City of Millbrae Final Climate Action Plan

October 27, 2020

RICAPS
Regionally Integrated Climate Action Planning Suite

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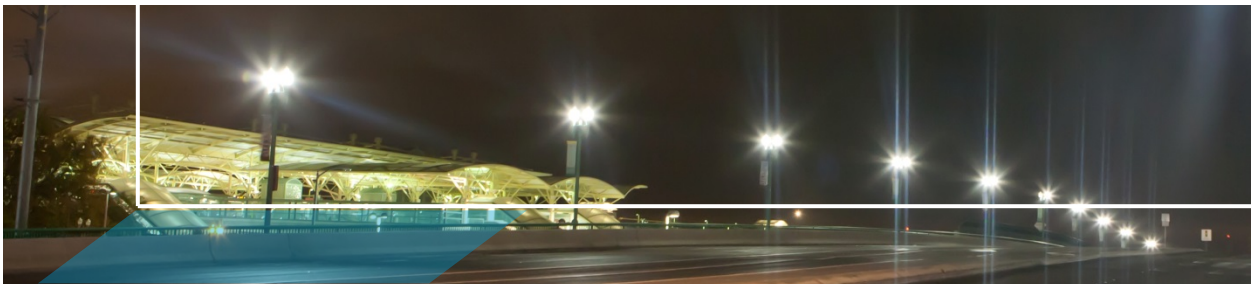

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1 Introduction

The City of Millbrae is pleased to present this Climate Action Plan (Plan), which is designed to be a blueprint of our community's response to the challenges posed by climate change. Climate change is a global problem; however, through local actions the City can do its part to contribute to reducing greenhouse gas (GHG) emissions from local sources. Climate scientists around the world, represented by the Intergovernmental Panel on Climate Change (IPCC), have an unequivocal position: human activity is changing the Earth's climate through the release of GHG emissions resulting from the combustion of fossil fuels. The longer communities delay taking action, the greater the risk humans face of irreversibly depleting non-renewable resources and harming our environment. However, it is conceivable, and increasingly foreseeable, that humans will delay action so long that useful policy and programs will become infeasible and both human civilization and the biosphere will be permanently damaged.

The City of Millbrae (City) cannot solve the climate crisis alone. Working in coordination with San Mateo County (County), the State of California (State), and the Federal government, the City has committed to taking steps to reduce GHG emissions and create new programs and services that will support the community and businesses in doing the same. This Plan offers ways to make homes more energy efficient and increase the amount of locally produced renewable energy. It recommends "smart" development patterns that emphasize vibrant neighborhoods and "complete streets" that allow people to go about their business on foot, by bicycle, or via public transportation. It provides transit solutions and offers ways to reduce waste that would otherwise go to landfills. Finally, this Plan outlines measures that will continue to make municipal government operations an efficient and environmentally responsible organization.

1.3 Why the City of Millbrae has a Climate Action Plan

The City of Millbrae, with our partner the City and County Association of Governments (C/CAG) of San Mateo County, and with partial grant funding from the Bay Area Air Quality Management District (BAAQMD) and the Pacific Gas and Electric Company (PG&E), has developed this Climate Action Plan in order to achieve a number of objectives, including:

- **To demonstrate environmental leadership** – We as a community can rise to the difficult challenge of reducing the impact of climate change by taking reasonable steps to reduce our GHG emissions.
- **To save money and promote green jobs** – Residents, businesses, and government will reduce their utility costs through increased energy and water efficiency. A focus on efficiency creates job opportunities within the community that contribute to protecting our environmental resources.
- **To comply with letter and spirit of State environmental initiatives** – California is taking the lead in tackling climate change while driving the new energy markets and fostering new environmental services. As such we have a responsibility to help the State meet its goals to reduce greenhouse gas emissions.
- **To promote sustainable development** – By developing this Climate Action Plan according to BAAQMD guidelines, a new class of sustainable development projects, such as mixed use and transit-oriented developments, can be fast-tracked through the California environmental review process.

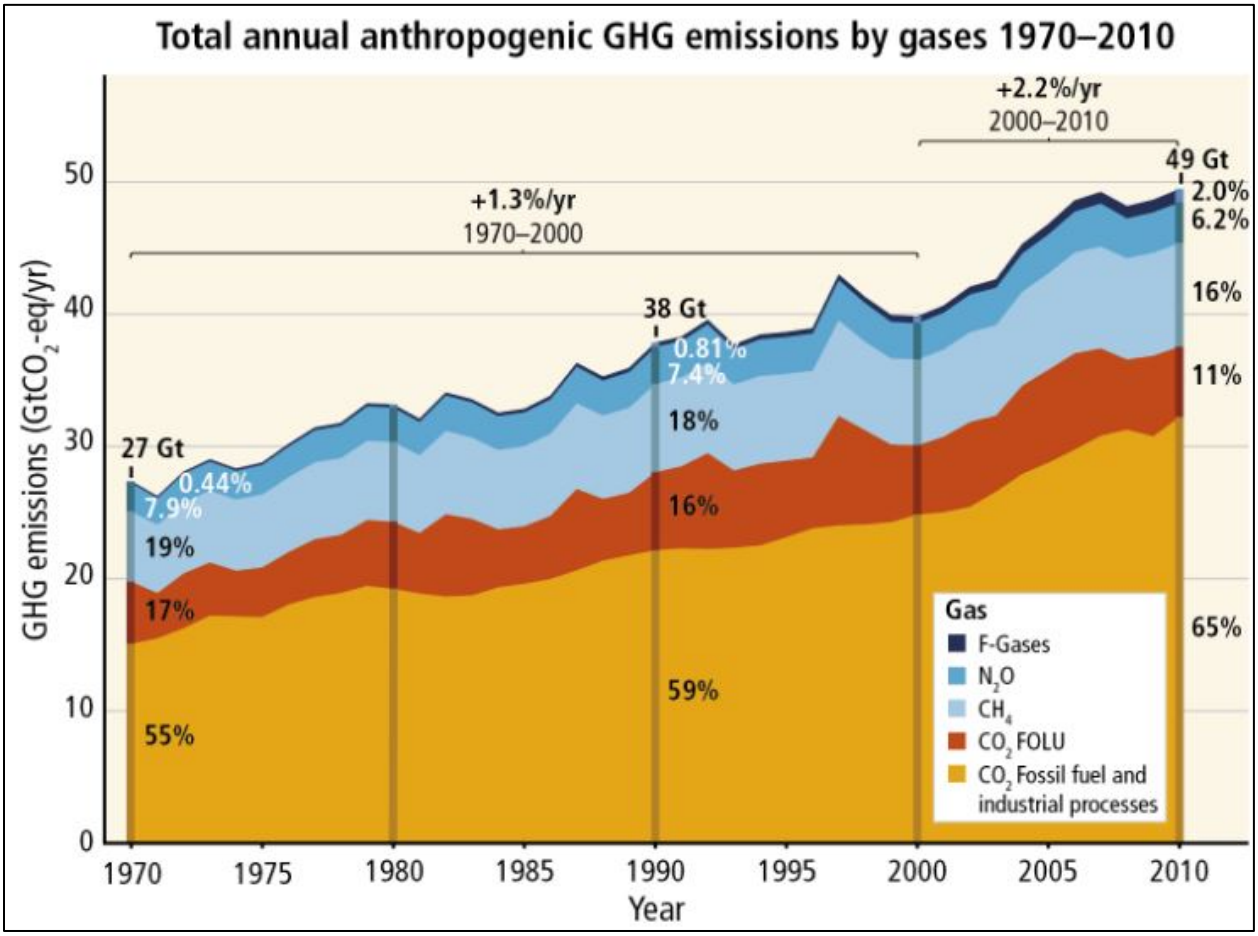
We have developed this Climate Action Plan to implement measures to reduce greenhouse gases through environmental leadership and stewardship of our local environment.

1.4 Climate Science

Climate change presents one of the most profound challenges of our time. A broad international consensus exists among atmospheric scientists that the Earth's climate system is being destabilized in response to elevated levels of GHG emissions in the atmosphere. This is primarily from the combustion of fossil fuels for energy use. GHG emissions include carbon dioxide (CO_2) methane (CH_4), nitrous oxide (N_2O), and three man-made gases: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Figure 1 from the Intergovernmental Panel on Climate Change (IPCC), the leading international scientific body on climate change, shows the growth and distribution of anthropogenic (human-caused) GHG emissions in the atmosphere.

Figure 1: Growth and Distribution of Global Anthropogenic GHG Emissions[1]



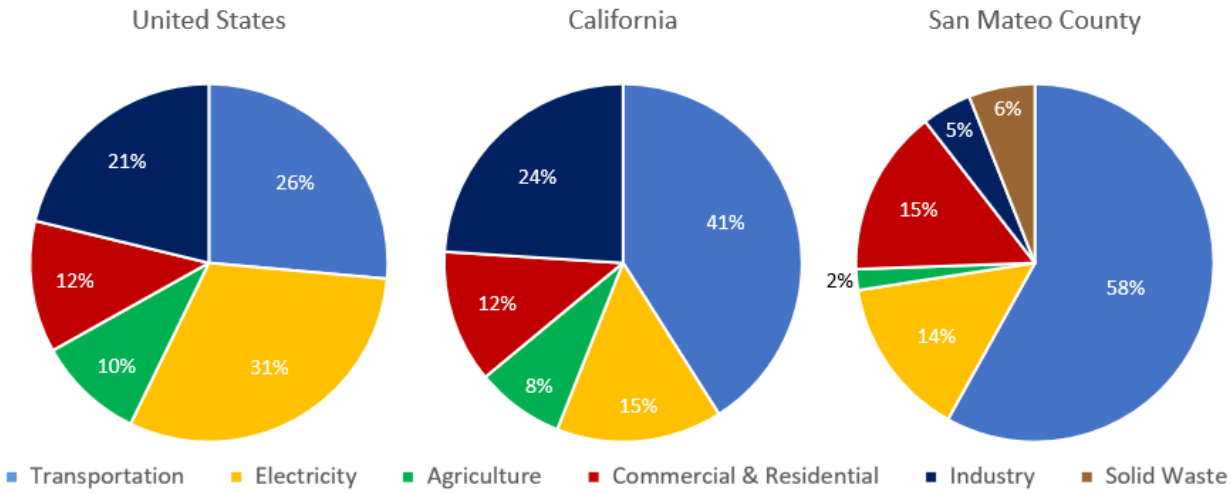
The largest anthropogenic contributor to climate change is carbon dioxide emissions from fossil fuel and industrial processes (65%), followed by methane (16%), carbon dioxide from forestry and other land use changes (11%), nitrous oxide (6.2%) and fluorinated gases (2.0%). Carbon dioxide is emitted through the combustion of fossil fuels such as coal and petroleum as well as through the decomposition of clear-cut forests (deforestation).

At a national level, the largest contributor to greenhouse gas emissions is the electricity sector (31%), followed by transportation (26%) and industry (21%). On the other hand, electricity makes up 21% and 14% of greenhouse gas emissions in California and San Mateo County, respectively. This indicates that California has made greater headway in removing GHG from

[1] Intergovernmental Panel on Climate Change, "Total annual anthropogenic GHG emissions by gases 1970-2010", Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. Geneva, Switzerland, (2014), 5.

electricity consumption, such as through the use of renewable energy, compared to the rest of the country (Figure 2).

Figure 2: Annual Greenhouse Gas Emissions by Economic Sector in the United States, California, and County of San Mateo[2,3,4]



Volume II of the Fourth National Climate Assessment (Assessment), released in 2018 by the United States Global Change Research Program, finds that climate change is affecting the natural environment, agriculture, energy production and use, land and water resources, transportation, and human health and welfare across the U.S. and its territories.

The key findings[5] of the Assessment from the National Oceanic and Atmospheric Administration, which was a major contributor to the report, include:

Communities

Communities across the U.S. are increasingly vulnerable to the impacts of climate change in terms of health and safety, quality of life, and the rate of economic growth. The resulting impacts of climate change threaten the natural, built, and social systems that communities rely on, both within and beyond the U.S. borders.

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[2] U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017*, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks (2019).

[3] California Air Resources Board, *GHG Current California Emission Inventory Data,* https://ww2.arb.ca.gov/ghg-inventory-data (2019).

[4] Calculated by the City and County Association of Governments of San Mateo County (C/CAG) Regionally Integrated Climate Action Planning Suite (RICAPS) program (2015).

[5] National Oceanic and Atmospheric Administration, "New federal climate assessment for U.S. released", https://www.noaa.gov/news/new-federal-climate-assessment-for-us-released (November 23, 2018).

While efforts to respond to climate change have expanded in the last five years, it is not at the scale needed to avoid substantial damages to the economy, environment, and human health over the coming decades.

Substantial and sustained global efforts to reduce greenhouse gas emissions and regional initiatives are needed or climate change is expected to cause increasing losses to infrastructure and property and hinder the rate of economic growth over this century.

Agriculture and food production
It is expected that rising temperatures, extreme heat, drought, wildfire on rangelands, and heavy downpours will increasingly challenge the quality and quantity of U.S. crop yields, livestock health, price stability, and rural livelihoods.

Ecosystems
Major disruptions in some ecosystems will occur with continued changes to the Earth's climate. Some of the coral reef and sea ice ecosystems have already experienced transformational changes, affecting communities and economies that rely upon them.

"Climate changes are already affecting water, energy, transportation, agriculture, ecosystems, and health."
-U.S. Global Change Research Program

Water and the Coasts
There will be increasing risks and costs to agriculture, energy production, industry, and recreation due to changes in the quality and quantity of fresh water available for people and the environment.

By the latter part of this century, climate change will transform coastal regions, which will also affect other regions and sectors. This will result in higher costs and lower property values due to sea level rise.

Health
Climate change threatens the health and well-being of people by causing increasing extreme weather, changes to air quality, the spread of new diseases by insects and pests, and changes to the availability of food and water.

The central aim of the Paris Agreement, an agreement within the United Nations Framework Convention of Climate Change signed in 2016, is to strengthen the global response to the threat of climate change. Under the Paris Agreement, countries agreed on a goal of limiting global warming to well below 2°C, or 3.6°F, by 2100 and to pursue efforts to limit the increase to 1.5°C, or 2.7°F. According to the current scientific consensus, a 2°C increase in average global temperature over the next century is a "safe" level of global warming. To limit the average global temperature increase to 2°C, GHG concentrations need to be stabilized at a level well below

450 parts per million (ppm). In 2018, the global atmospheric concentration of CO_2 passed 407 ppm.[6] Achieving this level requires global GHG emissions to be reduced by at least 50% below their 1990 levels by the year 2050.

The IPCC was created in 1988 by the World Meteorological Organization and the United Nations Environment Program with the objective to provide governments with scientific information that they can use to develop climate policies. IPCC reports are also a key input into international climate change negotiations. In 2018, the IPCC released a special report, *Global Warming of 1.5°C*, on the impacts of global warming and what it would take to cap rising temperatures at 1.5°C above preindustrial levels, which is a goal that is exceedingly difficult but thought not to be impossible.[7] The IPCC warns that warming of 1.5°C could be realized as early as 2030.

1.5 Projected San Francisco Bay Area Climate Impacts

Climate change refers to all aspects of climate, including disruptions to weather patterns that include shrinking of glaciers, accelerated sea level rise, more intense heat waves, shifts in animal and plant ranges, and changes in the timing of plant reproduction. In California and western North America, a changing climate is evident. During the past 50 years, the region has experienced warmer winter and spring temperatures, reduced spring snow levels in mountains and earlier snowpack melt.

1.5.1 Rising Sea Levels

Historical records show that sea level in San Francisco Bay has risen about 8 inches (20 cm) over the past 100 years. Scientists agree that the rate of sea level rise is accelerating, but projections of future sea levels vary considerably.

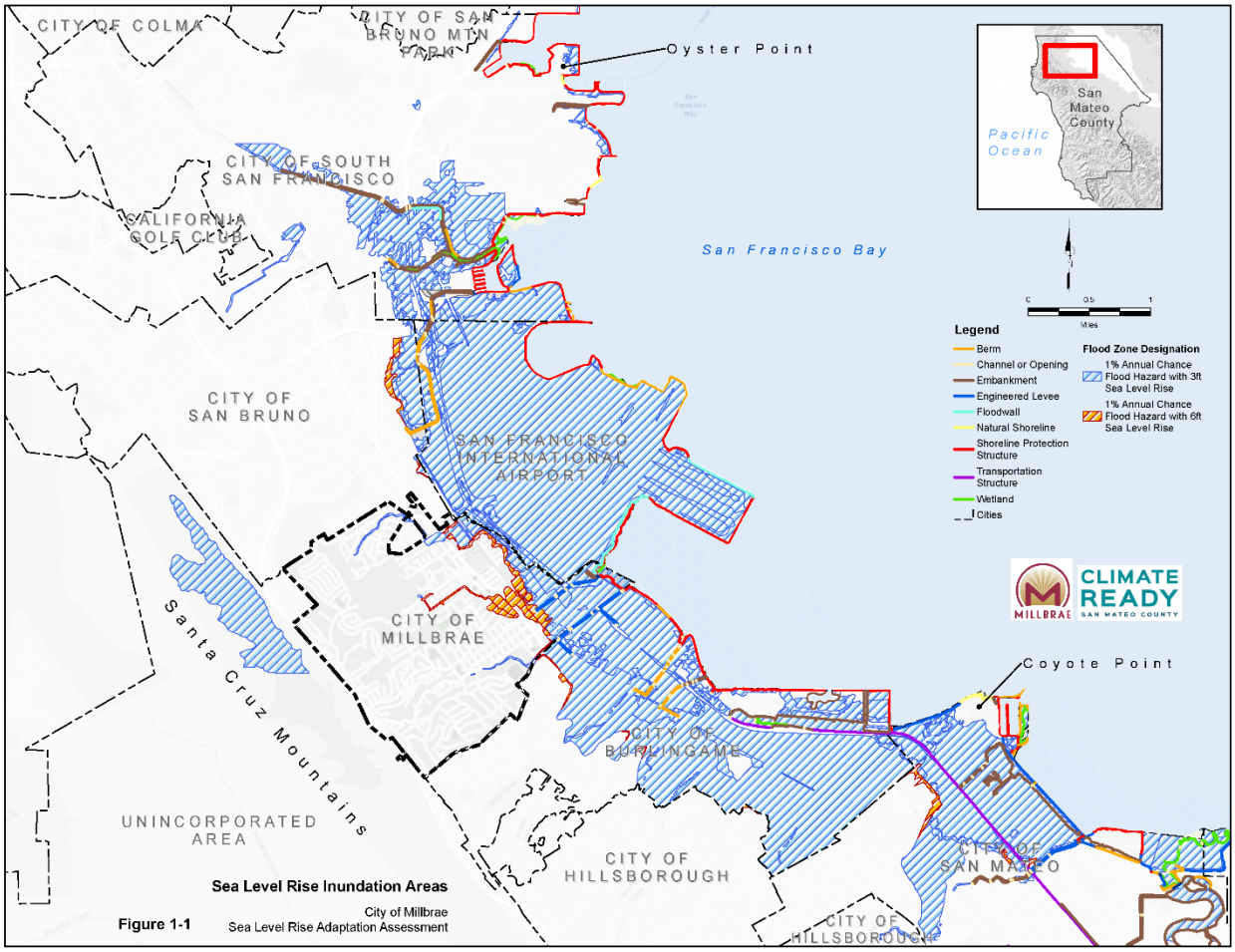
The City of Millbrae is located on the San Francisco Bay shoreline and is therefore susceptible to the threats of rising sea levels. Figure 3 shows sea level rise projections for the Millbrae

[6] Rebecca Lindsey, "Climate Change: Atmospheric Carbon Dioxide," National Oceanic and Atmospheric Administration, https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide (September 19, 2019).
[7] Intergovernmental Panel on Climate Change, "Special Report: Global Warming of 1.5°C", https://www.ipcc.ch/sr15/, (2018).

coastline and nearby cities. Critical transportation infrastructure in or near Millbrae will be affected by sea level rise, including San Francisco Airport and segments of Highway 101 and Highway 380, both of which are major access points to the City.

Figure 3: Projected Sea Level Rise - San Mateo County Shoreline

Source: City of Millbrae Sea Level Rise Adaptation Assessment, April 2020 – Inundation Areas
West Yost Associates



The range of current sea level rise estimates presents very different scenarios to cities that must decide how to expend limited resources to protect critical land uses and infrastructure. As the shoreline migrates landward, habitats and flood hazard areas will also shift. Past development of residential, commercial, and public access infrastructure may limit the flexibility of set-backs or adjustments to the Bay shoreline.

Due to San Mateo County being extremely vulnerable to sea level rise, the County started an initiative called Sea Change San Mateo County to bring together and provide resources to local governments and agencies within the County on the issue of sea level rise. A countywide Sea Level Rise Vulnerability Assessment was completed and is part of a long term resilience

strategy to ensure local communities, ecosystems, and economies are prepared for climate change. Specific information for Millbrae and other cities in the County can be found at http://seachangesmc.com/ and http://seachangesmc.com/current-efforts/vulnerability-assessment/. The assessment provides an overview of what is at risk from current and future flooding and erosion in the County using three different sea level rise scenarios and one erosion scenario. Other regional activities will be developed as a part of this effort, including a countywide Climate Collaborative, Climate Change Preparedness Action Plan, technical assistance, adaptation planning toolkits and more.

The City received a $60,000 Sea Change San Mateo County Community Resilience Grant with a partial City match which builds on previous studies, including the Vulnerability Assessment and San Francisco Estuary Institute's Bay Shoreline Adaptation Atlas, to assess the impacts of sea level rise and propose potential mitigations that will help the City to protect the shoreline.

Mitigations can reduce overall flood risks, including Federal Emergency Management Agency (FEMA) floodplains. The goals of the assessment are to develop city level mapping of sea level rise and infrastructure, identify and explain the risks, collaborate to identify regional solutions (Burlingame, San Francisco Airport, and San Mateo County), solicit public input, integrate findings into future plans, and implement actions. The City held a workshop in June 2019 to inform the community about these efforts and to gain input on sea level rise and climate change.

The Sea Level Rise Vulnerability Assessment for Millbrae for the baseline scenario shows a 1% annual chance flood (also known as the "100 year flood"); the mid-level scenario shows a 1% annual chance flood plus 3.3 feet of sea level rise; and the high-end scenario shows a 1% annual chance flood plus 6.6 feet above the current 100-year Base Flood Elevation.

More than 165 acres of the City would be inundated under the mid-level scenario, and more than 240 acres would be inundated under the high-end scenario. The direct value of properties directly impacted would range from $250M-$380M. The inundated areas that would be affected include drainage and pump stations, businesses, hotels, gas stations, the BART Station, the Water Pollution Control Plant, other City facilities, future transit-oriented development, electrical and gas infrastructure, and homes. The City is continuing to study the impacts from sea level rise, which includes cataloging potential risks to the City, collaborating with partners, identifying alternatives, preparing a sea level rise adaptation assessment, developing priorities, integrating findings into local and regional plans, identifying funding opportunities, and building a safer future for the community.

In addition, the City is implementing Green Infrastructure measures to improve water quality and provide climate change benefits. A summary of these measures can be found in Chapter 3.6 and Appendix F, Adaptation Planning for Climate Impacts.

To improve regional coordination, in 2017, C/CAG established its Countywide Water Coordination Committee to address flooding, regional stormwater, and sea level rise issues within San Mateo County. The Committee developed a proposal for a water management agency to modify an existing special district, the San Mateo County Flood Control District, which was changed to the Flood and Sea Level Rise Resiliency Agency (Agency) consisting of five city and two county elected officials. The Agency's mission and role is to address sea level rise, flooding, coastal erosion, and large-scale stormwater infrastructure improvements through integrated regional planning, design, permitting, project implementation, and long-term operations and maintenance to create a resilient "one shoreline" San Mateo County by 2100.

1.5.2 Extreme Heat & Storm Events

California in general should expect overall hotter and drier conditions with a reduction in winter rain (and concurrent snow in the mountains), as well as increased average temperatures. Dating back to 2009, it was expected that there would be a high likelihood that extreme weather events, including heat waves, wildfires, droughts, and floods would be among the earliest climate impacts experienced.[8] In San Mateo County, higher average sea levels mean that storms will impact the Bay shore more severely with higher storm surges, more extensive inland flooding, and increased erosion. If more frequent or severe natural disasters occur, more emergency and public health services will be needed to deal with the consequences.

Heat related illness and mortality are expected to increase. Though extreme heat events in coastal areas like San Mateo County are not expected to be as severe or as long-lasting as further inland, the resident population is not as well prepared or equipped to deal with higher temperatures. Air conditioning is far less common, for example. Outdoor workers, elderly populations, and children are particularly vulnerable to extreme temperatures.

2017 was the third hottest year on record and the hottest summer in state history. Higher temperatures and drier summer conditions produce higher levels of ozone, which can exacerbate respiratory illnesses, particularly among vulnerable populations such as children and the elderly. Higher temperatures and drier conditions can also increase the potential for wildfires, which can lead to declines in air quality and cause negative impacts to respiratory and cardiovascular health.

Agriculture is also likely to be impacted by extreme weather events, higher temperatures, and less water availability for agricultural production, resulting in lower production and a potential decline in food security.

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[8] California Natural Resources Agency, *2009 California Climate Adaptation Strategy*, http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf (2009).

Additional Resources about Climate Change

- International Panel of Climate Change Fifth Assessment Report: https://www.ipcc.ch/report/ar5/
- U.S. Global Change Research Program: http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts
- C2ES – Center for Climate and Energy Solutions: https://www.c2es.org/
- National Ocean and Aeronautical Administration (NOAA) http://www.climate.gov/#Data_And_services
- U.S. Environmental Protection Agency Climate Change Indicators: https://www.epa.gov/climate-indicators
- Real Climate: http://www.realclimate.org/

1.5.3 Public Health

Most Californians are not aware of recent statistics that suggest that California is home to the worst air quality in the nation, with over 90% of Californians breathing unhealthy air. According to the California Air Resources Board, unhealthy levels of ozone (smog) and particulate matter annually contribute to:

- 19,000 premature deaths
- 9,400 hospital admissions for respiratory and cardiovascular disease
- 280,000 asthma and other lower respiratory symptoms
- 22,000 cases of acute bronchitis
- Millions of school and work days lost due to respiratory conditions[9]

In addition, climate change, including increased summer temperatures, can have adverse effects for the health of City of Millbrae's residents and workers, especially the vulnerable

[9] American Lung Association, "Land Use, Climate Change & Public Health Issue Brief: Improving public health and combating climate change through sustainable land use and transportation planning" (Spring 2010).

populations such as children, seniors, and those with existing chronic illnesses, as mentioned in Section 1.3.1.

San Mateo County Health System, in accordance with the Centers for Disease Control, serves a number of functions to reduce health risks related to climate change. These include informing cities about the risk climate changes poses to public health, creating tools that support decision making and capacity building related to mitigating adverse health outcomes from climate change, and serving as a credible leader in planning for the public health impacts of climate change.

The City of Millbrae intends to work with the San Mateo County Health System to mitigate public health dangers and maintain or improve long-term health by encouraging local residents and workers to be part of the solution. Research shows that individuals who live in mixed-use and walkable communities have a 35% lower risk of obesity.[10] Another study estimates that the walking associated with transit use saves individuals $5,500 over the course of their life by reducing obesity-related medical costs.[11] The City and the Health System will support programs that promote more walkable and bikeable cities, which not only promote healthier lifestyles, but also decrease reliance on vehicles that contribute to climate change.

Vulnerable Communities and Climate Change

Climate change will affect all population groups, yet some will be far more vulnerable to its impacts than others as they may be less climate resilient. As mentioned, the rise and frequency of extreme weather events will result in health threats and challenges imposed by climate change. Those that are more vulnerable will disproportionately feel the detrimental effects that others may not, including rises in the cost of living (i.e. water and food), increased exposure to extreme weather, and associated threats to health. Those that are especially vulnerable include children, older adults, those with a low income and low-income communities of color, people with poor health, and others. The California Department of Public Health's Climate Change and Health Equity Program (CCHEP) addresses health and equity in California climate change planning as well as climate change and equity in public health planning. CCHEP works with local, state, and national partners to assure that climate change mitigation and adaptation activities have beneficial effects on health while not exacerbating existing unfair and preventable inequities in health status of some groups. Actions will need to be taken to provide resources and assistance to aid vulnerable communities affected by the impacts of climate change.

[10] Lawrence D. Frank, M.A. Andresen, T.L. Schmid, "Obesity relationships with community design, physical activity, and time spent in cars," *American Journal of Preventive Medicine*, Volume 27, Issue 2 (August 2004), 87-96.

[11] Robert Wood Johnson Foundation, "Active Transportation: Making the Link from Transportation to Physical Activity and Obesity," Research Brief 9/09, *Active Living Research* (2009).

1.5.4 Decreasing Fresh Water Supply

With shifting climate patterns, significant uncertainty exists related to whether the recent drought conditions are the "new normal" for California. However, all climate projections show increases in average temperatures and reduced snowpack where Millbrae sources much of its water. Rising temperatures compounded by decreased precipitation have already severely reduced spring snowpack in the Sierra Nevada. A past report indicated that the Sierra Nevada snowpack is projected to be reduced by at least 25% by 2050[12] and will pose severe water supply challenges for California, including the Hetch-Hetchy system in which the City relies. Additionally, California may see longer drought periods and decreased groundwater levels. According to the 2018 Fourth National Climate Assessment SF Bay Area, hydrologic changes affecting the amount and location of precipitation and snowpack in California's mountainous regions will stress existing storage reservoirs, impacting surface supply, imported water, and water transfer availability, especially in the summer and fall. Millbrae must continue to reduce consumption of water and seek to capture more water locally through rainwater, graywater, and stormwater retention, as well as investments in local green infrastructure.

1.6 Local efforts

For information on State and regional efforts to address climate change, see Appendix B. State Policy and Regulatory Context and Appendix C. Regional Efforts.

While cities may be vulnerable to climate impacts, they also can play a critical role in reducing the emissions that exacerbate climate impacts. With their concentrations of people and activities at high densities, cities can use resources such as energy, materials, and land more efficiently. Cities are places where high-level knowledge-based activities congregate, along with the expertise needed to tackle climate change. This is especially true in the San Francisco Bay Area.

Assembly Bill (AB) 32 identifies local governments as essential partners in achieving California's goal to reduce GHG emissions. Local governments have primary authority to plan, zone, and permit how and where land is developed to accommodate population growth and the changing needs of their jurisdictions. Cities have varying degrees of responsibility for the collection and processing of waste and have responsibility for other environmental infrastructures, such as energy and water. Cities own and manage buildings and vehicle fleets and are able to form partnerships with private interests to mobilize and coordinate community action. Furthermore,

[12] California Energy Commission, "Scenarios of Climate Change in California: An Overview." Final report from California Energy Commission, Public Interest Energy Research (PIER) Program, California Climate Change Center, publication no. CEC-500-2005-186- SF (February 27, 2006).

cities are uniquely positioned to promote economic development that emphasizes sustainable development and local green-collar jobs.

To date, the City of Millbrae has undertaken the following climate related actions:

- In 2007, the City Council passed two climate protection resolutions. One was the adoption of the U.S. Mayors' Climate Protection Agreement (part of the Cool Cities Campaign) and the other was the Cities for Climate Protection® program of ICLEI ─ Local Governments for Sustainability (ICLEI).
- The City also contracted with ICLEI in 2007 to assist with an inventory of municipal operations and community-wide GHG emissions for 2005, the baseline year by which reductions would be measured, and develop a report. ICLEI also developed two technical memos to help guide the City in implementing programs in the near term and in setting GHG emissions reduction goals. The City has also utilized the Community-Wide GHG Emissions Inventory for 2005 developed by the County of San Mateo and C/CAG, which is a secondary source of data for this climate action plan.
- In 2009, the City Council adopted GHG emissions reduction targets of 15% below 2005 levels by 2020 and 80% below 2005 levels by 2050. The emissions reduction target of 49% below 2005 levels by 2030 is an interim goal for the 80% below 2005 levels by 2050 goal. Senate Bill (SB) 32 calls for the State to reduce emissions 40% below 1990 levels by 2030, which has also been interpreted by the State as reducing emissions 49% below 2005 levels by 2030. The City is using the 49% emissions reduction target as 2005 is the baseline.
- In 2012, the City's 2010 Government Operations Greenhouse Gas Emissions Inventory Report was conducted by Joint Venture Silicon Valley in collaboration with ICLEI-Local Governments for Sustainability USA. A municipal inventory report was also completed for 2015.
- In March 2015, the City's 2010 Community Greenhouse Gas Inventory Report was prepared by DNV GL, a consulting firm, through the RICAPS (Regionally Integrated Climate Action Planning Suite) program of C/CAG. Other community inventory reports were completed for the years 2010 through 2015. See GHG inventory results in Appendix G. Historic GHG Inventories and Forecast.
- In 2015, the City participated in the Institute for Local Government's Beacon Award: Local Leadership toward Solving Climate Change Recognition Program. In recognition of the City's efforts to reduce greenhouse gases, the City was awarded a Silver Level Spotlight Award for reducing community GHG emissions by 5% between 2005 and 2010 and two Platinum Level Spotlight Awards, one for a 42% energy savings for City facilities between 2005 and 2010 and the other for sustainability best practices. In 2016, the City

received a Gold Level Beacon Award for reducing municipal operation GHG gases by 15% between the years 2010 and 2015. In 2020, the City received a Gold Level Beacon Spotlight Award for reducing community GHG emissions by 19% from 2005 to 2019.

Millbrae Climate Protection Programs

The City has actively implemented a variety of environmental programs over many years contributing to GHG reductions. The following is a listing of the City's primary sustainable and climate protection programs. Many of these programs are also described more fully in Section 3. The annual emissions reduction is also provided for those programs with a direct impact on GHG emissions in Section 3.

- **Community Programs**
  - Enacting a Transportation Systems Management Ordinance
  - Adopting a Complete Streets Policy
  - Developing the Millbrae Station Area Specific Plan that includes land use policies for developing residential and commercial development near transit
  - Updating the General Plan to include bicycle and trail routes and forming a Bicycle & Pedestrian Advisory Committee
  - Participating in the Spare the Air Program including distributing notifications
  - Achieving and surpassing the AB 939 waste diversion requirements and implementing many waste prevention, recycling, composting, and buy recycled programs
  - Adopting the first Sustainable Food Service Ware Ordinance in the County prohibiting restaurants from using polystyrene foam and solid food service ware
  - Adopting the first Single-Use Carryout Bag Ordinance in the County prohibiting the use of plastic shopping bags and encouraging reusable bags
  - Participating in the annual international Earth Hour event
  - Implementing a Commuter Options and Incentives Program for City employees and conducting outreach to the public
  - Participating in regional residential energy efficiency and retrofit programs
  - Participating in and holding workshops on the Bay Area SunShares solar and electric vehicle programs
  - Participating in the HOMEIntel energy conservation program
  - Adopting San Mateo County's Energy Strategy
  - Adopting a Green Building Ordinance and thereafter adopting the State of California's Green Building Standards (CALGreen) Code
  - Providing rebates for the installation of solar panels from 2007 to 2013

- Implementing the Green Business Program, including certifying and recertifying City Hall and the Library as Green Businesses and promoting the program to local businesses
- Implementing a variety of water conservation programs for all sectors
- Adopting resolutions allowing Property Assessed Clean Energy (PACE) programs to operate in Millbrae
- Participating in Peninsula Clean Energy, the countywide Community Choice Aggregation program which provides greener renewable energy supply to all energy customers
- Installing electric vehicle charging stations at City facilities and parking lots and holding electric vehicle workshops
- Installing a community garden to encourage growing food locally
- Preparing a Sea Level Rise Adaptation Assessment
- Preparing a Green Infrastructure Plan and implementing associated projects
- Joining the Flood and Sea Level Rise Resiliency Agency
- Participating in Clean Air Day events

- **Municipal Operations Programs**
  - Installing a bio-gas renewable energy co-generation operation in 2006 to use brown kitchen waste grease from restaurants to provide energy at the Wastewater Treatment Plant and Operations Center—the microturbine had worked intermittingly over the years and stopped working in approximately 2016. Currently, some of the generated methane is utilized to heat one of the tanks.
  - Installing energy efficiencies in City facilities including the Clean Energy Program:
    - Installing induction lighting in the City's streetlights and newer internal and external lighting technology in City facilities
    - Adding new irrigation controllers in the City's parks
    - Installing a 50kW solar photovoltaic system on the Library
    - Upgrading the heating and air conditioning systems (HVAC) at the Community Center
  - Participating in Peninsula Clean Energy and choosing 100% renewable energy
  - Participating in PG&E's ClimateSmart Program from 2008-2011 to offset greenhouse gas emissions from municipal operations
  - Participating in a Demand Response Program to reduce energy use during Energy Alert Days
  - Providing pre-tax commuter benefits for employees
  - Purchasing four hybrid vehicles
  - Planting trees

- Implementing a variety of water conservation programs
- Implementing a variety of waste prevention, recycling, and composting programs

- **Participation in Regional Climate Protection Programs and Organizations**
  - City and County Association of Governments of San Mateo County (C/CAG) Regionally Integrated Climate Action Planning Suite (RICAPS) Steering Committee, Office of Sustainability
  - Climate Ready San Mateo County
  - ICLEI – Local Governments for Sustainability
  - Silicon Valley Joint Venture Climate Task Force

This Plan incorporates the many programs the City has in place that have and will continue to reduce GHG emissions. Input will be sought on the Plan from community members, committees, and commissions. The goal is to have the policies and highlights of the measures included in this Plan incorporated into the City's General Plan, which is currently being updated through 2040.

1.7 The City of Millbrae's Climate Action Plan Process

This Climate Action Plan was developed in partnership with C/CAG. The climate action plan template project sponsored by C/CAG assists member jurisdictions and other interested local governments to develop climate action plans that are consistent with California Environmental Quality Act (CEQA) guidelines, including both the CEQA Guidelines Amendments effective March 18, 2010, and the BAAQMD's CEQA Air Quality Guidelines (Updated May 2011). By combining resources, the climate action plan template project promotes high quality climate action plans that can be used to meet regulatory requirements and support planning efforts to reduce GHG emissions. The template project and the City's climate strategy is based on the ICLEI 5-Milestone process as seen in the framework below. Prior to the City Council adopting the Climate Action Plan, it will be reviewed per CEQA guidelines.

1.7.1 Framework for Climate Action

The ICLEI Five Milestones Framework (http://icleiusa.org/programs/emissions-management/5-milestones/) is a management process based on increasing knowledge through each step to achieve the targeted GHG emissions reductions. Figure 4 illustrates the process.

Figure 4: ICLEI's Five Milestones Framework

- **Leadership Commitment:** Define the overall vision and goals for the community.
- **Milestone 1 (Inventory Emissions):** Conduct a baseline emissions inventory and forecast.
- **Milestone 2 (Establish Target):** Adopt an emissions reduction target for the forecast year.
- **Milestone 3 (Develop Climate Action Plan):** Identify feasible and suitable strategies and supporting actions to reduce emissions and achieve co-benefits aligned with the overall vision and goals.
- **Milestone 4 (Implement Climate Action Plan):** Enact the Plan.
- **Milestone 5 (Monitor/Evaluate Progress):** Establish feedback loops to assess and improve performance, including an assessment and adjustment of the necessary human, financial, and data resources.

In November 2009, all San Mateo County member jurisdictions completed their 2005 community and municipal GHG inventories as part of a joint effort with ICLEI, Joint Venture Silicon Valley Network, and the County of San Mateo, funded by C/CAG. The City's 2005 community and municipal operations GHG emissions inventories and report were completed with the assistance of ICLEI in 2008 and the City Council accepted the report and adopted GHG emissions reduction goals in 2009. With C/CAG's assistance, Milestone 3, the development of this Plan, is complete and the City is responsible for Milestone 4 and Milestone 5, implementing the actions identified and monitoring and evaluating progress.

1.7.2 Public Outreach and Community Engagement

The City of Millbrae has the opportunity to leverage existing programs funded by the State of California, Metropolitan Transportation Commission (MTC), Association of Bay Area Governments (ABAG), BAAQMD, C/CAG, PG&E, and others to support community actions to improve energy efficiency, increase renewable energy, facilitate alternative transportation initiatives, and reduce solid waste generation. This Plan proposes that the City continue to distribute information widely about programs and funding opportunities for residents and businesses to support their sustainability efforts. The Climate Action Plan will be adopted prior to the City's 2040 General Plan Update, but its policies will be included in the General Plan, and the Climate Action Plan will be an appendix to the General Plan.

The Plan was initially made available for public review on February 25, 2020, when an informational report was presented to the City Council. Public outreach occurred more widely starting on March 2, 2020. The draft Plan was promoted via the City's website and e-notifications, email messages to City Commissions and Committees and the Chamber of Commerce, a Public Service Announcement on MCTV Channel 27, emails to a database of residents involved in Sustainable Millbrae programs, and the City's social media pages. Originally the City planned on accepting public comments until April 30, 2020, but after various postponements due to the COVID-19 pandemic, the public comment period was extended to May 29, 2020.

Informational Reports on the Plan were planned to be presented to the City of Millbrae Planning Commission, Community Enhancement Advisory Committee (CEAC), and the Parks and Recreation (P&R) Commission during their March meetings, and an in-person informational workshop was planned for the public, but all in-person meetings were postponed due to COVID-19 impacts. A virtual Informational Report was presented to the Planning Commission on May 18, 2020. A Public Informational Workshop held virtually on May 14, 2020 for the community included members of the CEAC and P&R Commission members.

The purpose of the Public Informational Workshop and Informational Reports was to provide a high level overview of the Plan and inform commission and committee members, as well as the public, about its measures to reduce greenhouse gases that contribute to climate change. Attendees were also invited to share comments and ask questions about the Plan during these presentations. The Public Informational Workshop was promoted via the City's website and e-notifications, email messages to City Commissions and Committees and the Chamber of Commerce, a Public Service Announcement on MCTV Channel 27, emails to a database of residents involved in Sustainable Millbrae programs, and via the City's social media pages.

2 Greenhouse Gas Inventory and Forecast

The emissions inventory provides an important foundation for the Climate Action Plan (Plan), providing a baseline year, 2005, against which progress toward the City goal of reducing greenhouse gas (GHG) emissions 32% by 2025 and 49% by 2030 can be measured. This Plan includes a business-as-usual (BAU) forecast of GHG emissions, which will enable the City of Millbrae to estimate the amount of emissions reductions needed to meet its goal.

2.3 Inventory Sources and Data Collection Process

An inventory of GHG emissions requires the collection of information (data) from a variety of sectors and sources. The emissions inventory completed for the City of Millbrae follows the standard outlined in the Bay Area Air Quality Management District (BAAQMD) GHG Plan Level Quantification Guidance (dated May 2012), as well as the Local Government Operations Protocol[13].

Table 1 summarizes the sectors, emissions sources, and energy types included in our GHG inventory.

[13] *Local Government Operations Protocol For the quantification and reporting of greenhouse gas emissions inventories* (Version 1.0). Developed in partnership by California Air Resources Board, California Climate Action Registry, ICLEI – Local Governments for Sustainability, and The Climate Registry. (September 2008). Note that a newer version (version 1.1, dated May 2010) of the LGOP is available; however, at the time the GHG inventory was completed for the City of Millbrae, only version 1.0 was available.

Table 1: Sectors and Emissions in the GHG Inventory

Sector	Emissions sources	Energy types
Residential	Energy and water use in residential buildings	Electricity Natural gas
Commercial	Energy and water use in commercial, government and institutional buildings	Electricity Natural gas
Industrial	Energy and water use in industrial facilities, and processes	Electricity Natural gas
Transportation and Land Use*	All road vehicles Public transportation Light rail Off-road vehicles/equipment	Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel
Waste	Landfills Waste stream	Landfill gas (methane)
Wastewater	Process and fugitive emissions from treating wastewater, and associated stationary emissions	Not applicable
Water**	To be determined	To be determined
Stationary Sources**	Stationary combustion of fuel in various equipment, such as boilers and backup generators.	Various – may include natural gas, propane, and diesel

* Some sectors may be updated in a new version of the BAAQMD GHG Plan Level Quantification Guidance.[14]

** Water and Stationary Sources were included in the 2010-2014 inventories, but not the 2005 inventory.

While the BAAQMD GHG Plan Level Guidance recommends the inclusion of GHG emissions from water processing delivery, and wastewater treatment that occurs outside of the City's boundary, these emissions are not included in the City's baseline inventory due to lack of data on the energy used for water processing, delivery, and wastewater treatment in the baseline year. The following are emission sources that are mentioned in the BAAQMD GHG Plan Level Guidance but were excluded from the City's inventory because they are not applicable in Millbrae: airports and sea ports, non-road vehicle use (planes, trains, ships), and water travel.

In 2012, ICLEI – Local Governments for Sustainability (ICLEI) developed the U.S. Community Protocol[15], which is the first U.S.-specific protocol for developing community-wide GHG emissions estimates. In 2013, ICLEI released an updated Version 1.1 of the U.S. Community Protocol. All future inventories should utilize this protocol. Future inventories will also utilize the most recent version of the Local Government Operations Protocol, as well as any updated guidance from the BAAQMD.

The industry-accepted methodology for quantifying a community-wide GHG emissions inventory focuses on emissions that occur from combustion sources within city limits and from electricity

[14] For updates to the GHG Plan Level Quantification Guidance, visit http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

[15] ICLEI – Local Governments for Sustainability, *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Version 1.0)* (October 2012).

consumption. In the future, there may be the opportunity and need to quantity GHG emissions associated with the goods and products procured by communities and its residents. This type of lifecycle emissions accounting is not included in this Climate Action Plan.

As mentioned in Section 1.6, the City of Millbrae contracted with ICLEI in 2007 to assist with an inventory of municipal operations and community-wide GHG emissions for 2005, the baseline year by which reductions would be measured, and develop a report. The City participated in another study in which the City/County Association of Governments of San Mateo County (C/CAG) and the County of San Mateo developed a Community-Wide GHG Emissions Inventory for 2005. The project completed by ICLEI and the associated report is the primary source of data for the baseline inventory, while the project completed by C/CAG and the County of San Mateo is the secondary source of data for this plan. See Appendix H. Baseline GHG Inventory Updates for more details.

2.4 Baseline Emissions Inventory for 2005

In the base year of 2005, approximately 150,643 metric tons of carbon dioxide equivalent (MTCO2e) were emitted in Millbrae from the residential, commercial, industrial, transportation, waste, and municipal sectors.[16] Municipal sector emissions are calculated and reported because the City generally has more control over these emissions than emissions from the other sectors, and thus the City can implement specific policies and programs to reduce municipal emissions. However, in the context of the community-wide inventory, the municipal emissions are included in the commercial/industrial sector. Burning fossil fuels in vehicles and for energy use in buildings and facilities is the largest contributor to the City's GHG emissions.

Table 2 provides a summary of total city-wide (i.e. community and municipal) GHG emissions.

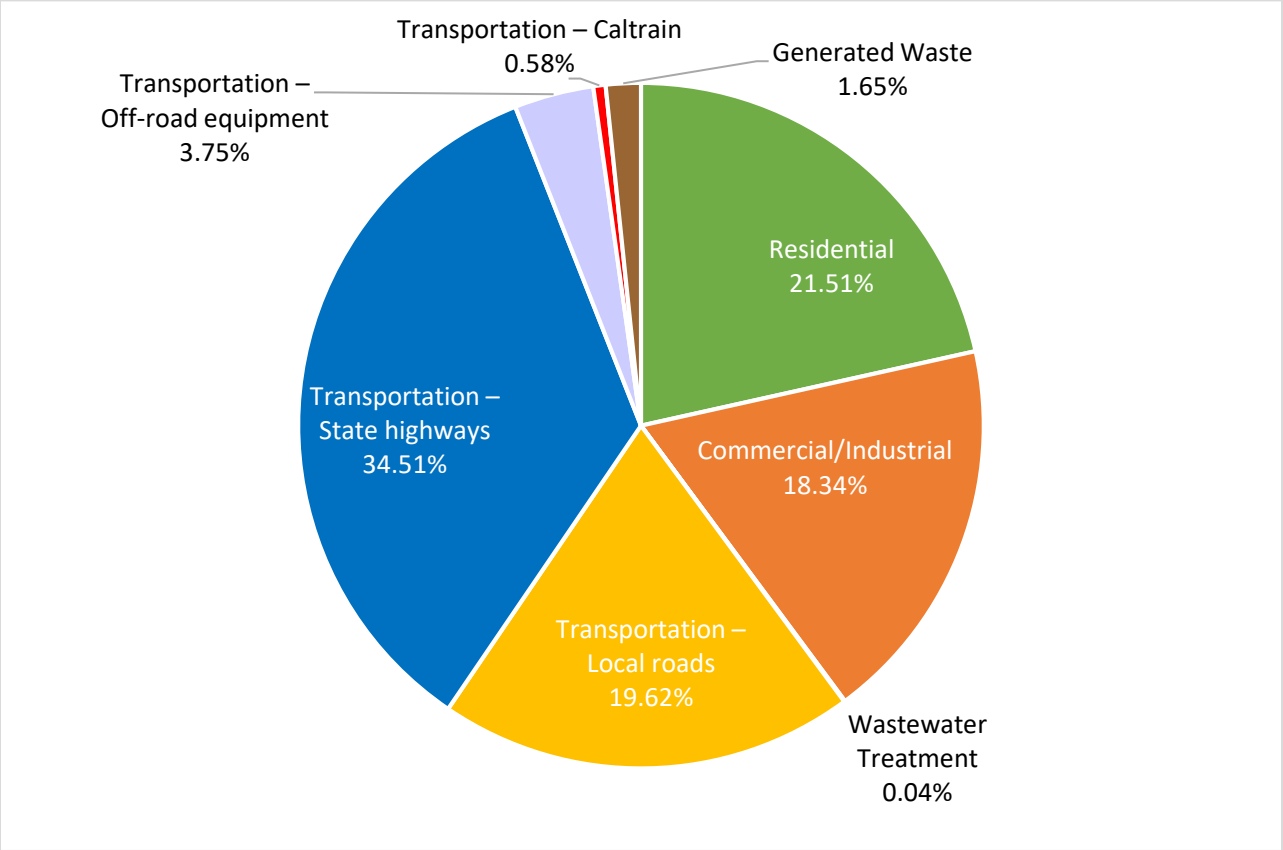
[16] Carbon dioxide equivalent is a unit of measure that normalizes the varying climate warming potencies of all six GHG emissions, which are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). For example, one metric ton of methane is equivalent to 21 metric tons of CO_2e. One metric ton of nitrous oxide is 210 metric tons of CO_2e.

Table 2: 2005 Community Emissions by Sector

Sector	GHG Emissions ($MTCO_2e$)	Percentage of GHG Emissions
Residential	32,405	21.5%
Commercial/Industrial	27,633	18.3%
Transportation – Local roads	29,558	19.6%
Transportation – State highways	51,981	34.5%
Transportation – Off-road equipment	5,645	3.7%
Transportation – Caltrain	873	0.6%
Generated Waste	2,486	1.7%
Wastewater Treatment	62	0.04%
TOTAL	**150,643**	**100%**

The residential, commercial, and industrial sectors represent emissions that result from electricity and natural gas used in both private and public sector buildings and facilities. The transportation sector includes emissions from private, commercial, and fleet vehicles driven within the City's geographical boundaries as well as the emissions from transit vehicles and the City-owned fleet. Off-road equipment includes lawnmowers, garden equipment, and construction, industrial, and light commercial equipment. Figure 5 shows the proportion of Millbrae's total GHG emissions from all major sources for 2005.

Figure 5: Community Emissions by Sector[17] (2005)



As shown above, the four largest sectors of emissions are either related to transportation (State highways and local roads) or building energy use (residential and commercial/industrial).

2.4.1 Electricity and Natural Gas Emissions

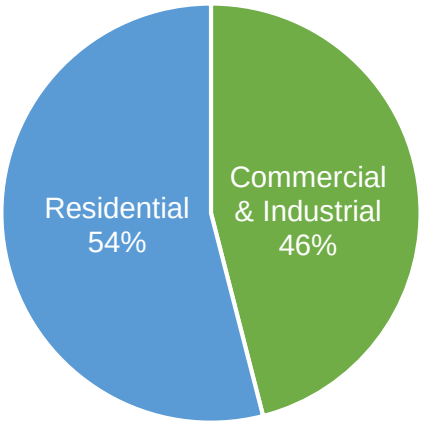
In 2005, Millbrae's total stationary energy consumption was 97,600,567 kilowatt-hours (kWh) of electricity and 8,251,321 therms of natural gas, including municipal operations and direct access customers. Direct access is when an end use customer buys electricity or natural gas on the wholesale market, rather than from the Pacific Gas and Electric Company (PG&E) or Peninsula Clean Energy (PCE). Stationary energy use by all community sectors (residential, commercial,

[17] While Millbrae's water emissions are not displayed separately in the chart above, they have been accounted for in the commercial/industrial and residential building energy sectors.

industrial, and municipal operations) accounted for 40% of total 2005 GHG emissions in Millbrae, resulting in a total of 60,038 $MTCO_2e$ emissions.

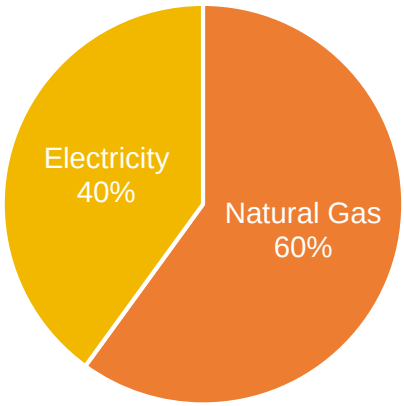
Of the total 60,038 $MTCO_2e$ emitted due to energy use in buildings, the residential sector accounts for a slightly greater portion (54%) of GHG emissions than commercial/industrial sector (46%).

Figure 6: Building GHG Emissions by Sector



Of the total 60,038 $MTCO_2e$ emitted due to energy use in buildings, natural gas accounts for a greater portion (60%) of GHG emissions than electricity (40%).

Figure 7: Building GHG Emissions by Fuel Type



It is important to note that emissions associated with the generation of electricity, which make up a significant portion of the greenhouse gases associated with building energy, can vary widely from year to year. The GHG emissions associated with electricity use are based on an emissions factor specific to PG&E's territory that is calculated annually by PG&E and then made available to cities. The source of the emission factor used for the 2005 baseline inventory is the PG&E Power/Utility Protocol (PUP) spreadsheet of the PG&E California Climate Action Registry Report. In future inventory years, the emission factor may be found in the Additional Optional Information tab of PG&E's Electric Power Sector report spreadsheet, which is part of PG&E's Report to The Climate Registry. PG&E's specific emissions factor is calculated by dividing PG&E's total emissions from their power plants (in pounds of CO_2) by the total amount of electricity (in megawatt-hours, MWh) delivered to end users. This factor varies year over year because PG&E's electricity sources change. For instance, the utility specific emissions factor for PG&E in 2006 was 455.81 lbs/MWh whereas in 2008 it was 641.35 lbs/MWh. For PG&E, the variance is typically dependent on the availability of hydroelectric resources. During low precipitation years, there is less water available to generate emissions-free hydropower. Because of this, PG&E must compensate by supplying more electricity generated from natural gas or coal.

For the 2005 baseline inventory, the 2005 emissions factor was used. For future inventories, a three-year average emissions factor could be used to address the large variance that may occur from year to year. Emissions from natural gas usage are calculated using the emissions factor from the EPA Climate Leaders, Stationary Combustion Guidance (2007), Table A-1, based on the US EPA, Inventory of Greenhouse Gas Emissions and Sinks: 1990-2005 (2007), Annex 3.1 (see also Local Government Operations Protocol, Table G.3).

2.4.2 Transportation Emissions

In 2005, transportation emissions accounted for 58% of Millbrae's total emissions. Travel on local roads accounted for 20% of transportation emissions (29,558 $MTCO_2e$), travel on State highways within city limits accounted for 35% (51,981 $MTCO_2e$), and emissions from off-road equipment, such as lawn and garden or construction and industrial equipment, accounted for 3.7% (5,645 $MTCO_2e$).

On-road transportation emissions are based on figures for total vehicle miles traveled (VMT) for the City of Millbrae provided by the Metropolitan Transportation Commission (MTC) and calculated from 2005 California Public Road Data, Highway Performance Monitoring System, State of California, Department of Transportation and Caltrans GIS data of State highway road segments divided into jurisdictional segments. Off-road equipment emissions data is calculated from BAAQMD, using EMFAC2007 as a proxy for unavailable 2005 data.

Figure 8 summarizes the proportion of total on-road transportation emissions from highway versus local roads travel.

Figure 8: Transportation Emissions – Highways v. Local Travel

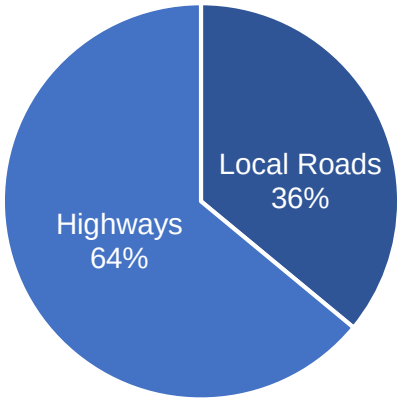
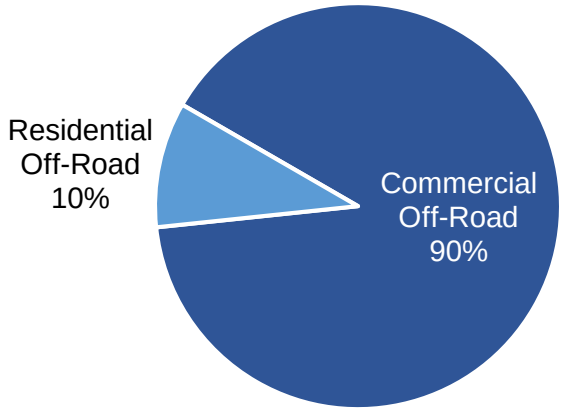


Figure 9 summarizes the proportion of total off-road transportation emissions from residential versus commercial equipment.

Figure 9: Transportation Emissions – Residential v. Commercial Off-road Equipment



2.4.3 Solid Waste

In 2005, 13,481 tons of solid waste were sent to landfills, resulting in 2,461 $MTCO_2e$ of emissions. Another 25 $MTCO_2e$ of emissions are estimated from the 1,347 tons of alternative daily cover (ADC) used on the surface of the active face of municipal landfills to control odors, blowing litter, and scavenging. Together, landfilled solid waste and ADC accounted for approximately 2% of Millbrae's total emissions.

Emissions from waste result from organic materials decomposing in the anaerobic environment of a landfill that produces methane, a GHG 21 times more potent than carbon dioxide. Organic materials (e.g., paper, plant debris, food waste, and so forth) generate methane within the anaerobic environment of a landfill while non-organic materials (e.g., metal, glass, and so on) do not. Table 3 shows the approximate breakdown of the materials Millbrae sent to landfills in 2005. Materials that do not release GHGs as they decompose are included in the "All Other Waste" category.

Table 3: Assumed Waste Composition[18]

Waste Type	Waste Share
Paper Products	21.0 %
Food Waste	14.6 %
Plant Debris	6.9 %
Wood/Textiles	21.8 %
All Other Waste	35.7 %
TOTAL	100 %

2.4.4 Municipal Operations

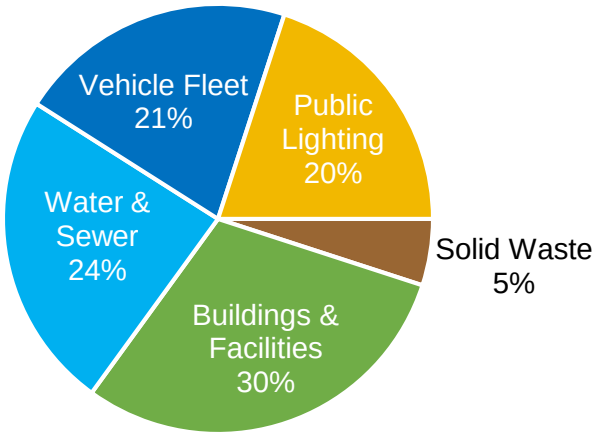
In 2005, Millbrae's municipal operations generated 1,645 $MTCO_2e$ of emissions, accounting for slightly more than 1% of the City's total emissions. Table 4: 2005 Millbrae Government Operations Emissions by Sector and Figure 10 below show that municipal buildings and facilities were the largest source of GHG emissions, followed by water and sewer operations.

[18] California Integrated Waste Management Board, Statewide Waste Characterization Study, https://www2.calrecycle.ca.gov/Publications/Details/1097, (December 12, 2004). This state average waste characterization accounts for residential, commercial and self-haul waste.

Table 4: 2005 Millbrae Government Operations Emissions by Sector

Sector	Greenhouse Gas Emissions (metric tons CO_2e)
Buildings and Facilities	496
Water and Sewer	389
Vehicle Fleet	344
Public Lighting	329
Government-Generated Solid Waste	87
TOTAL	**1,645**

Figure 10: 2005 Millbrae Government Operations Emissions by Sector



2.4.5 Emissions Forecast for 2025 and 2030

Based on the recently completed 2015 community GHG inventory, the City of Millbrae forecasted future emissions for the years 2025 and 2030. The emissions forecast represents a "business-as-usual" (BAU) prediction of how GHG emissions would grow in the absence of GHG policy. Conducting an emissions forecast is essential for developing the Climate Action Plan because one must compare future reductions with future emissions levels, not current levels.

The projected BAU GHG emissions are based on the emissions from the existing growth pattern prior to the adoption of this Climate Action Plan. More specifically, business-as-usual emissions would occur if Millbrae were to continue its 2015 patterns of travel, energy and water

consumption, and waste generation and disposal. The BAU emissions are projected in the absence of any mitigation measures, policies, or actions that would reduce emissions over time, including landmark State legislation described in Appendix B. State Policy and Regulatory Context. Programs, policies, and measures implemented after 2015 are considered beyond business-as-usual. The projections use growth factors specific to each of the different economic sectors. Table 5 below summarizes the results of the forecast.

Table 5: Millbrae "Business as Usual" Emissions Forecast for 2030

Emissions Sources	2005 Emissions ($MTCO_2e$)	2015 Emissions ($MTCO_2e$)	Annual Growth Rate: 2015-2030	2030 BAU Emissions ($MTCO_2e$)
Residential	32,405	25,281	0.66%	27,920
Commercial/Industrial	27,633	27,273	2.27%	38,177
Transportation	88,057	89,382	0.62%	98,042
Waste	2,548	3,618	1.42%	4,471
Water	N/A	196	1.42%	243
TOTAL	**150,643**	**145,750**	**0.99%**	**168,853**

The emissions forecast for each sector was projected because specific factors affect each sector differently (e.g. new building energy codes or new fuel economy standards for vehicles). This approach provides a better approximation of future emissions. The following points explain how the emissions forecast was estimated for each sector:

- For the residential energy sector, the compound annual population growth rate was calculated from 2015 through 2030 using population projections from the Association of Bay Area Governments (ABAG).
- For the commercial energy sector, the compound annual job growth rate was calculated from 2015 through 2030 using job projections from ABAG.
- For the transportation sector, the compound annual VMT growth rate was calculated from 2015 through 2030 using VMT projections from MTC.
- For waste and water emissions growth, the primary determinate for growth in emissions is population and jobs. Therefore, the compound annual population and jobs growth rates from 2015 through 2030 were used to estimate future emission in the waste and water sectors.

2.5 Emission Reduction Targets

The original California Air Resources Board Climate Change Scoping Plan was approved by the Board in 2008 and sought to bring California to a low carbon future, reaching 1990 emissions

levels by 2020. As part of that reduction, the plan asked municipal governments to reduce their emissions by at least 15% by 2020 compared with current levels (current levels are defined as 2008 levels or earlier). The plan also directed local governments to assist the state in meeting California's emissions goals. The updated California's 2017 Climate Change Scoping Plan reflects the 2030 emissions reduction target set by Executive Order B-30-15 and codified by SB 32. Many cities have consequently adopted community-wide emissions reduction targets of at least 15% below 2005 levels by 2020 and 49% below 2005 levels by 2030. The City is using the 49% emissions reduction target by 2020 as 2005 as the baseline, with an interim target of 32% below 2005 levels by 2025.

Some cities have also established more aggressive emissions reduction targets in line with State Executive Order B-55-18 which aims to achieve carbon neutrality as soon as possible, and no later than 2045. This carbon neutrality target is based on the Paris Agreement which calls for preventing average global temperature from rising more than 2°C (3.6°F) above pre-industrial levels and pursuing efforts to keep warming below 1.5°C (2.7°F). According to the IPCC, holding temperature rise below 1.5°C will mean global emissions of CO_2 will need to decline 45% from 2010 levels by 2030 and reach net zero by 2050. U.S. cities that have adopted aggressive targets of reducing emissions by 80-100% by 2050 or sooner include Boulder, Minneapolis, New York City, Portland, San Francisco and Washington D.C. The City will meet the 2030 GHG target emissions reductions and is on a trajectory to meet carbon neutrality by 2045. The City expects that the future update to this CAP will outline how the City will meet carbon neutrality by 2045.

The GHG emission reductions presented in this Plan are calculated using the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC)[19]. Emission reductions are reported across several sectors and sub-sectors and include both consumption and production activities that occur within the City's boundaries.

In line with SB 32, this Climate Action Plan sets a GHG reduction target of 49% below 2005 levels by 2030. This Plan summarizes the actions that the City is planning to take to reduce emissions within our community.

2.5.1 Reductions from State-Level Actions

In addition to the actions outlined here, regulations aimed at reducing GHG emissions at the State and regional levels will also contribute to emissions reductions in Millbrae. For example, the California Renewable Portfolio Standard (RPS) mandates that 100% of electricity sold by the State's investor-owned utilities be generated from renewable resources by 2045. These

[19] https://ghgprotocol.org/sites/default/files/standards/GHGP_GPC_0.pdf

actions are summarized in Section 1.1. A summary of the expected emissions reductions from State programs is provided in

Table 6 and additional information is included in Appendix B. State Policy and Regulatory Context. The impact of State-level actions on reducing local emissions is significant, and is shown in relation to the City's emissions baseline, BAU forecast, and reduction target in Figure 11: Millbrae GHG Reduction Target

Table 6: Total Emission Reductions from State of California Programs

State Initiative	Sector	% emissions reduction from applicable sector in 2030	2030 reduction in City's emissions (MTCO2e)
Advanced Clean Cars Program	On-road Transportation	30.4%	**27,207**
Low Carbon Fuel Standards	Off-road Transportation	17.1%	**1,223**
Caltrain Electrification	Trains	89.1%	**1,045**
Renewable Portfolio Standard	Electricity (Energy)	21.4%	**5,360**
100% Zero Net Energy New Residential 2020	Residential Energy	4.6%	**1,279**
50% Zero Net Energy Existing Commercial 2030	Commercial Energy	21.4%	**8,157**
Organic Waste Diversion SB 1383	Disposed Waste	80.0%	**2,007**
A. Total State-wide Initiative Emissions Reductions			**46,277**

The City of Millbrae Reduction Target

The City of Millbrae is committing to reducing community-wide greenhouse gas emissions 49% by 2030, a reduction of 92,025 metric tons of carbon dioxide equivalent.

The City of Millbrae is committed to an emissions reduction target of 49% below the baseline 2005 levels by 2030 and an interim target of 32% below baseline levels by 2025. This goal is selected to be consistent with the California SB 32 qualified GHG emissions reduction strategy and to be achievable by City-supported measures identified in the Plan. The target for SB 32 is a 40% reduction from the 1990 baseline by 2030, however, few California cities performed a 1990 baseline, with Millbrae's first inventory being performed for 2005. Emissions in California continued to increase from the period of 1990-2005. Based on direction from California Air Resources Board, cities

are to assume that a 15% reduction from 2005 levels will be equivalent to 1990 levels. The resulting savings requirement versus 2005 levels is 49% as shown in the equations below:

- 2005 emissions = 100 / 0.85 = 117.46% of 1990 emissions
- 2030 emissions target = {(117.64% - (100% - 40% [SB 32 mandated savings])) / 117.64%} = 49% required emissions savings versus 2005 baseline.

Figure 11 illustrates how the BAU emissions are estimated to increase, thus widening the emissions reductions needed by 2025 and 2030. Figure 11 also shows the emissions reductions expected from State-level actions, and the reductions needed to reach the City's emissions target.

Table 7 shows the baseline emissions, forecasted emissions, targeted emissions, and emissions needed to reach the targets.

Figure 11: Millbrae GHG Reduction Target

(32% below 2005 levels by 2025 and 49% below 2005 levels by 2030)

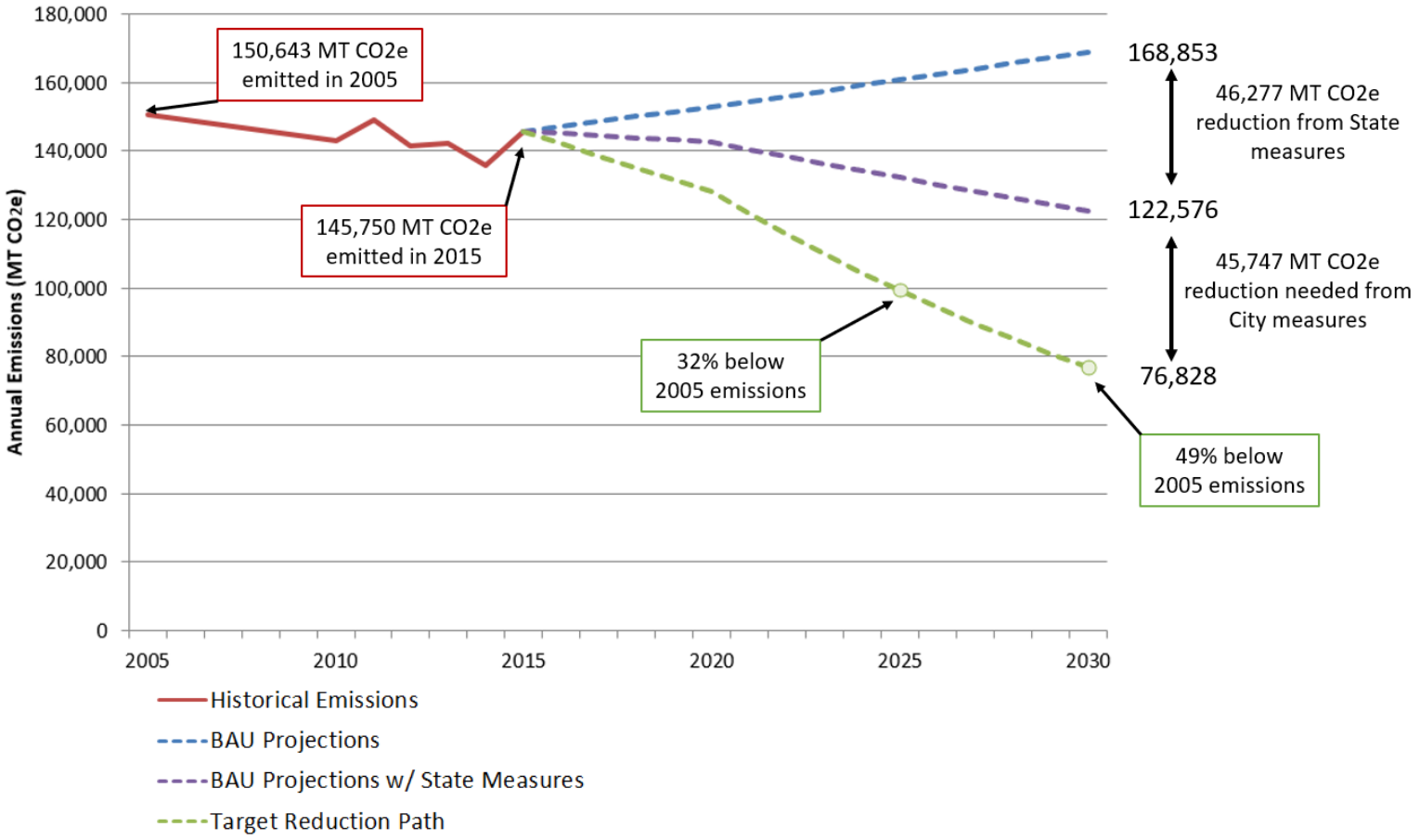


Table 7: GHG Emissions Projection and Reduction Target

Description	Emissions ($MTCO_2e$)
2005 Base Year Emissions:	150,643
2025 Target Emissions at 32% below 2005:	102,437
2025 BAU Emissions:	160,682
2025 Required Reduction:	**58,245**
2030 Target Emissions at 49% below 2005:	76,828
2030 BAU Emissions:	168,853
2030 Required Reduction:	**92,025**

3 Climate Action Strategies

This Climate Action Plan (Plan) is a beginning of a journey towards a more sustainable Millbrae. In these pages, the citizens and business community of Millbrae will find policies and programs that aim to reduce emissions, save energy (and money), and help the City of Millbrae (City) continue to be a beautiful and healthy place to live, work, and play as time goes on.

By adopting this Plan, the City is committing to take action to reduce greenhouse gas (GHG) emissions. The Plan provides a prioritized list of actions, or "measures". Many of the strategies in this Plan are already in progress or underway. The City benefits from its longstanding leadership in environmental programs, and a number of the measures included in this Plan extend current environmental programs that will help achieve its goals. Some of the other strategies are newly proposed policies or programs, each of which should be further studied before being implemented. Some of the emissions reductions will come from State and countywide transportation strategies that are essential in order for the City to achieve the emissions reduction goal by 2030. In addition, this Plan contains a mix of voluntary strategies and mandatory policies. Of the 43 measures included in this plan, 21 are new programs or policies. While implementation dates have been allocated to the various measures, dates may change based on financial considerations and other conditions outside of the City's control.

The programs and policies described give Millbrae a viable path towards reducing emissions that, combined with emissions reductions resulting from countywide programs and State and regional policies, will meet the emissions reduction goals adopted by the City Council and established in Assembly Bill (AB) 32 and Senate Bill (SB) 32.

Sections 2.2 and 2.3 of this Plan presented Milestones 1 and 2 in ICLEI's Five Milestone Framework: Millbrae's emissions inventory and the community emissions reduction target. The following sections represent Milestone 3: The Climate Action Plan.

Each section below outlines the specific measures that seek to reduce GHG emissions in Millbrae. Most measures are summaries of existing programs or policies already in place in Millbrae. For example, one measure to increase the City's solid waste diversion rate incorporates numerous policies or programs already underway, including recycling programs, a

single use carryout bag ordinance, and a sustainable food service ware ordinance. For methodology of how measures were selected and prioritized for action, see Section 4.1. Some measures aim to reduce emissions from the community at large, while other measures may specifically focus on municipal operations. All of the measures are assumed to lead to specific and quantifiable reductions of GHG emissions except for four measures that are considered "supporting measures". These supporting measures don't have quantifiable emissions reductions in themselves, but support other measures that do. For example, the City's Purchasing Policy: Recyclable Materials measure supports the overarching Municipal Zero Waste Policy measure.

This chapter is organized by the type of emissions reduction activity, or "sector" of emissions reductions: Energy (which includes water conservation); Transportation and Land Use; Solid Waste; and a section for one program that covers All Sectors. The chapters include background information for each sector, a general description of the programs and policies that apply to the sector, and concludes with the list of quantifiable emissions reduction measures for the sector. The methodology for GHG savings of each measure is described in Appendix J: GHG Savings Methodology.

3.1 Energy

In the United States, buildings account for 70% of total electricity use and about 40% of GHG emissions.[20] Since the 1970s, the State of California has led the nation in developing and implementing successful energy-efficiency efforts. The State is committed to first meet its energy needs "through all available energy efficiency and demand reduction resources that are cost effective, reliable and feasible."[21]

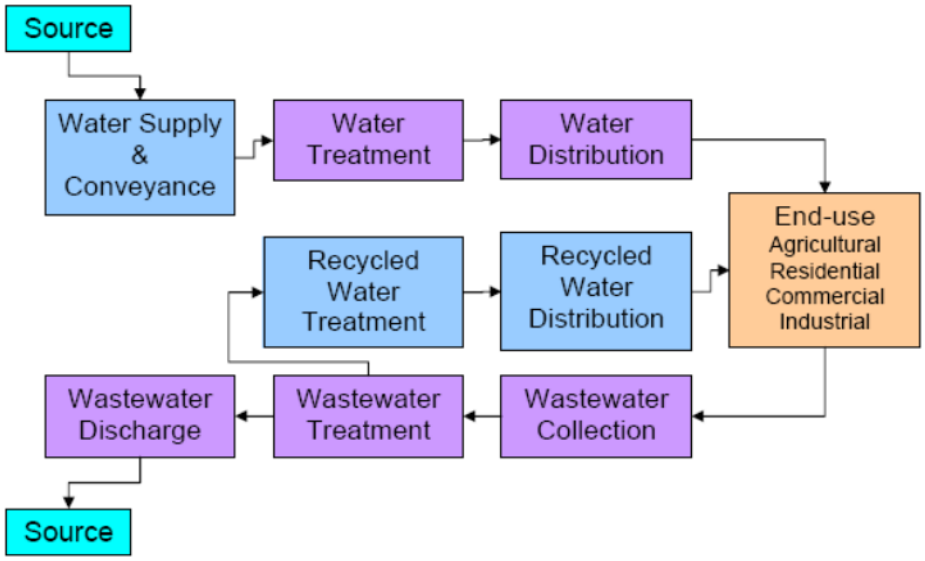
California has long been a leader in implementing policies aimed at improving the energy efficiency of its building stock. The California Energy Efficiency Standards for Residential and Residential Buildings (Title 24, Part 6 of the California Code of Regulations) mandates minimum levels of energy efficiency in both new construction and renovation projects. These requirements were updated in 2016 to further increase building and appliance energy efficiency. California has also set targets for "zero net-energy" new buildings, in which efficiency and on-site generation are combined to reduce residential buildings to zero net-energy use by 2020 and commercial buildings by 2030.[22]

Building energy is the sector with the most immediately achievable and affordable reduction opportunities. Energy efficiency is the most cost-effective measure for GHG reductions and has numerous co-benefits such as cost savings over time and promotion of green collar jobs. Design and construction of new buildings, and major renovations of existing ones, provide an opportunity to implement energy-saving measures that reduce GHG emissions. Generous utility rebates and federal tax incentives make investing in energy efficiency increasingly attractive. Along with energy efficiency, California has a long history of supporting renewable energy generation. With the idea of "reduce, then produce," a sensible energy policy seeks to first maximize energy efficiency and then look to generate electricity with low-carbon fuels and renewable resources.

Energy and water use are linked. Energy is needed to transport and treat water so that it is safe for public consumption. Energy is also used to treat wastewater so that it can be discharged back to the environment. Figure 12 demonstrates California's water use cycle.

[20] M.C. Fuller, S.C. Portis, and D.M. Kammen, "Toward a Low-Carbon Economy: Municipal Financing for Energy Efficiency and Solar Power", Environment Magazine (2009).
[21] California Energy Commission, California Public Utilities Commission and Consumer Power and Conservation Financing Authority, *Energy Action Plan*, http://docs.cpuc.ca.gov/word_pdf/REPORT/28715.pdf (May 8, 2003).
[22] California Energy Commission, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF (2007).

Figure 12: California's Water Use Cycle[23]



Energy is used in each step of the process. Water is collected, treated, and distributed to end users in farms, residences, businesses, and industries. Energy, (usually natural gas,) is used to heat water for use in buildings. Then energy is needed to treat water for discharge back to the environment. 19% of the State's electricity and 32% of the state's natural gas is consumed during this cycle.[23] 58% of the electricity and 98.5% of the natural gas consumption stems from the residential, business, and industrial end users alone.

Reducing water consumption through efficiency and conservation can make a big impact on energy consumption as well as protect against drought, a common problem in California. SB X7-7 was enacted in November 2009, requiring all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per capita urban water use 20% by December 31, 2020. The California State Integrated Water Management Planning Process promotes bringing together and prioritizing water-related efforts in a systematic way to ensure sustainable water uses and reliable water supplies. In addition, the State has enacted long term water use efficiency regulations in response to the drought spanning 2012-2016.

This chapter describes continuing and new programs and initiatives that will promote energy and water efficiency as well as renewable energy in both existing and new buildings.

This Plan, through a combination of State and City measures, outlines a path to reducing energy emissions 55% below 2005 levels by 2030.

[23]California Energy Commission, "California's Water-Energy Relationship" (2005).

3.1.1. Goal: Improve Energy Efficiency and Increase Electrification of Existing Buildings and New Construction Projects

Existing and Continuing Community-wide Energy Efficiency and Electrification Measures

Energy Efficiency in New Construction: Green Building Regulations

Reduced energy use in both new construction and existing buildings will continue to be achieved through the City's adoption and implementation of the California Green Building Standards Code (CALGreen), which affects new buildings and remodels. This program helps to reduce consumption of electricity, natural gas, and water as well as promote environmentally sustainable building materials. Originally, a Green Building Ordinance was enacted in 2010 by the City which required an additional 15% energy reduction over the State energy code at the time for all new buildings and certain remodeling projects. The Ordinance also required the use of Energy Star appliances. The City adopted the CALGreen Code in 2014[24]. The 2016 update to the Building Energy Efficiency Standards focused on several key areas to improve the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvements to the residential standards include improvements for attics, walls, water heating, and lighting.

The 2019 Building Energy Efficiency Standards, which went into effect in January 2020, require all new residential construction and major remodels to be built to a zero net energy (ZNE) standard. A ZNE building is one that produces as much energy (generally through onsite renewable energy) as it consumes. Along with new efficiency requirements, as of January 2020, all new residential construction statewide must include rooftop solar photovoltaic systems sized to offset simulated on-site electricity use. The City adopted the 2019 CALGreen code and will adopt electrification Reach Codes for all new commercial and residential new construction. The goal of these Reach Codes would be to mandate all-electric for new construction, or one of the exception options that may allow for specified usage of natural gas. This is discussed in the "New Residential and Commercial Energy Efficiency and Electrification Measures" section.

The City will continue adopting the CalGreen Code for applicable updates outside of the Reach Codes and evaluate requiring cool roofs and other sustainable measures in the future. The measure calculations assume that approximately 96,000 square feet of residential and 218,000 square feet of non-residential new construction or remodels are built per year, based on a previous review of permitted construction and projected growth in population and jobs.

[24] The full text of the CALGreen Code Ordinance can be found in Chapter 9.35 of the municipal code: http://www.codepublishing.com/ca/millbrae.html

Table 8 summarizes the estimated GHG reductions associated with the CALGreen Code measures.

Table 8: Existing Community Measures: Energy Efficiency in New Buildings

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
1	Commercial Green Building Ordinance	The City will continue to adopt the latest version of the CALGreen Code for non-residential new construction and major remodels for applicable updates outside of the Reach Codes.	497
2	Residential Green Building Ordinance	The City will continue to adopt the latest version of the CALGreen Code for residential new construction and major remodels for applicable updates outside of the Reach Codes.	146

Energy Efficiency in Existing Buildings

Millbrae is a mostly built-out community where there is a limited amount of open land available for construction; therefore, a large focus is on achieving energy efficiencies from existing buildings. Most homes in Millbrae were built prior to the enactment of State energy codes and have significant potential to increase their energy efficiency. Typically, homes can increase their energy efficiency by 30 to 40%.[25] Energy efficiency programs can help Millbrae residents reduce energy consumption and utility costs. Similarly, most businesses spend approximately 30% of their operating budget on energy costs. Providing businesses with energy efficiency resources can help them save on utility costs and reduce emissions.

The City has participated in a number of energy conservation programs for many years that will continue to help achieve the emissions reduction targets. These programs include the Energy Upgrade California™ Program, the Bay Area Regional Energy Network (BayREN), San Mateo County Energy Watch (SMCEW), and the Pacific Gas and Electric Company (PG&E) rebate and incentive programs. The City has also conducted public outreach and holds energy efficient workshops.

Energy Retrofit Incentives and Rebates

The City began participating in the Energy Upgrade California™ Program in 2010 through the coordinated efforts of the County of San Mateo to promote the state-wide voluntary energy

[25] California Public Utilities Commission, *Long Term Energy Efficiency Strategic Plan*, San Francisco (2008).

efficiency retrofit program for residential buildings, which matched homeowners with local contractors and provided rebates. This program has changed, and other energy efficiency programs as described below have emerged offering opportunities for residents, businesses, schools, and local governments.

The San Mateo County Energy Watch (SMCEW) Program is a local government partnership between PG&E and the City/County Association of Governments of San Mateo County (C/CAG), and is administered by the County's Office of Sustainability. SMCEW partners with the non-profit organization Ecology Action to provide no-cost technical services to eligible San Mateo County local governments, schools, non-profits, and businesses. SMCEW provides coordination, outreach, and educational resources to help guide community members through the implementation process. SMCEW also has a Check-It-Out Home Energy and Water Saving Toolkit program which residents can check out from the libraries to perform a basic assessment of the efficiency of their home energy and water use and how to improve it where possible. The Bay Area Regional Energy Network (BayREN) is a collaboration of the nine Bay Area counties led by the Association of Bay Area Governments (ABAG). The BayREN Home+ Program offers cash rebates for home improvements for single family homes, plus certified contractors along with support through the process. In 2020, BayREN added increased incentives for electrification of heating, water heating, cooking, and clothes drying equipment to their measures; offering up to $1,000 per appliance. BayREN also has energy efficient programs for multi-family buildings, including no-cost energy consulting for energy and water upgrades to multi-family buildings, and various energy efficient programs. BayREN programs for businesses include a Pay-for-Performance Program, microloans for energy efficient programs, Commercial PACE Financing consulting, and technical assistance.

To date, at least eight Millbrae homeowners have participated in BayREN program and received rebates and dozens of homeowners and contractors have received technical assistance on energy efficiency and home performance. There are eight businesses that have participated in the direct install program for upgrades to energy efficient lighting and refrigeration systems. The City also holds basic home energy efficiency workshops and has aired them on Millbrae Community Television. The City will continue to promote the programs to the community as an effective way to implement home energy efficiencies that will lower energy costs while also reducing GHG emissions, as well as continue with outreach and education programs. Increasing promotion of all of the incentive programs will lead to greater energy and water savings.

PG&E Programs: Incentives and Rebate Program

Achieving significant reductions in energy consumption in the residential sector will require both public and private time and investment, which will result in cost savings and local job opportunities over time. PG&E offers various incentives through providing rebates to residents for purchasing energy efficient appliances, such as electric heat pump storage water heaters and thermostats.

Another PG&E program the City participates in is the Home Energy Analytics HOMEintel Program that provides a set of customized energy saving recommendations for residents that typically includes many simple, low-or no-cost fixes, an energy coach, and regular email updates to help residents carry out the recommendations. Outreach is conducted on this energy saving opportunity and a customized website provided at http://www.millbrae.hea.com/.

Demand Response Energy Conservation Program

Another PG&E program is the Demand Response Energy Conservation Program, which helps to avoid rolling blackouts and reduces GHG emissions. This program is funded by the California Public Utilities Commission (CPUC) and runs from June through September when energy use is typically at its greatest. When Energy Alert Days are called, participating businesses are alerted to curtail their energy use during peak times and receive payment based on how much energy is reduced. The goal is to lower electricity use by at least 10% by implementing a variety of strategies, including turning off non-essential lighting and office equipment, turning the air conditioning up to 78 degrees Fahrenheit, taking the stairs instead of the elevator, and avoiding the use of appliances. Various providers work in coordination with PG&E to implement the program. The City participated in this program for municipal operations, described in Section 3.1.3. The City will promote this program to local businesses through the Chamber of Commerce newsletter and direct contact with businesses.

Financing Options

Numerous innovative financing programs are becoming available for residential and non-residential property owners who are interested in obtaining loans for energy efficiency projects. For example, a Property Assessed Clean Energy (PACE) program is available to residential building owners and owners of multifamily buildings with five or more units. This program is described in more detail in Section 3.1.2.

Table 9 summarizes the estimated GHG reductions associated with existing community energy efficiency in existing buildings measures.

Table 9: Existing Community Measures: Energy Efficiency in Existing Buildings

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
3	Residential Energy Retrofit Incentives and Rebates	Through marketing and outreach, the City promotes participation in residential energy efficiency programs, including Energy Upgrade California, BayREN's Home+ Program, San Mateo County Energy Watch, and PG&E's efficient appliance rebates. City will encourage residential energy audits.	2,872
4	Commercial Energy Efficiency Programs	Through marketing and outreach, the City promotes participation in commercial energy efficiency programs and demand response programs offered by SMC Energy Watch and PG&E, including PGE's appliance rebates, 0% energy efficiency financing, and demand response programs. City will encourage commercial energy audits.	1,657

New Residential and Commercial Energy Efficiency and Electrification Measures

Residential and Commercial Energy Conservation Programs

Encouraging or mandating retrofits of existing buildings has proven challenging for many cities due to significant market barriers. Often, building owners lack the incentives to upgrade inefficient equipment, especially in the case of a rental property where the benefit of the upgrade accrues to the renter who pays the utility bills. However, nearby jurisdictions including San Francisco and Berkeley have achieved considerable success implementing a residential energy conservation ordinance (RECO) and a commercial energy conservation ordinance (CECO) that continually improve energy efficiency in existing buildings. Berkeley is considering updates to their ordinance, including requiring mandatory installation of energy efficiency measures, mandatory energy assessments at time of residential listings (rather than sales), and prioritizing electrification and resilience in assessments.[26]

The measures included for the City are initially voluntary for residential and commercial properties that are undergoing title transfers and would encourage minimum energy efficiency and water efficiency standards at the time of building sale, then making the measures mandatory. Typically, the current owners of the buildings are responsible for the implementation of the energy efficiencies; however, arrangements could be made to have the new owners assume responsibility for the prescribed energy efficiencies.

[26] Romain, Billi. Office of Energy & Sustainable Development, City of Berkeley, *Memo to the Berkeley Energy Commission: BESO Evaluation and Update Recommendation*, https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Commissions/Commission_for_Energy/EC2020-02-26_Item%207.pdf (February 26, 2020).

Mandatory measures would apply to residential and commercial buildings and are modeled after the City of Berkeley's Building Energy Saving Ordinance (BESO). Millbrae's ordinance would require title-transfer properties to complete comprehensive energy assessments to uncover energy saving opportunities. The assessments would be conducted by registered energy assessors who provide tailored recommendations on how to save energy and link building owners to incentive programs for energy efficiency upgrade projects, such as BayREN and Energy Upgrade California. Homeowners would not be required to implement the recommendations in the assessments; however, because the reports are tailored and show energy and cost savings, it is expected that many would take the initiative to install the energy efficiencies.

Free or Subsidized Shade Tree Program

Millbrae is a designated "Tree City USA" and plants trees every year for Arbor and Earth Day as well as throughout the year. Strategic planting of shade trees, particularly on eastern, western or southern exposures of buildings, can help decrease the need for space cooling and the associated electricity consumption during hot days. Other benefits of trees: trees can cool the streets during the hot summer months; remove carbon dioxide through sequestration; generate oxygen; clean the air of particulate matter benefitting sensitive populations like children, the elderly, and residents with asthma; reduce noise; slow traffic; encourage outdoor activity; provide a home for wildlife; increase property values; and help make the City safer and more beautiful. Carbon sequestration is the process in which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in tree trunks, branches, foliage, roots and soils. This helps to offset sources of carbon dioxide to the atmosphere, such as deforestation, forest fires, and fossil fuel emissions. Trees are very important for carbon sequestration because they can store carbon for many years. Soil is even more important because it can store carbon for thousands of years. Not only do trees store carbon in their bodies and roots and remove carbon from the air, but they also release oxygen. The City of Glendale, CA, the City of San José, CA, and the Sacramento Municipal Utility District (SMUD) have had success in reducing electricity load through the provision of free shade trees to residents and businesses. The City will evaluate options for creating and implementing a tree shade or Adopt-A Tree Program.

Electrical Panel Upgrades in Existing Buildings

Replacing natural gas equipment in existing buildings— including heating, ventilation, and air conditioning (HVAC), water heating, and cooking equipment— with all-electric equipment will be critical in achieving the emissions reduction targets. However, the capacity of electrical panels in many existing buildings is not high enough to accommodate the installation of all-electric equipment. Peninsula Clean Energy, BayREN, and PG&E have expressed interest in removing this barrier to electrification through the provision of incentives that partially or fully offset the cost of upgrading electrical panels in existing residential and non-residential buildings. New

incentives being established in 2020 include costs for electrification aimed at covering the installation costs and electrical upgrades required to electrify certain equipment. Removing or reducing this financial barrier significantly improves the cost-effectiveness of replacing natural gas equipment with all-electric equipment. The City will leverage incentives and technical assistance provided by PCE, BayREN and PG&E to encourage residents and offices to upgrade electric panels in order to accommodate all-electric technologies including solar photovoltaic (PV), battery storage, air source heat pumps, heat pump water heaters, electric dryers, electric stoves, and electric vehicles.

Residential and Commercial All-Electric Ordinance

While it has been widely known for half a century that the burning of natural gas is one of the primary drivers of climate change, gas has been used as a transition fuel in our buildings as we moved away from coal as a power source. Due to recent developments in all-electric heating, water heating, and cooking – coupled with PCE moving to a carbon-free electricity grid - that transition period is over.

New construction represents the least expensive opportunity to electrify our building stock, and is the first step towards electrifying all new and existing buildings across Millbrae by 2045. In most cases, going all-electric during new construction saves capital cost and is energy cost neutral. Moreover, removing on-site combustion of fossil fuels from our newly constructed buildings increases health and safety for building occupants. The City will leverage assistance from PCE to pass a Reach Code ordinance either requiring new buildings to be electric, or providing preference to all-electric buildings.

Table 10 summarizes the estimated GHG reductions associated with these new programs aimed at increasing energy efficiency and electrification in existing buildings.

Table 10: New Community Measures: Energy Efficiency and Electrification in Existing Buildings

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
5	Residential Energy Conservation Program	Initially start a voluntary residential energy conservation program, whereby the City would encourage minimum energy efficiency and water efficiency standards at the time of building sale. Transition to mandatory residential energy conservation ordinance over time.	607	2021 (voluntary) / 2023 (mandatory)
6	Commercial Energy Conservation Program	Initially start a voluntary commercial energy conservation program, whereby the City would encourage minimum energy efficiency and water efficiency standards at the time of building sale. Transition to mandatory commercial energy conservation ordinance over time.	458	2021 (voluntary) / 2023 (mandatory)
7	Free or Subsidized Shade Trees	Implement City program to reduce energy consumption associated with cooling homes through the provision of free or subsidized trees.	23	2021
8	Electrical Panel Upgrades in Existing Buildings	Leverage incentives and technical assistance provided by PCE, BayREN, and PG&E to encourage residents and offices to upgrade electric panels in order to accommodate all-electric technologies including solar PV, battery storage, air source heat pumps, heat pump water heaters, electric dryers, electric stoves, and electric vehicles.	6,480	2020
9	Residential & Commercial All-Electric Ordinance	Update building code to mandate that residential and commercial new construction and major remodels be built to an all-electric standard, including electric heating, cooling, and water heating.	1,617	2021

3.1.2 Goal: Promote Renewable Energy Opportunities and Programs

Existing and Continuing Community-wide Renewable Energy Measures

Renewable Energy Solar Energy Incentives

The use of solar PV energy to power homes and businesses has become a popular method for residential and non-residential energy customers to reduce their monthly utility bills and increase their use of renewable resources, thus lowering emissions. Installation of renewable energy systems are recommended only after all cost-effective efficiency measures have been implemented. The City had encouraged the installation of PV systems by offering a rebate program between 2007 and 2013 for solar systems based on the number of PV panels installed. From 2003 to June 2019, a total of 2,052 kW of solar capacity was installed in Millbrae. Of the total installed solar capacity, 68% was installed on residential buildings and 32% was installed on non-residential buildings.[27]

To further encourage solar installations, the City started participating in the Peninsula SunShares Residential Solar Bulk Procurement Program (now known as the Bay Area SunShares Program,) in 2014, with outreach to the community beginning April 2015. The City participated again in 2018 and 2019. The program now includes an electric vehicle incentive. The goal of the program is to encourage single-family homeowners to install rooftop solar PV systems by leveraging economies of scale to drive down the price and making it easy for residents to implement. Homeowners would benefit through system discounted pricing and ease of administration and ultimately reduce energy consumption and related utility costs.

Typically, the most effective renewable energy installation options for San Francisco Bay Area residents are solar hot-water heating and roof-top PV systems. The largest barrier to on-site renewable energy is high up-front financing costs and long cost recovery periods. PG&E and the State of California offer incentive programs that help defray the initial investment of energy systems. Current clean energy incentives offered through PG&E include the New Solar Home Partnership which incentivizes the installation of solar energy systems on new, energy-efficient homes and the California Solar Initiative (CSI) Thermal which incentivizes the installation of solar water heating systems on single-family homes.[28]

California Assembly Bill (AB) 1990, Solar for All, was adopted in 2012 and includes payment to homeowner or business owner generators of renewable energy for the electricity they generate. The City will also encourage residents and businesses to take advantage of the Go Solar California tax credits and other Federal, State, local, and PG&E credits. The California Energy

[27] California Distributed Generation Statistics, https://www.californiadgstats.ca.gov/.

[28] PG&E clean energy incentives and programs, https://www.pge.com/en_US/residential/solar-and-vehicles/green-energy-incentives/incentives-overview/incentives-overview.page.

Commission also provides rebates for the installation of renewable energy systems in homes, including rebates for small wind-turbine generation systems. Benefits of solar energy generation include lower energy bills, shelter from increased energy costs, and increased home and business value.

The Property Assessed Clean Energy (PACE) program is an additional funding source for renewable energy systems available to residential and commercial property owners. Through the PACE program, the costs of renewable energy installations are added to a building owner's annual property tax assessment. This funding option is currently available and promoted to single family homeowners and owners of commercial businesses and multifamily residential properties. The City currently has three PACE Programs, CaliforniaFIRST, California Home Energy Renovation Opportunity (HERO) Program, and Figtree.

In 2015, the City adopted an ordinance in compliance with AB 2188 which aims to improve the permitting process of solar energy systems. The bill required cities and counties to adopt an ordinance to create an expedited, streamlined permitting process that conforms to best practices for small residential rooftop solar energy systems.

Peninsula Clean Energy (PCE) Program

In 2016, the City became a member of the Joint Powers Authority for the newly formed PCE Program formed by the County of San Mateo to purchase electricity with higher renewable energy content. This has resulted in greater GHG emission reductions. PCE became the new default electricity provider for all of San Mateo County, and all of the City's residents and businesses were automatically enrolled in the PCE Program by April of 2017. PCE purchases greener electricity for its customers, and PG&E continues to handle electricity delivery, maintenance of wires, customer billing, and natural gas services. All customers were enrolled in the ECOplus level by default, which provides a minimum of 50% renewable energy and 90% greenhouse gas free at a 5% cost savings compared to PG&E. Residents and businesses can opt up to the ECO100 level for 100% renewable energy. Based on current participation rates in PCE service in Millbrae, it is projected that the program will reduce 2018 emissions associated with electricity consumption 35-40%.[29] Table 11 summarizes the estimated GHG reductions associated with existing community renewable energy measures.

[29] This estimate is based on 2017 participation rates in PCE service offerings (i.e. ECOplus and ECO100), the 2017 PCE emission factors for these service offerings, and the 2015 PG&E electricity emission factor. 2018 is the first full year of PCE service being offered to Millbrae customers.

Table 11: Existing Community Measures: Renewable Energy

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
10	Promote Solar Installations	Continue to participate in bulk purchase program such as the Bay Area SunShares Program. Promote the installation of solar among residents and businesses in the community.	1,527
11	Participate in Community Choice Aggregation: Community	Through Peninsula Clean Energy, the City will continue to provide greener renewable electricity to citizens and businesses.	7,320

New Community Renewable Energy Measures

Solar Requirement for New Non-Residential Construction

The California Energy Code 2019 requires the installation of either a solar PV or solar thermal installation on new residential construction of three stories or less. Some cities, including the City of San Mateo, have adopted Reach Codes to extend this solar requirement to non-residential buildings. As a part of the Reach Codes process, the City would require all new non-residential construction to install solar PV system either before or during the next Building Code update. This measure will contribute to the State reaching its goal of 100% renewable energy by 2045.

Pairing Battery Storage with Solar Photovoltaic (PV) Systems

The amount of electricity produced by solar PV systems and other renewable sources will continue to increase over time. In order to fully capitalize on the GHG reduction potential of these renewable sources, the total capacity of battery storage will need to increase dramatically. Battery storage can store excess clean electricity as it is produced and deploy it at peak times when the grid is overburdened. As more battery storage is deployed, it will reduce the need for natural gas “peaker plants” which are currently used to supply electricity during periods of peak demand. The installation of battery systems is typically most cost effective for both residential and non-residential customers when it occurs concurrently with the installation of a solar PV system. Battery storage paired with solar PV provides residents and businesses the opportunity to reduce electricity demand charges and provide a source of backup power during power outages. Through education and outreach on the benefits of pairing battery storage with solar PV to relevant stakeholders, including businesses, residents, and contractors, the City can help increase the capacity of battery storage installed in Millbrae.

Table 12 summarizes the estimated GHG reductions associated with new community renewable energy measures.

Table 12: New Community Measures: Renewable Energy

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
12	New Non-Residential Buildings Solar Requirement	Update building code to mandate that all commercial new construction and major remodels install a solar PV system at time of construction.	616	2021
13	Pairing Battery Storage with Solar PV Systems	Provide education and outreach on the benefits of pairing battery storage with solar PV systems to stakeholders, including businesses, residents, and contractors.	872	2020

3.1.3 Goal: Increase Energy Efficiencies and Proportion of Electricity from Renewable Sources in Municipal Operations

Background on Municipal Operations Energy Efficiency Programs

The City of Millbrae has been a leader in implementing energy efficient equipment in city facilities, traffic signals and streetlights. The City first installed energy efficient equipment, such as lighting, in City facilities in 2003. The City enrolled in ABAG's Local Government Energy Partnership Program in 2004 to evaluate energy efficiency opportunities for City facilities. An Energy Assessment Report was developed that provided a comprehensive overview of energy use and identified which facilities have the highest energy use, as well as a high potential for energy savings and energy efficiency improvements. The assessment used utility energy and cost data and facility square footage information to generate the overview. Through this effort, the City switched to energy efficient lighting, installed variable speed drives in the City's HVAC systems, and installed automatic dimmers in various spaces such as mailrooms and bathrooms.

The City passed a resolution in 2009 in support of the Energy Strategy 2012 report developed by the County of San Mateo's former Utilities and Sustainability Task Force. The objective of the Energy Strategy was to bring together cities in the County to work collaboratively on energy and water related issues and to provide practical actions for the cities and the County on energy and

water conservation, alternative energy, and climate protection. The County is in the process of updating this report.

The following describes background on two municipal operations' programs, which were aimed at increasing energy efficiency and renewable energy generation.

Water Pollution Control Plant Co-Generation System

In 2006, Millbrae's wastewater treatment plant, the Water Pollution Control Plant (WPCP), installed a co-generation system to use a combination of biogas, which is a by-product of waste-water treatment, and brown restaurant kitchen grease, a waste by-product of food preparation, to help power the WPCP and benefit the environment and economy.

This was a first of its kind project to turn inedible kitchen grease waste from restaurants, that otherwise would have been disposed of in a landfill, into electricity. This type of kitchen grease is called brown grease, and it cannot be made into biodiesel (which is made from yellow grease.) The co-generation system is specifically designed to control odors, generate reliable power, capture waste heat, and reduce energy costs. The WPCP's microturbine had worked intermittingly over the years and stopped working in approximately 2016. Currently, some of the generated methane is utilized to heat one of the tanks.

The co-generation system was powered by a combination of natural gas and bio-gas; the bio-gas is a by-product of the wastewater treatment process known as anaerobic digestion. The production of biogas was substantially increased by adding used brown kitchen grease to the digesters. The project also included installing a grease receiving facility and a fuel treatment and blending facility.

The 250-kWh natural gas (methane) and biogas-fired microturbine co-generation system provided 80% of the WPCP's electrical needs, displacing energy derived from fossil fuels. The system was estimated to save approximately $150,000 per year in energy costs, which is based on the PG&E energy cost to Millbrae in 2004. Additionally, the new system was expected to produce an estimated $50,000 in annual revenue from tipping charges for grease received. As of this writing, the City is looking at removing this equipment as the size of the facility and generation of material is not large enough to successfully utilize a microturbine to create a co-generation system.

Clean Energy Project

In early 2012, the City contracted with the company Siemens Building Technologies to implement the Clean Energy Project to reduce city-wide energy consumption, reduce the City's overall carbon footprint, and explore renewable energy solutions, all in consideration of minimum upfront capital investment. City staff and Siemens Building Technologies undertook a technical evaluation of several facilities improvement measures to help achieve these

objectives. The entire $2 million cost for the project will be paid over approximately 20 years strictly from the energy savings and reduced maintenance costs. The guaranteed level of energy savings and mechanisms are in place to track and verify the savings.

The Clean Energy Project included the following components:

- Installation of a 50-kW solar PV system on the Millbrae Library to help save energy at Civic Center buildings (City Hall, Police Bureau, and Library).
- Replacement of the 50-year-old HVAC system at the Community Center to save energy, which was in use from 2012 until 2016 when the Center was burned down.
- Replacement of the older technology lighting in the City's nearly 1,400 streetlights with new state-of-the-art low induction lighting (except for 278 energy-conserving light emitting diodes, or LED, streetlights which were installed as part of a Federal stimulus grant in 2011.)
- Upgrade of the lighting inside and outside of the City's buildings to state-of-the-art energy-saving technology.
- Upgrade of five City parks with Smart Irrigation Controllers to save energy and water. The controllers sense the level of moisture in the soil, allowing for less irrigation. The City's other parks already had these controllers installed.

The City will realize energy savings for many years to come with the implementation of the Clean Energy Project. Estimates have not been recalculated since the Community Center had burned down, however, the total estimated annual electricity savings was 553,108 kWh and the natural gas savings, resulting primarily from the HVAC system boiler replacement and the building automation controls strategies at the Community Center, was projected at 3,507 therms annually. The total annual irrigation water savings is 324,819 gallons. This project was estimated to result in a reduction of 200,621 pounds (91 MTCO2e) of GHG emissions a year.

The LED Streetlight Project mentioned above involved installing 278 LED street lights utilizing Federal stimulus grant funding. The estimated annual energy savings is 70,255 kWh, which will result in a reduction of 19,842 pounds (9 $MTCO_2e$) of GHG emissions a year. The additional conversion of 1,400 streetlights to low-induction lighting in the Clean Energy Project will save another 41 $MTCO_2e$ a year for a total of 50 $MTCO_2e$ a year reduced through the two streetlight conversion projects.

The following describes the current municipal operations energy reduction measures.

Existing and Continuing Municipal Operations Energy Measures

Energy Efficient Street Lighting

While the City's streetlights were replaced as a part of the Clean Energy Project, street lighting is also included as a measure that will continue as lights expire and need replacing. New street lights are being replaced with LED lights.

Environmentally Preferred Purchasing Policy for Energy

The City implemented Administrative Standard Procedures for its Environmental Policy in 2013 which includes an environmentally preferred purchasing component, emphasizing purchasing of recycled content products and Energy Star labeled equipment.

The Energy Star label was established by the EPA to help eliminate wasted energy by promoting special energy-efficient designs that use less energy to perform regular tasks, and when not in use, automatically enter a low-power mode. Products with the Energy Star label reduce GHG emissions and other pollutants caused by inefficient use of energy and make it easy for consumers to identify and purchase energy-efficient products that offer savings on energy bills. Energy Star products are available for a variety of office equipment and appliances, including computers, monitors, printers, copiers, and fax machines.

Peninsula Clean Energy (PCE) in Municipal Facilities

The City currently procures all electricity required to power municipal facilities through PCE's ECO100 service offering that consists of 100% renewable electricity. The City plans to continue procuring electricity through the ECO100 service offering.

Energy Efficiency in Municipal Buildings

The City upgraded energy-consuming equipment in City facilities to be more efficient as described above for the Clean Energy Project, and thereafter has continued to install energy efficient equipment as older equipment needs to be replaced. The City will continue to participate in the San Mateo County Energy Watch Program, which is a local government partnership between PG&E and C/CAG to promote energy efficiency in municipal and non-profit buildings. The program is managed and staffed by the County of San Mateo Office of Sustainability. The City will work with the Energy Watch Program to take advantage of energy efficient opportunities for City facilities, such as benchmarking, energy audits, technical assistance, and other programs. All energy efficiency retrofit projects will leverage rebate and incentive programs offered by PG&E. The City had an energy audit performed in 2016 for the Civic Center (City Hall, Police Bureau, and Library), which led to the solar carport project being included in this Climate Action Plan. Other Energy Watch Program recommendations included installing HVAC efficiencies, which were implemented.

The City participated in a Demand Response Energy Conservation Program described in Section 3.1.1 from 2009-2011 for City Hall and surrounding facilities that are on the same electrical meter through the non-profit organization San Francisco Community Power. The City's participation ended when the service provider no longer allowed participation from businesses that were under the level of required energy savings. City Hall and buildings on the same meter were no longer eligible to participate in this program due to electricity being generated from the PV system on the Library. The City will keep apprised of other funding sources for future energy efficiency projects.

Table 13 summarizes the estimated GHG reductions associated with existing municipal operations energy measures.

Table 13: Existing Municipal Operations Measures: Energy

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
14	Energy Efficient Street Lighting	Continue to replace street, signal, parks, and parking lot lighting with efficient lighting.	64
15	Environmentally Preferred Purchasing Policy - Energy	Continue to implement Administrative Standard Procedures which include a sustainable purchasing policy prioritizing Energy Star equipment.	4
16	Participate in Community Choice Aggregation: Municipal	The City has elected and will continue to "opt up" to ECO100 (100% renewable) electricity service through PCE.	142
17	Energy Efficiency in Municipal Buildings	Continue to audit City facilities for energy efficiency opportunities and implement energy efficient (EE) retrofits. The City participates in San Mateo County Energy Watch and leveraged benchmarking to identify opportunities for EE upgrades and track energy performance. Leverage other programs that provide funding.	273

New Municipal Operations Energy Measures

Renewable Energy Installation for Municipal Properties

The City's Clean Energy Project, described above, was a huge undertaking that included the installation of PV panels on the Library roof to generate renewable energy. The City will evaluate the San Mateo County Energy Watch recommendation to install a solar carport system in City Hall and Library parking lots. The carport solar system would add an additional 308 kW and increase solar generation from 13% to 100% of the total electricity use for the facilities in

the City Hall complex. It is not known at this time if solar will be included in the rebuild of the Community Center.

Municipal Green Building Policy and Electrification

City facilities will follow the CALGreen Code and consider having new municipal buildings certified for LEED Silver or Gold status or equivalent. The new Community Center will be built to green building standards; however, at this point it is unknown what level of LEED standard will be achieved. The City is also looking at opportunities for including PV solar panels for the new Community Center.

In order to lead by example, all new construction projects by the City will be all-electric based on adopted Reach Codes and will strive to be zero net energy via on-site solar. The Community Center currently under design is committed to these goals.

Table 14 summarizes the estimated GHG reductions associated with new municipal operations energy measures.

Table 14: New Municipal Operations Measures: Energy

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
18	Renewable Energy Installation for Municipal Properties	Evaluate installation of solar carport system at Millbrae City Hall/Library parking lots.	68	2022
19	Municipal Green Building Policy	The City will follow the CALGreen Codes and consider certification for LEED Silver or Gold status or equivalent. New construction will follow adopted Reach Codes for building electrification.	5[30]	2021

3.1.4 Goal: Conserve Water to Reduce Energy Use

Existing and Continuing Community-wide Water Conservation Measures

As previously mentioned, approximately 19% of electricity use and 32% of natural gas use in California is related to water. Continuing and increasing water conservation in the City will

[30] These projections assume that any new facility is built to LEED Silver or Gold standards or equivalent.

indirectly reduce energy use and will also lead to increased stewardship of local water resources.

The City provides water to City residents and businesses. The City's Water Resources & Conservation Program began in 1990 and imposed water rationing measures in response to drought conditions. Since then, the City has continued and expanded on programs and opportunities for residents, businesses, and City facilities to conserve water. The City has steadily seen water consumption reduce over the last ten years. From the ten-year period 2006 to 2016, water use was reduced by nearly 25%. From 2013 to 2016, water use was reduced by nearly 19%, with 2013 being the base year for drought reporting. An ongoing voluntary 10% water use reduction had been encouraged for the community, which was adjusted to specific requirements during the 2012-2016 drought. In addition to the previously mentioned rebate programs, the City offers free water saving devices such as low flow showerheads, shower timers, low flow kitchen and bathroom faucet aerators, free sprinkler nozzle heads, low flow showerheads, toilet displacement bags, and toilet leak detection dye tablets. In an effort to expand on water conservation efforts during the drought, the City began providing buckets to residents in 2016 as a tool to collect and reuse indoor water for watering plants and landscapes. Other programs include water-wise landscaping and irrigation workshops, classroom presentations, audits of commercial businesses, and distribution of a variety of water conserving brochures and guides. Water conservation programs have also been implemented at City facilities, including changing to low flow bathroom and kitchen aerators and showerheads. The various parks also have water efficient irrigation systems. The continuation of the water conservation programs will contribute to the City's reduction of GHG emissions.

Water Conservation Incentives

The use of water conservation incentives is an existing strategy that includes providing rebates for water efficient appliances and equipment and is a voluntary measure. The City had rebate programs for water efficient toilets and clothes washers for many years which ended when PG&E discontinued their washer rebate program and BAWSCA member agencies discontinued their highest efficiency toilet rebate program due to limited demand. Currently, the City has a rain barrel rebate program in partnership with the San Mateo Countywide Pollution Prevention Program and BAWSCA. The City also offers rebates for cisterns. The City also began participating in the free sprinkler nozzle head program in 2015 in coordination with BAWSCA to reduce water used on landscapes by replacing inefficient sprinkler nozzle heads with efficient irrigation nozzle heads, which use 20-30% less water. Residential customers could sign up at www.freesprinklernozzles.com and print out a voucher to redeem up to 25 free sprinkler nozzle heads at a participating retailer. This program is being revamped and will be offered again in the future. New rebates for water efficient appliances and fixtures will be considered dependent on budget considerations. Other water conservation incentive programs are in the planning stage, such as the Lawn Be Gone Program to provide incentives for replacing lawns with native and

drought tolerant plants, and an irrigation controller program. A variety of outreach is conducted to inform residents and businesses of available resources and rebates.

Indoor Water Use Efficiency Ordinance

In 2010, the City adopted an Indoor Water Use Efficiency Ordinance based on BAWSCA's model template developed with member cities and water agencies. The Indoor Water Use Efficiency Regulations encouraged water conservation measures in the design, construction, and maintenance of buildings. The City transitioned to the CALGreen Code regulations in 2014. The water use efficiency practices are intended to achieve the conservation of natural resources, increase water efficiency, reduce water costs, and reduce the operating and maintenance costs for buildings. The regulations apply to new residential or commercial construction projects, all additions involving bathrooms with new or expanded water use, and remodels. The implementation of the CALGreen Code will continue in an effort to conserve water and reduce energy.

Water Efficient Landscape Ordinance

In 2010 and 2016, the State's Model Water Efficient Landscape Ordinance (MWELO) was updated by reference in the Municipal Code. The 2016 MWELO was much more stringent and affects new, rehabilitated, and existing landscapes. New development projects of 500 square feet or more are affected by the MWELO and the ordinance also applies to residential, commercial, industrial and institutional projects that require a permit, plan check, or design review. Existing landscapes that are being rehabilitated and are 2,500 square feet or more that are associated with a building or landscape permit, plan check, or design review must also comply with the MWELO. Existing landscapes over one acre in size have regulations based on the presence of an irrigation meter for conducting irrigation surveys, audits, and water use analyses. Local agencies are required to submit an annual report on implementation and enforcement.

Table 15 below summarizes the estimated GHG reductions associated with existing community water conservation measures.

Table 15: Existing Community Measures: Water Efficiency

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
20	Water Conservation Incentives	Continue promoting existing and new rebates for water efficient appliances and fixtures.	102
21	Water Efficient Landscape Ordinance and CALGreen Indoor Water Efficiency Requirements	Continue implementation of the State Model Water Efficient Landscape Ordinance (MWELO) and CALGreen indoor water efficiency requirements.	43

New Community-wide Water Conservation Measures

Residential Graywater Ready New Construction

Graywater is defined by California law as wastewater from laundries, showers, and bathroom sinks, but not wastewater from dishwashers or kitchen sinks or toilets. Graywater cannot contain hazardous chemicals or human or food waste. In single-family homes, graywater can be used for outdoor irrigation, although not for root crops or edible parts of food that touch the soil. In 2009, the California Building Standards Commission approved emergency graywater regulations that went into effect August 4, 2009. The regulations revised standards (California Plumbing Code, Title 24, Part 5, Chapter 16A, Part I) for construction, installation, and alteration of graywater systems for indoor and outdoor use. The City will encourage new residential construction projects to be built "graywater ready", meaning that these buildings can accommodate the future installation of a graywater system. The City could also consider implementing a recycled water measure for non-residential buildings where infrastructure is incorporated into the design and the treated water is used to water the landscaping.

Other Water Conservation Programs

A variety of additional programs will be developed to be in compliance with State legislation, AB 1668 and Senate Bill (SB) 606. Following the extreme drought of 2012-2016, the State of California developed a framework for "Making Water Conservation a California Way of Life" to address the long-term water use efficiency requirements called for in Governor Brown's executive orders. Governor Brown signed into law AB 1668 and SB 606 in 2018, which builds upon the executive orders to implement new urban water use objectives for urban retail water suppliers. Key elements include new water use targets for urban water suppliers that go beyond existing SB X7-7 20% reduction requirements and are based on strengthened standards for indoor residential per capita use; outdoor irrigation; commercial, industrial, and institutional water use; and water loss. The City is working with BAWSCA to plan programs to meet the requirements. Table 16 summarizes the estimated GHG reductions associated with new community water conservation measures.

Table 16: New Community Measures: Water Efficiency

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
22	Residential "Graywater Ready" New Construction	Encourage new construction projects to be built "graywater ready" by educating applicants during the design phase of projects.	11	2021

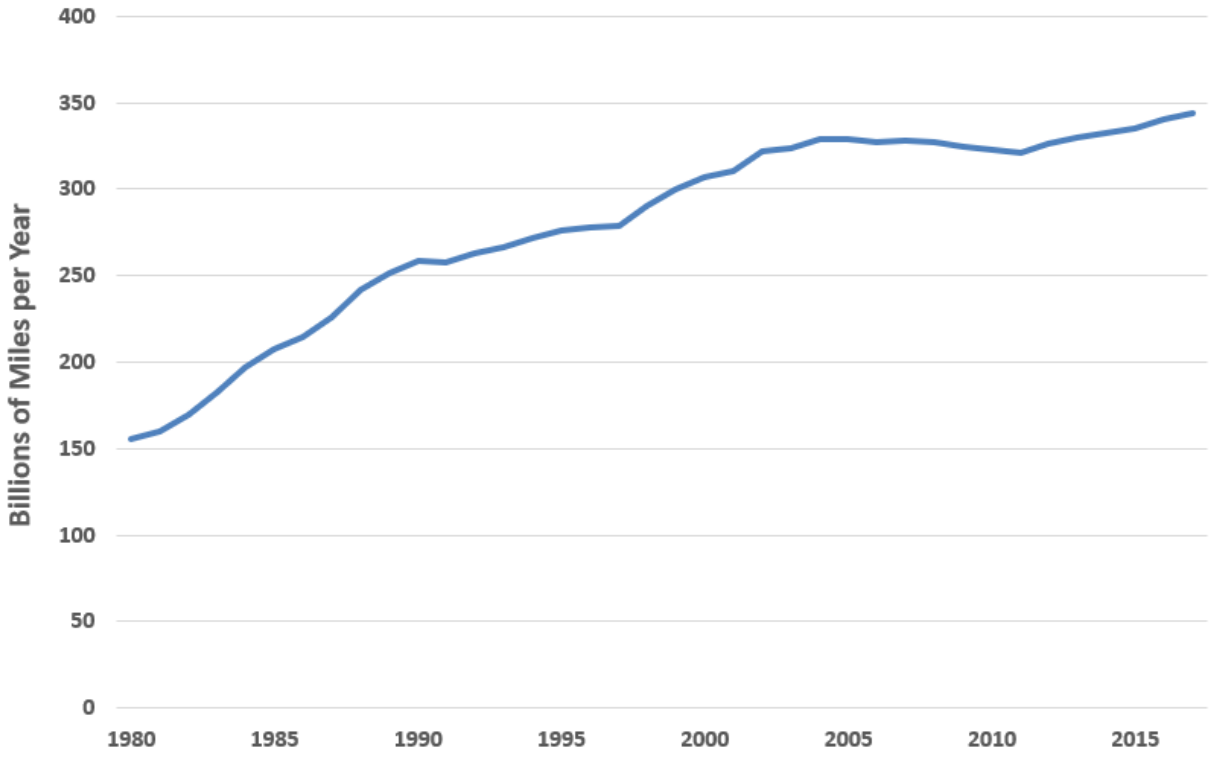
3.2 Transportation and Land Use

41% of California's GHG emissions stem from transportation[31] — the cars and trucks that move people and goods throughout the State. In Millbrae, 61% of emissions stem from transportation. Travel on local roads and State highways represent 35% and 57% of transportation emissions respectively, with the remaining 8% coming from off-road equipment, Caltrain, and freight trains. Thus, reducing transportation emissions is a critical component of the climate action strategy.

Reducing emissions from the transportation sector requires addressing three constituent components: reducing the carbon intensity of fuels, increasing vehicle efficiency, and reducing vehicle miles traveled (VMT). Fuel carbon intensity, defined as the amount of carbon per gallon, is addressed by the State of California's Low Carbon Fuel Standard, which mandates a 10% overall reduction in the carbon intensity of transportation fuels (gasoline, diesel, natural gas, electricity, and so on) by 2020. Vehicle efficiency is addressed by AB 1493, California's Clean Cars Law of 2002, which requires carmakers to reduce GHG emissions from new passenger cars and light trucks beginning in 2009. The first in the world to reduce GHG emissions from cars, this law has now been adopted by 11 other states. Affecting nearly one-third of the U.S. market, this law is projected to reduce GHG emissions in 2020 by 64 million tons per year. However, addressing the third component, reducing VMT, is considerably more difficult than the previous two. Californians have driven more and more miles per year over the past five decades. Figure 13 shows the growth in VMT from 1980 – 2017.

[31] California Air Resources Board, "Emissions by Economic Sector", GHG Current California Emission Inventory Data, https://www.arb.ca.gov/cc/inventory/data/data.htm.

Figure 13: California Growth in Vehicle Miles Travelled: 1980-2017[32]



Total 2017 annual VMT in California was an estimated 343.9 billion miles, representing a 121% increase since 1980, a 33% increase since 1990 and a 12% increase since 2000. This growth in VMT is attributable in part to following factors:

- Growth in gross domestic product
- Lack of affordability in urban core housing causes people to live far away from where they work
- Lack of viable public transportation options
- Low cost of gasoline
- Sprawl development patterns such as bedroom communities separated from retail and commercial centers
- Streetscapes that discourage pedestrian or bicycle access

[32] Graph based on data from U.S. Department of Transportation, "Public Road Mileage by Functional System, 1980-2017", U.S. Department of Transportation Federal Highway Administration Highway Statistics 2017, Table HM-220, https://www.fhwa.dot.gov/policyinformation/statistics/2017/ (2019).

In order to reduce VMT and the associated GHG emissions, then Governor Schwarzenegger signed Senate Bill 375 in 2008. SB 375 sets regional emissions targets and tasks regional planning organizations to recalibrate land use and transportation planning to meet those emissions targets. This Climate Action Plan seeks to meet the SB 375 targets for the San Francisco Bay Area of 7% below 2005 levels by 2020 and 15% below 2005 levels by 2035.

The benefits of integrated planning and sustainable development go far beyond simply reducing the GHG emissions that contribute to climate change and its damaging effects. Communities that are well designed provide housing options for all income and age groups and are supported by a range of transportation options that will have many other advantages. Among these are increased mobility and transportation choices; reduced congestion; greater housing choices; improved public health as a result of better air and water quality; natural resource conservation; economic benefits, such as opportunities for neighborhood economic development and lower costs for community infrastructure; reduced dependence on foreign oil; and greater equity through the provision of improved access to jobs, housing, and everyday needs.

The City is fully committed to providing diverse transportation options that are convenient, safe, and affordable. More than that, the City supports grouping new homes, jobs, and services near existing transportation corridors.[33] Policies proposed in this Plan strive to maintain a quality of life that is environmentally and economically sustainable. These priorities and commitments are reflected and incorporated in this chapter on transportation and land use.

This Plan, through a combination of State and City measures, outlines a path to reducing transportation emissions 56% below 2005 levels by 2030.

3.2.1 Goal: Encourage Smart Development and Programs that Support Alternative Modes of Transportation

There are a number of transportation and land use programs in place through local, countywide, regional, and state-wide efforts that the City will benefit from in order to achieve the emissions reduction target goals.

[33] See https://www.sierraclub.org/loma-prieta/guidelines-and-resources for guidelines on how to integrate land use and mobility strategies to create complete communities.

Existing and Continuing Community-wide Transportation Programs

The City implements a variety of transportation related programs that help to improve the flow of traffic, relieve congestion, reduce GHG emissions, and that promote biking, walking, or other alternative forms of transportation. The City is in a strong position to promote public transportation by having a hub of public transportation, the Millbrae Intermodal Station, which is conveniently located and includes Bay Area Rapid Transit (BART), Caltrain, SamTrans as well as commuter shuttles. The City works in partnership with the County and other agencies to implement programs, including participating in Commute.org programs.

Commute.org is San Mateo County's Transportation Demand Management Agency whose mission is to reduce the number of single occupancy vehicles traveling in, to, and through San Mateo County, which reduces vehicle emissions and results in improved air quality. Commute.org helps people find ways to get to work that are faster, cheaper, and/or easier through commuter information, employer programs, and city transportation demand management partnerships. The programs include brochures on countywide alternative transportation opportunities and schedules, the Emergency Ride Home Program, carpool and vanpool incentive programs, bike racks at reduced rates, shuttle routes, and bike safety classes. Commute.org is funded by C/CAG, the San Mateo County Transportation Authority, BBAQMD, and the Metropolitan Transportation Commission (MTC).

The City has supported State policies toward the development of improved vehicle standards for reducing GHG emissions. In 2010, the City Council passed a Resolution supporting the California Clean Cars Campaign which included sending a letter of support to the California Air Resources Board (CARB) to encourage them to strengthen their new vehicle standards to further reduce pollutants and greenhouse gases and to promote the development and deployment of zero emissions vehicle technologies. The goal of the California Clean Cars Campaign is to encourage CARB to set strong standards for cleaner and more efficient vehicles that reduce hazardous pollutants and emissions and improve California's air quality.

Commuter Options and Incentives Program

The City's Commuter Options and Incentives Program started in 2008, initially for City employees, to provide outreach and education on alternative transportation options for traveling to and from work to reduce single-occupant vehicle travel. Initially for City employees, this program has expanded to include outreach to the larger community on alternative transportation options such as public transportation, carpooling, and bicycling in order to reduce emissions, improve air quality, and improve overall health. Through Commute.org, the City participates in the programs as described above and in Bike to Work Day every spring, hosting an Energizer Station at the Millbrae Intermodal Station. Outreach for Bike to Work Day includes distribution of brochures, public service announcements on the local cable station, newsletter articles, displays at City Hall and the Library, and bicycle safety workshops.

Signalized Traffic/Pedestrian Crossing

A traffic signal and crosswalk at El Camino Real and Victoria Avenue were installed in late 2012. These improvements provide pedestrians with another pathway for safely walking across El Camino Real, and a shorter and easier route between Millbrae's downtown and the Intermodal Station, which helps to encourage the use of public transportation. Other aspects to help encourage the use of public transportation and other alternative modes of transportation include SamTrans bus stops, enhanced landscaping, and an improved median. The project was jointly funded by a Federal grant and a special grant from SamTrans. This is the third traffic signal recently installed on El Camino Real which provides pedestrian safety and encourages walking near the Millbrae Intermodal Station.

Millbrae Station Area Specific Plan

Another component for the City's Smart Growth Development is the Millbrae Station Area Specific Plan (MSASP) that includes land use policies for residential and commercial development near transit. Originally created in 1998 as part of a city-wide General Plan update, the MSASP was adopted in February 2016 and sets a vision for redevelopment of the 116 acres around the Millbrae Intermodal Station. The updated MSASP will guide future public improvements and private development in the Plan area over the next 25 years.

In addition, the City is creating the El Camino Real and Downtown Specific Plan for the Priority Development Area with the intent of transforming the City's primary areas of business and commerce into vibrant and connected mixed-use centers of cultural and economic activity. This Specific Plan focuses on the area that will undergo the majority of change and development in the City over the next couple of decades and will include measures that reduce vehicle traffic while promoting walking, biking, and using public transit.

Regional and Countywide Transportation Programs

There are a number of transportation programs that the City implements in coordination with the County and other agencies in the larger Bay Area region, and other programs that are implemented by other agencies. The City will coordinate additional transportation programs with the County and benefit from the state-wide and countywide programs in order to achieve the GHG emissions reduction goals as described in Section 4.2.

The County and regional transportation programs are expected to have a major impact on community-wide emissions reductions, especially from on-road vehicle emissions on State highways that traverse through the City, where the City has no control to implement programs. The expected countywide and regional transportation programs include promotion of and incentives for high density housing near transit services; a variety of bicycling and pedestrian infrastructure programs; improved transit system networks for shuttles and bus rapid transit; implementation of the Traffic Congestion Management Plan; Caltrain electrification; incentives for vehicular commute trip reductions; resources for employer ridesharing; and promotion of alternative and clean fuel vehicles. While the City implements some of these programs, some programs are implemented by the County, C/CAG, the transit agencies, or other agencies, with coordination amongst the City, the County, and regional agencies. Another regional program sponsored and completed by C/CAG is the Smart Corridor Project that improves the mobility of vehicles and mass transit along Highway 101 and includes improvements on arterial routes parallel to Highway 101. C/CAG created the San Mateo Countywide Transportation Plan 2040 (SMCTP 2040) which is a long-range, comprehensive transportation planning document and provides transportation planning goals and objectives to promote consistency and compatibility among all transportation plans and programs within the county. SMCTP 2040 supports an integrated system-wide approach to transportation planning and includes a coordinated, multi-modal strategy that relies on advanced technologies and management practices required to meet the growing and changing transportation needs of San Mateo County. More information can be found at http://ccag.ca.gov/programs/countywide-transportation-plan/.

Transportation Demand Management Program

In 1994, the City adopted the Transportation Systems Management (TSM) Ordinance, which is a multi-city effort to assist employers in the region in achieving trip reduction goals as a way to improve air quality and reduce traffic congestion. The Program aims to increase public awareness and encourage the use of alternatives to commuting by single-occupant vehicles. The program also reduces traffic impacts within the City and the region by reducing the number of automobile trips, daily parking demand, and total vehicle miles traveled per person that would otherwise be generated by single-occupant vehicle commuting.

Safe Routes to Schools

The San Mateo County Safe Routes to School (SR2S) Program is a countywide initiative started in 2010 and funded by C/CAG to help develop and implement programs that will enable school children and families to walk, bicycle, and carpool to school. The overall goal is to make San Mateo County a healthier, safer, and more environmentally sound community with improved air quality and reduced traffic congestion by reducing the number of school-related automobile trips. The highlights of Millbrae's School District programs include Bike, Walk, and Carpool to School Days; bicycle, pedestrian, and safety education; walking school buses and bike trains; SR2S Task Force; outreach materials; and parent education. Additional safety crossings are being planned in the City. The City also received a Green Infrastructure/Safe Route to Schools grant from C/CAG to make improvements to the area surrounding Taylor Middle School.

Bicycle Programs

The C/CAG Bicycle and Pedestrian Advisory Committee (BPAC) has been in existence for over 20 years and makes recommendations to the C/CAG Board of Directors on bicycle and pedestrian projects to be funded with Transportation Development Act (TDA) Article 3 funds. The BPAC serves as a countywide forum for information on bicycle and pedestrian issues that affect San Mateo County jurisdictions. In 2009, the City's General Plan was updated to include bicycle and trail routes and the City formed a local BPAC comprised of the Parks and Recreation Commission. In 2019, marked bike lanes were added in Millbrae to identify bicycle routes.

Active Transportation Plan

The Active Transportation Plan (ATP), currently in development, is the city-wide bicycle and pedestrian master plan that will enhance circulation and connectivity. The purpose of the ATP is to assess the needs of pedestrians and cyclists in Millbrae; identify improvements to infrastructure and programs; ensure eligibility for certain transportation funding sources; and coordinate pedestrian and bicycle local actions and regional projects.

Grand Boulevard Initiative

The City adopted the Grand Boulevard Initiative in 2010, which is a collaboration of 19 cities, counties, and local and regional agencies united to improve the performance, safety, and aesthetics of El Camino Real, which stretches from Daly City to San Jose. The vision is of a boulevard that connects communities by a mix of land uses designed to attract people. Millbrae is in the process of making improvements along El Camino Real within the City's boundaries. The upgrades will help El Camino Real to function and look better, however, the goal is to recreate the street to do a better job of connecting the communities (north-south) and of better integrating it within each of the communities (east-west). The transportation-related benefits include supporting transit-oriented development (TOD) and increasing density around station areas; designing transit stops for easy passenger loading, unloading, and fare payment;

improving signal timing; implementing transit-preferential street treatments such as signal priority, bulb out stops, bus bypass lanes, and high occupancy vehicle/bus-only lanes where needed and feasible; and implementing programs designed to reduce auto trips during congestion periods. The upgrades will also reduce the distance between corridor crossings to improve connectivity with adjacent neighborhoods thereby transforming the area to be more walkable and transit- and bicycle-friendly.

Smart Growth Development

The Smart Growth Development measure includes a number of policies that support and prioritize infill, high density housing, and mixed use and transit-oriented development (TOD). Infill involves building and developing in vacant areas which can reduce traffic congestion, save open space, and create more livable communities. High density housing includes a greater amount of housing units per building, allowing for building up rather than out and taking less space overall. Smart Growth includes building developments near transit. The principles of infill, high density housing, and mixed use and transit-oriented development lead to decreased vehicle miles traveled and increased neighborhood vitality. These methods of development also have multiple social benefits, including better health, lower infrastructure costs, and increased accessibility.

There are a number of TOD's located in Millbrae to provide high density housing near the Intermodal Station (BART, Caltrain, SamTrans, shuttles) for a total of 455 units at six developments. These developments include mixed uses: housing units on the upper levels and commercial businesses on the lower levels. Most of these developments are located on the main thoroughfare, El Camino Real. Two future developments near the intermodal station will add approximately 826 additional units. The City will continue to look to Smart Growth Development for future projects including the projects in the MSASP as described above. In addition, the City will work with C/CAG to encourage developments to take advantage of TOD incentives offered by C/CAG.

The City is finalizing its El Camino Real and Downtown Specific Plan and upon completion will provide a framework to guide future development along the El Camino Real corridor by promoting high density smart growth with an emphasis on alternative transportation modes.

Electric Vehicle Education and Outreach

Electric vehicles (EV) are a critical element of the State's path to a 40% reduction in emissions below 1990 levels by 2030. To support this effort, the State has developed a goal of 1.5 million zero-emission vehicles on California roads by 2025. To help reach this goal, the City will encourage residents and commuters to drive EVs as opposed to gasoline and diesel vehicles. The City will also continue to conduct outreach on electric vehicles, including electric vehicle workshops and providing information on incentive programs provided by Peninsula Clean Energy, the Bay Area SunShares Program, and other opportunities as they are identified.

Walkable and Bikeable Street Landscape

The City will continue with the local and regional programs previously described and implement other measures to make the City more amenable to walking and biking. Bike lanes, bike parking, traffic calming, and beautification are all part of creating an urban landscape that encourages biking and walking. The City is currently seeking funding for the Millbrae Pedestrians Overcrossing Project. The goal is to construct a bridge near BART at the Chevron Station on Millbrae Avenue that safely crosses over Highway 101 to connect to the San Francisco Bay Trail on Old Bayshore Highway. The overcrossing would promote walking and biking from the Trail and hotels and provide increased access to the transit hub, stores and restaurants. While some of the planned bicycle lanes have been implemented to date, the City continues to pursue and receive grants to complete more of the City's bicycle and pedestrian network, including for the Spur Trail. The grants help to connect the Transit Center to the Spur Trail as well as to the Bay Trail, and other regional trails allowing individuals to safely walk or ride their bikes. This also helps to reduce vehicles from the roadways by providing alternative routes to work and school. The City also conducts outreach on bicycling, such as organizing Bike to Work Day events, as mentioned above, and providing Bicycle Safety Workshops.

Furthermore, the City adopted a Complete Streets Policy Resolution in January of 2013, which outlines guidance on including bicyclists and pedestrians in roadway project planning and design. The goal is to create a network of safe bicycle and pedestrian facilities that serve all transportation users. This policy also enables the City to be eligible for federal and State transportation funding administered by the MTC. The City will continue to work with the Millbrae Bicycle Pedestrian Advisory Committee to fine tune the policy based on the MTC guidelines and from the experience and input from the community.

Local Farmers' Market

The Millbrae Chamber of Commerce sponsors and manages the Farmers' Market held every Saturday. The Farmers' Market benefits the community in a number of ways by providing fresh produce, supporting local farmers, and providing residents with a walkable option for buying groceries.

Table 17 summarizes the estimated GHG reductions associated with existing community transportation measures.

Table 17: Existing Community Measures: Transportation

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
23	Smart Growth Development	Continue Smart Growth Policy that prioritizes infill, higher density, transportation oriented, and mixed-use development.	624
24	Walkable / Bikeable Street Landscape	Remake urban landscape to make walking and biking more desirable, such as bike lanes, bike parking, traffic calming, beautification, etc.	873
25	Safe Routes to School	Continue to support the City's Safe Route to Schools program by establishing bike trails and safe pedestrian routes to local schools (infrastructure) and educating the community about the program.	50
26	Electric Vehicle Education and Outreach	Increase number of electric vehicles that are owned by residents, commuters, and visitors to the City through education and outreach focused on the benefits of electric vehicles.	5,555
27	Local Farmers' Market	Support the Farmers' Market to encourage local shopping for locally-grown food and reduce VMT associated with acquiring produce.	6

New Community-wide Transportation Measures

Bike Sharing

The City will look for opportunities to partner with bike sharing companies to establish bike share facilities throughout the City. Bike shares can be effective in solving the "last mile" issue of getting to and from public transportation that often prevents commuters and residents from fully utilizing public transportation.

Car Sharing

The City will look for opportunities to partner with car sharing companies to establish designated car sharing spaces and vehicles in the City. Providing residents with easy access to car shares can decrease the rate of vehicles ownership and, consequently, reduce the number of miles driven per resident per year.

Shuttle Program

The goal of the Shuttle Program is to increase shuttle service to connect areas not currently covered by public transit primarily through private sector programs. Shuttles are an efficient transport method to bring commuters from various areas to the transit system or close to work sites. The City has had various shuttles, such as the Senior Program shuttle; however, there are currently none operated by the City. There are various private sector shuttles in place including for the hotels/motels and from the Intermodal Station to work sites outside the City limits. The City will also look to grant funding from C/CAG and other organizations and work with Commute.org to fund local shuttles. Increasing the number of shuttles would encourage more passengers to commute to and from the Millbrae Intermodal Station and would reduce single occupancy drivers, congestion, and GHG emissions.

EV Charging Infrastructure in Existing Buildings

Providing an adequate amount of EV charging stations at home, work and in public locations is critical to increasing the adoption of electric vehicles. The City has installed ten ChargePoint dual-port level 2 EV charging stations since 2015, for a total of 20 chargers, which are located in four City-owned parking lots. Some of the stations were paid for by a grant from BAAQMD. In addition, three EVgo level 3 fast chargers were installed in one City parking lot and others are planned. The charging stations at the Library are powered by the building's photovoltaic solar system. In 2017, the City began charging $1.00 per hour with a parking limit of two hours for the ChargePoint chargers. Additional fast charging stations are currently in the design phase.

Strategies will include expanding public EV charging infrastructure, working with large employers to expand EV charging in existing buildings, and public parking policies that incentivize EV ownership. In order to reach the 2030 emissions reduction associated with this measure (see

Table 17), 43% of gasoline vehicles currently on the road will need to be replaced with EVs. PCE has expressed interest in offsetting the cost of installing EV chargers in existing buildings, particularly multi-unit dwellings, workplaces and public locations through the provision of incentives. Additionally, PCE is offering a technical assistance program to help building owners cost-effectively design, select, and install EV charging stations on existing properties. The City will look to leverage funds from PCE or other sources in order to accelerate the expansion of EV charging in existing buildings. This EV charging infrastructure will be critical to achieving the 2030 emissions reductions.

EV Charging Infrastructure in New Buildings

Incentives will be leveraged from PCE and other agencies to expand charging infrastructure in public properties, multi-unit dwellings, and workplaces. Another strategy for accelerating the expansion of EV charging stations is adopting Reach Codes either before or during the next Building Code update that require commercial and residential properties to go beyond the minimum requirements for the number of parking spaces in newly constructed buildings that must be “EV capable” or have an EV charging station installed. “EV capable” means that the parking spaces are designed with adequate electrical capacity and conduit installed to allow for future EV charger installations. One benefit of an EV charging Reach Code is that installing EV charging infrastructure in new construction is significantly more cost-effective than installing EV charging infrastructure in existing buildings. Cities in San Mateo County, including the City of San Mateo, Mountain View and Fremont have implemented EV charging infrastructure Reach Codes that go beyond the State’s minimum code requirements. CALGreen can also be modified to require new construction to require a certain percentage of parking spaces to be devoted to clean air vehicles (EVs, PHEVs, carpools). These parking spaces are typically located near entrances to buildings and, where applicable, include waived metered parking fees. The City will consider this requirement for future developments.

Shared Electric Bikes and Scooters

Shared electric bikes (e-bikes) and electric scooters (e-scooters) have the potential to play a critical role in decreasing Vehicle Miles Travelled (VMT) in Millbrae. These emerging forms of transportation offer low-emissions “first/last mile” solutions for residents, commuters, and visitors who want to connect with major transportation hubs, including the Intermodal Station. By increasing the ease and speed of which connections to public transportation can be made, e-bikes and e-scooters have the potential to significantly increase public transportation usage and decrease dependence on cars. The emissions associated with e-bikes and e-scooters, which use a small amount of electricity per mile, will continue to decrease as the amount of renewable electricity on the grid continues to increase. The existing infrastructure will be modified to accommodate shared electric bikes and scooters that provide last-mile solutions to residents and commuters. Infrastructure enhancements include dedicated off-street parking spaces and

on-street corrals to accommodate shared electric bike and scooter parking and prevent conflicts with pedestrians.

Electric Transportation Network Company (TNC) Vehicles

A 2017 study conducted by the San Francisco County Transportation Authority found that over 10% of total VMT in the city was attributable to Transportation Network Companies (TNCs) including Uber and Lyft[34]. For this reason, increasing the percent of TNC vehicle that are electric, opposed to gasoline, can have significant emissions reduction impacts. Cities have the ability to regulate TNCs. For example, in 2019 San Francisco passed a proposition adding a 1.5% tax on shared TNC rides and a 3.25% tax on all other TNC rides. Similar taxes or other policies could be implemented to encourage the adoption of electric vehicles among TNC drivers. This measure would involve developing a policy, such as a revenue-neutral fee, that only applies to internal combustion engine TNCs, to encourage the use of EV TNCs in the community. The funds could be utilized to pave roads, provide public transportation incentives, and/or provide discounts on EV TNC rides. Designated drop-off locations and charging locations would be provided for EV TNCs to facilitate EV adoption. Table 18 summarizes the estimated GHG reductions associated with new community transportation measures.

[34] San Francisco County Transportation Authority, "TNCs Today: A Profile of San Francisco Transportation Network Company Activity" (2017).

Table 18: New Community Measures: Transportation

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
28	Bike Sharing	Explore bike sharing program to have bikes located at the BART Station, downtown and elsewhere.	118	2021
29	Car Sharing	Encourage car sharing companies to open pods in town.	131	2021
30	Shuttle Program	Increase shuttle service within city limits to connect areas not covered by public transit.	249	2021
31	EV Charging Infrastructure in Existing Buildings	Leverage incentives and technical assistance from PCE to expand charging infrastructure in public properties, multi-unit dwellings, and workplaces.	11,558	2020
32	EV Charging Infrastructure in New Construction	Adopt Reach Code to update the residential and commercial building code to increase the mandated percentage of parking spaces designed to accommodate electric vehicle charging equipment and also increase the mandated percentage of parking spaces devoted to clean air vehicles (EVs, PHEVs, carpools).	878	2021
33	Shared Electric Bikes and Scooters	Modify existing City infrastructure to accommodate shared electric bikes and scooters that provide last-mile solutions to residents and commuters. Infrastructure enhancements include dedicated off-street parking spaces and on-street corrals to accommodate shared electric bike and scooter parking and prevent conflicts with pedestrians.	830	2021
34	Electric Transportation Network Company (TNCs) Vehicles	Develop policies, such as a revenue neutral fee that only applies to internal combustion engine TNCs, to encourage the use of EV TNCs in the community. Utilize funds generated by fees to provide pave roads, provide public transportation incentives, and/or discounts on EV TNC rides. Provide designated drop-off locations and charging locations for EV TNCs to facilitate EV adoption.	887	2021

3.2.2 Goal: Promote the Use of Fuel Efficient and Alternative Vehicles in Municipal Operations and Reduce Public Employee Vehicle Miles Traveled

Existing and Continuing Municipal Operations Transportation Measures

The City first purchased compressed natural gas (CNG) vehicles in 1989 and, up until recently, 30% of the fleet used CNG. Due to the tanks expiring, there are no longer CNG vehicles in operation. The measures include continuing and expanding existing programs along with new measures to help reduce GHG emissions.

Public Employee Commuting Program

The City's Commuter Options and Incentives Program were described above for community-wide programs. Commuter programs are also implemented for City employees, including participating in the regional Great Race for Clean Air to reduce single car occupancy, and providing periodic notifications on Spare the Air Days and general information on alternative forms of transporting to and from work.

In 2014, the City implemented the Commuter Benefits Program, as provided by State law SB 1339, to provide incentives to employees for taking public transportation. With this benefit, employees who work more than 20 hours a week and commute to work by public transit (bus, rail, or ferry) or vanpool can pay their fare with pre-tax dollars. The Commuter Benefits Program facilitates a regional approach to encourage the use of sustainable commute modes in an effort to reduce single occupancy vehicles, traffic congestion, GHG emissions, and improve air quality.

Table 19 summarizes the estimated GHG reductions associated with existing and continuing municipal operations transportation measures.

Table 19: Existing Municipal Operations Measures: Transportation

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
35	Public Employee Commuting Program	Continue with the commute alternatives program to promote and incentivize public transportation, carpooling, biking, etc.	2

New Municipal Operations Transportation Measures

Clean Fleet Policy

Municipal operations' emissions can be reduced by employing vehicles that are fuel efficient and utilize low carbon fuels, and by purchasing electric vehicles. This measure will reduce emissions by prioritizing the purchase of fuel efficient vehicles and alternative fuel vehicles, continuing maintenance of existing vehicles for optimum mileage, using re-refined oil, encouraging public employees to drive minimally and efficiently, and expanding on the City's municipal operations' idling reduction policy. In addition, the City will evaluate the feasibility of purchasing alternative fuel vehicles when new vehicles are needed and implementing a Clean Fleet policy. The City currently has four hybrid vehicles.

Table 20 below summarizes the estimated GHG reductions associated with new municipal operations transportation measures.

Table 20: New Municipal Operations Measures: Transportation

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
36	Clean Fleet Policy	Prioritize purchase of battery electric, plug-in hybrid electric, and traditional hybrid vehicles. Maintain existing vehicles for optimum mileage. Encourage staff to drive minimally and efficiently. Expand on the idling policy.	42	2020

3.3 Solid Waste

Reducing the amount of waste deposited into the landfill through waste prevention and reduction, reuse, recycling, and composting is an important strategy to reduce GHG emissions. Methane is the primary source of Millbrae's GHG emissions in the waste category. Continuing and expanding recycling-related programs for residents, businesses, schools, and city facilities will enable the City to reach its emissions reduction targets.

A total of 13,480 tons of solid waste were landfilled in 2005 resulting in 2,461 $MTCO_2e$ of emissions. There were an additional 25 $MTCO_2e$ of emissions associated with alternative daily cover placed on the surface of the landfill. Waste represented less than 2% of the City's total emissions. The anaerobic (without oxygen) decomposition of waste in landfills produces methane, a GHG that is 21 times more potent than carbon dioxide. Some landfills capture as much methane as possible and combust it for electricity generation, which is the process used at Ox Mountain Landfill in Half Moon Bay where 97% of Millbrae's waste is disposed. This process known as "landfill gas to energy" was started at Ox Mountain Landfill in 2009 and produces 11.5 megawatts of electricity a year, which has reduced GHG emissions by 71,000 tons, the equivalent to taking 11,800 cars off the road. The landfill gas-to-energy process captures and converts more methane than any other Bay Area landfill and has an estimated recovery rate of 75%. Its six engines operate 24 hours a day and generate enough electricity to power 7,500 homes, which is utilized by the cities of Alameda and Palo Alto.

Materials that typically end up in the landfill cannot be made into new products and are being replaced with new products. The production of these new products often requires the use of fossil fuels to obtain raw materials and manufacture the items.

GHG emissions are also associated with the production of products— more specifically, with the product supply chain, or the system involved in moving a product from supplier to retailer. Starting upstream, fossil fuel energy is used to extract the raw materials (wood, metals, etc.) from which products are made. Additional energy is needed to manufacture consumer goods in factories. Petroleum is used for the transportation of raw materials to the factory, moving manufactured goods to market, and moving waste from consumer's curbsides to landfills. These emissions do not show up in Millbrae's inventory; however, it is good to be aware of them as consumers and take responsibility to support products that reduce waste and encourage manufacturers to design environmentally-friendly products.

Waste reduction and recycling are powerful tools for reducing emissions throughout the consumer materials' lifecycle. Reducing the amount of materials required through reuse, such as replacing plastic and paper bags from the grocery store with reusable shopping bags, represents the best opportunity to reduce GHG emissions in a significant way. When people reuse things or when products are made with less material, less energy is needed to extract, transport, and process raw materials and manufacture products. When energy demand decreases, fewer fossil fuels are burned and less carbon dioxide is emitted to the atmosphere.

Recycling and composting are other opportunities to reduce GHG emissions. Recycling reduces energy-related carbon dioxide emissions in the manufacturing process and avoids emissions

from waste management. Manufacturing products from recycled materials typically requires less energy than producing products from virgin materials. Recycling paper products also allows for the storage of carbon in trees. Trees absorb carbon dioxide from the atmosphere and store it in wood, in a process called "carbon sequestration." Waste prevention and recycling of paper products allow more trees to remain standing in the forest, where they can continue to remove carbon dioxide from the atmosphere. Waste prevention and recycling of glass, metal, plastic, and other materials reduces the need for mining, drilling, and refining of resources from the Earth.

Composting yard trimmings and food scraps diverts organic wastes from landfills, reducing the methane released when these materials decompose. As mentioned previously, when organic materials break down in landfills, an anaerobic process takes place. On the converse, backyard composting it an aerobic (with oxygen) process, resulting in little to no emissions upon breakdown of the organic materials.

To address the issues of escalating waste production, California AB 939 was passed in 1989 and mandated local jurisdictions to meet a solid waste diversion goal of 50% by the year 2000. Each jurisdiction was required to create an Integrated Waste Management Plan to develop recycling related programs to reduce waste, including programs for waste prevention, recycling, composting, and the purchasing of recycled products. These plans formed the foundation of the recycling programs in place today along with additional adopted legislation.

The City's Recycling & Waste Prevention Program has provided a variety of programs and resources for residents, businesses, schools, and City departments since 1994. Since 1999, the City has achieved and surpassed the 50% waste reduction requirement. Through 2006, diversion was reported as a percentage and the City achieved a 67% diversion rate. In 2008, California law changed the method of calculating disposal rates. Diversion is now calculated using a per capita (per person) disposal rate, using a formula to arrive at a per day, per person, target weight amount measured in pounds per day (PPD). The new method was applied beginning with the 2007 reporting year. Millbrae was allocated a per capita of 5.3 PPD and for 2018, the last reporting year, had achieved 2.9 PPD.

This Plan, through a combination of State and City measures, outlines a path to reducing waste emissions 51% below 2005 levels by 2030.

3.3.1 Goal: Reduce Waste and Increase Recycling Opportunities

Existing and Continuing Community-wide Waste Reduction and Recycling Measures

The City has comprehensive waste prevention and recycling programs for residents, businesses, schools, and City facilities. These programs will continue and some of the programs will be expanded to increase the community diversion rate to 85% and municipal operations to 95% in an effort to achieve as close to zero waste as possible. The waste prevention and recycling programs provide opportunities for many ways to reduce, reuse, recycle, and buy recycled products. Additional programs are conducted to reduce the amount of household hazardous waste that is used and disposed of in landfills. The City works closely with the franchised hauler, the South San Francisco Company (SSF Scavenger), on the collection programs. The City appreciates the active participation of the community and businesses in the recycling programs. The City's efforts along with SSF Scavenger's collection and outreach efforts have led to high participation and diversion rates.

The City's Recycling & Waste Prevention Program has applied innovative ideas over the years to achieve a high diversion rate and has been recognized locally, regionally, and state-wide for its many implemented programs. The City was one of the first cities in the County to achieve the State's initially mandated 50% landfill diversion requirement. In addition, there have been many inquiries from other cities about Millbrae's recycling programs and many have replicated them. The City has led by example by implementing recycling programs for City facilities. The City won two awards for best recycling program— the State's Trash Cutters award in 2000 and an award from Sustainable San Mateo County in 2007. The program also received the Beacon Award for sustainable practices from the Institute for Local Governments, among other awards mentioned earlier in this Plan.

Landfill Diversion Rate Goal - Achieve 85% Diversion

The City will increase participation in existing recycling programs through outreach and education on reducing, reusing, recycling, and composting and through the weekly collection of

recyclables and organic waste to achieve 85% diversion. The existing and continuing programs are described below.

Residential Program

A cornerstone of the Recycling & Waste Prevention Program is conducting outreach to inform the community on where and how they can recycle materials. SSF Scavenger also provides outreach through quarterly newsletters and messaging on bills. A variety of recycling outreach and education to residents is conducted and will continue through the distribution of educational materials to public locations; holding organic gardening, energy conservation, water conservation, composting, and other workshops; airing public service announcements and educational videos on Millbrae Community Television, the local cable station; sending out press releases; conducting community presentations; and installing educational displays at the Library and City Hall. The City holds community events for Earth Day and Pollution Prevention Week and provides information on relevant City and countywide programs. The City also staffs educational tables in public locations like Millbrae Square and at events, where staff distributes program materials and answers questions. In addition to recycling curbside, there are opportunities to recycle materials in the public recycling containers located in the downtown area and in parks and athletic fields.

Food scrap collection became available to all residents living in single family homes in January of 2015. Residents can place food scraps and food soiled paper into their yard trimmings cart. SSF Scavenger built a state-of-the-art anaerobic digester which breaks down green waste into biogas and compost. The biogas is used to fuel SSF Scavenger's collection vehicles. They have 39 fueling stalls in use. Food scrap collection for condominiums and apartments is also available but currently underutilized. Outreach materials and a kitchen pail to collect food scraps were delivered to every household. The City also conducted outreach by updating the website and putting informational displays in City Hall and the Library. The food scrap program is reducing the amount of organic material from entering the landfill, thus reducing GHG emissions as well as the use of fertilizers, chemicals, and water use.

School Program

The Environmental Programs' staff periodically conducts classroom presentations, or partners with San Mateo County Office of Sustainability (County), and SSF Scavenger staff, on topics such as where Millbrae's waste goes, waste prevention, recycling, composting, buying recycled products, and water conservation. The City also provides assistance to set up and expand recycling programs by conducting assessments and providing indoor recycling containers and backyard and/or worm composting bins. The County and SSF Scavenger also provide assistance through waste assessments and school assemblies. Furthermore, City staff conducts outreach and periodic newsletters to teachers and principals to inform them of the available school resources and services.

Commercial Programs: AB 341, AB 1826 and SB 1383

The City's Environmental Programs staff works with new and existing businesses to provide assistance and resources to help them set up recycling and organics collection programs to reduce the amount of waste sent to the landfill. The City provides free indoor recycling containers, SSF Scavenger provides outdoor recycling containers and collection, and together they provide businesses additional resources and on-site visits to help ensure successful program setup. The current State legislation described below provides impetus for additional diversion programs. While the City has very good recycling participation and compliance, the City will need to adopt an enforcement measure for compliance with SB 1383 which could include other comprehensive recycling measures.

AB 341, the Mandatory Commercial Recycling regulation, took effect July 1, 2012 and requires businesses, government offices, and schools that generate four cubic yards or more of garbage per week and multi-family complexes of five or more units to recycle. This was one of the measures adopted in AB 32 by the Air Resources Board in the California Global Warming Solutions Act (Chapter 488, 2006). The goal is to achieve a state-wide 75% diversion rate in an effort to reduce waste and GHG emissions by diverting commercial solid waste to recycling efforts and expand opportunities for additional recycling services and recycling manufacturing facilities in California. The commercial sector generates nearly three fourths of the solid waste in California and much of this waste is readily recyclable. Most businesses and multi-family complexes were already recycling in Millbrae prior to AB 341 and City staff worked with the few required businesses and multi-family complexes that were not already setup with recycling collection services to comply.

AB 1826, the Mandatory Commercial Organics Recycling regulation, requires businesses and multi-family complexes with five or more units that generate specified amounts of waste to recycle their organic waste. Multi-family complexes are only required to recycle yard trimmings, not food scraps. On April 1, 2016, the bill went into effect for accounts that generate eight cubic yards or more of organic waste. The law follows a schedule based on the amount and type of waste the business produces on a weekly basis, with full implementation realized in 2019 with businesses that generate four yards or more of solid waste required to have organics collection. In 2020, if CalRecycle determines that the state-wide disposal of organic waste has not been reduced by 50 percent of the level of disposal in 2014, the organic recycling requirements for businesses could expand to businesses that generate two cubic yards or more of commercial solid waste per week.

In 2014, with the completion of the anaerobic digester, SSF Scavenger started working directly with businesses to implement food scrap recycling programs, requiring employees to sort their food scraps and food soiled paper in-house. This effort has increased diversion and helps the City and State achieve their diversion goals.

SB 1383 was adopted in 2016 with a goal to reduce state-wide GHG emissions of methane below 2013 levels by 2030, reduce state-wide disposal of organic waste 75% below 2014 levels by 2025, and recover 20% of disposed edible food for human consumption by 2025. This was adopted upon determining that the decomposition of organic waste in landfills was the second largest source of methane emissions in California and food waste accounted for 18% of landfill disposal in the State in 2014. Edible food recovery efforts are currently underway, working with the County of San Mateo Office of Sustainability, who is taking the lead countywide on food recovery and other elements. Additional planning, programs, policies, and reporting will need to be implemented to meet the requirements once the regulations are developed, including adopting an enforcement measure as previously mentioned. GHG reductions associated with this measure have been calculated and included in the reduction numbers in Table 26 under State-wide Initiative Emissions Reductions.

Construction and Demolition Reuse and Recycling

A program is in place to capture materials during the demolition and construction process for reuse and recycling. At least 65% of all waste generated for projects by weight must be achieved through the reuse and recycling of materials in accordance with the CALGreen Code. This program is managed by the City's Building Division in the Community Development Department. The City could consider adopting an ordinance where a deposit is charged and returned based on compliance.

City Adopted Policies

1. Single-Use Carryout Bag Ordinance

The City's Single-Use Carryout Bag Ordinance started on September 1, 2012 and prohibits the use of single-use carryout plastic bags and the distribution of free paper bags at retail stores, including grocery stores, supermarkets, convenience stores, drug stores, clothing stores, home improvement stores, office supply stores, and other retail stores.[35] The goal of the Ordinance is to encourage shoppers to use reusable shopping bags and decrease the use of single-use bags and associated waste and litter. As plastic bags often end up in storm drains, on beaches, and in waterways, this measure also helps with stormwater management regulations. Millbrae was the first community in the County to adopt this type of ordinance. Thereafter the County of San Mateo and other communities have adopted similar ordinances, leading to increased regional benefits.

Stores can supply paper bags that contain a minimum of 40% post-consumer recycled content and charge a minimum of $0.10 for each point-of-sale paper bag, which the stores retain. To help with the transition to using reusable bags, the City distributed free reusable cloth shopping bags made from 100% post-consumer recycled plastic bottles to Millbrae residents. To date, the City has distributed over 9,000 reusable shopping bags.

2. Sustainable Food Service Ware Ordinance

The City adopted a Sustainable Food Service Ware Ordinance in 2008 that prohibits foam and solid polystyrene food service ware and requires the use of compostable or recyclable food service ware by food vendors, such as restaurants.[36] The City once again was the first in the County to pass this type of ordinance and thereafter the County of San Mateo and a number of other cities in the County have adopted similar ordinances. The City adopted this Ordinance to reduce waste and littering and for health-related reasons. Polystyrene contains the hazardous chemicals styrene and benzene; benzene is a known carcinogen. Similar to single-use carryout

[35] The full text of the ordinance is available in Chapter 6.05 of the municipal code and can be found at: http://www.codepublishing.com/ca/millbrae.html.

[36] The full text of the ordinance is available in Chapter 6.40 of the municipal code and can be found at: http://www.codepublishing.com/ca/millbrae.html.

bags, polystyrene food service ware is a common item that is littered on streets and ends up in storm drains, on beaches, and in the Bay and ocean. This measure therefore also helps with stormwater management regulations. The County of San Mateo has amended its existing Disposable Food Service Ware Ordinance to require that all food ware is compostable and includes measures to reduce other single-use items used in food services, such as condiments. Other Bay Area cities are enacting similar ordinances. The City will amend its Sustainable Food Service Ware Ordinance to be in line with the County's.

Table 21 summarizes the estimated GHG reductions associated with the existing and continuing community waste measures.

Table 21: Existing Community Measures: Waste

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
37	Landfill Diversion Rate Goal	Increase participation in recycling programs and weekly collection of recyclables and organic waste to achieve 85% diversion.	289
38	Sustainable Food Service Ware	Amend the existing Sustainable Food Service Ware ordinance to require that all food ware is compostable and to reduce the use of other single-use items in food services.	Supporting Measure
39	Commercial Organics Recycling Ordinance	AB 1826 requires all businesses and multi-family complexes with more than five units to sort and recycle organic material. Provide enforcement to ensure compliance with ordinance.	Supporting Measure

3.3.2 Goal: Reduce Waste in Municipal Operations through Adoption of Purchasing and Zero Waste Policies

Expanding and New Municipal Operations Waste Prevention and Recycling Policy Measures

There are comprehensive waste prevention and recycling programs for the City's various facilities, including City Hall, the Library, Millbrae Police Bureau, fire stations, the Community Center, and the Public Works Operations Center. Each facility is recycling the standard materials including mixed paper, containers (cans/bottles), cardboard, yard trimmings, household batteries, and electronic waste. The collection of food scraps/organics began in 2017. The Utilities and Operations staff recycles a variety of other

materials including metals, cement, asphalt, bricks, soil, base rock, fluorescent light bulbs, and other materials. In addition, film plastic, expanded polystyrene, and all types of electronics are recycled at City Hall. Periodically, the City emails newsletters or notices on various waste prevention and recycling topics to employees.

The City adopted an Environmental Policy in 2013, which replaced a prior policy and sets guidelines and responsibilities for City staff, departments, and facilities to recycle materials to purchase recycled content paper, paper towels, and toilet paper, and adhere to other sustainability measures. The City uses 100% post-consumer content white copy paper and 30% post-consumer content colored paper. Other office products also contain recycled content. In 2007, the City placed a requirement in the custodial contract to use non-toxic cleaning products for City facilities. The City also certified City Hall and the Library as Green Businesses in 2008, and both were recertified in 2013 and 2019.

The City launched a paper reduction campaign initially in 2008 that went hand in hand with the transition to 100% post-consumer recycled paper. The campaign encouraged employees to reduce paper use by adjusting margins, using both sides of paper, utilizing print preview, using electronic versions as much as possible, etc. Paper reduction efforts have continued. By switching to 100% post-consumer recycled paper along with the paper reduction campaign, the City reduced enough paper use to offset the increased cost of buying the 100% post-consumer recycled paper. Each year, the City saves 84 trees (40 feet high and 6-8 inches in diameter) from being cut down, 14,350 kWh of electricity, 24,500 gallons of water, and 210 pounds of air pollution. The trees saved by buying recycled paper products provide oxygen, help to reduce climate change, protect fisheries, provide habitat for wildlife, increase precipitation, and help hold soil in place.

Environmentally Preferred Purchasing Policy

The City's Administrative Standard Procedures for its Environmental Policy described above includes Environmentally Preferred Purchasing procedures. It is the intent to expand on the City's Administrative Standard Procedures to include other areas of sustainable purchasing, including products such as building and landscaping materials, electronics, and additional office supplies. The Environmentally Preferred Purchasing Policy would include instituting practices that reduce waste by purchasing products that minimize environmental impacts, toxics, pollution, and hazards to worker and community safety; purchasing products that reduce GHG emissions in their production, shipping, use and discard; and purchasing products that include recycled content, are durable and long-lasting, conserve energy and water, use agricultural fibers and residues, use unbleached or chlorine free manufacturing processes, are non-toxic, and use wood from sustainably harvested forests. This type of policy has far-reaching benefits that encompass many environmental aspects for an overall comprehensive purchasing policy.

Sustainable Vendor Policy at Public Events
Efforts will continue in working with event organizers to provide recycling and food scrap/organics collection at local public events and to ensure the use of compostable/recyclable food service ware as required by the local Sustainable Food Service Ware Ordinance.

Table 22 summarizes the estimated GHG reductions associated with existing and continuing municipal operations waste measures.

Table 22: Existing Municipal Operations Measures: Waste

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
40	Environmentally Preferred Purchasing Policy - Waste Reduction	Revise the Administrative Standard Procedures for the Environmental Policy to strengthen sustainable purchasing procedures.	Supporting Measure
41	Sustainable Vendor Policy at Public Events	Continue to work with event organizers for recycling cardboard, paper, containers and food/organics at public events, and for using compostable/recyclable food service ware.	Supporting Measure

New Municipal Operations Waste Reduction and Recycling Policy Measure

Implement a Municipal Zero Waste Policy
"Zero waste" means sending very little to the landfills by increasing efforts to reduce, reuse, recycle, and compost, aiming for a minimum of a 95% diversion rate. It entails manufacturers taking responsibility for designing products that are less wasteful, reusable, non-toxic, and less polluting, as well as taking back their products and packaging for reuse and recycling. It also involves using economic incentives for customers, workers, and suppliers. This is known as Extended Producer Responsibility.

To help support sustainable resource management and landfill diversion, the City will adopt a policy that maximizes diversion by the year 2030. To help achieve this goal, programs will be developed to expand current efforts for reducing waste and increasing participation in all recycling programs. The City will work with the SSF Scavenger to identify other materials that may be recycled. An element of this is expanding the Administrative Standard Procedures to incorporate more elements of zero waste within the purchasing policy as described above.

Efforts would be made to partner with other zero waste and sustainability advocates to pursue and advocate for Extended Producer Responsibility as described above, where manufacturers are involved in materials management and system redesign solutions.

Table 23 summarizes the estimated GHG reductions associated with new municipal operations waste measures.

Table 23: New Municipal Operations Measures: Waste

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Measure Start Year
42	Zero Waste Policy	Implement policy to achieve 95% diversion in City operations by 2030.	3	2020

3.4 All Sectors: The Green Business Program

3.4.1 Goal: Help businesses conserve resources, prevent pollution, and minimize waste

Existing and Continuing All-Sector Program

Green Business Program

The Green Business Program addresses all sectors: energy efficiency, water conservation, transportation, and waste reduction and recycling. The Bay Area Green Business Program was developed in 1997 by ABAG and Bay Area public agencies in collaboration with the United States Environmental Protection Agency (US EPA), California EPA (CalEPA) Department of Toxic Substances Control, and the business community and is offered throughout the Bay Area and most of California. The Green Business Program is a partnership between the cities, counties, environmental agencies, and utility companies to assist, recognize, and promote businesses and government agencies that comply with all environmental regulations and take actions beyond compliance to conserve resources, prevent pollution, and minimize waste. The benefits of being a Green Business include: saving money and resources by reducing consumption of energy and water; reducing the amount of garbage disposed; reducing impact on climate change; improving employee morale and creating a healthy workplace; strengthening the bottom line through operating efficiencies and innovations; and being recognized as an environmental leader in one's community.

The Green Business Program offers motivated businesses and agencies an easy-to-use framework for improving environmental performance, and then verifies improved performance. To be certified as a Green Business, participants must be in compliance with all State and local regulations and meet program standards for conserving resources, preventing pollution, and minimizing waste. This program touches on many sectors affecting GHG reductions and therefore has its own section in this Plan.

Millbrae participated in the County of San Mateo's pilot Green Business Program before it expanded to include all of the cities in the County. The program ran from 2007 until it temporarily ended in 2011, resuming in 2013. The City and Library were initially certified as a Green Business in 2008 and then recertified in 2013 and 2019. The City provided environmental leadership by becoming a certified Green Business with the goal of encouraging the business community to follow suit. In addition, Central County Fire Department Stations were certified in 2019. Other certified local Green Businesses include Grace Yoga, Paper Culture, Taste Catering and Dela Rama Dental Care. The City will continue to promote the program to local businesses.

Table 24 summarizes the estimated GHG reductions associated with the Green Business Program.

Table 24: Existing Community Measures: Green Business Program

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)
43	Bay Area Green Business Program	Continue implementing this program that allows businesses to brand themselves as green by following sustainable practices.	110

3.5 Summary of Measures

A summary of all the emission reduction measures is provided in Table 25.

Table 25: Summary of All Measures

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
1	**Commercial Green Building Ordinance**	The City will continue to adopt the latest version of the CALGreen Code for non-residential new construction and major remodels for applicable updates outside of the Reach Codes.	497	Yes	N/A
2	**Residential Green Building Ordinance**	The City will continue to adopt the latest version of the CALGreen Code for residential new construction and major remodels for applicable updates outside of the Reach Codes.	146	Yes	N/A
3	**Residential Energy Retrofit Incentives and Rebates**	Through marketing and outreach, the City promotes participation in residential energy efficiency programs, including BayREN's Home+ program, San Mateo County Energy Watch and PG&E's efficient appliance rebates. City will encourage residential energy audits.	2,872	Yes	N/A
4	**Commercial Energy Efficiency Programs**	Through marketing and outreach, the City promotes participation in commercial energy efficiency programs and demand response programs offered by SMC Energy Watch and PG&E – including PGE's appliance rebates, 0% energy efficiency financing, and demand response programs. City will encourage commercial energy audits.	1,657	Yes	N/A
5	**Residential Energy Conservation Program**	Initially start a voluntary residential energy conservation program, whereby the City would encourage minimum energy efficiency and water efficiency standards at the time of building sale. Transition to mandatory residential energy conservation ordinance over time.	607	No	2021 (voluntary) / 2023 (mandatory)
6	**Commercial Energy Conservation Program**	Initially start a voluntary commercial energy conservation program, whereby the City would encourage minimum energy efficiency and water efficiency standards at the time of building sale. Transition to mandatory commercial energy conservation ordinance over time.	458	No	2021 (voluntary) / 2023 (mandatory)
7	**Free or Subsidized Shade Trees**	Implement City program to reduce energy consumption associated with cooling homes through the provision of free or subsidized shade trees for buildings with eastern, western or southern exposures.	23	No	2021

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
8	**Electrical Panel Upgrades in Existing Buildings**	Leverage incentives and resources provided by PCE, BayREN, and PG&E to encourage residents and offices to upgrade electric panels in order to accommodate all-electric technologies including solar PV, battery storage, air source heat pumps, heat pump water heaters, electric dryers, electric stoves, and electric vehicles.	6,480	No	2020
9	**Residential & Commercial All-Electric Ordinance**	Update building code to mandate that residential and commercial new construction and major remodels be built to an all-electric standard, including electric heating, cooling, and water heating.	1,617	No	2021
10	**Promote Solar Installations**	Continue to participate in bulk purchase program such as the Peninsula SunShares Program. Promote the installation of solar among residents and businesses in the community.	1,527	Yes	N/A
11	**Participate in Community Choice Aggregation**	Through Peninsula Clean Energy, the City will continue to provide greener renewable electricity to citizens and businesses.	7,320	Yes	N/A
12	**New Non-Residential Buildings Solar Requirement**	Update building code to mandate that all commercial new construction and major remodels install a solar PV system at time of construction.	616	No	2021
13	**Pairing Battery Storage with Solar PV Systems**	Provide education and outreach on the benefits of pairing battery storage with solar PV systems to stakeholders, including businesses, residents, and contractors.	872	No	2020
14	**Energy Efficient Street Lighting**	Continue to replace street, signal, parks, and parking lot lighting with efficient lighting.	64	Yes	N/A
15	**Environmentally Preferred Purchasing Policy - Energy**	Continue to implement Administrative Standard Procedures which includes a sustainable purchasing policy prioritizing Energy Star equipment.	4	Yes	N/A

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
16	**Participate in Community Choice Aggregation: Municipal**	The City has elected and will continue to elect to "opt up" to ECO100 (100% renewable) electricity service through PCE.	142	Yes	N/A
17	**Energy Efficiency in Municipal Buildings**	Continue to audit city facilities for energy efficiency opportunities and implement energy efficient (EE) retrofits. The City participates in San Mateo County Energy Watch and leveraged benchmarking to identify opportunities for EE upgrades and track energy performance. Leverage other programs that provide funding.	273	Yes	N/A
18	**Renewable Energy Installation for Municipal Properties**	Evaluate installation of solar carport system at Millbrae City Hall/Library parking lots.	68	No	2022
19	**Municipal Green Building Policy**	The City will follow the CALGreen Codes and consider certification for LEED Silver or Gold status or equivalent. New construction will follow adopted Reach Codes for building electrification.	5[37]	No	2021
20	**Water Conservation Incentives**	Continue promoting existing and new rebates for water efficient appliances and fixtures.	102	Yes	N/A
21	**Water Efficient Landscape Ordinance and CALGreen Indoor Water Efficiency Requirements**	Continue implementation of the State Model Water Efficient Landscape Ordinance (MWELO) and CALGreen indoor water efficiency requirements.	43	Yes	N/A
22	**Residential "Graywater Ready" New Construction**	Encourage new construction projects to be built "graywater ready" by educating applicants during the design phase of projects.	11	No	2021

[37] These projections assume that any new facilities are built to LEED Silver standards or equivalent.

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
23	**Smart Growth Development**	Continue Smart Growth Policy that prioritizes infill, higher density, transportation oriented, and mixed-use development.	624	Yes	N/A
24	**Walkable / Bikeable Street Landscape**	Remake urban landscape to make walking and biking more desirable such as bike lanes, bike parking, traffic calming, beautification, etc.	873	Yes	N/A
25	**Safe Routes to School**	Continue to support the City's Safe Route to Schools program by establishing bike trails and safe pedestrian routes to local schools (infrastructure) and educating the community about the program.	50	Yes	N/A
26	**Electric Vehicle Education and Outreach**	Increase number of electric vehicles that are owned by residents, commuters, and visitors to the City through education and outreach focused on the benefits of electric vehicles.	5,555	Yes	N/A
27	**Local Farmers' Market**	Support the farmers' market to encourage local shopping for locally-grown food and reduce VMT associated with acquiring produce.	6	Yes	N/A
28	**Bike Sharing**	Explore bike sharing program to have bikes located at the BART Station, downtown, and elsewhere.	118	No	2021
29	**Car Sharing**	Encourage car sharing companies to open pods in town.	131	No	2021
30	**Shuttle Program**	Increase shuttle service within city limits to connect areas not covered by public transit.	249	No	2021
31	**EV Charging Infrastructure in Existing Buildings**	Leverage incentives from PCE to expand charging infrastructure in public properties, multi-unit dwellings, and workplaces.	11,558	No	2020
32	**EV Charging Infrastructure in New Construction**	Adopt Reach Code to update the residential and commercial building code to increase the mandated percentage of parking spaces designed to accommodate electric vehicle charging equipment and also increase the mandated percentage of parking spaces devoted to clean air vehicles (EVs, PHEVs, carpools).	878	No	2021

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
33	**Shared Electric Bikes and Scooters**	Modify existing City infrastructure to accommodate shared electric bikes and scooters that provide last-mile solutions to residents and commuters. Infrastructure enhancements including dedicated off-street parking spaces and on-street corrals to accommodate shared electric bike and scooter parking and prevent conflicts with pedestrians.	830	No	2021
34	**Electric Transportation Network Company (TNCs) Vehicles**	Develop policies, such as a revenue neutral fee that only applies to internal combustion engine TNCs, to encourage the use of EV TNCs in the community. Utilize funds generated by fees to provide discounts on EV TNC rides. Provide designated drop-off locations and charging locations for EV TNCs to facilitate EV adoption.	887	No	2021
35	**Public Employee Commuting Program**	Continue with the commute alternatives program to promote and incentivize public transportation, carpooling, biking, etc.	2	Yes	N/A
36	**Clean Fleet Policy**	Prioritize purchase of battery electric, plug-in hybrid electric, and traditional hybrid vehicles. Maintain existing vehicles for optimum mileage. Encourage staff to drive minimally and efficiently. Expand on the idling policy.	42	No	2020
37	**Landfill Diversion Rate Goal**	Increase participation in recycling programs and weekly collection of recyclables and organic waste to achieve 85% diversion.	289	Yes	N/A
38	**Sustainable Food Service Ware**	Amend the existing Sustainable Food Service Ware ordinance to require that all food ware is compostable and to reduce the use of other single-use items in food services.	Supporting Measure	No	2021
39	**Commercial Organics Recycling Ordinance**	AB 1826 requires all businesses and multi-family complexes with more than five units to sort and recycle organic material. Provide enforcement to ensure compliance with ordinance**.**	Supporting Measure	Yes	N/A
40	**Environmentally Preferred Purchasing Policy - Waste Reduction**	Revise the Administrative Standard Procedures on Reuse and Recycling to strengthen sustainable purchasing procedures.	Supporting Measure	Yes	N/A

#	Measure	Description	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure ?	Measure Start Year
41	**Sustainable Vendor Policy at Public Events**	Continue to work with event organizers for recycling cardboard, paper, containers and food/organics at public events, and for using compostable/recyclable food service ware.	Supporting Measure	Yes	N/A
42	**Municipal Zero Waste Policy**	Implement policy to achieve 95% diversion in City operations by 2030.	3	No	2020
43	**Bay Area Green Business Program**	Continue implementing this program that allows businesses to brand themselves as green by following sustainable practices.	110	Yes	N/A

3.6 Adaptation

Climate adaptation involves taking practical actions to manage risks from climate impacts, protect communities, and strengthen the resilience of the economy. The climate is changing rapidly. According to the World Meteorological Organization (WMO), in their 2010 news release "2000-2009, The Warmest Decade", the decade of the 2000s was warmer than the 1990s, which was warmer than the 1980s. And according to WMO's "The State of the Global Climate in 2018", 2018 was the fourth warmest year on record, which means the four prior years, 2015, 2016, 2017, and 2018 taken together were the four warmest years on record.

In the past decade, the oceans absorbed around 25% of anthropogenic carbon dioxide emissions, according to WMO. More than 90% of the energy trapped by greenhouse gases goes into the oceans. This contributes to ocean acidification as absorbed carbon dioxide reacts with seawater to change the pH of the ocean. Observations over the last 30 years have shown a clear trend of decreasing oceanic pH, with potentially negative impacts to shell-forming marine organisms.

Even if humans stopped emitting GHGs tomorrow, the climate would continue to change due to the length of the carbon cycle, or the ability of the Earth to absorb the excess carbon in the ocean and plants. Therefore, our community must plan for adaptation to climate change.

Adaptation planning may be most effective at the State and regional level, due to the scale of resources needed to develop and implement a coordinated plan. The 2009 California Climate Adaptation Strategy was developed to guide California's efforts in adapting to climate change impacts. The State is currently developing an Adaptation Planning Guide to provide a decision-making framework to aid local and regional stakeholders in the interpretation of climate science and considerations for reducing risks caused, or exacerbated, by climate change.

For more information on adaptation planning, see Appendix F. Adaptation Planning for Climate Impacts.

4 Implementation

The preceding chapters describe the principal sources of the City of Millbrae's greenhouse gas (GHG) emissions and outline related goals and measures for achieving the target of reducing emissions to 32% below 2005 levels by 2025 and 49% below 2005 levels by 2030. This chapter outlines the main components of how the measures were prioritized and the timeline for implementation.

As evident from the comprehensive list of policies related to climate change in Section 1.6, the City of Millbrae (City) has a long history of enacting programs to reduce emissions from both the community and municipal operations. Although these GHG reduction policies and initiatives are already in place and will continue, the additional actions proposed in this Climate Action Plan (Plan), especially the state-wide and regional transportation measures, will be necessary to achieve the emissions reduction target. Implementing this Plan and ensuring that it results in real GHG emissions reductions will require increased coordination across sectors and institutionalized climate protection efforts across the community.

There are a large number of measures and programs that the City has included in this Plan to reduce GHG emissions and many of the measures and programs are currently in place or in progress of being implemented. Of the 43 measures included in this plan, 21 are new programs or policies.

4.1 Prioritizing Measures for Action

The measure prioritization framework was developed by the City/County Association of Governments of San Mateo County (C/CAG) Regionally Integrated Climate Action Planning Suite (RICAPS) program. The City of Millbrae utilized RICAPS to analyze existing measures and select and prioritize new measures, as described below. All existing measures or those that are in progress are assumed to continue and were not prioritized. The expanding and new programs are in the short and medium-term implementation time period to achieve the emissions reduction targets. There are no new measures to be implemented after 2025; however, there are many existing and continuing measures. This Plan is a living document. As

emerging technologies change in the coming years, additional measures can be added to the Plan.

The 21 new measures were prioritized for implementation and evaluated based on the following three categories of Key Performance Indicators (KPIs): Benefits, Costs, and Implementation and Feasibility. The following is a summary of the three categories of KPIs that were analyzed:

- **Category 1: Benefits**
  KPIs:
  - Annual GHG reduction in metric tons
  - Annual resource savings
  - Annual government dollar savings
  - Annual business dollar savings
  - Co-benefits (such as reduced air pollution, increased employee productivity, increased energy independence, and increased transportation options)

- **Category 2: Costs**
  KPIs:
  - Government capital costs
  - Additional government operating costs
  - Staff time
  - Residential costs
  - Business costs
  - Length of payback period

- **Category 3: Implementation and Feasibility**
  KPIs:
  - Length of measure implementation
  - Probability of community support or opposition
  - Requirements for new codes or ordinances
  - Synergies with existing initiatives and partnerships
  - Availability of outside funding

4.2 Meeting the Emissions Targets

In summary, the measures described in this Plan, combined with state-wide legislation and initiatives and countywide transportation programs, will enable the City to meet its emissions reduction target of 49% below 2005 levels by 2030 and the interim target of 32% below 2005 levels by 2025. Table 26 shows the contribution of the state-wide initiatives along with the community and municipal operations Climate Action Plan measures. As described in Section 2.5, the City needs to achieve a 92,025 $MTCO_2e$ of GHG emissions reduction by 2030 to meets its goal. The total estimated GHG reductions accounted for in this Plan total 93,887 $MTCO_2e$ by 2030 (49.68% below 2005 levels), as shown in Table 26.

Table 26: Meeting the 2030 Target

State Initiative	Sector	2030 Reduction in City's Emissions (MTCO2e)
Advanced Clean Cars Program	On-road Transportation	27,207
Low Carbon Fuel Standard	Off-road Transportation	1,223
Caltrain Electrification	Trains	1,045
Renewable Portfolio Standard	All Electricity	5,360
100% ZNE New Residential (2020)	Residential Energy	1,279
50% ZNE Existing Commercial (2030)	Commercial Energy	8,157
Organic Waste Diversion SB 1383	Disposed Waste	2,007
A. Total State-wide Initiative Emissions Reductions		46,277
B. Total City Climate Action Plan Reductions		47,609
C. Total Expected Emissions Reductions (A+B)		93,887
D. City of Millbrae Emissions Reduction Requirement		92,025
E. Meets/exceeds State goals? (C > D)		Yes

4.3 Management of GHG Reduction Strategy

Support will be needed to direct the implementation of this Plan's measures. The City currently has one fulltime staff person and one part-time staff person that implements the City's Environmental Programs. The Environmental Programs Manager will have the responsibility for overseeing the implementation of the Plan and coordination with Department staff for measures that fall under their respective departments. The implementation timeline in Appendix I. Timeline and Staffing outlines department staffing associated with the measures. A number of the measures are existing and continuing programs and some of involve staff from various departments. Additional staffing would be desirable in order to implement the measures. This section details how the City will organize itself to put this Plan into action.

Assign responsibility for implementation to the appropriate City staff: Responsibilities will be assigned to the appropriate department and staff for each measure that is implemented. The Energy and Transportation measures will involve the Public Works and Community Development Departments. The Solid Waste measures will involve Public Works/Environmental Programs. The Green Business Program will be primarily implemented by Environmental Programs staff. The Environmental Programs staff will coordinate outreach to appropriate City staff to review the elements of this Plan and outline which measures are in their department or division.

Conduct regular outreach to the public: Efforts will continue to conduct public education activities, such as facilitated public meetings and workshops on local and regional programs. These outreach events will engage the public in actively helping the City achieve the emissions reduction goals. Outreach will also be conducted on reducing energy use and related incentive programs. Other education activities may include developing literature, such as carbon footprint calculators, to promote programs associated with the Plan's implementation.

Maintain and add associations and partnerships: Partnerships will assist the City in developing programs and policies and in attaining funding for activities that will result in GHG emissions reductions.

4.4 Public Participation and Community Engagement

The City can play a substantial role in generating awareness and educating residents about ways to reduce emissions. While the City can help initiate a movement that emphasizes sustainable practices, it is crucial that other members of the community, such as residents and businesses, are engaged in the process in order to achieve the reduction targets of this Plan while minimizing costs. The targets will only be achieved by building a movement with sustained action and coordination across all stakeholders and sectors.

As mentioned previously, there are significant opportunities for the City to leverage existing programs funded by the State of California, County of San Mateo, C/CAG, Peninsula Clean Energy (PCE), the Pacific Gas and Electric Company (PG&E), and others to support community efforts to improve energy efficiency, install renewable energy technologies, facilitate alternative transportation initiatives, and support households and businesses in taking other actions.

The City will continue to conduct a variety of outreach on all of its climate-related programs, including wide distribution of information on incentive programs and specific actions that can be taken by residents and businesses. The types of outreach the City will continue to implement include: posting information and opportunities on the City's website, social media, and the local cable station; installing educational displays at City Hall and the Millbrae Library; conducting classroom presentations; sending out press releases to newspapers; distributing program

brochures at key locations, including City Hall, the Library, and the Millbrae Community Center; staffing public events; and holding workshops. The City will expand its efforts to reach more of the community, both residents and businesses, engaging them in the identified programs in this Plan.

Specific actions that community members can take today are included in Appendix D: 10 Steps to Reduce Your Carbon Footprint. Funding opportunities are listed in Appendix E. Summary of Funding Sources.

4.5 Timeline

An implementation timeline with associated measures is included in Appendix I. Timeline and Staffing.

5 Monitoring and Improvement

Monitoring progress is a critical component to ensure that the emissions targets are met. Should monitoring efforts find that the Climate Action Plan is falling short of its goals, the City will add additional voluntary and mandatory measures to the Plan in order to meet the GHG emissions reduction targets. Ongoing monitoring is critical in order to demonstrate that the Plan is achieving its goals, thereby maintaining its status as a GHG Reduction Strategy over time. The implementation and monitoring of the Plan will be critical to the ability of subsequent projects to tier their GHG analysis under the California Environmental Quality Act (CEQA). A CEQA GHG emissions checklist is available for building development projects to tier from the programmatic CAP CEQA analysis for project-level GHG emissions analyses in order to demonstrate consistency with the City reduction targets and CEQA Guidelines.

The following describes the monitoring and improvement plan:

- The Environmental Programs staff will develop a report every year to summarize the results of the implementation progress for the Climate Action Plan measures.
- A full GHG inventory will be conducted minimally every three years, but ideally annually if assistance from RICAPS is available to conduct the inventories. The inventory will allow the City to understand how emissions levels are tracking in a top-down manner. PG&E can provide annual updates on electricity and natural gas usage to track associated GHG emissions.
- This Plan may need to be updated based on the results of the GHG inventories. The City may modify and/or add new measures to ensure that the City is on track to meeting its GHG emissions reduction goals. The City Council also may review and potentially update the GHG emissions reduction targets, and potentially modify and/or add measures to ensure these targets are met. There may also be changes that reflect grants and funding opportunities from federal, state, and local initiatives and programs.

6 Conclusion

While the challenge of climate change is unprecedented, local-level solutions can reduce emissions, improve energy efficiency, promote economic development, and improve the quality of life for the community, both residents and businesses.

The City of Millbrae has taken a significant step toward a more sustainable future with this Climate Action Plan. The Plan has identified areas and opportunities to reduce GHG emissions through the community and municipal operations, along with state-wide and county-wide efforts, to ultimately achieve its environmental goals and GHG emissions reduction targets. The City is poised to reap the benefits of a clean energy economy, with policies that can increase the demand for local green jobs.

These are difficult issues that will take a unified approach working with the State of California, County of San Mateo, and local citizens and businesses to achieve the GHG emissions reduction goals. There is a lot that one person can do individually, and Appendix D: 10 Steps to Reduce Your Carbon Footprint of this Plan provides 10 ways individuals can reduce their GHG footprint and help safeguard the environment for future generations.

While creation of this Plan is an important first step, the Plan will remain a living document, to be updated as technology and policies progress, and to support the City's efforts to manage GHG emissions for a sustainable future for all.

7 Appendices

7.1 Appendix A. Glossary of Terms

AB 32	The California Global Warming Solutions Act of 2006
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
C/CAG	City/County Association of Governments of San Mateo County
CAP	climate action plan
CAPPA	Climate and Air Pollution Planning Assistant
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
EIR	environmental impact review
EV	electric vehicle
GHG	greenhouse gas
ICLEI	ICLEI – Local Governments for Sustainability
kWh	kilowatt hour
MFD	multifamily dwelling
MPO	metropolitan planning organization
MT	metric ton
PACE	property-assessed clean energy
PCE	Peninsula Clean Energy
PG&E	Pacific Gas and Electric Company
ppm	parts per million
PV	photovoltaic
RPS	renewable portfolio standard
US EPA	United States Environmental Protection Agency
TOD	transit-oriented development
VMT	vehicle miles traveled

7.2 Appendix B. State Policy and Regulatory Context

The State of California (State) has been a leader in developing and implementing policies and regulations to directly address the risk of severe climate change. Below is a summary of key state-wide legislation aimed to reduce greenhouse gas (GHG) emissions. There are many supporting pieces of legislation and other related initiatives that are sector specific. These are more fully described in Chapter 3.

Assembly Bill 32, the California Global Warming Solutions Act of 2006
In September 2006, the California legislature passed Assembly Bill (AB) 32, which set the goal of reducing GHG emissions back to 1990 levels by 2020. AB 32 finds and declares that "global warming poses a serious threat to economic well-being, public health, natural resources and the environment of California." The legislation granted authority to the California Air Resources Board (ARB) to establish multiple mechanisms (regulatory, reporting, voluntary and market) to achieve quantifiable reductions in GHG emissions to meet the state-wide goal.

Senate Bill 32, the California Global Warming Solutions Act of 2006 Emissions Limit
In September 2016, the California legislature approved Senate Bill (SB) 32, which extends the State's targets for reducing greenhouse gases from 2020 to 2030. Under SB 32, the State will reduce GHG emissions 40% below 1990 levels by 2030. The bill piggybacks on AB 32, the California Global Warming Solutions Act of 2006, which calls for California to reduce greenhouse gas emissions to 1990 levels by 2020. Governor Jerry Brown set the targets contained in SB 32 in an executive order in 2015. SB 32 codifies the targets set by the executive order.

Assembly Bill 197, State Air Resources Board Greenhouse Gases Regulations
In September 2016, the California State Legislature approved AB 197, a bill linked to SB 32, which increases legislative oversight over the California Air Resources Board and directs the California Air Resources Board to prioritize disadvantaged communities in its climate change regulations, and to evaluate the cost-effectiveness of measures it considers. AB 197 requires the ARB to "protect the State's most impacted and disadvantaged communities [and] consider the social costs of the emissions of greenhouse gases" when developing climate change programs. The bill also adds two new legislatively appointed non-voting members to the ARB, increasing the Legislature's role in the ARB's decisions.

Senate Bill 350, Clean Energy and Pollution Reduction Act of 2015
In October 2015, SB 350 was signed into law, establishing new clean energy, clean air, and GHG reduction goals for 2030 and beyond. SB 350 codifies Governor Jerry Brown's aggressive clean energy goals and establishes California's 2030 GHG reduction target of 40% below 1990 levels. To achieve this goal, SB 350 increases California's renewable electricity procurement

goal from 33% by 2020 (legislation originally enacted in 2002) to 50% by 2030. Renewable resources include wind, solar, geothermal, wave, and small hydroelectric power. In addition, SB 350 requires the State to double state-wide energy efficiency savings in electricity and natural gas end uses by 2030 from a base year of 2015.

Senate Bill 100, The 100% Clean Energy Act of 2018

In September 2018, Governor Brown signed SB 100, requiring that the State's load serving entities (including energy utilities and community choice energy programs) must procure energy generated 100% from Renewables Portfolio Standard (RPS) for eligible renewable resources by 2045.

Executive Order B-55-18, California Carbon Neutrality Requirement by 2045

The day after SB 100 was signed, Governor Brown also signed Executive Order B-55-18, requiring California to achieve carbon neutrality as soon as possible, and no later than 2045, and to maintain negative emissions thereafter. It was ordered that a new statewide goal be established to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter. This goal is in addition to the existing statewide targets of reducing greenhouse gas emissions.

California Energy Efficiency Strategic Plan of 2008

In September 2008, the California Public Utilities Commission (CPUC) adopted California's first Long Term Energy Efficiency Strategic Plan, presenting a single roadmap to achieve maximum energy savings across all major groups and sectors in California. The Strategic Plan was subsequently updated in January 2011 to include a lighting chapter. The Strategic Plan sets goals of all new residential construction and all new commercial construction in California to be zero net energy (ZNE) by 2020 and 2030, respectively. In 2018, the California Energy Commission voted to adopt a policy requiring all new homes in California to incorporate rooftop solar. This change will go into effect in January 2020 with the adoption of the 2019 Title 24 Code and is a step towards the State achieving its goal of all residential new construction being ZNE by 2020. Additionally, the Strategic Plan sets goals of 50% of existing commercial building to be retrofit to ZNE by 2030 and all new State buildings and major renovations to be ZNE by 2025.

Senate Bill 1275, Charge Ahead Initiative

In September 2014, Senate Bill 1275 was signed into law, establishing a State goal of one million zero-emissions and near-zero-emissions vehicles in service by 2020 and directing the Air Resources Board to develop a long-term funding plan to meet this goal. SB 1275 also established the Charge Ahead California Initiative requiring planning and reporting on vehicle incentive programs and increasing access to and benefits from zero-emissions vehicles for disadvantaged, low-income, and moderate-income communities and consumers.

Assembly Bill 1493, the Pavley Bill

In 2002, the California State Legislature enacted Assembly Bill 1493 (aka “the Pavley Bill”), which directs the Air Resources Board to adopt standards that will achieve "the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles," taking into account environmental, social, technological, and economic factors. In September 2009, the ARB adopted amendments to the “Pavley” regulations to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The Pavley Bill is considered to be the national model for vehicle emissions standards. In January of 2012, the ARB approved a new emissions-control program for vehicle model years 2017 through 2025. The program combines the control of smog, soot, and greenhouse gases and the requirement for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars.

Assembly Bill 117, Community Choice Aggregation

Assembly Bill 117 establishes the creation of Community Choice Aggregation (CCA) that fosters clean and renewable energy markets. CCA allows cities and counties to aggregate the buying power of individual jurisdictions. The California CCA markets were created as an answer to the brownouts and energy shortages of the early 2000’s. AB 117 was passed in 2002 as an answer to California’s increased energy independency by incorporating more alternative and renewable energy sources into its energy portfolio. With AB 117, municipalities can provide alternative energy choices to their local carrier (e.g. the Pacific Gas and Electric Company, PG&E). Marin Clean Energy was the first CCA in the State of California to go online with a 50% to 100% clean energy portfolio in 2010. Peninsula Clean Energy (PCE) was created in February 2016 when all 20 towns/cities in San Mateo County, plus the County of San Mateo, voted unanimously to form a Joint Powers Authority to administer the program. PCE is a public, locally-controlled electricity provider that gives PG&E customers in San Mateo County the choice of having 50% to 100% of their electricity supplied from clean, renewable sources at competitive rates. CCAs are governed by the California Public Utilities Commission (CPUC). SB 790 further ensures fair and transparent competition by creating a code of conduct and guiding principles for entrants into the CCA field.

Senate Bill 375, GHG Reduction

In September 2008, Senate Bill 375 was signed into law to provide emissions reduction goals related to vehicle miles traveled on a regional planning level. The bill seeks to align regional transportation planning efforts with regional GHG emissions reduction targets and land use and housing allocations. SB 375 requires metropolitan planning organizations (MPOs) to adopt a sustainable community's strategy or alternative planning strategy. The California Air Resources Board, in consultation with the MPOs, set a per capita GHG emissions reduction target for passenger cars and light trucks in the San Francisco Bay Area of 7% below 2005 levels by 2020, and 15% below 2005 levels by 2035.

Senate Bill 97, CEQA Guidelines for Addressing GHG Emissions

The California Environmental Quality Act (CEQA) requires public agencies to review the environmental impacts of proposed projects, including General Plans, Specific Plans, and specific kinds of development projects. In February 2010, the California Office of Administrative Law approved the recommended amendments to the State CEQA Guidelines for addressing GHG emissions. The amendments were developed to provide guidance to public agencies regarding the analysis, mitigation, and effects of GHG emissions in draft CEQA documents.

Bay Area Air Quality Management District CEQA Guidelines

The Bay Area Air Quality Management District (BAAQMD) encourages local governments to adopt a GHG Reduction Strategy that is consistent with AB 32 goals. The GHG Reduction Strategy may streamline environmental review of community development projects. According to the BAAQMD, if a project is consistent with a GHG Reduction Strategy, then it can be presumed that the project will not have significant GHG impacts. This approach is consistent with the following State CEQA Guidelines, Section 15183.5.a:

> "Lead agencies may analyze and mitigate the significant impacts of greenhouse gas emissions at a programmatic level, such as…a plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an [Environmental Impact Report] containing a programmatic analysis of greenhouse gas emissions."

This Plan provides a foundation for future development efforts in the City of Millbrae. It is expected that environmental documents for future development projects will identify and incorporate all applicable voluntary and mandatory measures from this Plan for projects undergoing CEQA review.

7.3 Appendix C. Regional Efforts

The following are current regional efforts promoting greenhouse gas (GHG) reductions.

City/County Association of Governments of San Mateo County (C/CAG). C/CAG is a council of governments consisting of the County of San Mateo (County) and its 20 cities. The organization deals with topics such as transportation, air quality, stormwater runoff, hazardous waste, solid waste and recycling, climate change, land use near airports, abandoned vehicle abatement, and issues that affect quality of life in general. C/CAG supports a number of sustainability initiatives including the following:

- **San Mateo County Energy Watch.** This program is a local government partnership between the Pacific Gas and Electric Company (PG&E) and C/CAG to promote energy efficiency in schools, municipalities, businesses, and non-profit organizations. The program is managed and staffed by the County of San Mateo Office of Sustainability.
- **Climate Ready San Mateo County.** This program out of the County Office of Sustainability is helping better prepare the County in the face of a changing climate. The initiative brings together non-profit and community-based organizations, local government, businesses, and other key partners to foster information sharing, expand our community's understanding of climate-related risks, and collectively find solutions to make San Mateo County climate ready.
- **Congestion Management Agency.** C/CAG serves as the Congestion Management Agency for San Mateo County, identifying strategies in response to future transportation needs, developing procedures to alleviate and control congestion, and promoting countywide solutions.
- **Sustainable Communities Strategy/Regional Transportation Plan.** C/CAG is collaborating with local governments in San Mateo County as well as regional agencies to develop a Sustainable Communities Strategy (SCS) in compliance with the requirements of Senate Bill 375. The SCS will facilitate more focused development in priority development areas near public transit stations. The aim of the San Mateo County SCS is to better integrate land use with public transportation in order to reduce GHG emissions.

Bay Area Regional Energy Network (BayREN). BayREN is a collaboration of the nine Bay Area counties led by the Association of Bay Area Governments (ABAG). The BayREN Home+ Program offers cash rebates for energy efficiency home improvements for single family homes, along with certified contractors and support through the process. BayREN also has energy efficiency programs for multi-family buildings and businesses.

Peninsula Clean Energy (PCE). PCE, the County's official electricity provider, was created in February 2016 when all 20 towns/cities in San Mateo County, plus the County of San Mateo, voted unanimously to form a Joint Powers Authority to administer the program. PCE is a public, locally-controlled electricity provider that gives PG&E customers in San Mateo County the choice of having 50% to 100% of their electricity supplied from clean, renewable sources at competitive rates. CCAs are governed by the California Public Utilities Commission (CPUC). Millbrae is a part of PCE and has opted for the ECO100 option (100% renewable option) for all City-owned accounts.

Joint Venture: Silicon Valley Network. Established in 1993, Joint Venture: Silicon Valley Network provides analysis and action on issues affecting the local economy and quality of life. The organization brings together established and emerging leaders from business, government, academia, labor, and the broader community to spotlight issues and work toward innovative solutions. Joint Venture is dedicated to promoting climate-friendly activities that help the local economy and improve the quality of life in Silicon Valley.

PG&E's Resources. PG&E offers municipal governments access to standardized information on community energy use. Community Inventory Reports provide community energy use details and can assist with sustainability planning and GHG inventories.

Sustainable San Mateo County (SSMC). SSMC was established in 1992 by a group of San Mateo County citizens who sought to create a broader awareness of the sustainability concept. SSMC supports multiple programs to promote energy efficiency, alternative transportation, and education on sustainability concepts that focus on the intersections of the environment, the economy, and social equity. SSMC's core programs include an Indicators Report, produced annually since 1997, and the Sustainable San Mateo County Sustainability Awards Program, held annually since 1999.

Sustainable Silicon Valley (SSV). SSV is a collaboration of businesses, governments, and non-governmental organizations that are identifying and addressing environmental and resource pressures in Silicon Valley. As its first initiative, SSV engages Silicon Valley organizations to work towards a goal of reducing regional carbon dioxide emissions 20% below 1990 levels by 2010. SSV's Net Positive Bay Area 2050 goals are to 1) produce more renewable energy than we consume, 2) sequester more carbon than we emit, and 3) optimize water resources to ensure water resilience. Their current strategy focuses on facilitating measure projects, education, events and polices that deliver solutions by activating SSV's member network to reach the Net Positive Bay Area goals.

7.4 Appendix D: 10 Steps to Reduce Your Carbon Footprint

Modified from coolclimate.org

1. **Change Your Commute**

   Did you know that one third of the carbon dioxide (CO_2) produced in the U.S. is from the transportation of people or goods? Pick one day a week to walk, bike, take public transportation, or carpool to work or when you run errands. Learn of the many programs and resources offered at commute.org. Silicon Valley Bicycle Coalition (bikesiliconvalley.org) has great resources and can help plan your bike commute. Another resource for planning trips via public transportation is 511.org. If possible, live close to your workplace and talk to your employer about working from home or subsidizing the costs of public transportation. When driving, remember to combine several car trips into one trip and avoid idling. Additionally, you can get better fuel efficiency by following the speed limit. Exceeding the speed limit by just 5 mph during highway travel results in an average fuel economy loss of 6%.

2. **Be a Better Consumer**

   Did you know that the average American generates about 4.4 pounds of trash each day? To reduce the amount of trash you generate, follow these easy steps. Use reusable coffee mugs, water bottles, and shopping bags. If you forget your mug or bag at the store, buy a new reusable mug or bag and keep the extra one in your purse or car for the next time you are out. Alternatively, set aside $1 each time you forget your mug or bag; depending on your memory, you will save enough funds to purchase a reusable item sooner or later. Also, reuse as many things as possible and recycle at home, work, and school.

3. **Grow & Shop Local**

   The shorter the distance your food travels to your plate or a product travels to your home, the fewer greenhouse gases produced. Declare one day a week to be a "buy local day" and eat foods produced within 50 miles of your house. Participate in community-supported agriculture and community-supported fishery programs and shop at farmer's markets.

   Buy certified organic foods. Also buy produce and fish labeled "As Fresh As It Gets," signifying that it was grown or harvested in San Mateo County. Support restaurants and businesses accredited by the "As Fresh As It

Gets" campaign, signifying that they use county-grown produce, fish, and other products. For a list of in-season produce and fish, farmer's market locations, and accredited businesses and restaurants, visit freshasitgets.com. Better yet, grow your own food at home or buy a plot at the City's community garden.

4. **Dry Up Household Water Consumption**
   Did you know that water-related energy use consumes 19% of California's electricity, 30% of its natural gas, and 88 billion gallons of diesel fuel every year? To reduce your water consumption at home, turn off your water when it's not being used, take shorter showers, stop unseen leaks by reading your meter, install low-flow shower heads* and aerators* on your faucets, install and use water-efficient landscaping and irrigation methods (for example, plant native and drought tolerant plants and/or install permeable surfaces and drip irrigation systems), and use EnergyStar appliances. Learn more about water-wise gardening at bayareagardening.org and through the Bay-Friendly Gardening Program (stopwaste.org/preventing-waste/residents/gardening) which provides resources for selecting plants, conserving water, and fostering soil health. Also attend City-sponsored workshops and pick up free water saving devices at City Hall.*

5. **Unplug It**
   Did you know that appliances, chargers, home theater equipment, stereos, and televisions use electricity even when their power is off? Eliminating this "leaking" electricity could save you 6-26% on your average monthly electricity bill. Take a walking tour of your home, unplug seldom-used appliances, and install power strips so that the power to frequently used items can be easily turned off.

6. **Change the Lights**
   Replace any incandescent light bulbs that remain in your home with light emitting diodes (LEDs) or compact fluorescent lights (CFLs). CFLs contain hazardous mercury— be sure to recycle them properly as hazardous waste. LEDs do not contain mercury. LEDs also save 30-50% more electricity and can last 5 times longer than CFLs. Replacing one incandescent light bulb with a CFL can save $30 or more in electricity costs over the bulb's lifespan.

7. **Set your Thermostat for the Season**
   Set your thermostat in winter to 68°F or less during the daytime, and 55°F before going to sleep, or when you are away for the day, to save 5–20% of your space-heating costs. During the summer, set thermostats to 78°F degrees or more to save 5–20% of your cooling costs. For an easy fix, purchase an inexpensive programmable thermostat that makes these changes for you.

8. **Increase Energy Efficiency at Home**
   Did you know that you can save up to 350 pounds of CO_2 and $150 per year at home by simply keeping air filters clean? To determine more ways to increase energy efficiency, take advantage of the resources offered through San Mateo County Energy Watch and the Bay Area Regional Energy Network (BayREN). When you are ready to purchase an appliance, purchase an EnergyStar appliance. To reduce carbon emissions associated with energy use, install or purchase alternative energy for your electricity needs. Also, opt for the ECO100 renewable energy option at Peninsula Clean Energy, Millbrae's electricity provider, at peninsulacleanenergy.com.

9. **Stop Unwanted Services**
   Did you know that junk mail production in the U.S. consumes as much energy as 2.8 million cars? In order to substantially reduce your junk mail, you need to reduce access to your name and address so that it won't be traded, rented, or sold to companies who send you unwanted mail. To be removed from mailing lists, catalogs, telemarketing calls, go to bayarearecycling.org/stop-junk-mail.

10. **Eat Less Meat**
    Nitrous oxide (N_20), 300 times more potent than CO_2, is generated from meat, egg, and dairy production. Globally, meat production contributes almost a fifth of total greenhouse gas emissions. This includes methane (CH_4) emissions from the animals themselves and deforestation to create new pastureland. Eating less meat is an easy way to reduce your carbon footprint. Try picking one day a week to go meatless. One less beef meal each week saves 300 pounds of CO_2 a year and a vegan diet (no meat, eggs or dairy) saves 3,000 pounds of CH_4 a year. Even eating chicken instead of beef or pork can greatly reduce your footprint. On a per calorie basis, chicken production results in less than 5% of the greenhouse gas emissions of beef.

Go the extra step and encourage your friends and family to reduce their carbon footprint!

Resources:

- Cool California carbon calculator and resources for households, small businesses, local governments, and schools:
  - coolcalifornia.org/small-business
  - coolcalifornia.org/household
  - coolcalifornia.org/schools
- Drive Clean Buying Guide: driveclean.ca.gov
- Bay Area Regional Network (BayREN): bayren.org
- Learn more about the City of Millbrae's environmental programs and opportunities at ci.millbrae.ca.us/sustainablemillbrae.

7.5 Appendix E. Summary of Funding Sources

For implementation of the Climate Action Plan (Plan), the City of Millbrae (City) must evaluate strategies for financing climate protection actions and provide adequate, reliable, and consistent long-term program funding. This appendix provides an overview of available funding sources to help determine appropriate potential program funding sources and funding levels to support existing and new programs outlined in this Plan. Other funding sources may be available that are not listed here.

7.5.1 Federal Funding

Federal Transportation Investment Generating Economic Recovery (TIGER) Grant
https://www.transportation.gov/tiger
https://ops.fhwa.dot.gov/Freight/infrastructure/tiger/

The Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grant Program, (previously known as the Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grants program), was first created by the American Investment and Recovery Act (ARRA) of 2009. Cities can apply for a BUILD grant to fund road, rail, transit and port projects that will have a significant impact on their local or regional communities.

7.5.2 State Funding

Energy Conservation Assistance Act (ECAA) Program Loans
http://www.energy.ca.gov/efficiency/financing/index.html

Since 1979, more than $399 million has been allocated to more than 850 recipients through ECAA Program Loans. The program offers loans with a 1% interest rate to finance energy efficiency improvements. The maximum loan amount is $3 million per application. Eligible projects include lighting system upgrades, pumps and motors, streetlights and LED traffic signals, energy management systems and equipment controls, building insulation, energy generating including renewable and combined heat and power projects, HVAC equipment, water and wastewater treatment equipment and load shifting projects.

Energy Upgrade California™
https://energyupgradeca.org

The Energy Upgrade California program helps residential and commercial consumers and the building industry to access available rebate programs and financing options for energy efficiency and renewable energy projects. It is supported by an alliance of the California Public Utilities

Commission (CPUC), the California Energy Commission, utilities, regional energy networks, local governments, businesses, and non-profit organizations. Funding comes from investor-owned utility customers under the auspices of the CPUC.

7.5.3 Utility Rebate Programs

The Pacific Gas and Electric Company (PG&E) offers a full suite of energy efficiency rebate programs to support its customers in saving energy and money.

Rebates for households: https://www.pge.com/en_US/residential/save-energy-money/savings-solutions-and-rebates/rebates-by-product/rebates-by-product.page?

Rebates for small and medium businesses: https://www.pge.com/en_US/small-medium-business/save-energy-and-money/rebates-and-incentives/product-rebates.page

Rebates for large businesses: https://www.pge.com/en_US/large-business/save-energy-and-money/business-solutions-and-rebates/product-rebates.page

Below are some of the PG&E programs.

PG&E Marketplace
https://marketplace.pge.com/

Search this website to find the most energy efficient products on the market.

San Mateo County Energy Watch Program
http://www.smcenergywatch.org

The San Mateo County Energy Watch (SMCEW) Program is a local government partnership between PG&E and the City/County Association of Governments of San Mateo County (C/CAG), and is administered by San Mateo County's Office of Sustainability. SMCEW partners with the non-profit, Ecology Action, to provide no-cost technical services to eligible San Mateo County local governments, schools, non-profits, and businesses. SMCEW provides coordination, outreach, and educational resources to help guide community members through the implementation process.

PG&E Residential Appliance Rebates
https://www.pge.com/en_US/residential/save-energy-money/savings-solutions-and-rebates/rebates-by-product/rebates-by-product.page?

PG&E offers rebates to customers who purchase qualifying energy efficient appliances, including electric heat pump water heaters and thermostats.

PG&E Commercial Appliance Rebates
https://www.pge.com/en_US/small-medium-business/save-energy-and-money/rebates-and-incentives/product-rebates.page

PG&E offers rebates to business customers on hundreds of products including refrigeration units, lighting fixtures, heating systems, food service appliances, boilers and water heaters, and insulation. More information and a complete list of products eligible for rebates is available at the link above.

PG&E Home Energy Efficiency Improvements Rebates
https://www.pge.com/en_US/residential/save-energy-money/savings-solutions-and-rebates/rebates-by-product/rebates-by-product.page

PG&E offers rebates to customers who make energy efficiency improvements when remodeling their homes. Currently PG&E offers a rebate of up to $0.20 per square foot for cool roof installations and $0.15 per square foot of attic and wall installations. Additionally, PG&E has rebates for homeowners who upgrade their home's heating and cooling systems. Rebates are available for installing energy efficient furnaces (up to $300), air conditioning units (up to $50), and whole house fans (up to $100). Finally, PG&E will provide up to $400 in rebates to customers who test and seal their home's duct system.

7.5.4 Local Energy Programs Available to Residents

Green House Calls
https://risingsunopp.org/

Since 2000, the local nonprofit Rising Sun Center for Opportunity has run Climate Careers, a youth empowerment program that addresses climate change by employing youth to provide energy efficiency services to Northern California residences. Climate Careers hires young people (ages 15-22) and trains them to become Energy Specialists, serving their communities (including Millbrae residents) with free Green House Calls. At no cost to the resident, Energy Specialists conduct home energy and water efficiency assessments, install free energy and water saving devices, and provide personalized recommendations and information for further savings. Energy Specialists receive employability skills training, paid summer employment, and the foundation for a green career.

HomeIntel
Millbrae.hea.com

Home Energy Analytics, through their HomeIntel Program, offers a free and secure online analysis of home energy use based on a household's PG&E smart meter data, which is

available for renters and homeowners. HomeIntel helps to help find energy leaks and ways to reduce energy which can help to save money on utility bills. The analysis includes a set of customized recommendations that typically includes many simple and low, or no cost fixes. Participants also receive advice from an energy coach and regular email updates to help carry out the energy savings plan. HomeIntel is available to residential customers of Peninsula Clean Energy and PG&E, and provides these free services on behalf of PG&E.

More information is available at Millbrae.hea.com.

7.5.5 Other Funding Opportunities

American Forests Program
https://www.americanforests.org/priorities/climate/

American Forests is a non-profit organization founded in 1875 that promotes forest conservation. American Forests is committed to building vibrant cities through urban forests and greenspace.

California ReLeaf Urban Forestry Grant Program

http://californiareleaf.org/programs/grants

The California ReLeaf Urban Forestry grant program provides funding to assist non-profit and community-based groups throughout California with urban forestry projects. The program is funded through a contract with the California Department of Forestry and Fire Protection (CAL FIRE).

Large Landscape Water Audits
http://bawsca.org/conserve/programs/audits

As a member of the Bay Area Water Supply and Conservation Agency (BAWSCA), the City participates in the large landscape water budget program. This program includes monthly distribution of landscape water budgets for select large irrigation accounts. A key component of the program is ongoing monitoring/tracking of actual water use and estimated water savings for the sites surveyed. If you have water conservation related questions, please call the City's Water Resources & Conservation Program at 650- 259-2348 or visit www.ci.millbrae.ca.us/waterconservation.

Waste Audits
http://www.ssfscavenger.com
http://www.ci.millbrae.ca.us/recycling

The South San Francisco Scavenger Company offers a free waste audit for its business customers, and will visit one's facility to advise on the recommended size and type of bins for the business and make other recommendations to reduce waste generated. To make an appointment, call (650) 589-4020. The City's Recycling & Waste Prevention Program also provides services to businesses to reduce waste. Learn more at the links included above.

7.6 Appendix F. Adaptation Planning for Climate Impacts

Effective adaptation planning and management entails dealing with uncertainty. Climate adaptation involves taking practical actions to manage risks from climate impacts, protect communities, and strengthen the resilience of the economy. It is a long-term process that should allow immediate action when necessary and adjust to changing conditions and new knowledge. The City of Millbrae (City) plans to initiate an inclusive planning process that ensures the resulting actions are feasible and widely accepted. Adaptation will likely be an ongoing process of planning, prioritization, and specific project implementation.

Chapter 1.3.1, Rising Sea Levels, describes various local and countywide activities that are currently underway or in the planning phases to mitigate the local effects of sea level rise. The City has also implemented green infrastructure planning and programs. The San Francisco Bay Regional Water Quality Control Board Municipal Regional Stormwater National Pollutant Discharge Elimination System Permit regulates pollutants in stormwater runoff from municipal storm drain systems throughout San Mateo and other counties. All permittees were required to create and implement a Green Infrastructure Plan.

Millbrae City Council adopted a Green Infrastructure Plan in September 2019 as a cost-effective, resilient approach to managing water quality that also provides climate change benefits. Green infrastructure encompasses many different types of stormwater measures that mimic natural hydrologic processes including filtration, infiltration, detention, and evapotranspiration. It uses plants, soils, and other elements to mimic the natural water cycle and capture rainwater. Examples of green infrastructure include stormwater planters or bio-retention areas, infiltration systems, permeable pavement, green roofs, green walls, green gutters, and stormwater trees.

Green infrastructure provides multiple community benefits such as: improving water quality—before discharging stormwater to the Bay or ocean, it removes pollutants like sediment and trash, reducing the effect of urbanization on local creeks and waterways; mitigating the heat island effect; providing climate change resilience; reducing localized flooding; promoting natural ground infiltration and groundwater recharge; increasing biodiversity and habitat for native plants and animals; and enhancing property and neighborhood economic vitality and aesthetics.

The Green Infrastructure Plan describes how over time the City will transition its existing “gray” (i.e., traditional) infrastructure to “green” infrastructure. Some of the projects include: the San Anselmo Green Street Project; Richmond and Laurel Safe Routes to School/GI Project; Millbrae History Museum and Fire Station No. 38 Landscape Improvement; Transit Center to Spur Trail Connection and Pedestrian/Bicycle Safety Improvements Project; and the Community Center Redevelopment Project.

Five important steps to effective adaptation planning are summarized below. The City is in the process of conducting steps 1-3, and has plans to conduct steps 4 and 5 in the near future.

1. **Increase Public Awareness; Engage and Educate the Community**

   It is critical that the public understand the magnitude of the challenge of climate change and why action is needed. The adaptation planning process should be inclusive of all stakeholders. Local outreach campaigns are needed to promote awareness of the dangers of heat exposure and recommend low-cost and GHG-reducing adaptation strategies. These efforts should leverage similar efforts undertaken at the regional, State, and federal levels.

2. **Assess Vulnerability**

   Understanding vulnerability to sea level rise and other climate change impacts is critical to developing effective adaptation strategies. A detailed vulnerability analysis should be performed to assess potential climate change impacts to infrastructure and natural systems. Future vulnerability of assets and infrastructure can then be assessed using conceptual models of shore response to sea level rise. Shore response models can be applied to one or more climate change scenarios and planning horizons, and a strategy for adapting can be developed with due consideration to priorities and time frames. Both short-term and long-term adaptation strategies should be identified. Level of risk can be categorized in terms of likelihood of damage within the forecasting period and the severity of the damages. This allows planners to prioritize their response to sea level rise. The vulnerability assessment can also provide a framework for agency and community education and participation, feed into other planning documents, and identify funding needs.

3. **Establish Goals, Criteria, and Planning Principles**

   Engage with stakeholders to establish planning priorities, determine decision criteria, and build community support for taking action. Rank physical and natural assets for preservation efforts. Where possible, look for situations where a mitigation action has adaptation co-benefits (e.g., planting trees to reduce urban heat islands while sequestering carbon and providing habitat).

4. **Develop Adaptation Plan**

   Identify specific strategies, develop actions (e.g. projects) and cost estimates, and prioritize actions to increase local resilience of City infrastructure and critical assets, including natural systems like wetlands and urban forests. Look for synergies between

natural processes and engineering solutions. There is a continuum of strategies available to manage sea level rise, ranging from coastal armoring (levees, seawalls, etc.), to elevated development, to a managed retreat, and abandonment of low-lying development. An adaptation plan should include a prioritized list of actions with a timeline, capital expenditure plan, and framework for monitoring and adaptive management.

5. **Ongoing Monitoring and Adaptive Management**

   Reassess climate change vulnerabilities on a regular basis and modify actions accordingly. This includes monitoring the effectiveness of current policies, strategies, and actions and keeping up with changing science, funding opportunities, and regulatory actions.

A menu of potential adaptation strategies and measures is provided in Table 27.

Table 27. Adaptation Strategies and Measures

Climate Change Impacts	Sample Adaptation Measures
Sea Level Rise Risks to existing facilities, natural systems, private property, and public infrastructure	• Educate and engage the community on the need for long-range planning • Partner or collaborate with other jurisdictions and agencies to increase awareness and build community support for actions • Identify funding mechanisms and seek public-private partnerships where interests converge • Use natural backshore wave-buffering processes to reduce wave erosion and run-up on levees • Increase or maintain the buffering capacity of tidal wetlands to protect against storm surges and keep pace with sea-level rise • Move levees further inland to allow marshes and mudflats to naturally transgress landward • Protect and restore wetlands that provide vital habitat and carbon storage, and allow for landward migration of habitat over time • Make modifications to low-lying wastewater treatment facilities. Consider opportunities for integrating wastewater treatments and wetlands • Avoid new development in areas at risk based on sea level projections • Do coastal armoring with levees and seawalls to protect vital infrastructure from erosion, inundation, and flooding

Climate Change Impacts	Sample Adaptation Measures
Extreme Heat Events Risks to public health and infrastructure	• Identify vulnerable communities and develop emergency preparedness plan • Establish cooling centers, especially for vulnerable populations • Reduce urban heat islands through use of cool roofs and other reflective surfaces • Do targeted tree planting and enact new requirements for shading in new parking lots and other large paved areas • Reduce risk of wildfires through fuel reduction in the urban-wildland interface
Regional Drought Risks to reliable water supply, and potential conflicts between urban and agriculture users	• Increase capacity for community water storage • Promote local water conservation • Make water conservation a top priority for agriculture in the region • Conduct water reclamation and reuse projects
Increased Flooding and Severe Weather Events Risks to public health, private property, public infrastructure, and ecosystems	• Integrate local flood management plans with adaptation planning • Identify vulnerable communities and develop emergency preparedness plans • Establish local land use policies that decrease flood risk; avoid building in high-risk areas • Make modifications to stormwater system routing and storage. Develop storage areas for peak flows • Maximize use of bioswales and permeable surfaces in both greenscape and hardscape areas to improve aquifer recharge and mitigate flooding from stormwater
Air Quality and Other Public Health Concerns	• Restrict use of fireplaces and open fires on high-risk days • Monitor potential threats to public health, including new diseases, and develop public awareness
Threats to Species, Ecosystems, and Ecosystem Services	• Design urban forest program to improve biodiversity, provide heat relief, and sequester carbon • Preserve wetlands, salt marshes, and other critical coastal habitats

Climate Change Impacts	Sample Adaptation Measures
Risks to Local Agriculture and Food Supply	• Promote conservation of local agricultural land • Promote the use of public and private land and rooftops for producing food • Promote the planting of fruit and nut trees • Support local farmers markets by providing incentives such as reduced costs for permits and support in attaining electronic benefit transfer (EBT) point-of-sale terminals • Provide incentives and remove regulatory obstacles to encourage animal husbandry and local food production and distribution • Provide and promote educational opportunities for residents at all levels of the educational system (preschool through college) to gain skills in organic gardening; fruit production; animal husbandry; food preservation and cooking; and affordable, healthy eating • Develop a city-run or city-supported food gleaning program that organizes volunteers or compensates workers to collect food from trees and shrubs on land owned by cities or within cities to distribute through food banks and other local distribution channels • Reduce food waste by implementing a local composting where all food scraps, food-soiled paper, waxed cardboard, wood crates and landscape trimmings from markets, restaurants, homes, hotels, and schools, would be collected and made available for distribution to rural or urban gardeners

7.7 Appendix G. Historic GHG Inventories and Forecast

Table 28: Historic Emissions (2005-2017)

Sector	2005 Emissions (MTCO2e)	2010 Emissions (MTCO2e)	2013 Emissions (MTCO2e)	2014 Emissions (MTCO2e)	2015 Emissions (MTCO2e)	2016 Emissions (MTCO2e)	2017 Emissions (MTCO2e)
Residential	32,405	32,319	30,959	25,650	25,281	23,474	21,969
Commercial/Industrial	27,633	27,664	26,974	26,669	27,273	21,679	19,948
Transportation	88,057	80,101	80,381	80,075	89,382	78,449	77,565
Generated Waste	2,486	2,184	2,056	2,071	2,068	1,849	1,964
Wastewater	62	530	1,610	1,137	1,550	1,492	843
Water	N/A	311	243	242	196	131	100
TOTAL	**150,643**	**143,108**	**142,222**	**135,845**	**145,750**	**127,074**	**122,289**

Between 2015 and 2017, total electricity emissions decreased from 19,409 MT CO_2e to 7,401 MT CO_2e, a 62% decrease. This decrease was largely due to the launch of Peninsula Clean Energy.

Table 29: Historic Emissions Percent Change Compared to 2005 Baseline (2010-2017)

Sector	2010: % Change Emissions from Baseline	2013: % Change Emissions from Baseline	2014: % Change Emissions from Baseline	2015: % Change Emissions from Baseline	2016: % Change Emissions from Baseline	2017: % Change Emissions from Baseline
Residential	-0.3%	-4%	-21%	-22%	-28%	-32%
Commercial/Industrial	+0.1%	-2%	-3%	-1%	-22%	-28%
Transportation	-9%	-9%	-9%	+2%	-11%	-12%
Generated Waste	-12%	-17%	-17%	-17%	-26%	-21%
Wastewater*	N/A	+204%	+115%	+192%	+182%	+59%
Water*	N/A	-22%	-22%	-37%	-58%	-68%
TOTAL	**-5%**	**-6%**	**-10%**	**-3%**	**-16%**	**-19%**

Between 2010 and 2017, total electricity emissions decreased from 21,981 MT CO_2e to 7,401 MT CO_2e, a 66% decrease. This decrease was largely due to the launch of Peninsula Clean Energy.

* All % changes above measured against 2005 baseline, with exception of wastewater and water (2010 baseline).

Table 30: 2015 Emissions and Business-as-usual Emissions Projections by Sector

Sector	2015 Emissions (MTCO2e)	Annual growth rate: 2015-->2030	2030 Emissions (MTCO2e)
Residential	25,281	0.66%	27,920
Commercial/Industrial	27,273	2.27%	38,177
Transportation	89,382	0.62%	98,042
Generated Waste	2,068	1.42%	2,556
Wastewater	1,550	1.42%	1,915
Water	196	1.42%	243
TOTAL	**145,750**	**0.99%**	**168,853**

Table 31: Emissions Forecast Inputs

Sector	Year	Data	Data Source
Residential (Households)	2015	8,263	ABAG
	2030	9,126	ABAG
Commercial/Industrial (Jobs)	2015	6,622	ABAG
	2030	9,270	ABAG
Transportation (Daily VMT)	2015	306,247	MTC
	2035	348,578	MTC

Recent Trends in Community-wide Greenhouse Gas Emissions: 2015-2017

Between 2015 and 2017, total electricity emissions decreased from 19,409 MT CO_2e to 7,401 MT CO_2e, a 62% decrease. This decrease was largely due to the launch of Peninsula Clean Energy. The 62% decrease in overall electricity emissions was also partially driven by a decrease in total non-residential electricity consumption from 57,470,605 kWh to 45,254,874 kWh, a 21% decrease. Total electricity emissions have decreased 66% since 2010. Transportation emissions also decreased 13% between 2015 and 2017, driven by a decrease in vehicle miles traveled (VMT) and an increase in electric vehicles and fuel-efficient vehicles. Natural gas emissions from residential sources increased from 17,455 MT CO_2e in 2015 to 18,979 CO_2e in 2017, a 9% increase. Natural gas emissions from the commercial and industrial sector saw a 1% decrease over that same time period.

The 2017 community-wide greenhouse gas inventory shows that Millbrae had experienced a 16.1% decrease in community-wide emissions from 2015 to 2017. This overall decrease in emissions from 2015 to 2017 is driven in large part by the decrease in electricity and transportation emissions.

In San Mateo County, five cities saw an increase in local roads VMT of at least 15% from 2014 to 2015 (including Millbrae) and five cities saw a decrease in local roads VMT of at least 15% from 2014 to 2015. The total change in local roads VMT from 2014 to 2015 aggregated for the entire County was a 3.8% increase. Despite this increase in overall emissions from 2014 to 2015 in Millbrae, the City's emissions have decreased 3.2% since 2005.

7.8 Appendix H. Baseline GHG Inventory Updates

Introduction

This appendix serves to update the 2005 baseline community-wide inventory completed by the City of Millbrae with assistance from ICLEI – Local Governments for Sustainability (ICLEI). This appendix provides the information needed to update the 2005 calendar year inventory and provides the summary of emissions used for the City's baseline that is found in the City's Climate Action Plan (Plan).

Background

The City of Millbrae, a leader in sustainability, completed a baseline community-wide and municipal operations greenhouse gas (GHG) inventory in 2008 with support from ICLEI. This inventory was completed for the baseline year of 2005. The City and ICLEI completed much of the work on the inventory prior to the publication of some key GHG protocols, such as the Local Government Operations Protocol (LGOP). This first inventory is the basis of the City's final baseline inventory used in the City's Plan. The report from this first inventory is titled City of Millbrae Greenhouse Gas Emissions Report: 2005 Community Emissions Inventory & 2004-2005 Municipal Operations Emissions Inventory (December 2008), and will be referred to as "the initial baseline inventory report" in this Appendix. The data and calculations are stored in an Excel workbook titled "Master Millbrae Data 12-12-08_Tweaker.xls," which will be referred to as "the baseline inventory workbook" in this Appendix.

In 2010, the City received a community-wide GHG inventory for 2005 as part of a countywide effort led by the City/County Association of Governments of San Mateo County (C/CAG), with assistance from ICLEI, to complete community-wide inventories for every jurisdiction in San Mateo County. As part of that project, ICLEI produced emissions data and calculated emissions for Millbrae for the 2005 baseline year, but a detailed report was not completed because the City already had the initial report from ICLEI. ICLEI provided a standard template that documented the methodologies used for the calculations for the C/CAG project. The calculations for this second inventory are stored in two Excel workbooks. One is called "Millbrae Emissions Summary.xls"; this file shows the total calculated emissions for each sector in the community-wide inventory. The second file is called "Millbrae Inventory GHG Tracking.xls'; this file contains some of the raw data, emission factors, conversion factors, etc. used in the calculations. The second inventory is referred to as "the County's community-wide inventory" in this Appendix.

Methodology

To develop this appendix of baseline GHG inventory updates, the City compared the two inventories mentioned above. The inventories were also compared to methodologies found in LGOP and other best practice GHG inventory protocols available. Portions of both the initial baseline inventory report and the County's community-wide inventory were used to create this final inventory for the City.

A summary of the results from the initial baseline inventory report, along with updated results, is presented in Table 32. The updated results in the column titled "Updated 2005 Inventory Emissions" comprise the community-wide emissions baseline that is used in the City's Plan. A description of each change made to create the updated results is provided below.

One of the major changes made between the initial baseline inventory report and the updated version is that municipal operations are not included as a separate category in the updated version. In the initial baseline inventory report, emissions from municipal operations were calculated and reported separately, and then municipal emissions were subtracted from the appropriate community-wide sector. For example, emissions from the municipal fleet were calculated, and then subtracted from the community-wide transportation sector. This subtraction was completed to avoid double-counting; all municipal operation emissions were then included and reported within a separate sector. In the updated version, all emissions from municipal operations are included with other community-wide emissions in the appropriate sectors. For example, emissions from electricity and natural gas usage in municipal buildings are included in the commercial energy use sector in the updated version, and emissions from the municipal fleet are included in the transportation sector in the updated version. Including emissions from municipal operations in broader community-wide sectors is now a common practice for local government inventories.

The City's Plan thus includes a complete community-wide inventory that includes all municipal operations emissions in each sector as appropriate. The community-wide inventory is the basis for the City's GHG emissions baseline, emissions forecast, and GHG reduction target in this Plan.

The City of Millbrae will continue to track emissions from municipal operations in an inventory that is separate from the community-wide inventory. The City has greater control over these emissions than the community-wide emissions, and will track municipal operations emissions as part of a larger effort to lead by example and to reduce the environmental impacts of the City's activities.

Table 32: Sectors and Emissions in the GHG Inventory

Sector	Emissions Sources	Energy Types	Initial Baseline Inventory Emissions (MTCO2e)	Updated 2005 Inventory Emissions (MTCO2e)	Increase or Decrease in Emissions (MTCO2e)
Residential	Energy and water use in residential buildings	Electricity Natural gas	32,405	32,405	No change
Commercial	Energy and water use in commercial, government and institutional buildings	Electricity Natural gas	20,122	23,738	+3,616
District Government (Electricity and Gas)	Energy and water use in district government buildings	Electricity Natural gas	2,493	0	-2,493
Direct Access – Electricity Only	Energy and water use in industrial facilities, and processes	Electricity	2,727	3,895	+1,168
Transportation and Land Use	All road vehicles Public transportation Light rail Off-road vehicles/equipment Passenger heavy duty rail	Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel	62,141	88,057	+25,916
Waste	Landfills Waste stream	Landfill gas (methane)	2,553	2,486	-67
Wastewater[38]	Process emissions from wastewater treatment	Not an energy type: these are Fugitive and Process Emissions	62	62	No change
Additional Municipal Operations[38]	Energy and water use in municipal buildings, fuel used in vehicles, refrigerants, and solid waste sent to the landfill	Electricity Natural gas Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel	1,579	0	-1,579
		TOTAL:	**124,082**	**150,643**	**+34,322**

The Commercial Sector and the District Government Sector

The Commercial sector and the District Government sector in the initial baseline inventory report include emissions from natural gas and electricity purchased from the Pacific Gas and Electric Company (PG&E) and consumed in non-residential buildings or other infrastructure, such as outdoor lighting or water pumps. The initial baseline inventory report included emissions for the Commercial and District Government sectors separately. In the initial baseline inventory report, the Commercial sector is comprised of non-residential buildings in the City, with the exception that the government buildings are included in other sectors. The District Government sector represents all district government electricity and natural gas accounts within incorporated

[38] In the original 2005 baseline inventory, wastewater emissions were included with other municipal operations emissions in a category called "City Government (All Municipal Operations)." For the purposes of Table 32, emissions from wastewater treatment were subtracted from the total emissions that were reported for the City Government sector in the original inventory. The remaining emissions that were originally reported under the City Government sector are shown in Table 32 under the sector for "Additional Municipal Operations."

Millbrae, such as Bay Area Rapid Transit (BART), school districts, hospital districts, water or sewer Districts, district fairs, public utility districts, community service districts, cemetery districts, mosquito abatement districts and park districts. Emissions were calculated based on data provided by PG&E for electricity and natural gas consumption purchased from PG&E within the City's boundaries for the non-residential accounts. Note that electricity and natural gas consumed in non-residential buildings that was not purchased from PG&E are not included in any of these sectors but are included in the Direct Access sectors.

For the initial baseline inventory report, data were also collected for electricity and natural gas consumption in Millbrae's City-owned facilities and infrastructure. These emissions were reported separately in the Municipal Operations sector. A summary of the emissions reported for the Commercial and District Government sectors is provided in Table 33 below. Table 33 also shows the emissions from natural gas and electricity consumption that were reported within the Municipal Operations sector.

The total emissions shown in Table 33, which represent emissions from all the non-residential buildings and infrastructure in Millbrae that purchase electricity and natural gas from PG&E, are 23,738 metric tons carbon dioxide equivalents ($MTCO_2e$). This equals the updated inventory results for the Commercial sector shown in Table 32. Thus, the changes for the Commercial, District Government, and Municipal Operations sectors shown in Table 32 are not due to errors or changes to the calculations, but rather represent a change in how the emissions are categorized. Instead of including all emissions from PG&E-purchased natural gas and electricity in non-residential buildings and infrastructure in three separate sectors (Commercial, District Government, and a portion of the Municipal Operations sector), the updated inventory includes these emissions in the Commercial sector.

The emission factors used to calculate emissions have not changed. The emission factor for electricity is described in note number 1 on the top of page 31 of the initial baseline inventory report and is the correct emission factor. The emission factors for natural gas were also correct, based on a review of the emission factors that were used for calculations and reported in the baseline inventory workbook. However, these emission factors were reported incorrectly in the initial baseline inventory report. But because the correct emission factor was used for the calculations, no change is needed.

Table 33: Initial GHG Inventory Results in Non-Residential Buildings and Infrastructure

Sector	Emissions Sources	Energy Types	Initial Baseline Inventory Emissions (MTCO2e)	Location of Data in the Initial Baseline Inventory Report
Commercial	Energy and water use in commercial and institutional buildings	Electricity Natural gas	20,122	Table 1, page 20
District Government (Electricity and Gas)	Energy and water use in district government buildings	Electricity Natural gas	2,493	Table 1, page 20
Municipal Operations	Energy and water use in City government buildings (natural gas used at the wastewater treatment plant is not included)	Electricity Natural gas	467	Table 15, page 53
Municipal Operations	Energy use in streetlights, traffic signals, and outdoor lighting	Electricity	329	Table 17, page 63
Municipal Operations	Natural gas use at the wastewater treatment plant	Natural gas	22	Table 19, page 66
Municipal Operations	Energy use at the wastewater treatment plant (electricity only) and electricity use in water pumps, lift stations, and irrigation equipment	Electricity	305	Table 20, page 67
		Total:	**23,738**	

The Direct Access Sectors for Electricity and Natural Gas

In the initial baseline inventory report, 2,727 MTCO2e were reported for Direct Access electricity. According to the report, in 2005, Direct Access customers (electricity customers that purchase electricity directly from power generation facilities, which is delivered through the transmission lines of public or private utilities) accounted for 10.76% of the total electricity usage for all users in San Mateo County. This number was provided by the California Energy Commission (CEC) and was used to estimate Direct Access electricity usage within incorporated Millbrae in the initial baseline inventory. Direct Access natural gas consumption and related emissions are included in the Commercial sector.

The CEC subsequently provided information that Direct Access was 20.89% of “non-residential” electricity consumption in San Mateo County in 2005. This percentage was used to calculate the updated emissions from Direct Access electricity consumption that are shown in Table 32.

The emission factors used to calculate electricity emissions also have been updated. The initial inventory baseline report states that emission factors for NERC Region 13 (Western Systems Coordinating Council/CNV Region) were used; aggregated to CO2e, this factor is 0.6866 pounds per kilowatt-hour (kWh). The updated results use emission factors that equal 0.95853 pounds per kWh. Instead of using an emission factor for NERC Region 13, the updated emission factors were calculated from total California in-state and imported electricity emissions divided by total consumption in megawatt-hours (MWh). Emissions data used are from California Air Resources Board, Greenhouse Gas Inventory, 1990-2004 (November 17, 2007 version), available at http://www.arb.ca.gov/cc/inventory/data/data.htm. The emission factors that were used are also found in the Local Government Operations Protocol, Appendix G, Table G.6, page 174. The updated emission factors are more specific to California, and thus more accurate than the emission factors used in the initial baseline inventory report.

The original and updated data for Direct Access electricity consumption and associated emissions are shown in Table 34 below.

Table 34: Direct Access Electricity and Natural Gas Consumption and Emissions

Sector	Original Consumption Data	Initial Baseline Inventory Emissions (MTCO2e)	Updated Consumption Data	Updated 2005 Inventory Emissions (MTCO2e)
Direct Access – Electricity Only	8,470,823 kWh	2,727	8,931,183 kWh	3,895
Total:	2,727		3,895	

Note that the emission factors shown in Table 35 were used to calculate the updated results.

Table 35: Direct Access Emission Factors

Sector	GHG	Emission Factor	
Direct Access – Electricity Only	CO2	958.49 lbs/MWh	Calculated from total in-state and imported electricity emissions divided by total consumption in MWh; emissions from California Air Resources Board, Greenhouse Gas Inventory, 1990-2004 (November 17, 2007 version), available at http://www.arb.ca.gov/cc/inventory/data/data.htm and also found in the Local Government Operations Protocol, Appendix G, Table G.6, pages 174.
	CH4	0.029 lbs/MWh	
	N20	0.011 lbs/MWh	

The Transportation and Land Use Sector

Emissions from the transportation sector are grouped into three categories: on-road vehicle emissions, off-road vehicle emissions, and Caltrain emissions. The on-road vehicle emissions are further divided into two categories: emissions from vehicles on local roads, and emissions from vehicles on State highways. Emissions from on-road vehicles on State highways and from Caltrain have not been updated but remain the same as those shown in the initial baseline inventory report.

Emissions from local roads were based on incorrect data in the initial baseline inventory report and have been corrected based on the proper data. Also, the initial baseline inventory report did not include off-road emissions. These emissions have been added to total transportation emissions using the data, methodology and assumptions provided below.

On-Road Vehicle Emissions from Local Roads

Emissions from local roads are based on the estimated vehicle miles traveled (VMT) on those roads. The initial baseline inventory report states that 2005 VMT data was obtained from Caltrans, which compiled and published state-wide data. The data source, *2005 California Public Road Data,* is provided in the initial baseline inventory report on page 32 and is found at https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/california-public-road-data/prd2005-a11y.pdf.

According to the backup spreadsheet for the initial baseline inventory report, titled “Master Millbrae Data 12-12-08_Tweaker.xls,” local road VMT is listed as 54.04 daily VMT and is shown in units of 1,000 (see the worksheet called “Community Transport Raw Data”.) Thus, annual VMT is 54,040 daily VMT multiplied by 365 days/year, equal to 19,724,600 VMT/year. This number is shown on the worksheet called “Community Transport Entry Data”. However, this annual VMT number is incorrect. The source file listed 54.04 miles of maintained local roads, but the actual daily VMT (in 1,000s) is 165.87. Thus, the correct annual VMT number for local

roads is approximately 61,000,000 VMT/year (165.87 daily VMT in 1000s * 1000 * 365 days/year).

The updated results use the corrected number of 61,000,000 VMT/year on local roads. The emission factors and other assumptions used to calculate emissions from local roads are shown on page 32 of the initial baseline inventory report. These emission factors and assumptions have not changed.

Off-Road Emissions

Off-road emissions were not included in the initial baseline inventory report because these emissions were considered "de minimis," which are typically defined as emissions that are approximately 3% or less of a total entity's GHG inventory. Certain GHG accounting protocols allow de minimis emissions to be estimated or excluded from the inventory. The newer LGOP guidelines do not recommend excluding de minimis emissions. These emissions have been calculated as follows.

Data on total countywide emissions from off-road equipment came from the Bay Area Air Quality Management District's (BAAQMD's) report "Source Inventory of Bay Area Greenhouse Gas Emissions" with a base year of 2007, as there is no report for 2005 and no other reliable way to quantify off-road emissions in 2005.[39] Emissions were divided into two categories—emissions from lawn and garden equipment and emissions from construction, industrial, and light commercial equipment.

Emissions per household were calculated using BAAQMD's data on countywide emissions from lawn and garden equipment and the total amount of households countywide. To calculate emissions from lawn and garden equipment generated in the City of Millbrae, emissions per household were multiplied with the number of households in the City.[40]

Emissions per job were calculated using BAAQMD's data on countywide emissions from construction, industrial, and light commercial equipment and the total amount of jobs countywide. To calculate emissions from construction, industrial, and light commercial equipment generated in the City of Millbrae, emissions per job were multiplied with the number of jobs in the city. The data used to calculate off-road emissions are shown in Table 36.

[39] Bay Area Air Quality Management District, "Source Inventory of Bay Area Greenhouse Gas Emissions", report base year: 2007, Table Q, http://www.baaqmd.gov/Divisions/Planning-and-Research/Emission-Inventory-and-Air-Quality-Related/Emission-Inventory/~/media/64A8751292F44BEEAD56B7569B68DB27.ashx (2010), 25.

[40] The number of households and jobs in the City of Millbrae are from Association of Bay Area Governments data, in particular the *Projections 2007* report, Jason Munkres, Regional Planner, ABAG, jasonm@abag.ca.gov.

Table 36: Off-Road Emissions

Category	Unit of Measure	Total Countywide Emissions	Total Units Countywide	Emissions per Unit	Units in Jurisdiction	Jurisdictions' Emissions (MTCO2e)
Lawn and Garden Equipment	Households	14,182	260,000	~0.055	7,980	435
Construction, Industrial, and Light Commercial Equipment	Jobs	255,468	337,350	~0.757	6,880	5,210
					Total:	5,645

Summary of Transportation Emissions

Table 37 shows the summary of transportation emissions reported in the initial baseline inventory report and the emissions reported in the updated inventory. The largest changes between the initial baseline inventory report and the updated version are the addition of off-road emissions (5,645 $MTCO_2e$/year) and the increase in on-road vehicle emissions from local roads (19,928 $MTCO_2e$/year) due to an error in the raw data used to calculate these emissions. Both of these changes are described in more detail in the preceding sections.

Note that the initial baseline inventory report calculated a total of 62,484 $MTCO_2e$/year in the transportation sector (see Table 5 on page 18 of the initial baseline inventory report). However, the total reported transportation emissions were 62,141 $MTCO_2e$/year (see Table 1 on page 15 of the initial baseline inventory report). This discrepancy in the transportation emissions reported in Table 1 and recalculated in Table 5 is because the emissions from the municipal fleet were calculated at 344 $MTCO_2e$/year (see Table 13 on page 24 of the initial baseline inventory report). The municipal fleet emissions were subtracted from the sector total of 62,484 $MTCO_2e$/year to reach 62,141 $MTCO_2e$/year. Similar to the Commercial and District Government sectors, municipal fleet emissions are not subtracted from the updated inventory results because municipal emissions are not shown as a separate sector in the updated inventory.

Table 37: Summary of Transportation Emissions Changes

Sector	Emissions sources	Energy types	Initial Baseline Inventory Emissions (MTCO2e)	Updated 2005 Inventory Emissions (MTCO2e)	Increase or Decrease in Emissions (MTCO2e)
Transportation and Land Use: On-road vehicles (State highways)	All road vehicles	Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel	51,981	51,981	No change
Transportation and Land Use: On-road vehicles (local roads)			9,630	29,558	+19,928
Transportation and Land Use: Off-road vehicles	Off-road vehicles/ equipment	Gasoline Diesel Propane	0	5,645	+5,645
Transportation and Land Use: Caltrain	Passenger heavy duty rail	Diesel	873	873	No Change
Transportation and Land Use: Municipal Fleet	All road vehicles	Gasoline Diesel Compressed natural gas Liquefied natural gas Biodiesel	-344	0	+344
Total:			62,141	88,057	+25,916

Waste Sector

The waste sector is comprised of two types of waste: landfilled solid waste and alternative daily cover (ADC). These two waste types, associated waste tonnages, and estimated GHG emissions are shown in Table 38.

Table 38: Summary of Waste Sector Emissions Changes

Sector	Waste Generation Data (tons)	Initial Baseline Inventory Emissions (MTCO2e)	Updated 2005 Inventory Emissions (MTCO2e)	Increase or Decrease in Emissions (MTCO2e)
Waste – Landfilled Solid Waste	13,481	2,461	2,461	No change
Waste - ADC	1,347	92	25	-67
Total:	14,828	2,553	2,486	-67

Similar to the Commercial, District Government, and Transportation sectors, the initial baseline inventory report calculated community-wide emissions from the waste sector and then subtracted the calculated waste emissions from municipal operations. The waste sector emissions are calculated at 2,553 $MTCO_2e$/year but reported at 2,466 $MTCO_2e$/year (Table 1 on page 15 of the initial baseline inventory report). Municipal operations waste emissions are reported at 87 $MTCO_2e$/year (Figure 4 on page 23 of the initial baseline inventory report). Thus, the municipal operations waste emissions were subtracted from the total calculated waste emissions to reach the total reported waste emissions.

As evident from Table 38, the emissions calculated for ADC decreased by 67 $MTCO_2e$/year. Both the initial baseline inventory report and the County's community-wide inventory used the same raw data on waste generation data and used similar methodologies to calculate emissions. Also, both inventories used a version of the U.S. Environmental Protection Agency's Waste Reduction Model (WARM) contained within the ICLEI Clean Air and Climate Protection (CACP) software to calculate emissions from waste disposal. The calculations are not documented since they occurred in the ICLEI software, and only the inputs and outputs of the model are reported. However, some of the assumptions used in the County's community-wide inventory are different than the assumptions used in the initial baseline inventory, which could have affected the calculation of emissions from ADC.

The differing assumptions relate to the composition of the waste deposited in the landfills. Both the initial baseline inventory report and the County's community-wide inventory cite the same source for these assumptions, which is a state-wide waste composition study completed by the California Integrated Waste Management Board (CIWMB). The County's community-wide inventory included assumptions that are more similar to the data in the CIWMB report than the assumptions in the initial baseline inventory report. Thus, the County's community-wide inventory is assumed to be more accurate than the initial baseline inventory report.

Municipal Operations Sector

As noted earlier in this appendix, the updated inventory does not report emissions from municipal operations as a separate sector, but rather includes these emissions in the appropriate community-wide sectors. Thus, this sector is omitted from the updated inventory.

7.9 Appendix I. Timeline and Staffing

Table 39: Summary of Measures – Implementation Timeline and Staffing

#	Measure	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure?	Measure Start Year	Implementation Date	Department - Division*
1	**Commercial Green Building Ordinance**	497	Yes	N/A	Jul 2021	CDD - Building
2	**Residential Green Building Ordinance**	146	Yes	N/A	Jul 2021	CDD - Building
3	**Residential Energy Retrofit Incentives and Rebates**	2,872	Yes	N/A	Quarterly	PW - Env Prgs
4	**Commercial Energy Efficiency Programs**	1,657	Yes	N/A	Ongoing	PW - Env Prgs
5	**Residential Energy Conservation Program**	607	No	2021 (voluntary) / 2023 (mandatory)	Jan 2021	PW - Env Prgs; CDD - Building
6	**Commercial Energy Conservation Program**	458	No	2021 (voluntary) / 2023 (mandatory)	Jan 2021	PW - Env Prgs; CDD - Building
7	**Free or Subsidized Shade Trees**	23	No	2021	Jan 2021	PW - Parks & Env Prgs
8	**Electrical Panel Upgrades in Existing Buildings**	6,480	No	2020	Quarterly	PW - Env Prgs

#	Measure	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure?	Measure Start Year	Implementation Date	Department - Division*
9	**Residential & Commercial All-Electric Ordinance**	1,617	No	2021	Jan 2021	CDD - Building; PW - Env Prgs
10	**Promote Solar Installations**	1,527	Yes	N/A	Sep 2020	PW - Env Prgs
11	**Participate in Community Choice Aggregation**	7,320	Yes	N/A	Ongoing	Administration; PW - Env Prgs
12	**New Non-Residential Buildings Solar Requirement**	616	No	2021	Jan 2021	CDD - Building; PW - Env Prgs
13	**Pairing Battery Storage with Solar PV Systems**	872	No	2020	Oct 2020	PW - Env Prgs
14	**Energy Efficient Street Lighting**	64	Yes	N/A	Ongoing	PW - Operations
15	**Environmentally Preferred Purchasing Policy - Energy**	4	Yes	N/A	Ongoing	All Departments
16	**Participate in Community Choice Aggregation: Municipal**	142	Yes	N/A	Ongoing	Administration
17	**Energy Efficiency in Municipal Buildings**	273	Yes	N/A	Feb 2021	PW - Operations & Env Prgs

#	Measure	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure?	Measure Start Year	Implementation Date	Department - Division*
18	**Renewable Energy Installation for Municipal Properties**	68	No	2022	Jan 2022	CDD - Building; PW - Env Prgs
19	**Municipal Green Building Policy**	5[1]	No	2021	Ongoing	PW - Env Prgs
20	**Water Conservation Incentives**	102	Yes	N/A	Sep 2020	PW - Operations
21	**Water Efficient Landscape Ordinance and CALGreen Indoor Water Efficiency Requirements**	43	Yes	N/A	Ongoing	CDD - Planning; PW - Env Prgs
22	**Residential "Graywater Ready" New Construction**	11	No	2021	Feb 2021	PW - Env Prgs
23	**Smart Growth Development**	624	Yes	N/A	Ongoing	PW - Operations & Env Prgs
24	**Walkable / Bikeable Street Landscape**	873	Yes	N/A	Ongoing	CDD - Planning; PW - Engineering
25	**Safe Routes to School**	50	Yes	N/A	Ongoing	PW - Engineering
26	**Electric Vehicle Education and Outreach**	5,555	Yes	N/A	Oct 2020	PW - Env Prgs

#	Measure	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure?	Measure Start Year	Implementation Date	Department - Division*
27	**Local Farmers' Market**	6	Yes	N/A	Ongoing	Administration; All Departments
28	**Bike Sharing**	118	No	2021	Mar 2021	PW - Env Prgs & Engineering; Recreation
29	**Car Sharing**	131	No	2021	Jun 2021	PW - Env Prgs & Engineering; CDD - Planning
30	**Shuttle Program**	249	No	2021	Mar 2021	PW - Engineering & Env Prgs; CDD - Planning
31	**EV Charging Infrastructure in Existing Buildings**	11,558	No	2020	Oct 2020	PW - Env Prgs
32	**EV Charging Infrastructure in New Construction**	878	No	2021	Jan 2021	CDD - Planning & Building
33	**Shared Electric Bikes and Scooters**	830	No	2021	Mar 2021	PW - Engineering & Env Prgs; Recreation
34	**Electric Transportation Network Company (TNCs) Vehicles**	887	No	2021	Apr 2021	Finance; PW - Env Prgs
35	**Public Employee Commuting Program**	2	Yes	N/A	Ongoing	PW - Env Prgs

#	Measure	GHG Reduction in 2030 (MTCO2e)	Cont. of Current Measure?	Measure Start Year	Implementation Date	Department - Division*
36	**Clean Fleet Policy**	42	No	2020	Oct 2020	PW - Operations
37	**Landfill Diversion Rate Goal**	289	Yes	N/A	Nov 2020	PW - Env Prgs
38	**Sustainable Food Service Ware**	Supporting Measure	No	2021	Dec 2021	PW - Env Prgs
39	**Commercial Organics Recycling Ordinance**	Supporting Measure	Yes	N/A	Nov 2020	PW - Env Prgs
40	**Environmentally Preferred Purchasing Policy - Waste Reduction**	Supporting Measure	Yes	N/A	Sep 2020	PW - Env Prgs
41	**Sustainable Vendor Policy at Public Events**	Supporting Measure	Yes	N/A	Ongoing	PW - Env Prgs
42	**Municipal Zero Waste Policy**	3	No	2020	Dec 2020	PW - Env Prgs
43	**Bay Area Green Business Program**	110	Yes	N/A	Ongoing	PW - Env Prgs

[1] These projections assume that any new facilities are built to LEED Silver standards or equivalent.

*Key to Department & Division Abbreviations	
Administration	City Manager's Office - Administration Department
CDD	Community Development Department
Building	CDD Building Division
Planning	CDD Planning Division
Finance	Finance Department
PW	Public Works Department
Engineering	PW Engineering Division
Env Progs	PW Environmental Programs Division
Operations	PW Operations Division
Parks	PW Parks Division
Recreation	Recreation Department

7.10 Appendix J: GHG Savings Methodology

Table 40: Summary of Measure Savings Calculation Methodology

#	Measure	GHG Reduction Calculation Methodology
1	**Commercial Green Building Ordinance**	Measure is designed to estimate the impact of adoption of CALGreen Tier 1 energy efficiency requirements. Energy Use Intensities from the California Commercial End-Use Survey (CEUS) are used to break down the savings into gas and electricity savings, then multiplied by gas and electric grid emissions factors.
2	**Residential Green Building Ordinance**	Measure is designed to estimate the impact of adoptions CALGreen Tier 1 energy efficiency requirements. Energy Use Intensities from the California Residential Appliance Saturation Survey (RASS) are used to break down the savings into gas and electricity savings, then multiplied by gas and electric grid emissions factors.
3	**Residential Energy Retrofit Incentives and Rebates**	Measure assumes 8% of buildings will receive an EE retrofit by 2030 due to promotion of EE programs, with each home in an EE program saving 10% energy of both gas and electricity. Use Intensities from the California Residential Appliance Saturation Survey (RASS) are used to break down the savings into gas and electricity savings, then multiplied by gas and electric grid emissions factors.
4	**Commercial Energy Efficiency Programs**	Measure assumes 5% of buildings will receive an EE retrofit by 2030 due to promotion of EE programs, with each home in an EE program saving 5% energy of both gas and electricity. Use Intensities from the California Commercial End-Use Survey (CEUS) are used to break down the savings into gas and electricity savings, then multiplied by gas and electric grid emissions factors.
5	**Residential Energy Conservation Program**	Assumes that 20% of sold residential properties participate in program and that they achieve 15% energy savings of both electricity and gas.

#	Measure	GHG Reduction Calculation Methodology
6	**Commercial Energy Conservation Program**	Assumes that 20% of sold commercial properties participate in program and that they achieve 10% energy savings of both electricity and gas.
7	**Free or Subsidized Shade Trees**	Assumes 5% of homes receive a shade tree and 4% electricity savings per household (due to air conditioning energy savings) compared to total annual energy use.
8	**Electrical Panel Upgrades in Existing Buildings**	Assumes that PCE provides an incentive covering 100% of the installed cost of electrical panel upgrades in single family residential, multi-family residential, and office buildings to accommodate the installation of electric equipment (HVAC, water heating, cooking, clothes drying, EV charging, etc.). PCE is currently considering building electrification incentives beginning in 2020 but details are to be determined. Assumes that the PCE incentive results in 10% of all residential and office gas equipment, at end of life, to be converted to electric equipment. Due to lack of available data on this specific topic, this assumption is based on DNV GL's industry expertise.
9	**Residential & Commercial All-Electric Ordinance**	Assumes policy is in place for 10 years and results in 100% gas savings for new residential and commercial construction from 2020-2030. Assumes PCE grid mix is 100% carbon free by 2030 (their mix will be true on January 1st, 2021.)
10	**Promote Solar Installations**	Assume that 15% of non-residential roof space installs solar PV by 2030 and 15% of homes install solar PV by 2030. Calculations assume the average residential solar system is 6 kW.
11	**Participate in Community Choice Aggregation**	Assumes the percent of electricity in the community obtained from direct access providers will remain constant before/after the launch of PCE. The 2030 PCE electricity emission factor is based off of PCE's commitment to 100% carbon free electricity by 2021.
12	**New Non-Residential Buildings Solar Requirement**	Assumes 198,792 square feet of new commercial construction by 2030, with 50% of new facilities installing solar due to program, and each of those facilities providing 43.6% of total annual electricity demand via solar (per NREL Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment.)

#	Measure	GHG Reduction Calculation Methodology
13	**Pairing Battery Storage with Solar PV Systems**	Analysis assumes that battery storage reduces emissions in the electricity sector by providing the ability to reduce peak electricity demand and, as a result, reducing reliance on natural gas peaker power plants. To estimate the emissions avoided due to battery storage, the average emission factor for a natural gas peaker plant was used. The average natural gas peaker plant emission factor of 437 kg CO2e/MWh (0.437 MT CO2e/MWh) is from California Air Resources Board's AB 32 Scoping Plan.
14	**Energy Efficient Street Lighting**	Assumes average operation of 12 hours per day, 365 days per year, and replacement of 400 watt street lamps with 4 watt street lamps.
15	**Environmentally Preferred Purchasing Policy - Energy**	Assumes office equipment and refrigeration represents 24.9% of annual electricity use per CEUS. Assumes 15% electricity savings for each facility.
16	**Participate in Community Choice Aggregation: Municipal**	Assumes 100% carbon free electricity in 2030 for all municipal electricity use by using PCE.
17	**Energy Efficiency in Municipal Buildings**	Assumes 5% electricity and 5% gas savings per participating municipal buildings.
18	**Renewable Energy Installation for Municipal Properties**	Assumes 308 kW of solar installations producing 486,490 kWh per year of carbon free electricity. NREL's PV Watts program was used to determine solar production characteristics in Millbrae.
19	**Municipal Green Building Policy**	Assumes new municipal buildings will achieve 25% energy savings above that required by Title 24.
20	**Water Conservation Incentives**	Assumes average water consumption of 174,000 gallons per year from State Water Resources Control Board and a target reduction of 10% water savings. Assumes electricity avoided per water reduced of 0.0023 kWh per gallon and gas avoided per water reduced of 0.00115 therms per gallon.

#	Measure	GHG Reduction Calculation Methodology
21	**Water Efficient Landscape Ordinance and CALGreen Indoor Water Efficiency Requirements**	Assumes average water consumption of 174,000 gallons per year from State Water Resources Control Board and a target reduction of 20% water savings. Assumes electricity avoided per water reduced of 0.0023 kWh per gallon.
22	**Residential "Graywater Ready" New Construction**	Assumes average water consumption of 174,000 gallons per year from State Water Resources Control Board and a target reduction of 20% water savings. Assumes electricity avoided per water reduced of 0.0023 kWh per gallon.
23	**Smart Growth Development**	Calculation methodology based off California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures measure LUT-1.