi-family residential units and/or 10,000 square feet of nonresidential square footage, if off-street parking is provided, include a number of EV charging stations with designated parking spaces capable of meeting the California Green Building Code Voluntary Standards at time of new construction or addition or alteration as defined in San Mateo Municipal Code Section 23.06.012.

- Require all new single-family houses and multi-family units with private attached garages or carports to be pre-wired for an EV charging station inside the garage or carport.

Technical Appendix: Methods and Assumptions

GHG Assumptions

	2020	2030
EVs as a share of San Mateo vehicles	4%	7%

Activity and GHG Reduction

	2020	2030
Electricity Usage (kWh)	+6,612,310	+12,342,190
Effective VMT Savings	19,447,970	36,300,540
Emissions Reduction ($MTCO_2e$) with CCA	6,110	10,660

Performance Indicators

	2020	2030
VMT per EV	11,650	11,490
Electricity use per EV (kWh)	3,960	3,910
Number of households with an EV	1,670	3,160

GHG Method

Information from the California Air Resources Board, the Association of Bay Area Governments, and the UC Davis Institute of Transportation Studies, along with results of the inventory, was used to identify the average annual VMT per EV. Data from the US Environmental Protection Agency were used to determine the efficiency of EVs. This information was combined with the participation rate to identify VMT and electricity use from EVs. Lastly, these results were multiplied by emissions factors from the inventory to calculate net GHG emissions from this measure.

GHG Sources

Association of Bay Area Governments. 2013. "Projections 2013."

California Air Resources Board. 2013. "EMFAC Emissions Database." http://www.arb.ca.gov/emfac/.

Davies, J. 2014. "How Assumptions About Consumers Influence Estimates of Electric Vehicle Miles Traveled of Plug-in Hybrid Electric Vehicles." UC Davis Institute of Transportation Studies. http://www.its.ucdavis.edu/wp-content/themes/ucdavis/pubs/download_pdf.php?id=2036.

US Environmental Protection Agency. 2012. "Fuel Economy and Environment Labels – Electric Vehicles." http://www.epa.gov/carlabel/electriclabelreadmore.htm.

AT 1 Alternative Transportation

Public shuttles – Encourage

Recommended Actions

- Conduct an outreach campaign to San Mateo residents and employees about available shuttle and vanpool options to support increased ridership.
- Work with riders and shuttle providers to identify potential improvements to service schedules and route coverage, including possible expansion of routes to locations outside of San Mateo/Foster City.

GHG Assumptions

	2020	2030
Annual shuttle trips per job	1.3	1.3

Activity and GHG Reduction

	2020	2030
VMT Savings	127,490	191,620
Emissions Reduction ($MTCO_2e$) with CCA	50	60

Performance Indicators

	2020	2030
Annual shuttle ridership	81,660	81,660

GHG Method

Data from the Peninsula Traffic Congestion Relief Alliance were used to identify the current shuttle ridership rates. This information was combined with population projections to estimate ridership rates at current levels as population

increases, which were converted to VMT savings. The VMT savings from EA 7 were then subtracted to avoid double-counting, and the net VMT savings were converted to GHG emissions using emissions factors from the inventory.

GHG Sources

Association of Bay Area Governments. 2013. "Projections 2013."

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

AT 2 Alternative Transportation

Transportation Demand Management (TDM) – Require

Recommended Actions

- Educate developers working on projects in San Mateo about ways to reduce vehicle miles traveled and the resultant benefits.
- Publicize developments and businesses with successful TDM programs.
- Work with regional partners to fund successful TDM strategies for existing developments that can be implemented with little or no cost to property owners (e.g., City-subsidized transit passes).
- Require new developments of at least six multi-family units and/or 10,000 square feet of nonresidential space to implement a suite of TDM strategies to comply with the appropriate trip reduction target identified in applicable area plans and the future San Mateo Citywide TDM Plan (currently under development).
- Require developments of at least 20 multi-family units and/or 50,000 square feet of nonresidential space undergoing additions or alterations (as defined in San Mateo Municipal Code Section 23.06.012) to implement TDM strategies consistent with the targets in relevant area plans and the future San Mateo Citywide TDM Plan.

GHG Assumptions

	2020	2030
Amount of new development subject to TDM provisions	90%	90%

Activity and GHG Reduction

	2020	2030

VMT Savings	8,567,260	36,368,420
Emissions Reduction ($MTCO_2e$) with CCA	3,090	11,700

Performance Indicators

	2020	2030
Average VMT reduction per person	1,080	1,800
Service population in TDM developments not identified in Existing Activities	7,930	20,210

GHG Method

Information from the San Mateo Rail Corridor Area Transportation Management Agency was used to identify reductions in trip generation as a result of existing and under-construction developments subject to TDM. This information was applied to forecast growth in San Mateo to identify reductions in VMT from future populations not in an existing or under-construction development subject to TDM. This VMT reduction was combined with an emissions factor from the inventory to identify emissions reductions.

GHG Sources

San Mateo Rail Corridor Area Transportation Management Agency. 2013. "2013 Annual Report."

Technical Appendix: Methods and Assumptions

AT 3 Alternative Transportation

Expand car share program – Incentivize

Recommended Actions

- Conduct an outreach campaign intended to increase use of car share vehicles.
- Discuss including dedicated car share parking spaces in applications for new construction and additions/alterations of multi-family or nonresidential developments that include off-street parking.
- Seek funding and coordinate with car share operators to offer reduced-cost car share trial memberships for San Mateo residents.
- Provide streamlined permitting for development projects allowing car share vehicles to be parked in required on-site visitor parking spaces.

GHG Assumptions

	2020	2030
Number of car share vehicles	50	60

Activity and GHG Reduction

	2020	2030
VMT Savings	5,892,440	6,371,500
Emissions Reduction ($MTCO_2e$) with CCA	2,120	2,050

Performance Indicators

	2020	2030
VMT reduction per car share member	3,780	3,730
Number of car share members	1,560	1,710

GHG Method

Data from the California Air Pollution Control Officer's Association and academic studies were used to determine participation rates and VMT reductions from car share programs per number of available car share vehicles. This information was combined with a target for the number of car share vehicles in San Mateo to determine reductions in VMT. VMT savings were combined with emissions factors from the inventory to calculate GHG savings.

GHG Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

Shaheen, S. A. 2011. "Carsharing: A Strategy for Reducing Carbon Footprint and Parking Policy Approaches." 2011 CCPA Conference.

AT 4 Alternative Transportation

Increase bicycle mode share – Incentivize

Recommended Actions

- Host bicycle safety and awareness efforts for bicyclists, pedestrians, and drivers.
- Work to expand bike-to-school commutes through the Safe Routes to School program.
- Work with the Metropolitan Transportation Commission and other regional partners to expand Bay Area Bike Share stations at destinations as identified in the San Mateo Bike Share Feasibility Study, and explore opportunities to reduce Bay Area Bike Share costs for San Mateo residents and employees. Work with project developers to locate Bike Share stations in publicly accessible areas of new developments.
- Install additional bike racks and long-term bike storage lockers at City facilities.
- Continue to secure funding for full implementation of the infrastructure improvements identified in the adopted Bicycle Master Plan, including 40 miles of bike paths/lanes and associated pavement markings (green bike lanes, bike boxes, etc.), improved bicycle parking at Caltrain stations and downtown locations, raised pavement markers, and bicycle detection loops at signalized intersections.

GHG Assumptions

	2020	2030
Miles of new bike lanes	20	40
Target school mode bike share	4%	5%

Percentage of new nonresidential development with off-street bike parking	100%	100%

Activity and GHG Reduction

	2020	2030
VMT Savings	1,831,200	3,865,950
Emissions Reduction ($MTCO_2e$) with CCA	660	1,240

Performance Indicators

	2020	2030
Yearly bike share miles	2,170	2,170

GHG Method

Information from the City of San Mateo's Bicycle Master Plan, the US Department of Education, the California Air Pollution Control Officers Association, and the Bay Area Census was used to identify the total increase in bicycle trips due to measure implementation. Data from the Bay Area Bike Share program, the City of San Mateo's Bike Share Feasibility Study Report, and Huynh were used to determine bike trips resulting from bike share. These two figures were combined with an emissions factor from the inventory to identify GHG emissions from an increase in bicycle activity.

GHG Sources

Bay Area Bike Share. 2014. "System Metrics." http://www.bayareabikeshare.com/system-metrics.

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

City of San Mateo. 2011. "City of San Mateo Bicycling Master Plan." http://www.cityofsanmateo.org/index.aspx?NID=2474.

———. 2013. "City of San Mateo Bike Share Feasibility Study Report." http://www.cityofsanmateo.org/DocumentCenter/View/36959

Huynh, X. 2014. "Bay Area Bike Share Data." http://xinhstechblog.blogspot.com/2014/04/bay-area-bike-share-data.html.

Metropolitan Transportation Commission and Association of Bay Area Governments. n.d. "Bay Area Census – City of San Mateo." http://www.bayareacensus.ca.gov/cities/SanMateo.htm.

US Department of Education. 2002. "Average length of school year and average length of school day." http://nces.ed.gov/surveys/pss/tables/table_15.asp.

AT 5 Alternative Transportation

Increase pedestrian mode share – Require

Recommended Actions

- Improve pedestrian safety through education and outreach efforts.
- Support efforts to walk to school through the Safe Routes to School program.
- Provide development incentives for new buildings that promote a pedestrian-friendly streetscape through minimal setbacks, ground-floor activity, etc., consistent with the San Mateo Urban Design Element and urban design guidelines.
- Secure funding for and fully implement the infrastructure improvements identified in the adopted Pedestrian Master Plan, including green and complete streets, additional sidewalks as needed, lighting and curb improvements, parklets, intersection and crossing improvements, etc.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote increased feasibility of alternative modes of transportation, including AT 1, AT 2, and AT 4. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

Technical Appendix: Methods and Assumptions

SW 1 Solid Waste

Increase participation in composting program – Require

Recommended Actions

- Provide educational outreach materials to multi-family residents about urging HOA/property managers to support composting programs.
- Work with Recology San Mateo County to include information about adding composting services in monthly garbage and recycling bills to existing BizSMART customers.
- Work with food service facilities to understand barriers to utilizing existing composting programs. Use this clearer perception of roadblocks to mitigate concerns and target incentives more specifically at high food-waste facilities.
- Work with multi-family and commercial property owners to minimize any potential health or cleanliness impacts associated with compost collection bins.
- Explore alternative off-site collection methods to capture compostable materials from multi-family units.
- Provide a diversion discount to participating commercial and multi-family users to incentivize properly and fully utilize compost services.
- Mandate that all commercial properties over 10,000 square feet and multi-family buildings of at least four units with sufficient space to store and access a composting bin participate in curbside or offsite composting by 2020.
- Require that all commercial properties over 10,000 square feet and multi-family buildings of at least four units have an area of sufficient space to store and allow access to a compost bin at time of construction or additions/alterations, as defined in San Mateo Municipal Code Section 23.06.012.

GHG Assumptions

	2020	2030
Multi-Family Participation	85%	90%
Commercial Participation	25%	30%

Activity and GHG Reduction

	2020	2030
Landfilled Waste Savings	22,340	29,860
Emissions Reduction ($MTCO_2e$) with CCA	8,940	11,940

Performance Indicators

	2020	2030
Tons of compostables per multi-family unit	0.8	0.8
Number of participating multi-family units	15,690	17,990
Tons of compostables per business	11.9	11.9
Number of participating businesses	880	1,360

GHG Method

Information about the amount of compost produced per household and per business was provided by the City of San Mateo through its existing composting program. These data were combined with participation rates to determine the total amount of compostable materials produced. This result was combined with an emissions factor produced by ICLEI to calculate total emissions savings.

GHG Sources

ICLEI – Local Governments for Sustainability. 2013. "Recycling and Composting Emissions Protocol, v 1.0." http://www.icleiusa.org/tools/ghg-protocol/recycling-and-composting-emissions-protocol.

Technical Appendix: Methods and Assumptions

WW 1 Water and Wastewater

Water efficiency retrofits for existing buildings – Incentivize

Recommended Actions

- Provide educational materials at outreach events that include personal actions and technical solutions for minimizing indoor water use.
- Visit local schools and community centers to give presentations about conservation.
- Partner with the Bay Area Water Supply & Conservation Agency (BAWSCA) for efficiency rebate programs on high efficiency toilets, washing machines, and other water-conserving appliances.
- Work with Cal Water to offer low-cost or free water audits to business and homeowners. Provide a list of recommended water-efficient appliances and fixtures that could remedy problem areas found in the audit.

GHG Assumptions

	2020	2030
Percentage of houses conducting water efficiency retrofits	10%	20%

Activity and GHG Reduction

	2020	2030
Electricity Savings (kWh)	63,540	127,070
Digester Gas Savings ($MTCO_2e$)	10	20
Emissions Reduction ($MTCO_2e$) with CCA	20	30

Performance Indicators

	2020	2030
Water use reduction per house from water efficiency retrofits (gallons)	8,420	8,420
Number of houses receiving water efficiency retrofits	3,820	7,650

GHG Method

Information about water savings from water efficiency retrofits was provided by ICLEI. These data were combined with participation rates to calculate the amount of water reduced. The resulting figure was converted to GHG reductions using emissions factors and other data in the inventory, as well as information from the California Water Service Company.

GHG Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures."

California Water Service Company. 2014. "Mid-Peninsula Water Conservation Report, 2013." https://www.calwater.com/conservation/water-conservation-reports/.

ICLEI – Local Governments for Sustainability. n.d. Climate and Air Pollution Planning Assistant v 1.5.

WW 2 Water and Wastewater

Water-efficient landscaping – Require

Recommended Actions

- Provide educational materials to the community about drought-tolerant landscaping. Promote aesthetic and low-maintenance co-benefits of native, water-efficient plants.
- Continue to host and increase frequency of City-offered water-efficient landscaping classes.
- Adopt the Sustainability Commission's revisions to the Landscape Water Efficiency Ordinance, or formally adopt the BAWSCA ordinance.
- Partner with local nurseries to subsidize drought-tolerant and/or native plants.
- Partner with Cal Water and/or BAWSCA to host a trade-in program for inefficient sprinklers for more efficient drip irrigation systems.
- Retrofit City-owned landscapes to increase the amount of drought-resistant and/or native plant landscaping.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote water efficiency, such as WW 1. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

WW 3 Water and Wastewater

Develop new sources of nonpotable water – Incentivize

Recommended Actions

- Provide outreach materials for community members about greywater, including potential uses, safety considerations, and relationship to drought protection.
- Partner with Cal Water or BAWSCA to host rain barrel demonstrations for homeowners.
- Explore partnering with another community or water provider to create a multi-jurisdictional wastewater production and distribution system.
- Pursue funding to construct recycled water production and/or distribution system.
- Create a rain barrel rebate program for City residents who want to add rainwater capture systems on their properties for nonpotable use.
- Offer expedited and/or reduced cost permits to new developments and major renovations of existing developments that include greywater systems or pipes for recycled water.

GHG Assumptions, Reductions, and Performance Indicators

This measure is supportive of other measures that promote water efficiency, such as WW 1. There are no assumptions, activity or GHG reductions, or performance indicators for supportive measures.

GHG Method

Supportive measures do not produce direct, measurable GHG reductions, so no calculations were made.

GHG Sources

Supportive measures do not produce direct, measurable GHG reductions. There are no sources for GHG reduction calculations for supportive measures.

OR 1 Off-Road Equipment

Alternative fuel lawn and garden equipment – Encourage

Recommended Actions

- When purchasing new City-owned landscaping equipment, buy hybrid and alternative fuel models as feasible.
- Conduct education campaigns and outreach events to property owners and landscaping companies about the availability of hybrid and alternative fuel landscaping equipment, and available incentives such as the BAAQMD Lawn Mower Exchange.

GHG Assumptions

	2020	2030
Percentage of lawn mowers traded in	5%	10%

Activity and GHG Reduction

	2020	2030
Electricity Usage (kWh)	+48,570	+105,200
Emissions Reduction ($MTCO_2e$) with CCA	40	90

Performance Indicators

	2020	2030
Change in emissions and energy use per lawnmower traded in	Decrease of 0.054 $MTCO_2e$ in direct emissions and an increase of 60 kWh per lawnmower	Decrease of 0.054 $MTCO_2e$ in direct emissions and an increase of 60 kWh per lawnmower
Number of lawnmowers traded in	840	1,830

GHG Method

Data from the California Air Resources Board and the inventory were used to identify the reduction in direct emissions per lawnmower traded in, while data from Salem Electric were used to determine the increase in electricity use per lawnmower traded in. Both figures were then multiplied by the participation rate to determine the total change in direct emissions and electricity. The increase in electricity use was converted to emissions using emissions factors provided in the inventory and subtracted from the reduction in direct emissions to calculate the net emissions reduction.

GHG Sources

California Air Resources Board. 2011. OFFROAD model. http://www.arb.ca.gov/msei/categories.htm.

Salem Electric. n.d. "Home Energy Use Guide." http://www.salemelectric.com/residential/pdfs/energy_saving_tips/home_energy/HomeEnergyUseGuide.pdf.

OR 2 Off-Road Equipment

Alternative fuel construction equipment – Encourage

Recommended Actions

- Work with local property developers and contractors to promote the availability of hybrid and alternative fuel construction equipment.
- When purchasing new City-owned construction equipment, buy hybrid and alternative fuel models as feasible.

GHG Assumptions

	2020	2030
Percentage of construction projects using 25% alternative fuel equipment	5%	10%

Activity and GHG Reduction

	2020	2030
Emissions Reduction ($MTCO_2e$) with CCA	30	60

Performance Indicators

	2020	2030
Net reduction from alternative fuel construction equipment	19%	19%

GHG Method

Information from the California Energy Commission, Nealon, and the inventory was used to determine potential reductions in construction equipment emissions from the use of CNG and hybrid-electric machinery. This information was combined with the participation rate to identify the overall emissions reductions.

GHG Sources

California Energy Commission. 2007. "Full Fuel Cycle Assessment: Wells-to-wheels Energy Inputs, Emissions, and Water Impacts." http://cafcp.org/sites/files/sites/default/files/shared/CEC%20Appendices.pdf.

Nealon, S. 2013. "Hybrid Not Always Greener." UC Riverside. http://ucrtoday.ucr.edu/18506.

Technical Appendix: Methods and Assumptions

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Appendix 2

CAP Measure Key Metrics

This appendix summarizes the items that the City will use to track implementation of the CAP. As part of San Mateo's ongoing CAP monitoring and implementation efforts, the City will track progress on the implementation of individual measures using an Excel-based monitoring tool. The City will collect specific pieces of data, known as key metrics, for each measure, including the planned actions. These key metrics will be used to identify the implementation status of each measure. Key metrics are provided by City staff, utility companies, and State and regional agencies. Some data may be collected through the Development Checklist in **Appendix 3**. Specific information about the sources of each key metric is given in the monitoring tool. The key metrics are shown in **Table 1-3**.

Table 1-3: CAP Measure Key Metrics

Measure		Time Frame	Lead Department	Key Metric
PA 1	Increased density for new housing	By 2020	Community Development Department	- Cumulative number of multifamily units, included duplexes and townhomes, constructed since 2014
PA 2	LED bulbs for remaining streetlights	By 2015	Public Works	- Have all streetlights been converted to LED bulbs?
PA 3	Digester gas to biomethane	By 2016	Public Works	- Is the Wastewater Treatment Plant's Digester Gas to Biomethane project operational?
PA 4	County Health Building solar	By 2020	Community Development Department	- kW potential of the solar panel array installed on the County Health building
PA 5	Downtown Parking Management Plan	By 2020	Public Works	- Have higher parking rates been put into effect as identified in the Downtown Parking Management Plan?

CAP Measure Key Metrics

Measure		Time Frame	Lead Department	Key Metric
RE 1	Expanded options to purchase renewable electricity from other sources – Encourage	By 2016	City Manager's Office	- Number of kWh supplied by PG&E Green Tariff or related program
RE 2	Community Choice Aggregation – Require	By 2018	City Manager's Office	- Number of kWh supplied by CCA
RE 3	Renewable energy systems for new residences – Require	By 2016	City Manager's Office, Community Development	- Cumulative number of kW potential of installed rooftop PV arrays since 2014 - Cumulative number of homes or units with solar water heaters installed since 2014
RE 4	Renewable energy systems for existing residences – Incentivize	By 2016	City Manager's Office, Community Development	- Cumulative number of kW potential of installed rooftop PV arrays since 2014 - Cumulative number of homes or units with solar water heaters installed since 2014
RE 5	Renewable energy systems for new nonresidential buildings – Require	By 2016	City Manager's Office, Community Development	- Cumulative number of kW potential of installed rooftop PV arrays since 2014 - Cumulative nonresidential square feet of floor space with solar water heaters installed since 2014
RE 6	Renewable energy systems for existing nonresidential buildings – Incentivize	By 2018	City Manager's Office, Community Development	- Cumulative number of kW potential of installed rooftop PV arrays since 2014 - Cumulative nonresidential square feet of floor space with solar water heaters installed since 2014
RE7	Advanced and emerging renewable energy systems – Encourage	By 2016	City Manager's Office, Community Development	None – supportive measure

Measure		Time Frame	Lead Department	Key Metric
EE 1	Residential energy efficiency owner-occupied retrofits – Encourage	By 2015	City Manager's Office, Community Development	- Cumulative number of homes or units with energy-efficient retrofits since 2014 - Cumulative number of homes or units retrofitted with energy-efficient appliances since 2014 - Cumulative number of homes with Variable Frequency Drive (VFD) pool pumps installed since 2014
EE 2	Residential energy efficiency renter-occupied retrofits – Incentivize	By 2018	City Manager's Office, Community Development	- Cumulative number of homes or units with energy-efficient retrofits since 2014 - Cumulative number of homes or units retrofitted with energy-efficient appliances since 2014
EE 3	Nonresidential energy efficiency retrofits – Incentivize	By 2016	City Manager's Office, Community Development	- Cumulative nonresidential square feet of floor space with retrocommissioning since 2014 - Cumulative nonresidential square feet of floor space with energy-efficient retrofits since 2014 - Cumulative nonresidential square feet of floor space with energy-efficient appliances installed since 2014
EE 4	Energy efficiency at healthcare centers – Incentivize	By 2016	City Manager's Office, Community Development	- Cumulative square feet of healthcare floor space with retrocommissioning since 2014 - Cumulative square feet of healthcare floor space with energy-efficient retrofits since 2014
EE 5	Residential energy education and low-cost retrofits – Encourage	By 2015	City Manager's Office, Community Development	-Is the City providing a comprehensive home energy education and outreach program?

CAP Measure Key Metrics

Measure		Time Frame	Lead Department	Key Metric
EE 6	Nonresidential energy education and low-cost retrofits – Encourage	By 2016	City Manager's Office, Finance	-Is the City providing a comprehensive business energy education and outreach program?
ME 1	Energy efficiency for new City buildings – Incentivize	By 2016	Public Works	None – supportive measure
ME 2	Energy efficiency at existing City buildings – Incentivize	By 2016	Public Works	None – supportive measure
AF 1	Public EV charging stations – Require	By 2015	City Manager's Office, Public Works	- Total number of public EV charging stations
AF 2	Increased EV adoption – Require	By 2018	City Manager's Office, Community Development	- Total number of registered EVs
AT 1	Public shuttles – Encourage	By 2015	City Manager's Office, Public Works	- Total number of annual Caltrain shuttle riders
AT 2	Transportation Demand Management (TDM) – Require	By 2018	Community Development, Public Works	- Cumulative percent of new development with TDM standards
AT 3	Expand car share program – Incentivize	By 2015	City Manager's Office, Public Works	- Total number of car share vehicles
AT 4	Increase bicycle mode share – Incentivize	By 2020	Public Works	- Cumulative number of miles of new bike lanes since 2005
AT 5	Increase pedestrian mode share – Require	By 2020	Public Works, Community Development	None – supportive measure
SW 1	Increase participation in composting program – Require	By 2020	Public Works	- Total annual tons of organic waste composted
WW 1	Water efficiency retrofits for existing buildings – Incentivize	By 2018	City Manager's Office	- Cumulative number of homes with water efficiency upgrades

Measure		Time Frame	Lead Department	Key Metric
WW 2	Water-efficient landscaping – Require	By 2015	Community Development, Parks and Recreation	None – supportive measure
WW 3	Develop new sources of nonpotable water – Incentivize	By 2020	Public Works, Community Development	None – supportive measure
OR 1	Alternative fuel lawn and garden equipment – Encourage	By 2018	Public Works, Parks and Recreation	- Cumulative number of lawn mowers traded in for electric models
OR 2	Alternative fuel construction equipment – Encourage	By 2016	Community Development, Public Works	- Annual percent of construction projects using at least 25% alternative-fueled equipment

CAP Measure Key Metrics

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Appendix 3

CAP Consistency Checklist

The following checklist assists project applicants and City staff to determine whether a proposed project complies with the City of San Mateo Climate Action Plan (CAP). The CAP is an implementation tool of the General Plan, demonstrating the City's strategy to reduce greenhouse gas (GHG) emissions consistent with Section 15183.5 of the California Environmental Quality Act (CEQA) Guidelines. New projects deemed consistent with the CAP are eligible for streamlining the analysis of GHG emissions. Projects inconsistent with the CAP may refer to this checklist for informational purposes but may have to submit a separate GHG analysis for the project. Examples of projects inconsistent with the City's forecast include:

- Stationary source emissions regulated by the Bay Area Air Quality Management District.
- General Plan amendments.
- New specific plans, amendments to specific plans, or new development agreements that would increase the population and nonresidential land use expectations beyond those anticipated in the General Plan buildout scenario.

CAP Consistency Checklist

Development Checklist

Project Description Characteristics

Please identify the applicable land uses included in the proposed project and provide a brief description of the proposed project (or the project description to be used for the associated environmental document).

1) What is the size of the project (in acres)?

2) Identify the applicable land uses:

☐Residential
☐Commercial
☐ Industrial
☐ Manufacturing
☐ Other

3) If there is a residential component to the project, how many units are being proposed?

Single-family residences:	:
Multi-family residences:	:

4) Please provide a brief project description:

5) Does the project require any amendments to the General Plan or specific plans?

☐ Yes☐ No

If yes, please explain:

6) Is the project located in a specific plan area?

☐ Yes☐ No

If so, which one? _____

7) Please complete the following table to identify project compliance with any applicable CAP measures.

Standards for CAP Consistency – New Development

Reduction Measure and Applicable Standard	Does the Project Comply?	Notes & Comments
RE 3. New single family houses and multifamily residential buildings: Meet the standards to be solar ready as defined by the California Building Standards Code	☐ Yes ☐ No ☐ N/A	If yes, what is the square footage of the solar zone? Additional notes:
RE 5. New nonresidential buildings: Meet the standards to be solar ready as defined by the California Building Standards Code	☐ Yes ☐ No ☐ N/A	If yes, what is the square footage of the solar zone? Additional notes:
AF 2. If off-street parking is provided, projects of at least six multi-family residential units and/or 10,000 square feet of nonresidential square footage at time of new construction or addition or alteration (as defined in San Mateo Municipal Code Section 23.06.012): Provide EV charging stations with designated parking spaces capable of meeting the California Green Building Code Voluntary Standards.	☐ Yes ☐ No ☐ N/A	If yes, how many EV charging stations are provided? Additional notes:
AF 2. New single-family houses and multi-family units with private attached garages or carports: Provide pre-wired for an EV charging station inside the garage or carport.	☐ Yes ☐ No ☐ N/A	If yes, how many spaces are prewired? Additional notes:

CAP Consistency Checklist

Reduction Measure and Applicable Standard	Does the Project Comply?	Notes & Comments
AT 2. New developments of at least six multi-family units and/or 10,000 square feet of nonresidential space: Implement TDM strategies to comply with the appropriate trip reduction target identified in applicable area plans and San Mateo Citywide TDM Plan.	☐ Yes ☐ No ☐ N/A	If yes, what is the trip reduction target for the project? % short-term commute trip reduction % long-term commute trip reduction What strategies will the project use to achieve these trip reduction targets?
AT 2. Projects of at least 20 multi-family units and/or 50,000 square feet of nonresidential space undergoing additions or alterations (as defined in San Mateo Municipal Code Section 23.06.012): Implement TDM strategies consistent with the targets in relevant area plans and the San Mateo Citywide TDM Plan.	☐ Yes ☐ No ☐ N/A	If yes, what is the trip reduction target for the project? % short-term commute trip reduction % long-term commute trip reduction What strategies will the project use to achieve these trip reduction targets?
SW 1. Commercial properties over 10,000 square feet and multi-family buildings of at least four units at time of construction or additions/alterations (as defined in San Mateo Municipal Code Section 23.06.012): Provide an area of sufficient space to store and allow access to a compost bin.	☐ Yes ☐ No ☐ N/A	Does the project participate in any composting programs? Does the project compost on-site?