

MEETING AGENDA
TOWN OF CORTE MADERA
CLIMATE ACTION COMMITTEE

Wednesday, May 13, 2020
4:00 P.M.
Corte Madera Town Hall
300 Tamalpais Drive, Corte Madera, CA 94925
VIA VIDEOCONFERENCE ONLY

NOTICE TO PUBLIC:

Due to Coronavirus (COVID-19), the May 13, 2020, meeting of the Climate Action Committee will occur via videoconference only. All committee members will be participating remotely, and residents are urged to follow the orders issued by the Marin County Public Health Officer and Governor and participate in the meeting remotely as well. As allowed under the Governor's Executive Order N-29-20 (March 17, 2020), during the duration of the COVID emergency the Town of Corte Madera will no longer offer an in-person meeting location for the public to attend.

Members of the public may view and participate in the meeting remotely through the following link:

<https://tinyurl.com/y8vnb74c>

(No Pre-Registration Needed- Click on Link at Meeting Start Time)

Zoom webinar ID: 958-0228-2362

Or call in using any of the following phone numbers:

1 (408) 638-0968	1 (253) 215-8782	1 (301) 715-8592	1 (346) 248-7799
1 (669) 900-6833	1 (312) 626-6799	1 (646) 876-9923	

(for higher quality, dial a number based on your current location):

Submit public comment remotely by:

1. Emailing PublicComment@tcmmail.org prior to 3:00 P.M. on the day of the meeting.
2. Emailing PublicComment@tcmmail.org during the meeting.
3. Registering for the meeting at the link above and selecting the "Raise Hand" icon during the meeting to provide public comment verbally when recognized by the Clerk at the appointed time.

Anyone with a disability needing further assistance with public comment should contact the Clerk at least 2 hours before the beginning of the meeting to make alternative arrangements at rvaughn@tcmmail.org or 415-927-5050.

Click [here](#) for more information on how to register to watch the meeting and submit public comment remotely.

1. CALL TO ORDER, ROLL CALL AND SALUTE TO THE FLAG

2. OPEN TIME FOR PUBLIC REGARDING NON-AGENDA ITEMS

(Anyone wishing to speak on non-agenda items will be recognized at this time. These items can legally have no action as they are not on the agenda. There is a three minute time limit.)

3. GENERAL BUSINESS

(Anyone wishing to speak on agenda items will be recognized after the Committee has concluded their initial discussions. There is a three minute time limit for public comment per item.)

- A. Recap of March 2, 2020 Initial Meeting of the Climate Action Committee
- B. Presentation From Sebastian Conn, Community Development Manager for MCE, Regarding the Deep Green Program and Potential Actions That Could Be Taken To Increase Community Participation in the Deep Green Program
- C. Discussion Regarding Update to 2016 Climate Action Plan
The Committee will review the latest draft and consider approval and recommendation to Town Council for final review and adoption
- D. Committee Organization
Committee members will be appointed to subcommittees dedicated to the following five areas: Energy, Transportation, Food Waste, Water, and Nature, in order to enable members to work and communicate about these issues outside of formal Committee meetings

4. CONFIRM NEXT MEETING DATE AND ADJOURN

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Town Clerk at 415-927-5085. For auxiliary aids or services or other reasonable accommodations to be provided by the Town at or before the meeting please notify the Town Clerk at least 2 business days (the Monday before the meeting) in advance of the meeting date. If the town does not receive timely notification of your reasonable request, the town may not be able to make the necessary arrangements by the time of the meeting.

Town of Corte Madera CLIMATE ACTION PLAN



Administrative Draft April 2020

Prepared by

O'Rourke & Associates

Credits and Acknowledgments

CORTE MADERA TOWN COUNCIL

James Andrews, Mayor

Eli Beckman, Vice Mayor

Sloan Bailey, Council Member

David Kunhardt, Council Member

Bob Ravasio, Council Member

CORTE MADERA PLANNING COMMISSION

Peter Chase, Chair

Phyllis Metcalfe, Vice-Chair

Margaret Bandel, Planning Commissioner

Robert Bundy, Planning Commissioner

Charles Lee, Planning Commissioner

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INTRODUCTION

PURPOSE OF THE CLIMATE ACTION PLAN

The Town of Corte Madera understands that climate change is now increasingly evident and has the potential to affect Corte Madera's residents and businesses significantly, as well as other communities around the world. The Town also recognizes that local governments play a strong role in reducing greenhouse gas emissions and mitigating the potential impacts of climate change. Corte Madera, along with other coastal Bay Area cities and towns, will have additional challenges adapting to sea level rise, which is already underway.

The purpose of this Climate Action Plan (CAP) is to compile existing and potential strategies (i.e., actions, projects, and programs) that the Town's government and the community can use to address climate change. It provides a brief background on what climate change is and its potential impacts, but focuses on the efforts Corte Madera can take to reduce its greenhouse gas emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change.

Through the actions outlined in this plan, such as increasing energy efficiency in buildings, encouraging less dependence on the automobile, and using clean, renewable energy sources, the Corte Madera community can experience lower energy bills, improved air quality, reduced emissions, and an enhanced quality of life. The Town's preparation of annual greenhouse gas emissions inventories and this Climate Action Plan are part of an ongoing planning process that includes assessing, planning, mitigating and adapting to climate change.

Specifically, this plan does the following:

- Summarizes the various regulations at the federal, state, and regional levels.
- Incorporates the Town's 2018 Greenhouse Gas Emission Inventory, which identified sources of greenhouse gas emissions generated by the community and the local government.
- Estimates how these emissions may change over time under a business-as-usual forecast.
- Provides energy use, transportation, land use, waste, water, wastewater, and natural system strategies necessary to minimize Corte Madera's impacts on climate change.

RELATIONSHIP TO THE GENERAL PLAN

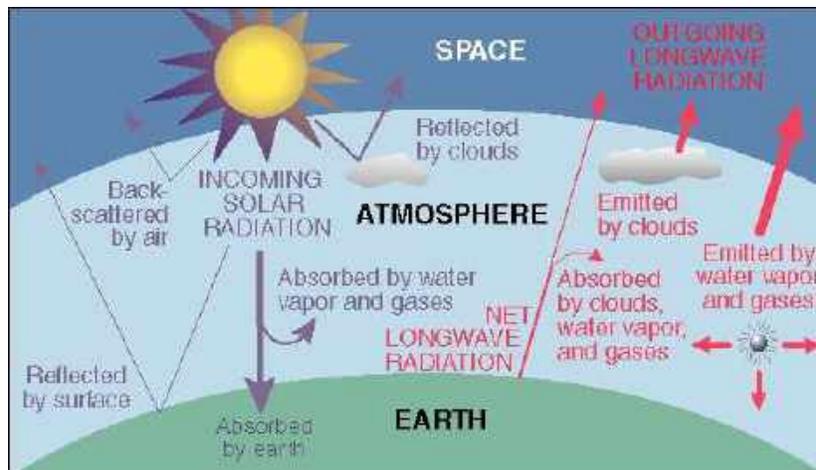
The Town of Corte Madera's General Plan, adopted by the Town Council in April 2009, contains policies and programs that promote community sustainability and effective management of renewable and non-renewable natural resources through energy conservation, and solid waste management and recycling in Chapter 3.0 Resource Conservation and Sustainability. This Climate Action Plan supports the Town's General Plan, including Implementation Program RCS-1.1.a which calls for the preparation of a Sustainability Plan for Town Government Operations. Specific General Plan implementation programs that support the emissions reduction measures identified in the Climate Action Plan are cross-referenced in the measure descriptions located in the appendix. Nonetheless, the Climate Action Plan is intended to be incorporated into the Town's General Plan.

CLIMATE CHANGE BACKGROUND

A balance of naturally occurring gases dispersed in the atmosphere determines the Earth's climate by trapping infrared radiation (heat), a phenomenon known as the greenhouse effect (Figure 1). Significant evidence documents that human activities are increasing the concentration of these gases (known as "greenhouse gases" or GHGs) in the atmosphere, causing a rise in global average surface temperature and consequent global climate change. The greenhouse gases include carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons (Table 1)¹. Each one has a different degree of impact on climate change. To facilitate comparison across different emission sources with mixed and varied compositions of several GHGs, the term "carbon dioxide equivalent" or CO₂e is used. One metric ton of CO₂e may consist of any combination of GHGs and has the equivalent Global Warming Potential (GWP) as one metric ton of carbon dioxide (CO₂). According to the U.S. Environmental Protection Agency's 2019 "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2017," the majority of GHG emissions comes from fossil fuel combustion, which in turn is used for electricity, transportation, industry, heating, etc.

Collectively, these gases intensify the natural greenhouse effect, causing global average surface temperatures to rise, which affects local and global climate patterns. These changes in climate are forecasted to manifest themselves in ways that might impact Corte Madera as well as other changes to local and regional weather patterns and species migration.

FIGURE 1: THE GREENHOUSE EFFECT



¹ Water vapor is the most dominant greenhouse gas, but it is not measured as a part of a greenhouse gas inventory and for that reason is not included in this discussion.

TABLE 1: GREENHOUSE GASES

Gas	Chemical Formula	Emission Source	Global Warming Potential
Carbon Dioxide	CO ₂	Combustion of natural gas, gasoline, diesel, and other fuels	1
Methane	CH ₄	Combustion, anaerobic decomposition of organic waste in landfills, wastewater and livestock	28
Nitrous Oxide	N ₂ O	Combustion, wastewater treatment	265
Hydrofluorocarbons	Various	Leaked refrigerants, fire suppressants	12 to 11,700

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

CLIMATE CHANGE IMPACTS IN CALIFORNIA, THE BAY AREA, AND CORTE MADERA

The Earth’s climate is warming, mostly due to human activities such as changes in land cover and emissions of certain pollutants. Greenhouse gases are the major human-induced drivers of climate change. These gases warm the Earth’s surface by trapping heat in the atmosphere.

The evidence that the climate is warming is unequivocal. Global surface temperatures have increased 0.9 °C (1.6 °F) relative to the 1951-1980 average temperatures. Eighteen of the 19 warmest years in the 137-year record have occurred since 2001, and the year 2016 ranks as the warmest on record (Source: NASA/GISS, 2019). Consistent with global observations, annual average air temperatures have increased by about 1.8 °F in California since 1985, with temperatures rising at a faster rate beginning in the 1980s.

As temperatures continue to rise, California faces serious climate impacts, including:

- More intense and frequent heat waves
- More intense and frequent drought
- More severe and frequent wildfires
- More severe storms and extreme weather events
- Greater riverine flows
- Shrinking snowpack and less overall precipitation
- Accelerating sea level rise
- Ocean acidification, hypoxia, and warming
- Increase in vector-borne diseases and heat-related deaths and illnesses
- Increase in harmful impacts to vegetation and wildlife, including algal blooms in marine and freshwater environments, spread of disease-causing pathogens and insects in forests, and invasive agricultural pests.

The Cal-Adapt.org web portal provides resources to help communities understand how climate change will raise temperatures and exacerbate extreme heat events, drought, wildfire, and coastal flooding in their area. The Cal-Adapt tool shows projections for two possible climate futures, one in which greenhouse gas emissions peak around 2040 and then decline (RCP 4.5) and another in which emissions continue to rise strongly through 2050 and plateau

around 2100 (RCP 8.5). Both futures are considered possible depending on how successful the world is at reducing emissions and atmospheric carbon dioxide.

AVERAGE MAXIMUM TEMPERATURES

Overall temperatures are projected to rise substantially throughout this century. The historical (1990-2005) annual maximum mean temperature for Corte Madera is 70°F. Under the low emissions (RCP 4.5) scenario, the maximum mean temperature in Corte Madera is expected to rise about 4°F by 2100. Under the high emissions (RCP 8.5) scenario, the maximum mean temperature is projected to rise 8°F to about 78°F by 2100.

EXTREME HEAT DAYS

As the climate changes, some of the more serious threats to public health will stem from more frequent and intense extreme heat days and longer heat waves. Extreme heat events are likely to increase the risk of mortality and morbidity due to heat-related illness, such as heat stroke and dehydration, and exacerbation of existing chronic health conditions.

An extreme heat day is defined as a day in April through October where the maximum temperature exceeds the 98th historical percentile of maximum temperatures based on daily temperature data between 1961-1990. In Corte Madera, the extreme heat threshold is 94.7°F.

Cal-Adapt projects a significant increase in the number of extreme heat days for Corte Madera. Between 1990-2005, there was an average of 5 days above 94.7°F. That average is projected to increase to 9 days by 2050 under the low emissions scenario (RCP 4.5). By the end of the century, the average number of extreme heat days is expected to increase to 10 days and could be as many as 27 days under the high emissions scenario (RCP 8.5).

SEA LEVEL RISE

The San Francisco Bay is vulnerable to a range of natural hazards, including storms, extreme high tides, and rising sea levels resulting from global climate change. Flooding already poses a threat to communities along the Bay and there is compelling evidence that these risks will increase in the future. As temperatures rise globally, sea level is rising mainly because ocean water expands as it warms, and water from melting major ice sheets and glaciers flow into the ocean. In the past century, average global sea level has increased by 7 to 8 inches, and sea level at the San Francisco tidal gauge has risen about 7 inches since 1900.

Rising seas put new areas at risk of flooding and increase the likelihood and intensity of floods in areas that are already at risk. The State's *Sea Level Rise Guidance Document* projects a "likely" (66% probability) increase in sea level at the San Francisco tide gauge of up 6-10 inches by 2040 and 7-13 inches by 2050. By the end of the century, sea levels are likely to rise 1 to 2.4 feet under a low emissions scenario (RCP 2.6) and 1.6 to 3.4 feet under a high emissions scenario (RCP 8.5). Flooding will be more severe when combined with storm events.

TABLE 2: PROJECTED SEA LEVEL RISE FOR SAN FRANCISCO RELATIVE TO YEAR 2000

Year	Sea Level Rise (feet)			
	Low Emissions Likely Range (66% probability)	High Emissions Likely Range (66% probability)	Low Emissions 1-in-200 Chance (0.5% probability)	High Emissions 1-in-200 Chance (0.5% probability)
2030	-	0.3 – 0.5	-	0.8
2040	-	0.5 - 0.8	-	1.3
2050	-	0.6 – 1.1	-	1.9
2100	1.0 – 2.4	1.6 – 3.4	5.7	6.9

Source: California Natural Resources Agency, *State of California Sea-Level Rise Guidance*, 2018 Update.

[Our Coast, Our Future](#) (OCOF) provides interactive, online maps and tools to help visualize vulnerabilities to sea level rise and storms within the San Francisco Bay and on the outer coast from Half Moon Bay to Bodega Bay. The online tools allow the user to zoom in and out on an area and to visualize inundation with tidal and storm surge effects for sea level rise scenarios in 25-centimeter increments. Figure 2 shows the inundation effect of a 25-centimeter sea level rise on the Corte Madera coast, while Figure 3 shows 25-centimeter (10-inch) sea level rise coupled with the 20-year storm, which is a storm that has a 5% chance of occurring in any given year.. Flooding under this scenario occurs primarily in the Mariner Cove neighborhood of Corte Madera. Flooding also occurs in areas to the north of Corte Madera, including the Greenbrae Boardwalk community in the unincorporated area and the Marin RV Park and adjacent industrial area of Larkspur.

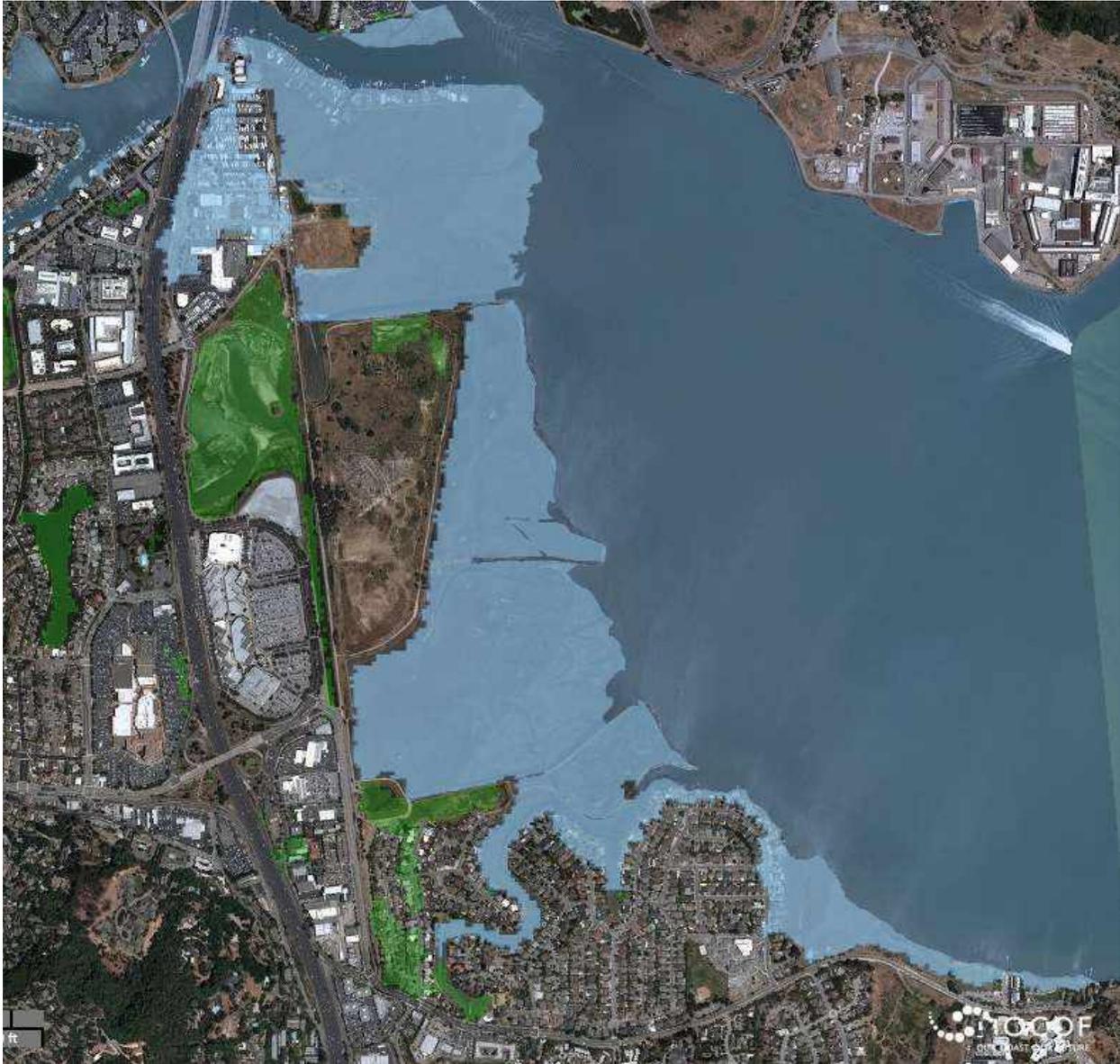
The OCOF maps rely upon a sophisticated modeling system which considers wave run-up, wave set-up, storm surge, seasonal effects, tides, and sea level rise, as well as vertical land motions, levees, river discharge, and wind waves for San Francisco Bay. Heights of levees and manufactured mounds were included in the study. Levees were not allowed to fail in the model, but water was allowed to flow over them in cases when the total water level was sufficiently high. Nonetheless, inundation maps are intended as planning level tools to illustrate the potential for flooding under future sea level rise and storm surge scenarios. Although the information is appropriate for conducting vulnerability and risk assessments, finer-grained information will be needed for detailed engineering design and implementation.

FIGURE 2: FLOODING EFFECT OF 25-CENTIMETER (10-INCH) SEA LEVEL RISE



Our Coast Our Future flood maps (accessed 12/10/19)

FIGURE 3: FLOODING EFFECT OF 25-CENTIMETER (10-INCH) SEA LEVEL RISE WITH A 20-YEAR STORM



Planning for sea level rise involves not only protecting existing structures and resources but ensuring new projects are designed to be resilient to and/or adapt to potential sea level rise. Factors to consider for any future coastal facility or infrastructure project include:

1. The projected lifespan of the project or facility;
2. The cost or value of the project or a replacement facility; and
3. The impact or consequence of damage to or loss of a facility or project.

The San Francisco Bay Conservation and Development Commission (BCDC) is a state agency that provides regulatory authority over the water of the San Francisco Bay up to mean high tide, salt ponds, managed wetlands, and a 100-foot band of land adjacent to the bay. BCDC's strategies to prepare for and adapt to sea level rise are to: 1) restore wetlands and manage sediments; 2) allow development of small and interim projects and repairs to existing levees,

boat docks, sewer outfalls, etc.; and 3) require risk assessments for projects that have a longer life. If sea level rise and storm surge levels that are expected to occur during the life of the project would result in public safety risks, the project must be designed to be resilient to mid-century sea level rise. If it is likely that the project will remain in place longer than mid-century, the project must plan to address flood risks expected at the end of the century.

MARIN BAY WATERFRONT ADAPTATION AND VULNERABILITY EVALUATION (BAYWAVE)

In 2019, the County of Marin, in partnership with local jurisdictions, developed a sea level rise vulnerability assessment for the eastern Marin shoreline from the Golden Gate Bridge to the county line north of Novato. The goal of the [BayWAVE](#) project was to increase awareness and preparation for future sea level rise impacts. The assessment is an informational document that catalogs impacts with six different scenarios across the entire bay shoreline. The best available science was used to complete the report with a range of projections including those that we already face with high tides and storms. The sea level rise scenarios evaluated in the project are as follows:

Scenario 1:	10 inches
Scenario 2:	10 inches plus 100-year storm surge
Scenario 3:	20 inches
Scenario 4:	20 inches plus 100-year storm surge
Scenario 5:	60 inches
Scenario 6:	60 inches plus 100-year storm surge

Scenarios 1 and 2 represent near-term sea level rise projections and correspond to the upper range of likely sea level rise by year 2040. Scenarios 3 and 4 represent medium-term sea level rise, and Scenarios 5 and 6 represent the long-term.

Key vulnerabilities identified in the assessment for Corte Madera include:

- Homes along the tributaries to Corte Madera Creek may be vulnerable in the near-term.
- Commercial areas on Paradise Drive may be vulnerable to sea level rise in the near-term, and storm surges sooner.
- Segments of the 101 could be vulnerable to seasonal storm surges in the near-term, and sea level rise in the medium to long-term. Access to the community from the US Highway 101 corridor may become increasingly difficult with chronic flooding.
- Marin Country Day School, Marin Montessori, Cove Elementary, and Neil Cummins elementary could be vulnerable across the scenarios.
- Mariner Cove and Marina Village are already susceptible to subsidence and could be vulnerable to sea level rise surface flooding in the near-term.
- Madera Gardens and the Corte Madera Town Center could be vulnerable to the 100-year storm surge in the medium-term, scenario 4, and sea level rise in the long-term, scenario 6.
- Stormwater pump stations could become tidally influenced and overburdened. If the pump station fails or capacity is exceeded, the surrounding neighborhoods could flood.
- Marsh land degradation or loss at the shoreline and Corte Madera Creek tributaries.
- The fire station on Paradise Drive could experience flooding impacts and access issues in the medium-term.
- Police serving the community are headquartered in Larkspur. Flooded roads could increase response times, and at worst, low lying areas become blocked to vehicles.
- California Highway Patrol Marin headquarters is vulnerable to subsidence and sea level rise in the medium-term.

REGULATION OF CLIMATE CHANGE – INTERNATIONAL, FEDERAL, STATE AND COUNTY LEVELS

INTERNATIONAL CLIMATE POLICY

In 2015, the United Nations Framework Convention on Climate Change adopted the Paris Agreement, the world's first global pact aimed at reducing GHG emissions. The agreement's goals are to limit global temperature rise this century to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit temperature increase to 1.5 degrees Celsius. The Paris Agreement has been signed by nearly every country in the world, 197 nations in all. The accord includes commitments from all major emitting countries to reduce their GHG emissions, although national plans vary in scope and reduction target. However, the emission reduction pledges are not enough to meet the Agreement's stated goals.

Under the accord, the United States had pledged to cut its GHG emissions 26 to 28 percent below 2005 levels by 2025 and commit up to \$3 billion in aid for poorer countries by 2020. U.S. initiatives to meet this goal included the Clean Power Plan and tightening of automotive fuel efficiency standards. In 2017, President Donald Trump announced that the United States would withdraw from the Paris climate accord. Under the terms of the agreement, the United States cannot exit until November 4, 2020.

FEDERAL CLIMATE POLICY

Currently, there is no federal legislation mandating comprehensive greenhouse gas emissions reporting or reduction in the United States. The U.S. Senate considered, but failed to pass, various cap-and-trade bills in 2009 and 2010. Therefore, the U.S. has used its rulemaking authority under the Clean Air Act to begin to regulate greenhouse gas emissions. In 2009, the EPA made an "endangerment finding" that GHGs threaten the public health and welfare of the American people². This finding provided the statutory prerequisite for EPA regulation of GHG emissions from motor vehicles and has led to a number of GHG regulations for stationary sources. In May 2010, the EPA issued a "tailoring" rule that enables the agency to control GHG emissions from the nation's largest GHG sources, including power plants, refineries, cement production facilities, industrial manufacturers and solid waste landfills, when these facilities are newly constructed or substantially modified. The EPA reported that its GHG permitting requirements would address 70% of the national GHG emissions from stationary sources³. In 2013, the EPA announced proposed Clean Air Act standards to cut carbon dioxide emissions from power plants.

In 2012, the Obama administration issued new rules that mandate an average fuel economy of 54.5 miles per gallon for cars and light-duty trucks by the 2025 model year, up from the current standard of 35.5 MPG in 2016.⁴ The new standards were designed to pressure on auto manufacturers to step up development of electric vehicles as well as improve the mileage of conventional passenger cars by producing more efficient engines and lighter car bodies.

In 2013, President Barack Obama released his administration's [Climate Action Plan](#) which outlined steps the administration could take to reduce GHG emissions. Actions included: reducing emissions from power plants; accelerating renewable energy production on public lands; expanding and modernizing the electric grid; raising fuel economy standards for passenger vehicles; and accelerating energy efficiency initiatives.

² [Final Rule, EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under the Clean Air Act](#), 74 Fed. Reg. 66495, December 7, 2009, accessed 12/09/2010.

³ Final Rule: Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule Fact Sheet, EPA, <http://www.epa.gov/NSR/documents/20100413fs.pdf>, accessed 07/01/2013.

⁴ "Obama Administration Finalizes Historic 54.5 MPG Fuel Efficiency Standards," Office of the Press Secretary, the White House, <http://www.whitehouse.gov/the-press-office/2012/08/28/obama-administration-finalizes-historic-545-mpg-fuel-efficiency-standard> (accessed 10/07/14).

Since 2016, President Trump has made eliminating federal regulations a priority. His administration has often targeted environmental rules it sees as burdensome to the fossil fuel industry and businesses. The Trump administration has proposed freezing fuel efficiency standards at 2020 levels, at an average 37 miles per gallon, and has challenged California's right to set its own more aggressive standards. Trump has also proposed repeal of the Clean Power Plan, which would have set strict limits on carbon emissions from coal and natural gas power plants. He also directed federal agencies to stop using the "social cost of carbon" in their cost-benefit analyses, and he withdrew guidance that federal agencies include GHG emission in environmental reviews. A full list of environmental rules that have been revoked, weakened, or proposed to be changed or eliminated is available at the New York Times, "[85 Environmental Rules Being Rolled Back Under Trump.](#)"

STATE CLIMATE POLICY

Since 2005, the State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing greenhouse gas (GHG) emissions in the public and private sectors. Executive Order S-3-05, signed by Governor Arnold Schwarzenegger in 2005, established long-term targets to reduce GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050. The 2020 GHG reduction target was subsequently codified with the passage of the Global Warming Solutions Act of 2006, more commonly known as Assembly Bill 32 (AB 32). Senate Bill 32 (SB 32), passed in 2016, established a longer-term target to reduce emissions 40 percent below 1990 levels by 2030. Executive Order B-30-15 reaffirmed California's goal to reduce emissions 80 percent below 1990 levels by 2050.

The California Air Resources Board (CARB) is responsible for monitoring and reducing greenhouse gas (GHG) emissions set forth in AB 32 and SB 32, and is, therefore, coordinating statewide efforts. CARB adopted its first Scoping Plan in 2008 which outlined the actions required for California to reach its 2020 emission target. CARB's [California's 2017 Climate Change Scoping Plan](#) lays out a strategy to achieve the 2030 target. The Scoping Plan encourages local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce greenhouse gas emissions. The State encourages local governments to track GHG emissions and adopt a Climate Action Plan that identifies how the local community will meet the reduction target. Corte Madera has tracked both community and government operations GHG emissions since 2005.

The State of California established the [Six Pillars](#) framework in 2015. These include (1) reducing today's petroleum use in cars and trucks by up to 50%; (2) increasing from one-third to 50% our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, *Safeguarding California*. The measures contained in this Climate Action Plan are designed to support and implement the Six Pillars and the goals of the 2017 Climate Change Scoping Plan on a local level.

SB 375, passed by the State Assembly and Senate in August 2008, is another significant component of California's commitment to GHG reduction. The goal of SB 375 is to reduce emissions from cars and light trucks by promoting compact mixed-use, commercial and residential development. The first step outlined in SB 375 called for the state's 18 metropolitan planning organizations (MPOs) and the California Air Quality Board to establish a region's GHG reduction target for passenger vehicle and light duty truck emissions. Then, the MPO was required to develop a sustainable communities strategy that demonstrates how the region will meet its GHG reduction target. Here in the Bay Area, four regional government agencies – the Association of Bay Area Governments, the Bay Area Air Quality Management District, the Bay Conservation and Development Commission, and the Metropolitan Transportation Commission, worked together to create Plan Bay Area, the region's sustainable communities strategy. Adopted in

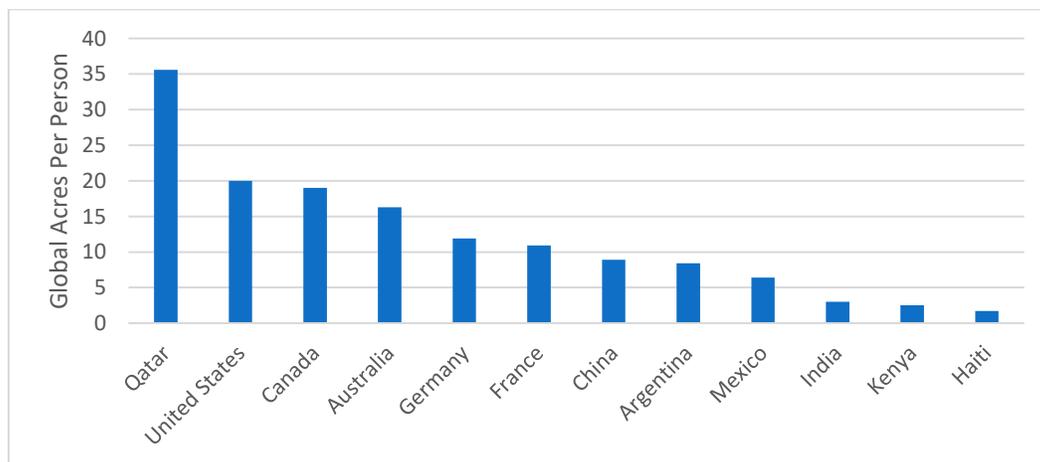
July 2013, the plan is projected to reduce regional greenhouse gas emissions from passenger vehicles and light duty trucks 10.3% by 2020 and 16.4% by 2035.⁵

In 2010, the California State Office of Planning and Research adopted revised CEQA Guidelines which allow the Town to streamline project-level analysis of greenhouse gas emissions through compliance with a greenhouse gas reduction plan contained in a general plan, long range development plan, or separate climate action plan. Plans must meet the criteria set forth in section 15183.5 of the CEQA Guidelines, which include requirements for quantifying existing and projected greenhouse gases; identifying a level of cumulative greenhouse gas emissions that would not be considered significant; specifying measures and standards that would ensure achievement of this level; and continued monitoring to track progress. The greenhouse gas reduction plan, once adopted following certification of an EIR or adoption of an environmental document, may be used in the cumulative impacts analysis of later projects such as development or infrastructure projects. An environmental document that relies on a greenhouse gas reduction plan for a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if those requirements are not otherwise binding and enforceable, incorporate those requirements as mitigation measures applicable to the project.

MARIN COUNTY CLIMATE POLICY

Though Marin County is known for its environmental consciousness, it is also known for its low-density developments, larger homes, multi-vehicle households, and consumerism. It also ranks among the highest in the U.S. in terms of per capita GHG emissions. Marin residents consume resources at a far greater rate than most industrialized nations, and that the worldwide use of resources is exceeding the earth’s capacity to renew them. One way to measure the use of natural resource against the planet’s actual biocapacity and ability to renew those resources is the “ecological footprint.” It can be calculated for individuals, regions, countries, or the entire earth and is expressed as the number of global acres (acres with world average biological productivity) that it takes to support one person. As Figure 4 shows, the average American uses 20 global acres per capita. Other western democracies, such as France, Germany, and Italy, have footprints of approximately 11 to 12 global acres per person.

FIGURE 4: ECOLOGICAL FOOTPRINT COMPARISON



Source: Global Footprint Network National Footprint Accounts, 2019 Edition Downloaded 2/20/20 from <http://data.footprintnetwork.org>.

⁵ Association of Bay Area Governments and Metropolitan Transportation Commission, Draft Plan Bay Area Draft Environmental Impact Report, April 2013, pages 2.5-50 and 3.1.59.

Marin was an early leader in both quantifying greenhouse gas emissions and developing strategies to reduce emissions. The County developed its first climate action plan in 2006 (updated in 2015) and adopted a goal to reduce emissions to 15 percent below 1990 levels by 2020. As of 2016, all of the cities and towns in Marin had adopted climate action plans, and some communities, including San Rafael and San Anselmo, have adopted plans to meet 2030 emission targets that are 40 percent below 1990 levels.

The County of Marin, noting the need for all residents and businesses to actively reduce emissions and plan for climate adaptation has created an engagement framework based on the research and book by local author, entrepreneur, and environmentalist [Paul Hawken](#) called [DRAWDOWN: Marin](#). DRAWDOWN: Marin is a comprehensive, science-based, community-wide campaign to do its part to slow the impacts of climate change. It is an effort to recognize the need to reduce Marin's carbon footprint and to provide a road map to do so. Like the State's Six Pillars, there are six areas of focus: (1) 100% Renewable Energy, (2) Low-Carbon Transportation, (3) Energy Efficiency in Buildings and Infrastructure, (4) Local Food and Food Waste, (5) Carbon Sequestration, and (6) Climate Resilient Communities.

THE MARIN CLIMATE & ENERGY PARTNERSHIP

Created in 2007, the mission of the Marin Climate & Energy Partnership (MCEP) is to reduce greenhouse gases emissions levels to the targets of Marin County and local municipalities, consistent with the standards set by AB32. All eleven Marin Cities and towns, the Marin County Community Development Agency, the Transportation Authority of Marin, Marin Clean Energy (MCE), and the Marin Municipal Water District are members. The Marin Climate and Energy Partnership provided staff support and technical expertise for the development of this greenhouse gas inventories and climate action plans for member jurisdictions, which are available at the MCEP website at www.marinclimate.org. MCEP also provides an interactive map that compares how Marin cities and towns are progressing on various sustainability metrics at www.marintracker.org.

Partner members have agreed to use their adopted climate action plans to identify mutual measures to reduce community-wide greenhouse gas emissions and develop policies and programs to support priority measures. The Town works closely with the MCEP to implement a coordinated approach to local and regional emissions reduction targets and climate action planning goals.

ACTIONS TAKEN BY CORTE MADERA TO REDUCE GREENHOUSE GAS EMISSIONS

Since adoption of our first Climate Action Plan in 2015, the Town of Corte Madera has implemented a wide range of measures to reduce greenhouse gas emissions such as:

ENERGY

- In 2017, the Town began purchasing 100 percent renewable electricity from MCE for all of its municipal facilities.
- The Town has completed several LED streetlight conversions since 2016 and plans to convert all streetlights to LED by 2023.
- In 2018, the Town installed two solar powered pedestrian flashing beacons and in 2020 is scheduled to install another twenty.
- In 2018, the Town signed the Bay Area Air Quality Management District's Diesel Free by 2033 Statement of Purpose to reduce and eliminate diesel emissions by 2033 and embark on a collaborative process to share solutions and ideas.

TRANSPORTATION AND OFF-ROAD

- Completed pedestrian and bicycle infrastructure and safety improvements to encourage residents, employees and visitors to walk or bike rather than drive to their destinations.
- In 2019, the Town approved a revised contract with employees that provides up to \$1,500 for reimbursement of green commuting costs. Green Commuting is defined as using public transit, walking, biking or carpooling to work.
- In 2019, the Town purchased an electric assist bicycle for town staff to use for inspections, site visits and other town business.
- In 2019, the Town installed an electric vehicle charging station.
- The Town is in the process of leasing three electric vehicles for staff use as recommend in action 2-6 High-Efficiency Town Vehicles of the CAP.
- In 2020, the Town approved an ordinance prohibiting the use of any gasoline-powered leaf blower at any time within the Town.

WASTE

- Since 2017, the Town has been using grant funding provide by the Marin Hazardous and Solid Waste JPA to improve organic waste recycling by increasing the Town's business compliance with State legislation AB 1826 (Mandatory Commercial Organics Recycling). The program provides tangible resources to businesses that fall into CalRecycle's threshold for this law. These resources include technical assistance, education and outreach conducted in English and Spanish, and free organic waste bins and signage.
- The Town has installed a hydration station at the Community Center to reduce the use and waste of single use bottles.
- In 2016, 2017 and 2018, the Town received grant funding from CalRecycle's Beverage Container Recycling City/County Payment Program to pay the California Conservation Corps of the North Bay for recycling pickup at Town Parks. In 2019, the Town used the grant funding to invest in durable recycling infrastructure for Town Parks. This effort will continue at other parks throughout town.

WATER AND WASTEWATER STRATIGIES

- The Town Public Works Department/ Sanitary District 2 uses recycled water to flush sewer lines instead of fresh water.

NATURAL SYSTEMS AND SEQUESTRATION

- The Corte Madera Beautification Committee has given away on average 16 free street trees per year to residents, thereby increasing carbon sequestration, improving air quality and natural cooling

ADAPTATION AND CLIMATE ACTION

- In 2019, the Town began the process of developing a Climate Adaptation Plan focused on enhancing the resilience of the Town. The plan will provide the necessary foundation and framework for the Town to make critical decisions that address the Town's extensive range of climate change-related risks.
- In 2020, the Town established the Climate Action Committee to assist in implementing and publicizing actions needed to lessen greenhouse gas emissions and further the goals addressed by the Town's Climate Action Plan and Climate Adaptation Plan.

CORTE MADERA'S GREENHOUSE GAS EMISSIONS

CORTE MADERA PROFILE

Located in Marin County on San Francisco Bay, Corte Madera is a town with a land area of approximately 4.5 square miles. However, 1.25 square miles of this area is submerged under bay waters and 0.67 square mile is protected marshland, leaving a net land area of 2.55 square miles. Parks, open space, and flood control areas comprise 0.38 square miles of this net land area. . Corte Madera enjoys a temperate climate, with cool, wet, and almost frostless winters and dry summers with frequent fog or wind. According to California Department of Finance estimates, the population of Corte Madera in 2018 was 10,043 and there were 4,207 housing units. The housing stock is relatively older, with approximately 79 percent of the housing units built before 1980, providing excellent opportunities to upgrade homes to include more energy-efficient features (American Community Survey, 2013-2017). The local climate means that little electricity is currently used to cool buildings in the summer, while natural gas consumption rises in the winter months and fluctuates according to average low temperatures during the rainy season. Water use spikes during the summer, and outdoor water use is largely dependent upon local rainfall patterns and weather conditions.

Corte Madera is a local employment center providing about 6,600 jobs (Plan Bay Area Projections 2040). Most people who work in Corte Madera commute from other Marin County towns (51 percent), while about 37percent come from other counties (Census Transportation Planning Products, 2012-2016). Two regional shopping centers are located within the town.

The Town has public and private schools for grades K-12, a post office, a library, fire stations, and a Town Hall. The non-residential sector of the built environment, which includes retail and office buildings as well as public and government facilities, uses about 64 percent of all electricity and 31 percent of all natural gas in the built environment. As such, the non-residential sector has a significant role to play in reducing GHG emissions in the community.

Corte Madera enjoys good transit service. The Town is served by the Golden Gate Ferry in neighboring Larkspur, which provides daily service to the San Francisco Ferry Building. The Town is also connected to local bus service, which provides transportation to San Francisco and northbound cities as well as local schools and the ferry terminal. Finally, Corte Madera residents can access the Sonoma Marin Area Rail Transit (SMART) which serves Northern Marin and Sonoma County from Larkspur. An estimated 17 percent of Corte Madera residents commute to work by public transportation. About 56 percent of employed residents drive to work alone and 12 percent carpool (American Community Survey, 2013-2017).

The Town's climate, compact size and mostly flat topography are conducive to walking and bicycling, and the Town's well-developed network of bicycle and pedestrian facilities and amenities provides safe and convenient routes. Nonetheless, while approximately 7 percent of employed Corte Madera residents work in Town and not in their homes, only 4 percent walk or bike to work. Encouraging more residents to walk and bike to destinations within Town will help to reduce transportation emissions.

Finally, Corte Madera residents are both wealthier and more educated than residents in most California communities. With an average household income double that of the average California household (\$134,902 vs. \$67,169) and a great majority of well-educated residents (68 percent have bachelor's degrees or higher), Corte Madera residents are well-positioned to lead the way in adopting new technologies. Public information campaigns and incentives to support solar installation, electric vehicle infrastructure, and the purchase of 100 percent renewable electricity are strategies that can be used to support programs to reduce GHG emissions in the community.

COMMUNITY EMISSIONS INVENTORY

The first step toward developing a climate action plan is to identify sources of emissions and establish baseline levels. In 2019, the Marin Climate & Energy Partnership prepared a Greenhouse Gas Emissions Inventory for community operations emissions for the years 2005 through 2018. The inventory quantifies greenhouse gas emissions from a wide variety of sources, from the energy used to power, heat and cool buildings, to the fuel used to move vehicles and power off-road equipment, to the decomposition of solid waste and treatment of wastewater. The report provides a detailed understanding of where the highest emissions are coming from, and, therefore, where the greatest opportunities for emissions reductions lie. The inventory also establishes a baseline emission inventory against which to measure future progress.

Community emissions are quantified according to these seven sectors:

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

Community greenhouse gas emissions totaled 121,068 metric tons in 2005 and 76,926 metric tons in 2018, falling 36 percent, or 44,142 metric tons CO₂e. As shown in Table 3, reductions occurred in all inventoried sectors. The largest decline occurred in the Non-Residential sector, primarily due to the closing of the WinCup factory. Emissions declined 77 percent in this sector and 25,243 metric tons.

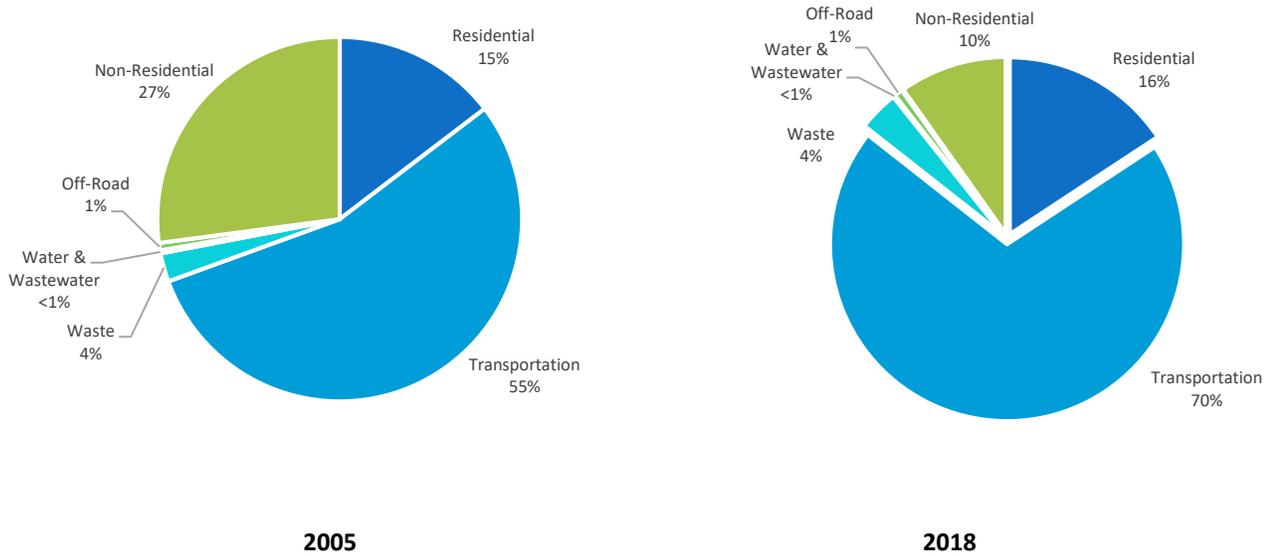
TABLE 3: COMMUNITY EMISSIONS BY SECTOR, 2005 TO 2018

Year	Residential	Non-Residential	Transportation	Waste	Off-Road	Water	Wastewater	Total	% Change from 2005
2005	17,714	32,794	66,372	3,066	790	119	212	121,068	
2006	17,405	30,735	67,212	3,028	812	104	204	119,499	-1%
2007	18,972	34,259	67,400	2,712	967	140	256	124,705	3%
2008	19,141	33,098	66,676	2,247	797	128	260	122,347	1%
2009	18,528	32,409	69,867	1,968	711	128	233	123,844	2%
2010	16,669	28,443	64,825	1,925	663	73	191	112,788	-7%
2011	16,550	17,073	64,758	1,878	658	51	177	101,144	-16%
2012	15,975	13,607	64,257	1,952	650	55	189	96,686	-20%
2013	15,297	13,259	62,069	1,976	640	64	185	93,490	-23%
2014	12,608	11,890	59,969	1,997	628	55	159	87,306	-28%
2015	12,896	11,703	58,592	2,069	613	44	156	86,073	-29%
2016	12,974	10,342	56,721	2,438	599	29	143	83,246	-31%
2017	11,742	7,496	55,668	2,547	582	9	107	78,149	-35%
2018	12,097	7,551	53,757	2,834	585	3	99	76,926	-36%
Change from 2005	-5,617	-25,243	-12,616	-232	-204	-116	-113	-44,142	
% Change from 2005	-32%	-77%	-19%	-8%	-26%	-97%	-53%	-36%	

Note: The WinCup foam cup manufacturing plant ceased operations in July 2011.

Figure 5 compares sector emissions between 2005 and 2018. Emissions from the Transportation sector have always been responsible for the greatest percentage of greenhouse gas emissions, but that share has grown over the years as energy use has declined substantially (primarily due to the closing of the WinCup factory) and electricity has become cleaner. PG&E has been steadily increasing the amount of renewable energy in its electricity mix, which was 58% less carbon intensive in 2018 than it was in 2005. MCE, which began providing electricity to Corte Madera customers in 2012, has historically provided electricity that is less carbon intensive than PG&E electricity. In 2018, MCE Light Green electricity was 38% less carbon intensive than PG&E electricity. MCE carries about 78% of the electricity load in Corte Madera. In 2018, about 7% of MCE electricity purchased by Corte Madera customers was 100% renewable Deep Green electricity.

FIGURE 5: EMISSIONS BY SECTOR, 2005 AND 2018



GOVERNMENT OPERATIONS EMISSIONS INVENTORY

In 2018, the Marin Climate & Energy Partnership prepared a Local Government Operations Greenhouse Gas Inventory report for Corte Madera comparing emissions between the baseline 2005 year and 2015. The inventory shows that local government operations emitted an estimated total of 777 metric tons CO₂e in 2015, down 9 percent from 2005 levels, as shown in Table 4. The greatest reduction occurred in the vehicle fleet sector, where emissions dropped 54 metric tons CO₂e, or 22 percent. Other significant reductions occurred in the water delivery sector (37 metric tons) and the buildings and facilities sector (32 metric tons).

TABLE 4: GOVERNMENT OPERATIONS EMISSIONS, 2005 AND 2015

Sector	2005 Metric Tons CO ₂ e	2015 Metric Tons CO ₂ e	Change Metric Tons CO ₂ e	% Change
Buildings & Facilities	137	105	-32	-23%
Vehicle Fleet	247	193	-54	-22%
Public Lighting	86	58	-28	-32%
Water Delivery	86	48	-37	-43%
Waste	139	254	115	82%
Employee Commute	160	119	-42	-26%
Total	855	777	-78	-9%

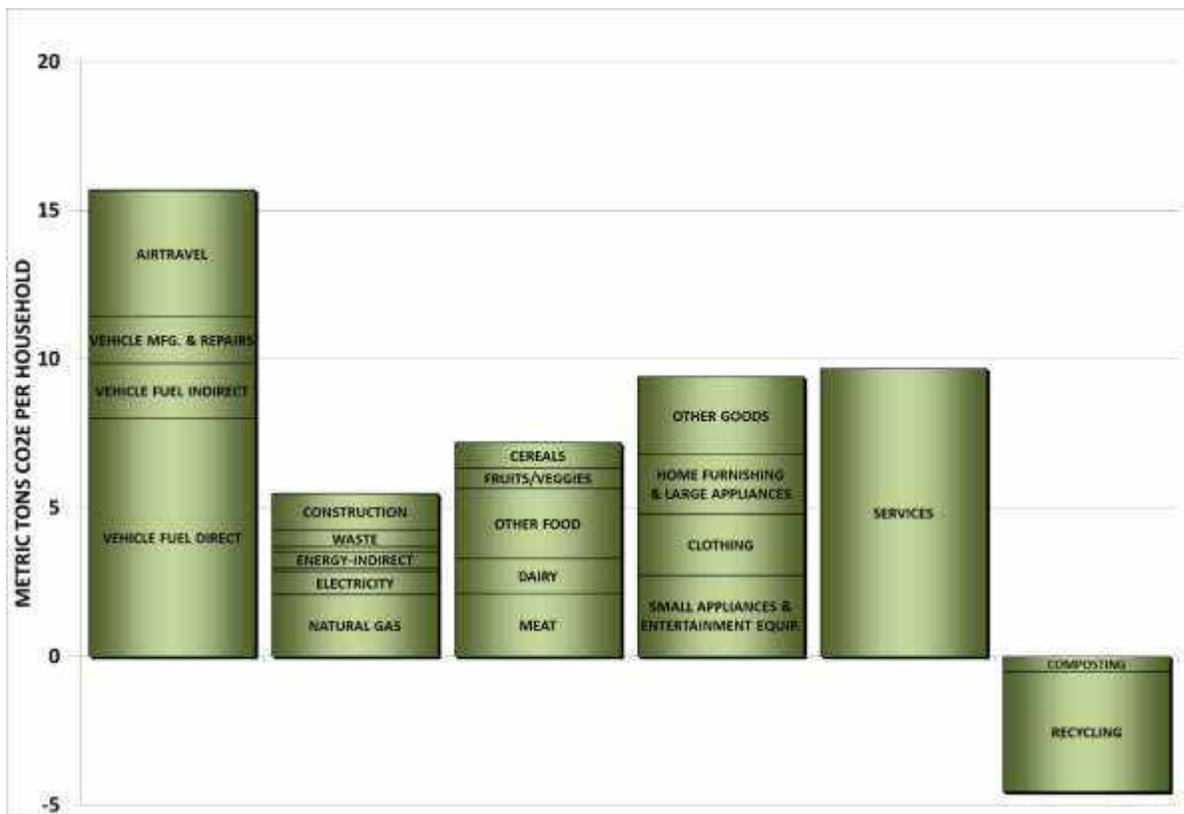
The Local Government Operation GHG Inventory does not reflect the Town’s decision in 2017 to begin purchasing 100 percent renewable energy for municipal operations. If this action is factored in, emissions from government operations would be 622 metric tons CO₂e and 27 percent below 2005 levels.

Government operations are considered a subset of community emissions. Government operations represented approximately 0.8 percent of community emissions in 2018.

CONSUMPTION-BASED INVENTORY

The Bay Area Air Quality Management District (BAAQMD) and U.C. Berkeley developed a [Consumption-Based Inventory](#) to better understand how our purchasing habits contribute to global climate change. A consumption-based inventory includes emission sources that don't get counted in the typical "in-boundary" GHG inventory, as well as other items that are difficult to quantify like airplane travel and upstream emissions from the production, transport and distribution of food and household goods. Figure 6 shows the results of the consumption-based inventory for Corte Madera households. According to this inventory, the average Corte Madera household generates 47 MTCO_{2e} per year. As a comparison, the Town's community-wide emissions of 76,926 MTCO_{2e} works out to about 19 MTCO_{2e} per household. For more information on this and to see carbon footprints by census tract, visit the [SF Bay Area Carbon Footprint Map](#).

FIGURE 6: AVERAGE CORTE MADERA HOSHEOLD CARBON FOOTPRINT



Source: CoolClimate Network

EMISSION FORECASTS AND REDUCTION TARGETS

COMMUNITY EMISSIONS

The Climate Action Plan includes a business-as-usual (BAU) forecast in which emissions are projected in the absence of any policies or actions that would occur beyond the base year to reduce emissions. The forecasts are derived by “growing” 2018 emissions by forecasted changes in population, number of households, and jobs according to projections developed by the Association of Bay Area Governments. Transportation emissions are projected utilizing data provided by the Metropolitan Transportation Commission, which incorporate the vehicle miles traveled (VMT) reductions expected from the implementation of [Plan Bay Area 2020](#) and the [Regional Transportation Plan](#) adopted in 2017. As shown in Table 5, emissions are expected to rise about 4.3 percent by 2030 and 6.5 percent by 2040. Although the regional agencies have not made official projections for 2050, continuing the trendline suggests emissions would reach approximately 83,735 MTCO_{2e} by 2050 under the BAU forecast, an increase of 8.9 percent.

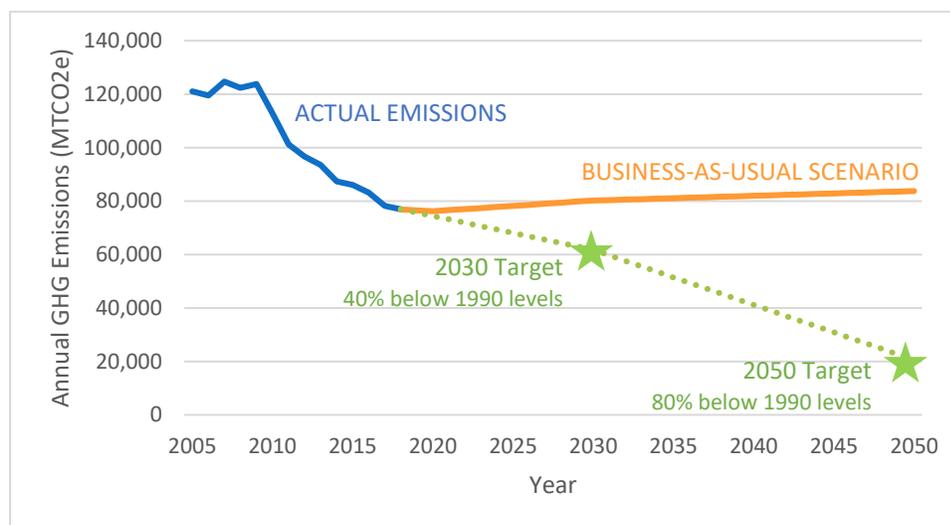
TABLE 5: COMMUNITY EMISSIONS FORECAST

2005 Emissions	2018 Emissions	2030 BAU Emissions	2040 BAU Emissions	2050 BAU Emissions
121,068	76,926	80,199	81,945	83,735

Values are expressed in MTCO_{2e}

The Climate Action Plan establishes targets similar to the State’s goals to reduce emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. In Corte Madera, that means emissions would need to drop to 61,745 MTCO_{2e} by 2030 and 20,582 MTCO_{2e} by 2050. The Plan lays out measures that will exceed the 2030 target and put the Town on a trajectory to meet the 2050 goal. The community emissions trend, forecast and targets are shown in Figure 7 below.

FIGURE 7: COMMUNITY EMISSION TRENDS, FORECAST AND TARGETS



LOCAL GOVERNMENT OPERATIONS EMISSIONS

Emissions from local government operations are not expected to rise due to an expansion of government services or facilities. Government operations emissions are estimated to have totaled 691 metric tons CO₂e in 2018 (utilizing some 2015 data and factoring in the Town’s action to begin purchasing Deep Green electricity in April 2017). In order to meet a reduction target that is equivalent to 40 percent below 1990 levels, emissions would need to drop by 235 metric tons CO₂e, as shown in Table 6.

TABLE 6: GOVERNMENT OPERATIONS EMISSIONS FORECAST AND REDUCTION TARGET

2005 Emissions	2018 Emissions	2030 BAU Emissions	2030 Goal	Reductions Needed to Meet 2030 Goal
855	671	671	436	235

Values are expressed in MTCO₂e

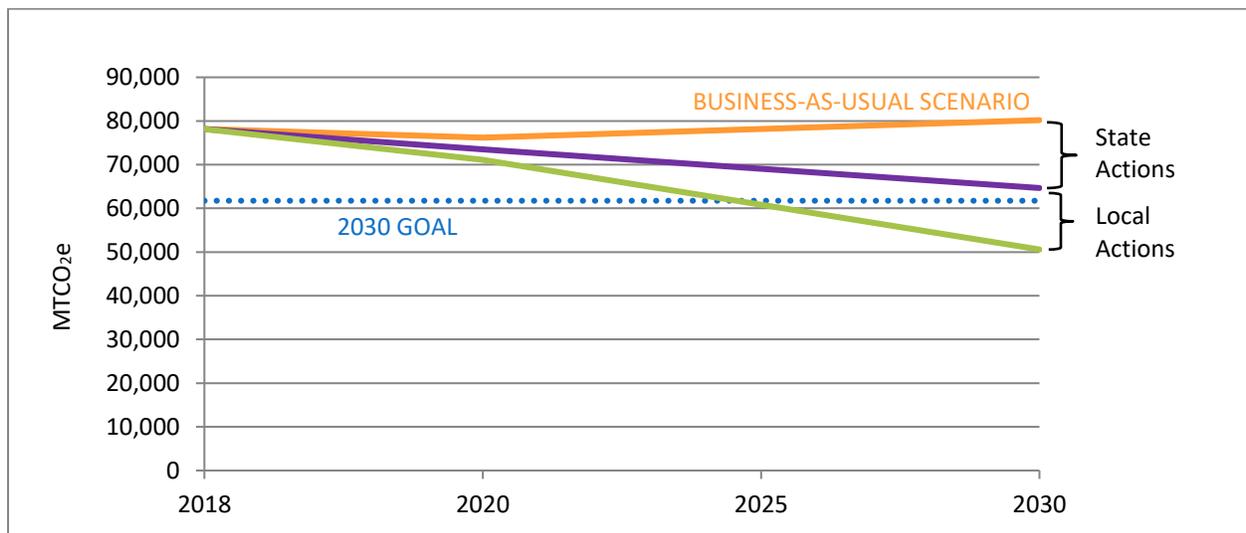
ACTIONS TO REDUCE GREENHOUSE GAS EMISSIONS

INTRODUCTION

The Climate Action Plan includes a variety of regulatory, incentive-based and voluntary strategies that are expected to reduce emissions from both existing and new development in Corte Madera. Several of the strategies build on existing programs while others provide new opportunities to address climate change. State actions will have a substantial impact on future emissions. Local strategies will supplement these State actions and achieve additional GHG emissions reductions. Successful implementation will rely on the combined participation of Town staff along with Corte Madera residents, businesses, and community leaders.

The following sections identify the State and local strategies included in the Climate Action Plan to reduce community and government emissions. Emissions reductions are estimated for each strategy; combined these indicate the Town will reduce emissions 51 percent below 1990 emissions in 2030, which exceeds the State's 2030 goal. As shown in Figure 8, State actions represent about 60 percent of the reduction expected through implementation of the Climate Action Plan while local actions represent about 40 percent.

FIGURE 8: CUMULATIVE IMPACT OF REDUCTION STRATEGIES



STATE ACTIONS

The following are State reduction strategies that have been approved, programmed and/or adopted and will reduce local community emissions from 2018 levels. These programs require no local actions. As such, the State actions are first quantified and deducted from projected community emissions in order to provide a better picture of the responsibility for local action.

RENEWABLE PORTFOLIO STANDARD (RPS)

Established in 2002 in Senate Bill 1078, the Renewable Portfolio Standard program requires electricity providers to increase the portion of energy that comes from eligible renewable sources, including solar, wind, small hydroelectric, geothermal, biomass and biowaste, to 20 percent by 2010 and to 33% by 2020. Senate Bill 350, passed in September of 2015, increased the renewable requirement to 50 percent by the end of 2030. Senate Bill 100, passed in September 2018, accelerated the RPS standard to 60 percent by 2030 and zero-carbon by 2045. In 2018, PG&E's electric power generation mix contained 39 percent eligible renewable energy. MCE's "Light Green" electricity contained 61 percent eligible renewable energy.

LIGHT AND HEAVY DUTY FLEET REGULATIONS

Assembly Bill 1493 (Pavley), signed into law in 2002, requires carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2009 through increased fuel efficiency standards. The California Air Resources Board (CARB) adopted regulations in September 2009 that reduce greenhouse gas emissions in new passenger cars, pickup trucks and sport utility vehicles for model years 2012-2016. CARB expects the new standards to reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016, while improving fuel efficiency and reducing motorists' costs. The Advanced Clean Cars rule will further reduce GHG emissions from automobiles and light-duty trucks for 2017-2025 vehicle models years. CARB Tractor-Trailer Greenhouse Gas Regulations accelerated the use of low rolling resistance tires and aerodynamic fairing to reduce GHG emissions in the heavy-duty truck fleet. Finally, the Heavy Duty GHG Emissions Standards (Phase One) established GHG and fuel efficiency standards for medium duty and heavy duty engines and vehicles for 2014-2018 model years.

TITLE 24

The California Energy Commission (CEC) promotes energy efficiency and conservation by setting the state's building efficiency standards. Title 24 of the California Code of Regulations consists of regulations that cover the structural, electrical, mechanical, and plumbing system of every building constructed or altered after 1978. The building energy efficiency standards are updated on an approximate three-year cycle, and each cycle imposes increasingly higher demands on energy efficiency and conservation. Emissions reductions are based on lower energy budgets mandated by existing Title 24 energy efficiency standards.

Table 7 shows the total emissions reductions in Corte Madera projected through implementation of State actions.

TABLE 7: EMISSIONS REDUCTIONS FROM STATE ACTIONS

State Action	2030 Emissions Reductions MTCO ₂ e
Light and Heavy Duty Vehicle Regulations	14,957
Renewable Portfolio Standard	426
Title 24	176
Total	15,559

SUMMARY OF LOCAL GREENHOUSE GAS EMISSIONS REDUCTION STRATEGIES

The local mitigation measures presented in this section, and as summarized in the tables below, achieve greenhouse gas emissions reductions in the community of approximately 14,075 metric tons CO₂e by 2030. These reductions are in addition to the 44,142 metric tons CO₂e already realized in the community between 2005 and 2018 (see Table 3). When State reductions are added (see Table 7 for a breakdown of State actions), emissions in Corte Madera would be approximately 51 percent below 1990 levels in 2030 – enough to exceed the State target for that year.

Government operations represent a subset of community emissions. Within government operations, the Town could achieve reductions of 212 metric tons CO₂e by 2030 by implementing the local reduction strategies described in this chapter and detailed in the Appendix. These actions could reduce government operations emissions approximately 46 percent below 2005 levels by year 2030 (see Table 9).

TABLE 8: REDUCTION STRATEGIES FOR COMMUNITY EMISSIONS

Sector	2030 GHG Reductions (metric tons CO ₂ e)
1 – Energy Efficiency and Renewable Energy	4,801
2 – Transportation	6,890
3 - Waste Reduction, Reuse and Recycling	2,144
4 - Water and Wastewater	1
5 - Natural Systems and Sequestration	27
Total Local Community Actions	13,863
Local Government Operations Actions (see Table 9)	212
State Actions (see Table 7)	15,559
TOTAL GHG Reductions	
2005 Emissions	121,068
Projected Emissions with Local and State Actions Implemented	50,565
<i>% Reduced Below 2005 Levels (equivalent to 51% below 1990 levels)</i>	<i>58%</i>

TABLE 9: REDUCTION STRATEGIES FOR GOVERNMENT OPERATIONS EMISSIONS

Sector	2030 GHG Reductions (MTCO _{2e})
1 – Energy Efficiency and Renewable Energy	8
2 – Transportation	9
3 – Waste Reduction, Reuse and Recycling	191
4 – Water and Wastewater	<1
5 – Natural Systems and Sequestration	5
Total Local Government Operations Actions	212
TOTAL GHG Reductions	
2005 Emissions	855
Estimated 2018 Emissions	671
Projected Emissions with Local Actions Implemented	459
<i>% Reduced Below 2005 Baseline</i>	<i>46%</i>

ENERGY EFFICIENCY AND RENEWABLE ENERGY

The two fundamental means for reducing emissions from electricity and natural gas use are decreasing consumption through both efficiency and behavioral change, and switching from fossil fuels to renewable sources.

Increasing the efficiency of buildings is the most cost-effective approach for reducing greenhouse gas emissions. Programs that require minimum energy efficiency upgrade for home remodeling, such as increasing insulation and sealing heating ducts, have demonstrated energy savings of up to 20 percent. More aggressive “whole house” retrofits can result in even greater energy savings. Many improvements are “low-hanging fruit” that can be made inexpensively and without remodeling and are extremely cost-efficient; these include efficient lighting, advanced shower heads and irrigation controllers. Installing Energy Star-certified appliances and office equipment, high-efficiency HVAC systems, and LED lighting not only save energy but reduce operating costs in the long run.

New construction techniques and building materials, known collectively as “green building,” can significantly reduce the use of resources and energy and creation of waste in our homes and commercial buildings. Green construction methods can be integrated into buildings at any stage, from design and construction to renovation and deconstruction. The Town can also adopt energy efficiency standards for new construction and remodels that exceed existing State mandates.

Here in Marin County, residents and business have two primary options to switch to renewable energy – either by installing solar energy systems or purchasing 100 percent renewable electricity such as MCE Deep Green, MCE Local Sol, and PG&E Solar Choice. Solar energy systems in Corte Madera supplied about 4 percent of the community’s electricity needs in 2018, and this Plan targets increasing that to 21 percent by 2030. The Town can help to increase solar adoption rates by providing incentives and financing options through property assessed clean energy (PACE) loans, streamlining permit processing, and amending design guidelines and zoning ordinances.

The Town can reduce energy consumption in its own operations by upgrading all streetlights and outdoor lighting to LED lights, completing recommended indoor lighting and HVAC retrofits, and installing solar energy systems at the

Community Center, the corporation yard, and the fire stations. The Town began purchasing MCE’s Deep Green electricity in 2017, and this Plan assumes the Town will continue to do so each year.

TABLE 10: ENERGY EFFICIENCY AND RENEWABLE ENERGY STRATEGIES

Strategy	2030 GHG Reductions (metric tons CO ₂ e)
<i>Community Actions</i>	
1-1 Residential Green Building Ordinance	8
1-2 Commercial Green Building Ordinance	11
1-3 Solar Energy	784
1-4 Energy Efficiency	1,937
1-5 Energy Audits	34
1-6 GHG-Free Electricity	1,997
1-7 Building and Appliance Electrification	31
<i>Government Operations Actions</i>	
1-9 Public Lighting	0
1-10 Municipal Energy Efficiency Projects	6
1-11 Municipal Energy Efficiency Protocols and Equipment	2
1-12 Municipal Solar	0
1-13 Municipal MCE Deep Green Electricity	0
TOTAL GHG Reductions	4,809

RECOMMENDED COMMUNITY ACTIONS

CAP 1-1

Residential Green Building Ordinance. Consider adopting a reach code based on the countywide model that provides options for all-electric, limited mixed-fuel, and mixed fuel construction for new single family and multi-family buildings with the 2019 building code cycles.

CAP 1-2

Commercial Green Building Ordinance. Consider adopting a reach code based on the countywide model that provides options for all-electric, limited mixed-fuel, and mixed fuel construction for new non-residential buildings with the 2019 building code cycle.

CAP 1-3

Solar Energy. Encourage residents and businesses to install solar energy systems.

CAP 1-3.a

Consider providing financial incentives for solar energy and hot water system installation, such as reducing or waiving permit fees.

CAP 1-3.b

Amend design guidelines and zoning ordinance to allow variances for solar systems in setbacks and to encourage ground-mount systems as well as installation on building roofs and over parking areas.

CAP 1-3.c

Continue to participate in CaliforniaFIRST, the property assessed clean energy (PACE) financing program and expand the program to additional providers for increased competition.

CAP 1-3.d

Provide information to the public regarding energy audits, and the cost and payback time for solar installations and other energy efficiency improvements.

CAP 1-3.e

Provide solar assessment information to the public for residential and commercial projects.

CAP 1-4

Energy Efficiency.

Promote and expand participation in residential and commercial energy efficiency programs.

- a. Work with organizations and agencies such as the Marin Energy Watch Partnership, the Bay Area Regional Network, Resilient Neighborhoods, and the Marin Climate & Energy Partnership to promote and implement energy efficiency programs and actions.
- b.
- c. Promote utility, state, and federal rebate and incentive programs.

Participate and promote financing and loan programs for residential and commercial projects such as Property Assessed Clean Energy (PACE) programs and programs provided by utilities and the state.

CAP 1-5

Energy Audits. Consider requiring energy audits and/or energy efficiency upgrades for residential and commercial buildings prior to completion of sale or within a specified period of time after sale is transacted.

CAP 1-6

GHG-Free Electricity. Encourage residents and businesses to switch to 100 percent renewable electricity (MCE Deep Green, MCE Local Sol, and PG&E Solar Choice) through engagement campaigns and partner agency incentives and work with MCE Clean Energy to assure that it reaches its goal to provide electricity that is 100 percent GHG-free by 2025.

CAP 1-7

Building and Appliance Electrification. Promote electrification of building systems and appliances that currently use natural gas, including heating systems, hot water heaters, stoves, and clothes dryers.

CAP 1-8

Innovative Technologies. Investigate and pursue innovative technologies such as micro-grids, battery storage, and demand-response programs that will improve the electric grid's resiliency and help to balance demand and renewable energy production.

RECOMMENDED GOVERNMENT OPERATIONS ACTIONS

CAP 1-9

Public Lighting. Replace all streetlights, traffic signals, and park lighting with energy-efficient LED lighting.

CAP 1-10

Municipal Energy Efficiency. Identify and complete energy-efficiency projects, including lighting efficiency and HVAC upgrades for Town Hall and the Fire Station, as feasible.

CAP 1-11

Municipal Energy Efficiency Protocols and Equipment. Install energy management software and implement energy efficiency protocols such as turning off lights and computers when not in use and reducing energy use through thermostat control. Adopt a sustainable purchasing policy that emphasizes recycled materials and Energy Star-certified appliances and office equipment.

CAP 1-12

Municipal Solar Energy. Install solar PV systems at Town facilities, such as the Community Center, the corporation yard, and the fire stations as feasible.

CAP 1-13

Municipal 100% Renewable Electricity. Continue to purchase 100 percent renewable electricity for all Town facilities, such as MCE's Deep Green program.

TRANSPORTATION

The transportation sector, which includes emissions from passenger vehicle trips, commercial vehicles and public transit traveling on local roads and highways, is the largest source of GHG emissions in the community, contributing 71 percent of total emissions. State legislation aimed at improving vehicle fuel efficiency will have a significant impact on reducing transportation emissions, as will market forces that accelerate the adoption of electric vehicles. Nonetheless, there is much that the local government can do to encourage residents, employees and visitors to drive electric vehicles (EVs) and take alternative modes of transportation, including bicycling, walking and public transportation. The Town can expand the network of pathways, sidewalks and bicycle routes and lanes, and ensure there are adequate facilities to lock and store bicycles. Improving safety and ensuring there are adequate multi-modal connections will help to maximize use of these facilities.

Increasing the use of zero emission vehicles (ZEVs) is an important way to reduce emissions. ZEVs include all-battery as well as plug-in hybrid vehicles. Marin County is a leader in ZEV adoption rates – second only to Santa Clara County – and ZEVs already comprise about 4% of all registered automobiles in Marin. The Climate Action Plan targets increasing that rate to 25 percent by 2030 by building out the EV charging infrastructure and encouraging ZEV ownership through incentives, public education, and development requirements. This is an aggressive target, but one that complements the State's goal to put 5 million ZEVs on the road by 2030. Improvements in battery and charging technology, expected cost reductions, and automakers' commitments to significantly expand ZEV offerings point to an all-electric future.

TABLE 11: TRANSPORTATION STRATEGIES

Strategy	2030 GHG Reductions (metric tons CO ₂ e)
<i>Community Actions</i>	
2-1 Bicycle and Pedestrian Transportation	417
2-2 Employee Trip Reduction	223
2-3 Public Transit	238
2-4 School Transportation	40
2-5 Electric Vehicles	5,972
<i>Government Operations Actions</i>	
2-6 High-Efficiency Town Vehicles	4
2-7 Town Employee Commute	5
TOTAL GHG Reductions	6,899

RECOMMENDED COMMUNITY ACTIONS

CAP 2-1

Bicycle and Pedestrian Transportation. Encourage bicycling and walking as a safe and efficient means to travel around Corte Madera.

CAP 2-1.a

Implement the Town’s Bicycle Master Plan. Construct recommended bike lanes, routes, bike racks and other facilities, and develop a town-wide bicycle system that meets the needs of residents, commuters and visitors.

CAP 2-1.b

Install traffic calming measures and intersection improvements to control speeding and improve pedestrian and cyclist safety.

CAP 2-1.c

Implement “Complete Streets” policies to ensure the needs of bicyclists, pedestrians and the disabled are considered in the transportation element of any new capital improvement or development project where feasible.

CAP 2-1.d

Install sidewalks and pathways where feasible. Improve and maintain all pedestrian facilities. Install lighting and other pedestrian amenities where practical.

CAP 2-1.e

Establish bicycle parking requirements for private developments, including indoor bike storage for multi-family projects.

CAP 2-1.f

Provide bicycle parking at large Town-sponsored events and encourage hosts of large events to do the same.

CAP 2-1.g

Require employers to provide bicycle parking and shower and changing facilities for employees in their development plans and as a component in all commute and traffic demand management programs.

CAP 2-1.h

Require development projects to provide connection and orientation to pedestrian and bicycle paths and existing transit facilities.

CAP 2-1.i

Work with transit providers to ensure there are adequate facilities to transport bicycles.

CAP 2-1.j

Promote “Share the Road” strategies to improve bicycle safety and improve compliance with traffic laws.

CAP 2-1.k

Educate residents and employees about the health and environmental benefits of walking and cycling and provide information to assist in these modes of travel.

CAP 2-2

Employee Trip Reduction. Encourage employees to walk, bike, carpool or take transit to work.

CAP 2-2.a

Work with the Transportation Authority of Marin, the Metropolitan Transportation Commission, the Bay Area Air Quality Management District, and major employers to create and utilize transportation demand management programs, such as rideshare matching programs, vanpool incentive programs, emergency ride home programs, telecommuting, transit use discounts and subsidies, showers and changing facilities, bicycle racks and lockers, and other incentives to use transportation options other than single occupant vehicles.

CAP 2-2.b

Require new commercial development to implement transportation demand management programs, such as shuttle service to transit stops, vanpool services, preferred parking for carpool vehicles, and teleworking and flexible work schedule policies.

CAP 2-3

Public Transit. Work with transit providers to plan, fund and implement additional transit services that are cost-effective and responsive to existing and future transit demand.

CAP 2-3.a

Work with transit providers and other applicable agencies to develop a school and town-wide transit/transportation study.

CAP 2-3.b

Encourage transit providers, including school buses, to use renewable diesel as a transition fuel and to purchase electric buses whenever replacing existing buses. ⁶

CAP 2-3.c

⁶ Renewable diesel is a hydrocarbon diesel fuel produced by hydro processing of fats, vegetable oils, and waste cooking oils.

Work with SMART, TAM, employers and others to provide first and last mile programs to maximize utilization of the Larkspur SMART train station, including shuttle buses.

CAP 2-4

School Transportation. Encourage bicycling, walking, carpooling, and taking public transit to school.

CAP 2-4.a

Identify issues associated with unsafe bicycle and pedestrian facilities between neighborhoods and schools, apply for Safe Routes to School grants, and execute plans to improve pedestrian and bicycle facilities.

CAP 2-4.b

Work with the Transportation Authority of Marin and Safe Routes to School to develop and promote walking school buses, bike trains, and other programs that encourage walking and biking to school.

CAP 2-4.c

Work with school districts, Marin Transit and the Transportation Authority of Marin to promote school bus and carpooling programs and to limit parking at schools.

CAP 2-5

Electric Vehicles. Encourage the use of electric vehicles, including electric bicycles, scooters and other personal transportation devices.

CAP 2-5.a

Install electric vehicle charging stations in Town parking lots.

CAP 2-5.b

Require new and remodeled commercial and multi-family development to provide electric vehicle charging stations, and encourage existing shopping centers and office buildings to install EV charging stations.

CAP 2-5.c

Require new single-family residential development to provide electrical service for a potential electric vehicle charging station.

CAP 2-5.d

Participate in regional efforts and grant programs to encourage widespread availability of charging stations.

CAP 2-5.e

Provide wayfinding signage to public EV chargers.

CAP 2-5.f

Work with PG&E and other entities to identify multi-family and workplace charging sites appropriate for available incentive programs, such as EV Charge Network.

CAP 2-5.g

Participate in a countywide effort by MCE, PG&E and others to provide rebates for new or used electric vehicles and/or charging stations.

RECOMMENDED GOVERNMENT OPERATIONS ACTIONS

CAP 2-6

High-Efficiency Town Vehicles. Purchase or lease low or zero-emissions vehicles and the most fuel-efficient models possible for the Town fleet, including construction vehicles where practical.

CAP 2-7

Town Employee Commute. Continue to provide Town employees with incentives to use alternatives to single occupant automobile commuting, such as transit incentives, bicycle facilities, ridesharing services and subsidies, flexible schedules, and telecommuting when practical.

WASTE REDUCTION, REUSE AND RECYCLING

The reduction of waste, as well as the reuse and recycling of products, is key to reducing impacts on the environment. It is necessary to rethink what has traditionally been regarded as garbage and treat all materials as valued resources instead of items to discard. This requires shifting consumption patterns, more carefully managing purchases, and maximizing the reuse of materials at the end of their useful life.

Emissions from the waste sector are an estimate of methane generation from the decomposition of organic solid waste and alternative daily cover sent to the landfill. These emissions are not generated in the year the waste is landfilled, but instead result from the decomposition of the waste over 100+ years. About 75 percent⁷ of landfill methane emissions are captured through landfill gas collection systems, but the remaining 25 percent escape into the atmosphere as a significant contributor to global warming. Approximately 60 percent of Corte Madera's landfilled waste is organic (paper, cardboard, wood, yard trimming, food scraps, etc.); diverting this waste from the landfill is what will reduce greenhouse gas emissions.

The Town of Corte Madera is a member of the Marin Hazardous and Solid Waste Joint Powers Authority (JPA), which works with private waste haulers and facility operators to implement recycling programs and achieve state-mandated targets for waste diversion rates. Marin County has a high rate of diversion, with a current rate of about 74 percent. Countywide landfilled waste has declined about 14 percent since 2005 but has been increasing ever since hitting a low in 2011.

In 2009, the JPA completed a zero-waste feasibility study which concluded that between 75 and 80 percent of the material that goes to the landfill can be diverted. Currently the JPA is targeting the diversion of food waste and demolished building materials to increase the county's diversion rate. The JPA has embraced an aggressive goal for achieving "zero waste" by 2025. The JPA provides grant funds to member agencies to attain this goal. The JPA's Zero Waste Marin website provides tips, tools and challenges to encourage community members to take action.

The JPA proposes that the member agencies endorse an Extended Producer Responsibility resolution and sign the California Product Stewardship Council pledge to shift California's product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on extended producer responsibility (EPR) in order to reduce public costs and drive improvements in product design that promote environmental sustainability.

⁷ U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emissions Factors*, AP-42, Fifth Edition, January 1995.

TABLE 12: WASTE REDUCTION, REUSE AND RECYCLING STRATEGIES

Strategy	2030 GHG Reductions (metric tons CO ₂ e)
<i>Community Actions</i>	
3-1 Zero Waste	2,144
<i>Government Operations Actions</i>	
3-2 Zero Waste in Government Operations	191
TOTAL GHG Reductions	2,334

RECOMMENDED COMMUNITY ACTIONS

CAP 3-1

Zero Waste. Divert 75 percent of organic waste from the landfill by the year 2030.

CAP 3-1.a

Explore adoption of an ordinance requiring mandatory subscription to and participation in waste diversion activities, including recycling and organics collection provided by Marin Sanitary Service. Consider including phased implementation of the ordinance, penalties, and practical enforcement mechanisms.

CAP 3-1.b

Work with the Town’s waste hauler, Zero Waste Marin, and non-profits such as Extra Food to divert commercial organic waste from the landfill through recycling, composting, and participation in waste-to-energy and food recovery programs. Conduct outreach and education to businesses subject to State organic waste recycling mandates (AB 1826) and encourage or enforce compliance with the law.

CAP 3-1.c

Work with Zero Waste Marin, the Town’s waste hauler, and other organizations to educate and motivate residents to utilize curbside collection services and home composting for food waste.

CAP 3-1.d

Review and revise as appropriate the Town’s franchise agreement with its waste hauler to ensure waste reduction and diversion rates are met. Conduct a formal rate structure study to support these efforts, including lowering charge for small landfill waste bins. Conduct a feasibility study and consider investing in new solid waste processing infrastructure to remove recoverable materials (recycling and organics) from the waste stream and reduce contamination.

CAP 3-1.e

Require recycling and composting at public events. Provide visible and educational signage to ensure compliance.

CAP 3-1.f

Increase mandatory construction and demolition diversion rates beyond the rate required by State building codes. Require all loads of construction and demolition debris and self-haul waste to be processed for recovery of materials as feasible.

CAP 3-1.g

Work with community groups and the Marin Hazardous and Solid Waste Joint Powers Authority to conduct outreach and educational campaigns for Zero Waste initiatives. Host quarterly educational events

throughout the year, and produce regular educational mailings for all residents including those living in multifamily dwellings.

CAP 3-1.h

Encourage the State to regulate the production and packaging of consumer goods and take-back programs. Encourage on-demand delivery services like Amazon and Blue Apron to reduce packaging waste and investigate requirements and incentives for same through ordinance or engagement campaigns.

CAP 3-1.i

Require regular residential and commercial waste audits and waste characterization studies to identify opportunities for increased diversion and to track progress in meeting targets.

RECOMMENDED GOVERNMENT OPERATIONS ACTIONS

CAP 3-2

Zero Waste in Government Operations. Divert 75 percent of organic waste from the landfill by the year 2030.

CAP 3-2.a

Conduct a waste audit of all government facilities to understand where opportunities for increased diversion lie.

CAP 3-2.b

Provide recycling and composting containers with clear and visible educational signage in public areas, parks and Town facilities.

CAP 3-2.c

Embark on an educational and incentive-based campaign to increase recycling and composting rates within government operations.

CAP 3-2.d

Implement operational and purchasing policies to reduce paper use, such as requiring duplex printing, providing dishware and glassware to reduce use of paper plates and cups, and online submission of applications and documents.

CAP 3-2e

Provide educational materials to assist citizens and contractors in reducing waste at home and at construction sites.

WATER AND WASTEWATER

WATER

The Marin Municipal Water District (MMWD) supplies drinking water to a 147-square-mile area of south and central Marin, including the Town of Corte Madera. The primary source of water supply is rainfall stored in seven local reservoirs. About one-quarter of the water supply is imported from the Russian River annually. After treatment at one of the district's three water treatment plants, the water is transmitted throughout the MMWD service area by gravity flow or booster pumps.

Water conservation efforts not only save water but reduce the demand for electricity to pump, treat and convey water from the water source to water users in Corte Madera. In addition, conservation reduces the need to treat wastewater at the Central Marin Sanitation Agency's facilities, where GHG emissions are created during the treatment process as well as indirectly through the consumption of electricity to run the facilities.

Properties in Corte Madera are subject to MMWD's water conservation regulations, which exceed State building codes in some instances. All plumbing installed, replaced or moved in any new or existing building must be high-efficiency fixtures. Water-efficient landscape regulations apply to all newly constructed and rehabilitated non-residential and developer-installed residential landscapes of 1,000 square feet or greater, as well as homeowner residential projects of 2,500 square feet or greater.

The Water Conservation Act of 2009 (Senate Bill X7-7) requires all urban water districts, including MMWD, to reduce per capita water usage by 20 percent by the year 2020. MMWD's target is 124 gallons per capita per day, a level that was achieved in 2011. In 2018, water usage was 110 gallons per capita per day.

MMWD's Water Conservation Plan outlines a number of water conservation programs, including education, outreach, rebates, incentives, water audits, and requirements, designed to reduce water usage. Supporting MMWD's water conservation programs and adopting additional water conservation measures will help to reduce greenhouse gas emissions created by the Corte Madera community.

WASTEWATER

The Central Marin Sanitation Agency (CMSA) treats wastewater produced by the Corte Madera community. As wastewater is treated, chemical processes in aerobic and anaerobic conditions create two greenhouse gases, methane and nitrous oxide. Methane that would otherwise be released to the atmosphere is collected and converted to energy, thereby reducing the treatment plant's use of electricity and/or natural gas in its daily operations. In partnership with Marin Sanitary Service, CMSA adds food waste collected from restaurants, markets and other eligible businesses to the bio digestion process, increasing the amount of energy that can be produced at the plant.

TABLE 13: WATER AND WASTEWATER STRATEGIES

Strategy	2030 GHG Reductions (metric tons CO ₂ e)
<i>Community Actions</i>	
4-1 Indoor Water Efficiency and Conservation	1
4-2 Outdoor Water Efficiency and Conservation	<1
4-3 Rainwater Catchment	<1
4-4 Greywater Systems	<1
<i>Government Operations Actions</i>	
4-5 Municipal Water Conservation	<1
TOTAL GHG Reductions	1

RECOMMENDED COMMUNITY ACTIONS

CAP 4-1

Indoor Water Efficiency and Conservation. Reduce indoor water use in residential and commercial buildings.

CAP 4-1.a

Ensure all projects requiring building permits, plan check, or design review comply with State and MMWD regulations.

CAP 4-1.b

Work with Marin Municipal Water District (MMWD) and other organizations to promote water conservation programs and incentives.

CAP 4-1.c

Educate residents and businesses about local and State laws requiring retrofit of non-compliant plumbing fixtures during remodeling and at resale.

CAP 4-1.d

Utilize the Town’s website, newsletter, community events, and other communication channels to educate the public on indoor water conservation practices, available financial incentives and programs, and water-efficient fixture requirements for new buildings, remodels, and resales.

CAP 4-2

Outdoor Water Efficiency and Conservation. Reduce outdoor water use.

CAP 4-2.a

Work with Marin Municipal Water District to promote existing and new rebates for water-efficient landscaping, irrigation systems, and weather-based irrigation controllers.

CAP 4-2.b

Support additional water-efficient landscape requirements as needed to meet water conservation targets. Provide information to the public on water-efficient landscape requirements for new and remodeled landscape projects.

CAP 4-2.c

Utilize the Town’s website, newsletter, community events and other communication channels to educate the public on water-efficient landscaping and irrigation practices, rainwater catchment systems, and greywater systems.

CAP 4-2.d

Partner with non-profit agencies that provide workshops and classes to educate homeowners and business owners on ways to reduce outdoor water use and use captured rainwater and greywater for irrigation.

CAP 3-2.e

Install a demonstration garden with locally available, low-water use plants to provide ideas for water-efficient landscaping.

CAP 4-3

Rainwater Catchment. Reduce potable water use for landscape irrigation.

CAP 4-3.a

Promote existing and new rebates for rainwater storage facilities, such as rain barrels, cisterns, and storage tanks.

CAP 4-3.b

Review existing building and zoning codes and permitting procedures and revise as necessary to encourage rainwater storage facilities.

CAP 4-4

Greywater. Recycle wastewater and reduce potable water use for landscape irrigation.

CAP 4-4.a

Promote existing and new rebates for greywater systems, including laundry-to-landscape system components.

RECOMMENDED GOVERNMENT OPERATIONS ACTIONS

CAP 4-5

Municipal Water Conservation. Assess, maintain and repair existing plumbing fixtures, pipes, and irrigation systems in all Town buildings, facilities and landscaping to minimize water use.

NATURAL SYSTEMS AND SEQUESTRATION

The natural environment has been extensively altered by human civilization, often with little consideration for how natural systems function, depriving us of the important benefits they offer. Clearing and draining of wetlands, forestlands, grasslands and other open space for agricultural production or urban development decreases or eliminates the capacity of those natural systems to store carbon. The carbon dioxide stored in soil, trees and other vegetation is released into the atmosphere when forestland and open space is converted to other uses. Restoration of these natural areas, and establishment of new ones, has the potential to tie up or sequester greenhouse gas emissions in the form of soil and wood carbon. One way Corte Madera can sequester emissions is by encouraging tree planting in the community.

TABLE 14: NATURAL SYSTEMS AND SEQUESTRATION STRATEGIES

Strategy	2030 GHG Reductions (metric tons CO ₂ e)
<i>Community Actions</i>	
5-1 Tree Planting on Private Land	27
<i>Government Operations Actions</i>	
5-2 Tree Planting on Public Land	5
TOTAL GHG Reductions	32

RECOMMENDED COMMUNITY ACTIONS

CAP 5-1

Tree Planting on Private Land. Increase carbon sequestration and improve air quality and natural cooling by increasing Corte Madera’s tree cover.

CAP 5-1.a

Require new development and significant remodeling projects to plant trees along street frontages, wherever feasible.

CAP 5-1.b

Require new and renovated parking lots to plant trees, wherever feasible. Review parking lot landscape standards to maximize tree cover, size, growth, and sequestration potential.

CAP 5-1.c

Regulate and minimize removal of large trees and require planting of replacement trees.

CAP 5-1.d

Require that the site planning, construction and maintenance of new development preserve existing healthy trees and native vegetation on site to the maximum extent feasible. Replace trees and vegetation not able to be saved.

CAP 5-1.e

Encourage community members to plant trees on private land. Provide information to the public, including landscape companies, gardeners and nurseries, on carbon sequestration rates, drought tolerance, and fire resistance of different tree species.

CAP 5-1.f

Manage trees and invasive species in the open space for forest health and reduction of fuel load.

RECOMMENDED GOVERNMENT OPERATIONS ACTIONS

CAP 5-2

Tree Planting on Public Land. Increase the number of trees on Town land.

CAP 5-2.a

Plant trees in Town parks, parking lots, medians and sidewalks, wherever feasible.

CAP 5-2.b

Replace Town park and street trees that are removed, wherever feasible.

CAP 5-2.c

Properly maintain and prune existing Town park and street trees.

STRATEGIES TO ADAPT TO CLIMATE CHANGE

To effectively address the challenges that a changing climate will bring, the Town must not only reduce its greenhouse gas emissions but be prepared to respond to the expected impacts of climate change. Sea level rise, in particular, is expected to have significant impacts on Corte Madera's coastline, especially when coupled with storm events and king tides. In 2019, the Town began the process of developing a Climate Adaptation Plan focused on enhancing the resilience of the Town. The plan will provide the necessary foundation and framework for the Town to make critical decisions that address the Town's extensive range of climate change-related risks.

In addition to the Climate Adaptation Plan, many of the recommended actions incorporated in this Climate Action Plan will help the community prepare for the effects of climate change. Reducing water use will ease competition for limited water supplies expected from higher temperatures and reduced snowmelt, while reducing electricity use will help ease demand for diminishing hydroelectric power. Other expected effects from climate change – such as higher frequency of large damaging fires and pest and insect epidemics – must be anticipated through adequate public safety, emergency, and public health responses.

RECOMMENDED ACTIONS

CAP 6-1

Conduct a sea level rise vulnerability and risk assessment and develop adaptation measures to prepare for flooding and inundation. Integrate the impact of storm events and king tides when analyzing and planning for sea level rise.

CAP 6-2

Partner with neighboring municipalities and regional agencies to develop and implement regional risk and vulnerability studies and adaptation programs and projects.

CAP 6-3

Adopt the Town's Climate Adaptation Plan by 2021.

CAP 6-4

Incorporate the likelihood of sea level rise and extreme heat and storm events in the Town's Local All-Hazard Mitigation Plan.

CAP 6-5

Incorporate the likelihood of climate change impacts into Town emergency planning and training.

CAP 6-6

Coordinate with water districts, wildlife agencies, flood control and fire districts, Marin County, and other relevant organizations to address climate change impacts and develop adaptation strategies. Address human health and the health and adaptability of natural systems, including the following:

- a. Water resources, including expanded rainwater harvesting, water storage and conservation techniques, water reuse, and water-use and/or irrigation efficiency.
- b. Biological resources, including land acquisition, creation of marshlands/wetlands as a buffer against sea level rise and flooding, and protection of existing natural barriers.
- c. Public health, including heat-related health plans, vector control, safe water, and improved sanitation.
- d. Environmental hazards, including seawalls, storm surge barriers, and fire protection.

IMPLEMENTATION OF THE CLIMATE ACTION PLAN

Corte Madera recognizes that responding to and preparing for climate change is a critical step toward a sustainable future. The Town's early actions to reduce its contribution to climate change reflect the Town's history and commitment to decrease the impacts of day-to-day activities on the natural environment while enhancing its vibrant quality of life. Mitigating climate change will require everyone — residents, businesses, government agencies, and nonprofit organizations — to work together to implement this plan.

This plan provides a strategy to achieve emission reductions that will achieve local levels consistent with State goals to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030. Successful implementation of the plan will require staff and the Town Council to identify and commit resources to climate change mitigation activities, and to monitor and report on progress towards meeting emissions reduction goals.

RECOMMENDED ACTIONS

CAP 7-1

Monitor and report on the Town's progress annually. Create an annual priorities list for implementation.

CAP 7-2

Update the greenhouse gas emissions inventory for community emissions annually and every five years for government operations.

CAP 7-3

Continue and expand public and private partnerships that support implementation of the climate action plan, including membership in the Marin Climate and Energy Partnership.

CAP 7-4

Identify funding sources for recommended actions, and pursue local, regional, state and federal grants as appropriate.

CAP 7-5

Update the Climate Action Plan by the year 2025 to revise and add new reduction strategies as appropriate.

TABLE 15: IMPLEMENTATION TARGETS AND COST/BENEFIT ASSESSMENT FOR REDUCTION STRATEGIES

Strategy	Target	Estimated Cost	Estimated Annual Savings	2030 GHG Reductions (MTCO _{2e})
1-1 Residential Green Building Ordinance	Adopt a reach code that increases energy efficiency 27% over the base code.			8
1-2 Commercial Green Building Ordinance	Adopt a reach code that increases energy efficiency 10% over the base code.			11
1-3 Solar Energy	Achieve 21% market penetration by 2030.			784
1-4 Energy Efficiency	Achieve annual decrease of 0.6% of electricity consumption and 0.9% natural gas consumption.			1,937
1-5 Energy Audits	10% of audited households reduce energy use by 10%			34
1-6 GHG-Free Electricity	MCE electricity is 100% GHG-free by 2022.			1,997
1-7 Building and Appliance Electrification	7 cooktops, 11 water heaters and 21 heating systems are replaced with electric versions by 2030			31
1-9 Public Lighting	Replace all public lighting with LED lights.	\$225 per cobra-head streetlight. On bill financing is available through PG&E which is a loan program with no out-of-pocket expenses. ¹		0
1-10 Municipal Energy Efficiency Projects	Complete lighting and HVAC retrofits.	Town Hall & firehouse lighting retrofit: \$26,017 Firehouse 14 lighting retrofit: \$4,790 Lighting retrofit estimates are net of rebates and were developed in 2015. Town Hall HVAC replacement: \$33,750	Town Hall & Firehouse lighting retrofits: \$1,551 Lighting retrofits were developed in 2015.	6

		Town Hall furnace replacement: \$7,200	Town Hall HVAC replacement: \$434 Town Hall furnace replacement: \$224	
1-11 Municipal Energy Efficiency Protocols and Equipment	Reduce energy use by 5%	Energy management software costs approximately \$20 per desktop with a \$15 rebate currently available.		2
1-12 Municipal Solar	Install solar PV as follows: 1. 32 kW system at Firehouse 14 2. 30 kW DC system at Community Center 3. 18 kW DC system at Corp Yard 4. 15 kW DC system at Firehouse 13	1. \$152,000 2. \$143,310 3. \$85,500 4. \$75,770 Estimates updated in 2015.	1. \$10,164 2. \$9,582 3. \$5,717 4. \$4,870 Estimates updated in 2015.	0
1-12 Municipal MCE Deep Green	Purchase Deep Green electricity for all facilities	Approximately \$4,500 after implementation of all energy-efficiency and renewable energy strategies (1 cent per kWh)		0
2-1 Bicycle and Pedestrian Transportation	Pedestrian improvements decrease VMT 2% by 2030. 1.84 miles of new Class I and II bike facilities installed by 2020 and 4.80 miles installed by 2030.			417
2-2 Employee Trip Reduction	TDM programs targeted to 50% of employees by 2020 and 75% of employees by 2030. 5.4% of targeted employees participate.			223
2-3 Public Transit	3% of buses will be zero emissions and 97% of VMT will be driven by buses using renewable diesel in 2020, and 33% will be driven by electric buses utilizing MCE electricity by 2030.			238
2-4 School Transportation	Decrease number of students driving alone to school by 320 students.			40
2-5 Electric Vehicles	25% of passenger vehicles registered in Marin are EVs in 2030.			5,972

2-6 High-Efficiency Town Vehicles	Replace 4 vehicles with hybrid models	Fueleconomy.gov compares costs for individual hybrid vs. non-hybrid models. As an example, the hybrid version of the Honda Accord costs \$30,095 vs. \$26,620, an additional expense of \$3,475.	Fueleconomy.gov provides fuel savings and payback periods for hybrid vs. non-hybrid models. As an example, estimated fuel savings for the Honda Accord hybrid is \$535 per year. The payback period is 6.5 years.	4
2-7 Town Employee Commute	Reduce employee commute VMT 5.4%	The Transportation Authority of Marin provides green commute programs and a free Go Time Marin commuter toolkit. 511 provides free survey and consultation services.		5
3-1 Zero Waste	Divert 75% of organic waste from landfill by 2030.			2,144
3-2 Zero Waste in Government Operations	Divert 75% of organic waste from landfill by 2030.	The Town is eligible to receive approximately \$14,000 per year in Zero Waste grant funds from the Marin County Hazardous and Solid Waste JPA, and funds may be used to conduct waste audits, adopt a zero waste resolution, adopt a Construction & Demolition Ordinance, add public recycling receptacles, etc.		191
4-1 Indoor Water Efficiency and Conservation	Reduce water consumption by 1% per year			1
4-2 Outdoor Water Efficiency and Conservation	Reduce water consumption by 1% per year			<1
4-3 Rainwater Catchment	50,000 gallons of water storage installed by 2030.			<1
4-4 Greywater Systems	200 households using greywater systems by 2030.			<1

4-5	Municipal Water Conservation	Reduce water use by 20%.	Change-out of specific fixtures will require additional analysis.	<1
5-1	Tree Planting on Private Land	Plant 50 net new trees per year.		27
5-2	Tree Planting on Public Land	Plant 10 net new trees per year.	Estimated annual cost for planting new trees is \$10,000.	5

 Indicates a Government Operations Action

¹ Large scale replacement of standard high pressure sodium (HPS) fixtures with light-emitting diode (LED) fixtures saves a significant amount of money each month in lower energy costs and lower routine monthly maintenance charges. PG&E pays for the new LED fixtures up front as a loan, but instead of cities paying the loan back directly, PG&E instead takes the difference between what the monthly bill would have been with old HPS fixtures and the lower energy cost of new LED fixtures. The amount the Town pays each month stays the same as the old billing structure up until the time when the loan is paid in full.

APPENDIX

GHG EMISSIONS REDUCTION SUMMARY
Corte Madera Climate Action Plan

Measure		GHG Emissions Reductions (MTCO₂e/yr)
Local Actions		
1-1	Residential Green Building Ordinance	-8
1-2	Commercial Green Building Ordinance	-11
1-3	Solar Energy	-784
1-4	Energy Efficiency	-1,937
1-5	Energy Audits	-34
1-6	GHG-Free Electricity	-1,997
1-7	Building and Appliance Electrification	-31
1-9	Public Lighting	0
1-10	Municipal Energy Efficiency	-6
1-11	Municipal Energy Efficiency Protocols and Equipment	-2
1-12	Municipal Solar Energy	0
1-13	Municipal 100% Renewable Electricity	0
2-1	Bike and Pedestrian Transportation	-417
2-2	Employee Trip Reduction	-223
2-3	Public Transit	-238
2-4	School Transportation	-40
2-5	Electric Vehicles	-5,972
2-6	High-Efficiency Town Vehicles	-4
2-7	Town Employee Commute	-5
3-1	Zero Waste	-2,144
3-2	Municipal Waste	-191
4-1	Indoor Water Efficiency and Conservation	-1
4-2	Outdoor Water Efficiency and Conservation	0
4-3	Rainwater Catchment	0
4-4	Greywater	0
4-5	Municipal Water Conservation	0
5-1	Tree Planting on Private Land	-27
5-2	Tree Planting on Public Land	-5
TOTAL - LOCAL ACTIONS		-14,075
State Actions		
RPS		-426
TITLE 24		-176
Light and Heavy Duty Vehicle Fleet		-14,957
TOTAL - STATE ACTIONS		-15,559

Projected Emissions	
Projected BAU Community-Wide GHG Emissions	80,199
Emissions Reductions from Local and State Actions	-29,615
Community-Wide Emissions with Local and State Actions Implemented	50,584
Reduction from 2005 Baseline Emissions	
2005 Community-Wide GHG Emissions	121,068
Community-Wide Emissions with Local and State Actions Implemented	50,584
% Reduction from 2005 Baseline	58%
GHG Target to Meet State Goals	61,745
% Below 1990 Levels	51%
Emissions per Service Population	3.0

GREEN BUILDING REACH CODE <i>Community Action 1-1</i>	
Objective	Adopt a reach code based on the countywide model that provides options for all-electric, limited mixed-fuel, and mixed fuel construction for new single family and multi-family buildings with the 2019 building code cycle.
General Plan Programs	RCS-2.6.d: Green Building Guidelines. Adopt Green Building guidelines for new construction, renovations and municipal projects. Integrate green building requirements into the development review and building permit process. Collaborate with local jurisdictions to share resources, and develop green building policies and programs that are optimized for the region. (See GP for full text)
Reductions (MTCO ₂ e)	Implementation action: 2020 2030
Methodology	CAPCOA Measure BE-1 used for estimating building energy savings. We assume ordinance is adopted in 2020. We assume a 27% improvement in energy efficiency for residential buildings, similar to the mixed fuel compliance method which requires a total compliance margin of 10 EDR.
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.

Calculation

Residential	2030
Percent over Title 24 Energy Requirements	27 %
Percent of participating new residential units	100%
New construction electricity use, BAU	118,706 kWh
New construction electricity use, after Title 24	40,644 kWh
Additional reduction in electricity use	807 kWh
New construction natural gas use, BAU	10,774 therms
New construction natural gas use, after Title 24	6,148 therms
Additional reduction in natural gas use	1,477 therms
GHG emissions reductions	7.9 MTCO ₂ e

COMMERCIAL GREEN BUILDING ORDINANCE

Community Action 1-2

Objective	Adopt a reach code based on the countywide model that provides options for all-electric, limited mixed-fuel, and mixed fuel construction for new non-residential buildings with the 2019 building code cycle.
General Plan Programs	RCS-2.6.d: Green Building Guidelines. Adopt Green Building guidelines for new construction, renovations and municipal projects. Integrate green building requirements into the development review and building permit process. Collaborate with local jurisdictions to share resources, and develop green building policies and programs that are optimized for the region. (See GP for full text)
Reductions (MTCO ₂ e)	Implementation action: 2020 2030
Methodology	CAPCOA Measure BE-1 used for estimating building energy savings. We assume ordinance is adopted in 2020. We assume a 10% improvement in energy efficiency in non-residential buildings, similar to the mixed fuel compliance method.
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.

Calculation

Commercial	2030
Percent over Title 24 Energy Requirements	10 %
Percent of participating new commercial space	100%
New construction electricity use, BAU	1,726,188 kWh
New construction electricity use, after Title 24	1,014,909 kWh
Additional reduction in electricity use	26,388 kWh
New construction natural gas use, BAU	39,518 therms
New construction natural gas use, after Title 24	23,234 therms
Additional reduction in natural gas use	1,673 therms
GHG emissions reductions	11.1 MTCO ₂ e

COMMUNITY SOLAR ENERGY <i>Community Action 1-3</i>					
Objective	Identify and remove barriers to small-scale, distributed solar energy production within the community.				
Program Description	The goal of this measure is to reduce GHG emissions from residential and commercial energy use by facilitating the development of small-scale distributed solar energy production. This can be accomplished through 1) adoption of incentives, such as permit streamlining and fee waivers, as feasible; 2) amendments to development codes, design guidelines, and zoning ordinances, as necessary; 3) installation of solar panels on carports and over parking areas on commercial projects, and new large-scale residential developments, and; 4) implementation of Property Assessed Clean Energy (PACE) programs for residential and non-residential projects.				
General Plan Programs	RCS-2.4.b: Renewable Energy. Provide for use of renewable energy systems to help meet future energy needs of the community. This may include use of photovoltaic solar collection systems to reduce dependency on fossil fuels. Include provisions for use of such systems in the Town's Design Guidelines.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">-58.1</td> <td>2020</td> </tr> <tr> <td>-783.6</td> <td>2030</td> </tr> </table>	-58.1	2020	-783.6	2030
-58.1	2020				
-783.6	2030				
Methodology	<p>According to Project Sunroof, 88% of Corte Madera buildings have roofs that are solar-viable. These 2,900 roofs have the capacity for 51.9 MW DC and could generate 72,400,000 kWh per year, which is more than the 56,500,000 kWh consumed in Corte Madera in 2018. Project Sunroof estimates there are 205 existing solar installations in Corte Madera as of November 2018). As of the end of 2018, there were 210 installed PV systems in Corte Madera according to California Solar Statistics.</p> <p>Calculation assumes annual growth rates of 15% for residential systems and 15% for non-residential systems based on California Distributed Generation Statistics data, which shows countywide growth of 13.2% for residential systems and 19.7% for commercial systems, excluding government facilities. Growth continues at an annual 15% rate and then slows until reaching a 21% market penetration in 2030 (after reaching 20-30% market penetration, studies show that the annual growth rate typically slows until it eventually drops to 4% in a mature market). The estimate of PV to be installed is restricted to installations on existing homes and commercial properties, excluding government facilities.</p>				

Sources	<p>Solar Electric Power Association, "Utility Solar Market Snapshot: Sustained Growth in 2014," May 2015, https://www.solarelectricpower.org/media/322918/solar-market-snapshot-2014.pdf</p> <p>California Distributed Generation Statistics, "NEM Currently Interconnected Data Set," https://www.californiadgstats.ca.gov/downloads/, March 2020.</p> <p>Project Sunroof, https://www.google.com/get/sunroof/data-explorer/place/ChIJRf47R3CahYARV2ndbPAFwMk/, accessed April 20, 2020.</p>
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Calculation

	2020	2030
Estimated residential PV generation, 2018	1,284,358 kWh	1,284,358 kWh
Annual growth rate	15%	15%
Projected residential PV generation	1,698,563 kWh	6,871,634 kWh
Additional residential PV generation	414,205 kWh	5,587,277 kWh
Estimate non-residential PV generation, 2018	1,151,867 kWh	1,151,867 kWh
Annual growth rate	15%	15%
Projected non-residential PV generation	1,523,344 kWh	6,162,775 kWh
Additional non-residential PV generation	371,477 kWh	5,010,908 kWh
Additional electricity produced by distributed PV	785,682 kWh	10,598,185 kWh
GHG emissions reductions	58.1 MTCO ₂ e	783.6 MTCO ₂ e

ENERGY EFFICIENCY

Community Action 1-3

Action	<p>Promote and expand participation in residential and commercial energy efficiency and electrification programs.</p> <ul style="list-style-type: none"> • Work with organizations and agencies such as the Marin Energy Watch Partnership, the Bay Area Regional Network, Resilient Neighborhoods, and the Marin Climate & Energy Partnership to promote and implement energy efficiency programs and actions. • Promote utility, state, and federal rebate and incentive programs. • Participate and promote financing and loan programs for residential and commercial projects such as Property Assessed Clean Energy (PACE) programs and programs provided by utilities and the state. 				
Target	Electricity consumption is reduced an average of 0.6% per year between 2018 and 2030 and natural gas consumption is reduced an average of 0.9% per year between 2018 and 2020.				
Reductions (MTCO ₂ e)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: right; width: 15%;">-322.9</td> <td style="width: 15%;">2020</td> </tr> <tr> <td style="text-align: right;">-1,937.3</td> <td>2030</td> </tr> </table>	-322.9	2020	-1,937.3	2030
-322.9	2020				
-1,937.3	2030				
Methodology	<p>We are forecasting an annual electricity savings of 0.9% and an annual natural gas savings of 0.9% based on the following:</p> <p>The National Action Plan for Energy Efficiency states among its key findings "consistently funded, well-designed programs are cutting annual savings for a given program year of 0.15 to 1 percent of energy sales."</p> <p>The American Council for an Energy-Efficiency Economy (ACEE) reports for states already operating substantial energy efficiency programs, energy efficiency goals of one percent, as a percentage of energy sales, is a reasonable level to target.</p> <p>The Marin Energy Authority's Implementation Plan states "Forecast achievable energy efficiency equal to 1.1 percent of the CCA's forecast energy sales, as indicated in the table above ["Forecast Annualized Energy Efficiency Potential and Program Budgets," page 30] appears to be a reasonable and conservative baseline for the demand-side portion of the CCA's resource plan. these savings would be in addition to the savings achieved by PG&E administered programs."</p> <p>Residential electricity consumption declined 7% between 2005 and 2018 (including electricity generated by distributed PV), or an average of 0.9% per year in Corte Madera. Residential natural gas consumption declined 12% between 2005 and 2018 in Corte Madera, or an average of 0.6 percent per year.</p>				

Sources	<p>Marin Energy Authority, "Revised Community Choice Aggregation Implementation Plan and Statement of Intent," October 4, 2012.</p> <p>National Action Plan for Energy Efficiency, July 2006, Section 6: Energy Efficiency Program Best Practices (pages 5-6).</p> <p>Energy Efficiency Resource Standards: Experience and Recommendations, Steve Nadel, March 2006 ACEEE Report E063 (pages 28-30).</p>
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Calculation

	2020	2030
Residential and commercial electricity use, 2018	59,243,247 kWh	59,243,247 kWh
Less electricity use in government operations	761,880 kWh	761,880
Annual reduction in electricity consumption	0.6%	0.6%
Electricity savings	701,776 kWh	4,210,658 kWh
Residential and commercial natural gas use, 2018	2,843,889 therms	2,843,889 therms
Less natural gas use in government operations	7,880 therms	7,880 therms
Annual reduction in natural gas consumption	0.9%	0.9%
Natural gas savings	51,048 therms	306,289 therms
GHG emissions reductions	322.9 MTCO ₂ e	1,937.3 MTCO ₂ e

ENERGY AUDITS <i>Community Action 1-5</i>					
Objective	Require energy audits for residential and commercial buildings prior to completion of sale.				
General Plan Programs	RCS-2.2a: Energy Conservation and Efficiency. Identify opportunities for creating energy conservation and efficiency programs for application in all Town facilities, schools and local businesses.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">0.0</td> <td>2020</td> </tr> <tr> <td style="padding-right: 20px;">-33.8</td> <td>2030</td> </tr> </table>	0.0	2020	-33.8	2030
0.0	2020				
-33.8	2030				
Methodology	<p>129 housing units sold annually, based on 14-year average for 2005-2018 (Marin County Assessor).</p> <p>Assumes 10% of audited housing units will voluntarily reduce energy use by 10% and that program is implemented in 2021.</p>				
Sources	Marin County Assessor, http://www.marincounty.org/depts/ar/divisions/assessor/sales				

Calculation

	2030
Average household electricity use 2018	5,161 kWh
Average household natural gas use 2018	468 therms
Number of housing units sold annually	129 units
Number of housing units provided energy audits	1,158 units
Percent of participating housing units	10%
Number of housing units implementing energy efficiency projects	116 units
Electricity reduction	10%
Natural gas reduction	10%
Annual electricity savings	59,742 kWh
Natural gas savings	5,422 therms
Electricity emissions reductions	5.0 MTCO ₂ e
Natural gas emissions reductions	28.8 MTCO ₂ e
Total GHG reductions	33.8 MTCO ₂ e

GHG-FREE ELECTRICITY <i>Community Action 1-6</i>	
	Support MCE in its goal to provide 100% GHG-free electricity by 2022.
Reductions (MTCO ₂ e)	2020 -1,369.4 2030 -1,996.9
Methodology	The MCE 2019 Resource Integration Plan states that MCE electricity is projected to be 94% GHG-free in 2020 and 100% GHG-free by 2022. We have conservatively estimated a future GHG emission factor by assuming the remainder will be system power using the current emission factor set by CARB of 929.5 lbs CO ₂ e/MWh. MCE supplied 77.5% of the total electricity load in Corte Madera in 2018 Assumes same percentage of Deep Green electricity as in 2018.
Sources	MCE 2019 Integrated Resource Plan (November 2018). https://www.mcecleanenergy.org/wp-content/uploads/2019/01/MCE-2019-Integrated-Resource-Plan_11-8-2018_v_12-21-18.pdf Personal communication, Justin Kudo, MCE Manager of Account Services, jkudo@marinenergyauthority.org, July 14 and 15, 2016.

Calculation

	2020	2030
Electricity use, BAU	59,408,237 kWh	61,088,141 kWh
Electricity saved through State actions	17,746 kWh	789,342 kWh
Less electricity saved through local energy efficiency and renewable energy actions	1,548,914 kWh	15,142,130 kWh
Net electricity use	57,841,578 kWh	45,156,670 kWh
Projected MCE electricity use (77.5% of total)	44,828,617 kWh	34,997,508 kWh
Electricity emissions w/MCE, BAU	2,558 MTCO ₂ e	1,997 MTCO ₂ e
Electricity emissions w/MCE, BAU	1,188 MTCO ₂ e	0 MTCO ₂ e
GHG emissions reductions	1,369.4 MTCO ₂ e	1,996.9 MTCO ₂ e

BUILDING AND APPLIANCE ELECTRIFICATION

Community Action 1-7

Reductions (MTCO ₂ e)	-3 2020 -31 2030
Targets	9 cooktops, 14 water heaters and 28 heating systems are replaced with electric versions by 2030 through a Building Decarbonization incentive program.
Methodology and Assumptions	Potential number of appliance replacements is based on a Marin County grant application for a Building Decarbonization Pilot Program, which proposes to provide cash rebates for natural gas appliance swap-outs. The pilot program application estimates the following number of replacements during the pilot program period: stoves and cooktops, 20; water heaters, 30; and furnaces and heating systems, 60. We assume 3.8% of the replacements will take place in Corte Madera homes based on Corte Madera's share of countywide households in 2018. We assume the program can grow at an annual rate of 25% with continued rebates and program implementation.
Sources	2009 California Residential Appliance Saturation Study, Volume 2, Page 23. http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF County of Marin, Marin County Building Decarbonization Pilot Program for BAAQMD Climate Protection Grant Application, May 8, 2018.

Calculation

	2020	2030
Estimated annual natural gas use for stoves and cooktops	31 therms	31 therms
Estimated annual natural gas use for water heaters	188 therms	188 therms
Estimated annual natural gas use for space heating and	213 therms	213 therms
Estimated annual electricity use for stoves and cooktops	71 kWh	71 kWh
Estimated annual electricity use for water heaters	1,382 kWh	1,382 kWh
Estimated annual electricity use for space heating and cooling	3,096 kWh	3,096 kWh
% share of county-wide replacements	3.8%	3.8%
Number of units stoves and cooktops replaced	1 units	7 units
Number of units water heaters replaced	1 units	11 units
Number of furnaces and heating systems replaced	2 units	21 units
Natural gas savings	724 therms	6,738 therms
Electricity consumption	8,688 kWh	80,916 kWh
GHG emissions reduction	3 MTCO ₂ e	31 MTCO ₂ e

Public Lighting <i>Government Operations Action 1-9</i>	
Objective	Replace energy-inefficient street, parking lot and other municipal outdoor lights with LED or other energy efficient alternative.
General Plan Programs	RCS-2.2a: Energy Conservation and Efficiency. Identify opportunities for creating energy conservation and efficiency programs for all Town facilities, schools and local businesses.
Reductions (MTCO ₂ e)	<p>0.0 2020: Replace all streetlights with LED lamps.</p> <p>0.0 2030: Replace all streetlights with LED lamps.</p>
Methodology	<p>The Town has performed two pilot projects for LED streetlight conversions. One in 2016 included 6 lights along Paradise Dr. and the second in 2019 for two streetlights near Town Hall. The Town is currently planning a streetlight replacement project for approximately 1/3 of Town’s streetlights in various neighborhoods. The Town expects to retrofit all street lights to LED by 2023.</p> <p>The method used to calculate energy savings was developed by Town staff and the Marin Energy Watch Partnership. We assume 1/3 of streetlights will be retrofitted by the end of 2020 and the remaining streetlights will be retrofitted by 2023.</p> <p>The action does not result in reduced emissions because Corte Madera purchased MCE Deep Green electricity in 2018 for all public lighting. Action 1-13 assumes that the Town will continue to purchase MCE Deep Green electricity.</p>
Sources	Dana Armanino, Senior Planner, Marin County Community Development Agency

Calculation

	2020	2030
Reduction in annual energy use (kWh)	54,166	162,497
Reduction in electricity emissions (MTCO ₂ e)	0.0	0.0

MUNICIPAL ENERGY EFFICIENCY

Government Operations Action 1-10

Objective	Implement energy efficiency retrofits as indicated in the 2015 audit of Town facilities by the Marin County Energy Watch partnership. Leverage programs that provide rebates and advantageous financing.
Reductions (MTCO ₂ e)	<p>-0.5 2020: Implement identified projects</p> <p>-5.6 2030: Implement identified projects</p>
General Plan Programs	<p>RCS-2.2a: Energy Conservation and Efficiency. Identify opportunities for creating energy conservation and efficiency programs for application on all Town facilities, schools and local businesses.</p> <p>RCS-2.2.g: Conduct Energy Audits. Continue to conduct energy audits of Town facilities, and implement energy efficiency recommendations from those audits. Seek funding from available state sources and grant opportunities, as well as the CIP.</p>
Methodology	<p>This measure requires the Town to complete identified lighting efficiency and HVAC upgrade projects.</p> <ol style="list-style-type: none"> 1. Town Hall and Firehouse Lighting Retrofit (10,341 kWh) 2. Firehouse 14 Lighting Retrofit (6,645 kWh) 3. Town Hall Furnace Replacement (224 therms) 4. Town Hall HVAC Replacement (2,896 kWh) 5. Water Heater Replacement for Town Hall, both Firehouses and Community Center - 9 total (821 therms) <p>As of November 2019, one water heater at Fire Station #13 had been replaced. We assume all projects will be completed by 2030.</p> <p>The action does not result in reduced electricity emissions because Corte Madera purchased MCE Deep Green electricity in 2018 for all facilities. Action 1-13 assumes that the Town will continue to purchase MCE Deep Green electricity.</p>
Sources	<p>SmartLights Customer Reports for the Corte Madera Fire Department and Town Hall, September 10, 2015.</p> <p>Dana Armanino, Senior Planner, Marin County Community Development Agency</p>

Calculation

	2020	2030
Annual electricity savings (kWh)	0	19,882
Annual natural gas savings (therms)	91	1,045
GHG emissions reductions	0.5	5.6

ENERGY EFFICIENCY PROTOCOLS AND EQUIPMENT <i>Government Operations Action 1-11</i>	
Objective	Implement energy management software and energy efficiency protocols such as turning off lights and computers, thermostat control, etc. Implement a sustainable purchasing policy that emphasizes recycled materials and Energy Star equipment.
General Plan Programs	RCS-2-2.d: Energy Efficient Models. Require energy-efficient models for all new Town equipment purchases. RCS-2-2.e: Energy Efficient Town Facilities. Manage Town facilities in the most energy efficient manner feasible.
Reductions (MTCO ₂ e)	-2.1 2020 -2.1 2030
Methodology	Energy management software is proven to reduce energy consumption by 10% through identifying inefficiencies within operations. 5% reduction in energy use for miscellaneous behavioral changes by staff and mechanical operations, and upgrading to Energy Star equipment was assumed. The action does not result in reduced electricity emissions because Corte Madera purchased MCE Deep Green electricity in 2018 for all facilities. Action 1-13 assumes that the Town will continue to purchase MCE Deep Green electricity.
Sources	Dana Armanino, Senior Planner, Marin County Community Development Agency

Calculation

	2020	2030
Electricity use in municipal buildings (kWh)	319,549	319,549
Natural gas use in municipal buildings (therms)	7,880	7,880
Percent reduction in energy use	5%	5%
Annual natural gas savings (therms)	394	394
Annual electricity savings (kWh)	15,977	15,977
GHG emissions reductions	2.1	2.1

MUNICIPAL SOLAR ENERGY <i>Government Operations Action 1-12</i>					
Objective	Install cost-effective solar PV systems on all buildings and facilities.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="text-align: right;">0.0</td> <td>2020</td> </tr> <tr> <td style="text-align: right;">0.0</td> <td>2030</td> </tr> </table>	0.0	2020	0.0	2030
0.0	2020				
0.0	2030				
General Plan Programs	RCS-2.4.a: Use Alternative Energy Systems. Increase the use of renewable energy when retrofitting or constructing new Town facilities or when purchasing new equipment, provided they meet all public, safety, health, and design requirements and are proven to be reliable. Use renewable energy systems where they are cost effective. Analysis and consideration of payback time periods and future financial savings shall be included in the review of cost effectiveness.				
Methodology	<p>There are four potential sites for solar PV on municipal buildings.</p> <ol style="list-style-type: none"> 1. 32 kW system at Firehouse 14 2. 30 kW DC system at Community Center 3. 18 kW DC system at Corp Yard 4. 15 kW DC system at Firehouse 13 <p>The action does not result in reduced emissions because Corte Madera purchased MCE Deep Green electricity in 2018 for all facilities. Action 1-13 assumes that the Town will continue to purchase MCE Deep Green electricity.</p>				
Sources	Dana Armanino, Senior Planner, Marin County Community Development Agency				

Calculation

	2030
kWh generated by renewable energy systems	128,910
GHG emissions reductions	0.0

MUNICIPAL 100% RENEWABLE ELECTRICITY <i>Government Operations Action 1-14</i>	
Related CAP Program	Continue to purchase Marin Clean Energy 100% renewable energy ("Deep Green") for all facilities.
Reductions (MTCO ₂ e)	
0.0	2020
0.0	2030
Methodology	<p>Purchase remaining electricity from renewable sources (e.g., MCE).</p> <p>The action does not result in reduced emissions because Corte Madera purchased MCE Deep Green electricity in 2018 for all facilities.</p>
Sources	

Calculation

	2020	2030
Government operations electricity consumption in 2018 (kWh)	761,880	761,880
Electricity emissions reduced through other measures (kWh)	70,143	327,266
Remaining electricity to be offset with Deep Green (kWh)	691,737	434,614
Reduction in GHG emissions (MTCO ₂ e)	0.0	0.0

BICYCLE AND PEDESTRIAN TRANSPORTATION

Community Action 2-1

Action	<p>Promote walking through design standards and amenities that concentrate uses, reduce the need for vehicular travel, improve safety, and enhance the pedestrian experience. Construct bike facilities as adopted in Town's Bicycle Master Plan and as required by Complete Streets policies. Establish parking policies and development requirements to increase use of walking and bicycling. Requirements for new commercial and multi-family development could include sidewalks, bike racks, lockers and showers. Ensure new development provides connection and orientation to pedestrian and bicycle paths and existing transit facilities.</p>
General Plan Programs	<p>RCS-2.5.c: Programs to Reduce Fossil Fuel Based Transportation. Support municipal and community programs aimed at reducing fossil fuel based transportation. Programs should include alternatives such as employee carpooling, transit, walking and biking.</p>
<p>Reductions (MTCO₂e)</p> <p style="text-align: right;">-154.3</p> <p style="text-align: right;">-416.8</p>	<p>2020</p> <p>2030</p>
Methodology	<p>Studies cited by CAPCOA show pedestrian network improvements can reduce VMT 1-2% (CAPCOA SDT-1). We apply this to passenger vehicle trips that start and end in the unincorporated communities and assume a 1% reduction for 2020 and 2% for 2030.</p> <p>Studies cited by CAPCOA show each additional mile of bike lanes per square mile increases the share of workers commuting by bicycle by 1% (CAPCOA SDT-5). We have applied this to the following population segments:</p> <ul style="list-style-type: none"> • Live in/work in area • Live in/work out of area • Live in area/non-worker • Live out of area/work in area <p>The Town's Bicycle Master Plan identifies 3.94 miles of proposed Class I bike facilities and 1.84 miles of proposed Class II facilities.</p>

Sources	<p>Bay Area Air Quality Management District Vehicle Miles Traveled Dataportal, http://capvmt.us-west-2.elasticbeanstalk.com/data.</p> <p>California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.</p> <p>Town of Corte Madera Bicycle/Pedestrian Plan, prepared by Alta Planning + Design, 2016.</p>
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Calculation

	2020	2030
<i>Pedestrian Improvements</i>		
Passenger vehicle trips starting and ending in Corte Madera	3,104,586	3,112,360
% decrease in VMT due to pedestrian improvements	1.0%	2.0%
Annual decrease in VMT	31,046	62,247
GHG emissions reductions	11	22
<i>Bicycle Improvements</i>		
VMT generated by targeted population segments	60,126,878	63,453,724
Miles of new Class I bike lanes	0.23	1.26
Miles of new Class II bike lanes	1.61	3.54
Total miles new bike lanes	1.84	4.80
New bike lanes per square mile	0.69	1.80
Reduction in local VMT	415,038	1,142,613
Emissions reductions	143.6	395.3

EMPLOYEE TRIP REDUCTION <i>Community Action 2-2</i>					
Program Description	Work with the Transportation Authority of Marin, 511.org, and major employers to create and utilize transportation demand management (TDM) programs to encourage employees to walk, bike, carpool or take transit to work.				
General Plan Programs	RCS-2.5.c: Programs to Reduce Fossil Fuel Based Transportation. Support municipal and community programs aimed at reducing fossil fuel based transportation. Programs should include alternatives such as employee carpooling, transit, walking and biking.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">-141.0</td> <td>2020</td> </tr> <tr> <td>-223.4</td> <td>2030</td> </tr> </table>	-141.0	2020	-223.4	2030
-141.0	2020				
-223.4	2030				
Methodology	<p>The Transportation Authority of Marin provides several employee commute programs including Emergency Ride Home, Vanpool Incentive, Telework Initiative, Safe Routes to School, School Pool, and a dynamic rideshare pilot program (Carma smartphone application). SB 1339 requires employers with 50 or more employees within the Bay Area Air Quality Management District's geographic boundaries to offer their employees specific alternative commute incentives, including the option to pay for their transit or vanpooling with pre-tax dollars, a subsidy to reduce or cover the employee's transit or vanpool costs, or free or low-cost bus, shuttle or vanpool service operated by or for the employer.</p> <p>CAPCOA Measure TRT-1. Assuming a suburban center and 100% of employees are eligible for incentives, VMT reduction is 5.4%. Measure assumes the employer support program will include carpooling, ride-matching, preferential carpool parking, flexible work schedules for carpools, vanpool assistance, bicycle parking, showers, and locker facilities.</p> <p>An estimated 7.8% of people work at home (American Community Survey, 2009-2013 Five-year estimates)</p>				
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.				

Calculation

	2020	2030
Total employment	6,660	6,945
Work at home	521	567
Town of Corte Madera employees	47	47
Percent employees targeted	50%	75%
Number employees targeted	3,046	4,748
Rate of participation in TDM programs	5.4%	5.4%
Average daily VMT for Corte Madera worker	10.3 miles	10.5 miles
Estimated annual VMT	7,550,117 miles	11,959,449 miles
Annual decrease in VMT	407,706 miles	645,810 miles
GHG emissions reductions	141 MTCO ₂ e	223 MTCO ₂ e

PUBLIC TRANSIT <i>Community Action 2-3</i>					
Action	Work with transit providers to plan, fund and implement additional transit services that are cost-effective and responsive to existing and future transit demand.				
General Plan Programs	RCS-2.5.c: Programs to Reduce Fossil Fuel Based Transportation. Support municipal and community programs aimed at reducing fossil fuel based transportation. Programs should include alternatives such as employee carpooling, transit, walking and biking.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">-102.7</td> <td>2020</td> </tr> <tr> <td>-238.2</td> <td>2035</td> </tr> </table>	-102.7	2020	-238.2	2035
-102.7	2020				
-238.2	2035				
Methodology	<p>Marin Transit reports 3,674,440 revenue miles in FY 18/19 and 31.7% of those miles within unincorporated areas. Golden Gate Transit reports 3,467,056 revenue miles in FY 18/19 and 17.5% of those miles in unincorporated areas. Marin Transit's Draft Fixed Route Vehicle Replacement Plan indicates 3% of its fleet will be comprised of zero emission buses in 2020 and 33% of its fleet will be zero emission by 2030. In 2019, 72% of its buses were using renewable diesel and 3% of the fixed route buses were zero emission. Marin Transit and Golden Gate Transit have been using renewable diesel since 2016. We assume 3% of buses will be zero emissions and 97% of VMT will be driven by buses using renewable diesel in 2020 and 33% will be driven by electric buses utilizing MCE electricity by 2030.</p> <p>CARB adopted the Innovative Clean Transit (ICT) Rule in December 2018. This rule outlines a transition of California transit agencies to a zero emission fleet by 2040. 100% of transit agencies' bus purchases must be zero emission beginning in 2029. Marin Transit's Draft Fixed Route Vehicle Replacement Plan (2019) identifies purchases that will achieve the ICT zero emission fleet mandate in 2040. As of October 2019, Golden Gate Transit had not yet developed a transition plan.</p>				
Sources	<p>Marin Transit Board of Directors Staff Report, April 1, 2019</p> <p>Personal communication with Keith Nunn, Director of Maintenance, Golden Gate Transit, Oct. 22, 2019.</p> <p>Personal communication with Anna Penoyar, Senior Capital Analyst, Marin Transit, Oct. 22, 2019.</p>				

Calculation

	2020	2030
Transt miles, BAU	463,031 miles	463,031 miles
Emissions BAU	541 MTCO ₂ e	541 MTCO ₂ e
Renwable Diesel VMT	97%	67%
Electric bus VMT	3%	33%
Tailpipe emissions	438 MTCO ₂ e	302 MTCO ₂ e
GHG emissions reductions	103 MTCO ₂ e	238 MTCO ₂ e

SCHOOL TRANSPORTATION <i>Community Action 2-4</i>					
Action	Construct pedestrian and bicycle facilities and safety improvements for school routes. Work with the Transportation Authority of Marin to encourage walking school buses, bike trains, and other programs to encourage walking, biking and carpooling to school.				
General Plan Programs	RCS-2.5.c: Programs to Reduce Fossil Fuel Based Transportation. Support municipal and community programs aimed at reducing fossil fuel based transportation. Programs should include alternatives such as employee carpooling, transit, walking and biking.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="text-align: right;">-39.3</td> <td>2020</td> </tr> <tr> <td style="text-align: right;">-39.8</td> <td>2030</td> </tr> </table>	-39.3	2020	-39.8	2030
-39.3	2020				
-39.8	2030				
Methodology	<p>Average trip length was determined by modeling trip lengths to Corte Madera schools.</p> <p>Estimated 1,755 Corte Madera students enrolled in local schools in 2010. 180 days in a school year.</p> <p>To demonstrate the benefits of providing Safe Routes to Schools, the Marin County Bicycle Coalition recruited nine pilot schools in four different geographic locations. Initial surveys reported that 62% of the students were arriving by car, with only 14% walking, 7% biking to school, 11% carpool, and 6% arriving by bus. Every school in the pilot program held periodic Walk and Bike to School Days and participated in the Frequent Rider Miles contest, which rewarded children who came to school walking, biking, by carpool or bus.</p> <p>At the end of the pilot program, the participating schools experienced a 57% increase in the number of children walking and biking and a 29% decrease in the number of children arriving alone in a car.</p>				
Sources	<p>Trip lengths modeled with Google Maps, maps.google.com.</p> <p>2010 U.S. Census, Summary File 1</p> <p>Safe Routes to School Marin County, http://www.saferoutestoschools.org/history.html#success</p>				

Calculation

	2020	2030
Average trip length	1.0 miles	1.0 miles
Number of students in Corte Madera schools	1,757 students	1,777 students
Number students estimated to drive to school	1,089 students	1,102 students
Potential decrease in students driving to school	316 students	320 students
VMT avoided	113,734 VMT	115,043 VMT
Emissions reductions	39.3 MTCO ₂ e	39.8 MTCO ₂ e

ELECTRIC VEHICLES

Community Action 2-5

Action	Install electric vehicle charging stations in public parking lots/areas. Require new commercial and multi-family development to provide electric vehicle charging stations. Require new residential development to provide electrical service for potential electric vehicle use.
Reductions (MTCO ₂ e)	Implementation options: 2020 2030
-180.3	
-5,971.7	
Methodology	<p>Marin has approximately 1.5% of all ZEVs in California (DMV, 1-1-19) and 197,609 automobiles registered in the County (DMV, 2019). CARB's proposed strategy is to put 4.2 million ZEVs on the road by 2030, which is approximately 14% of light duty vehicles in California in 2030. In January 2018, Governor Jerry Brown issued Executive Order B-48-18 set a new goal of having a total of 5 million ZEVs in California in 2030.</p> <p>At the end of 2018, DMV reports there were 4,309 battery EVs, 2,747 plug-in hybrid EVs, and 60 fuel cell vehicles, for a total of 7,116 ZEVs in Marin County. We assume the same percentage of EVs in 2020 and 2030: 61% battery EVs and 39% plug-in hybrids.</p> <p>In October 2018, DMV reports there were 142 battery EVs and 87 plug-in hybrid EVs registered to Corte Madera residents.</p> <p>74% of the distance PHEVs drive is electric (Smart et al, 2014).</p> <p>EV kWh/mile is 0.32 (US Dept of Energy).</p> <p>Assuming the same share of ZEV ownership in 2030 as in 2019 (1.5%) means there would be approximately 75,000 ZEVs registered in Marin by 2030, or approximately 37% of existing automobile registrations. We conservatively assume 50,000 ZEVs in Marin in 2030, or 25% of ZEVs registered in Marin. This would require an average annual growth rate of 19%. Electric vehicle sales in California grew by 20% in 2016, followed by 29% growth in 2017 (ICCT, 2018). The number of ZEVs grew 33% in Marin between 2018 and 2019. This data suggests that an annual growth rate of 19% is reasonable, especially as the number of models expands and battery technology and charging improves.</p> <p>According to the Department of Energy, towns (population 2,500 to 50,000) need 54 public EV plugs per 1,000 PEVs, which would equal about 2,706 public EV plugs countywide for 50,100 PEVs. The analysis assumes 88% of EV charging is done at home.</p>

Sources	<p>California Air Resources Board, 2017 Scoping Plan.</p> <p>Smart, J., Bradley, T., and Salisbury, S., "Actual Versus Estimated Utility Factor of a Large Set of Privately Owned Chevrolet Volts," SAE Int. J. Alt. Power. 3(1):2014, doi:10.4271/2014-01-1803.</p> <p>U.S. Department of Energy, Alternative Fuels Data Center, https://www.afdc.energy.gov/vehicles/electric_emissions_sources.html. Sales weighted average of 2016 model year vehicles with sales in 2015: 2015 sales from "U.S. Plug-in Electric Vehicle Sales by Model" (https://www.afdc.energy.gov/data/vehicles.html); MPGs from 2016 Fuel Economy Guide (https://www.fueleconomy.gov/feg/)</p> <p>The International Council on Clean Transportation, "California's continued electric vehicle market development," May 2018, https://www.theicct.org/sites/default/files/publications/CA-cityEV-Briefing-20180507.pdf.</p> <p>US Department of Energy, "National Plug-In Electric Vehicle Infrastructure Analysis," September 2017. https://www.nrel.gov/docs/fy17osti/69031.pdf</p> <p>Bay Area Air Quality Management District, Vehicle Miles Dataportal, http://capvmt.us-west-2.elasticbeanstalk.com/, accessed 11/13/19.</p> <p>California Department of Transportation, "California County-Level Economic Forecast 2018-2050," September 2018.</p> <p>California Department of Motor Vehicles, "Estimated Vehicles Registered by County for the Period January 1 through December 31, 2018" and "Fuel Type by County as of 1/1/2019."</p> <p>Personal communication with Derek McGill, Planning Manager, Transportation Authority of Marin, dmcgill@tam.ca.gov, August 22, 2018.</p>
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Calculation

	2020	2030
Number of registered Marin ZEVs in 2018	7,116	7,116
Projected number of registered passenger vehicles in Marin	197,705	199,141
Percent of Marin ZEVs in target year	4%	25%
Number of Marin ZEVs in target year	8,500	50,000
Increase in ZEVs	1,384	42,884
Additional ZEVs as a percent of Marin vehicles	0.7%	21.5%
Corte Madera passenger VMT	115,067,020 miles	122,182,549 miles
VMT from non-Marin workers and visitors	30,859,347 miles	33,378,104 miles
Corte Madera passenger VMT from Marin-based vehicles	84,207,673 miles	88,804,445 miles
VMT from additional ZEVs	589,481 miles	19,123,585 miles
VMT driven with electricity	541,969 miles	17,582,224 miles
Emissions without EV program	204 MTCO _{2e}	6,615 MTCO _{2e}
Tailpipe emissions reduction with EV program	187 MTCO _{2e}	6,082 MTCO _{2e}
Electricity used by ZEVs	173,430 kWh	5,626,312 kWh
Electricity emissions from ZEVs	7 MTCO _{2e}	110 MTCO _{2e}
Emissions reduction	180 MTCO _{2e}	5,972 MTCO _{2e}

HIGH-EFFICIENCY TOWN VEHICLES <i>Community Action 2-6</i>	
Action	Purchase or lease low or zero-emissions vehicles and the most fuel efficient models possible for the Town fleet, including construction vehicles.
General Plan Programs	RCS-2.5.a: Vehicle Program. Create and implement a Town vehicle green fleet program that includes the purchase of fuel-efficient and alternative-fuel vehicles, to be implemented in a timely manner.
Reductions (MTCO ₂ e)	Implementation options: -3.5 2020 -3.5 2030
Methodology	Assumes vehicles with an average of fuel economy of 20 MPG are replaced with hybrid vehicles with a fuel economy of 45 MPG. Assumes vehicles travel an average of 3,600 miles annually based on 2010 GHG Inventory. Emissions reduction calculated for CO ₂ only since N ₂ O and CH ₄ emissions are dependent on VMT and VMT is unaffected.
Sources	www.fueleconomy.gov

Calculation

	2020	2030
Annual mileage per vehicle	3,600 VMT	3,600 VMT
Annual fuel use per vehicle at 20 MPG fuel economy	180 gallons	180 gallons
Annual fuel use per vehicle at 45 MPG fuel economy	80 gallons	80 gallons
Annual fuel saved per car replaced	100 gallons	100 gallons
Annual emissions reduced per vehicle	0.9 MTCO ₂	0.9 MTCO ₂
Number of vehicles replaced with hybrid vehicles	4 vehicles	4 vehicles
Emissions reductions	3.5 MTCO ₂ e	3.5 MTCO ₂ e

TOWN EMPLOYEE COMMUTE <i>Government Operations Action 2-7</i>					
Action	Continue to provide Town employees with incentives to use alternatives to single occupant vehicles including flexible schedules, transit incentives, bicycle facilities, ridesharing services and subsidies, and telecommuting when practical.				
General Plan Programs	RCS-2.5.c: Programs to Reduce Fossil Fuel Based Transportation. Support municipal and community programs aimed at reducing fossil fuel based transportation. Programs should include alternatives such as employee carpooling, transit, walking and biking.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="text-align: right;">-6.7</td> <td>2020</td> </tr> <tr> <td style="text-align: right;">-5.2</td> <td>2030</td> </tr> </table>	-6.7	2020	-5.2	2030
-6.7	2020				
-5.2	2030				
Methodology	CAPCOA Measure TRT-1. Assuming a suburban center and 100% of employees are eligible for incentives, VMT reduction is 5.4%.				
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.				

Calculation

	2020	2030
Employee commute VMT, BAU	311,675	311,675
Reduction in VMT	5.4%	5.4%
VMT avoided	16,830	16,830
Emissions reduction (MTCO ₂ e)	6.7	5.2

ZERO WASTE <i>Community Action 3-1</i>	
Action	Divert 75% of organic waste from the landfill from 2014 levels.
General Plan Programs	<p>RCS-4.1.a: Reduction of Waste. Work with Marin County’s MRRRA and Office of Waste Management in distributing recycling and related educational information to businesses in order to reduce commercial and industrial wastes.</p> <p>RCS-4.1.b: Recycling Receptacles. Include provisions in the Zoning Ordinance to allow for placement of recycling receptacles at public, multi-family residential, commercial, office and industrial use locations.</p> <p>RCS-4.2.a: Recycling for Existing Uses. Work with the Town’s refuse collection provider and Marin County in continuing to provide Town-wide recycling and waste reduction services to existing residences, schools and businesses, as well as increasing participation in composting and recycling programs for technology waste, hazardous waste, and green waste.</p> <p>RCS-4.2.b: Recycling for Future Uses. Cooperate with the Town’s refuse collection provider and Marin County to provide for future Town-wide programs to promote waste reduction and recycling. Program development shall include innovative recycling options for future waste disposal and recycling as patterns and needs of consumption and waste generation change. Evaluate the Town’s waste and solid waste management and recycling every two years to ensure that the City is taking every possible action to provide adequate and appropriate waste reduction and recycling services.</p>
Reductions (MTCO ₂ e) -2,143.7	2030

Methodology	<p>Marin County Hazardous and Solid Waste JPA's goal is to achieve "zero waste" by 2025. The County's Zero Waste goal and programs are in support of the following State legislation:</p> <p>AB 1826. Passed in 2014, AB 1826 requires businesses to recycle their organic waste, depending on the amount of waste they generate per week. Organic waste means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste. The law phases in mandatory recycling of commercial organics over time. In 2017, businesses that generate 4 cubic yards of organic waste per week were required to arrange for organic waste recycling services and divert all organic waste they produce. In 2019, the law extended to businesses that generate 4 cubic yards or more of commercial solid waste. The State law is intended to reduce statewide disposal of organic waste by 50% by 2020. If that target is not met, the law will be extended to cover businesses that generate 2 cubic yards or more of commercial solid waste.</p> <p>SB 1383. Passed in 2016, SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025. In 2022, CalRecycle may begin to issue penalties for non-compliance. On January 1, 2024, the regulations may require local jurisdictions to impose penalties for noncompliance on regulated entities subject to their authority.</p> <p>CALGreen. The State's Green Building Code (CALGreen) requires residential and non-residential development projects to recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste.</p> <p>We assume a 75% reduction in organic waste from 2014 levels by 2030.</p>
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Calculation

	2030
Waste emissions less government waste, 2014	1,742.9 MTCO ₂ e
Percent organic waste diverted from landfill	75 %
Targeted waste emissions	435.7 MTCO ₂ e
Waste emissions less government waste, 2018	2,579.5 MTCO ₂ e
GHG emissions reduction	2,143.7 MTCO ₂ e

MUNICIPAL ZERO WASTE <i>Government Operations Action 3-2</i>	
Action	Government policy to achieve 86% diversion in Town operations by 2020 and 94% by 2030.
General Plan Programs	See programs identified for Action 3-1.
Reductions (MTCO ₂ e)	2020 2030
	-12.7 -190.6
Methodology	Targeted organic waste diversion is assumed to be 5% by 2020 and 75% by 2030, consistent with State goals.
Sources	

Calculation

	2020	2030
Waste emissions BAU less government waste	254.1 MTCO ₂ e	254.1 MTCO ₂ e
Percent organic waste diverted from landfill	5 %	75 %
GHG emissions reduction	12.7 MTCO ₂ e	190.6 MTCO ₂ e

INDOOR WATER EFFICIENCY AND CONSERVATION <i>Community Action 4-1</i>					
Action	Promote existing and/or new rebates for water efficient appliances and fixtures.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">-0.1</td> <td>2020</td> </tr> <tr> <td>-0.9</td> <td>2030</td> </tr> </table>	-0.1	2020	-0.9	2030
-0.1	2020				
-0.9	2030				
Methodology	<p>Per capita water use declined from 142 gallons per capita per day (gpcd) in 2005 to 110 gpcd in 2018, a reduction of 23% or 1.7% per year. We conservatively assume an annual reduction rate of 1%.</p> <p>67% of water consumption is for indoor use. Calculation reflects emissions avoided for treating and transporting potable water by MMWD.</p>				
Sources	<p>Marin Climate and Energy Partnership, "Town of Corte Madera Greenhouse Gas Inventory for Community Emissions for the Year 2018," April 2020.</p> <p>Personal communication with Dan Carney, MMWD.</p>				

Calculation

	2020	2030
Water consumption, 2018	402 MG	402 MG
Indoor water consumption	269 MG	269 MG
Annual water reduction	1%	1%
Indoor water consumption reduction	5 MG	32 MG
GHG emissions reduction	0.1 MTCO ₂ e	0.9 MTCO ₂ e

OUTDOOR WATER EFFICIENCY AND CONSERVATION

Community Action 4-2

Action	Promote existing and/or new rebates and support existing landscape efficiency requirements.
Reductions (MTCO ₂ e)	2020 2030
	-0.1 -0.4
Methodology	Per capita water use declined from 142 gallons per capita per day (gpcd) in 2005 to 110 gpcd in 2018, a reduction of 23% or 1.7% per year. We conservatively assume an annual reduction rate of 1%. 33% of water consumption is for outdoor use. Calculation reflects emissions avoided for treating and transporting potable water by MMWD.
Sources	Marin Climate and Energy Partnership, "Town of Corte Madera Greenhouse Gas Inventory for Community Emissions for the Year 2018," April 2020. Personal communication with Dan Carney, Water Conservation Manager, MMWD.

Calculation

	2020	2030
Water consumption, 2018	402 MG	402 MG
Outdoor water consumption	133 MG	133 MG
Annual water reduction	1%	1%
Indoor water consumption reduction	3 MG	16 MG
GHG emissions reduction	0.1 MTCO ₂ e	0.4 MTCO ₂ e

RAINWATER CATCHMENT <i>Community Action 4-3</i>					
Action	Encourage cisterns and other water storage facilities.				
Reductions (MTCO ₂ e)	<table border="1"> <tr> <td>0.00</td> <td>2020</td> </tr> <tr> <td>0.00</td> <td>2030</td> </tr> </table>	0.00	2020	0.00	2030
0.00	2020				
0.00	2030				
Methodology	Rainwater cisterns vary in size from 50 gallon barrels to 15,000+ gallon storage tanks. This analysis assumes an average 500 gallons of storage per tank, and tanks that are emptied twice per year.				
Sources					

Calculation

	2020	2030
Average rainwater storage capacity per tank	500 gallons	500 gallons
Number of tanks installed	5	100
Water saved	2,500 gallons	50,000 gallons
Avoided GHG emissions per year	0.0 MTCO ₂ e	0.0 MTCO ₂ e

GREYWATER <i>Community Action 4-4</i>					
Action	Encourage greywater systems.				
General Plan Programs	RCS-2.2.c: Public Facilities Conservation. Strongly encourage the use of recycled water and drought-resistant landscaping in Town facilities, public roadway landscape, and in new development.				
Reductions (MTCO ₂ e)	<table border="0"> <tr> <td style="padding-right: 20px;">0.0</td> <td>2020</td> </tr> <tr> <td>-0.1</td> <td>2030</td> </tr> </table>	0.0	2020	-0.1	2030
0.0	2020				
-0.1	2030				
Methodology	CAPCOA Measure WSW-2 used for estimating greywater generation. Assumes 25 gallons generated per residential occupant per day from showers, bathtubs, and wash basins and 15 gallons per occupant per day from laundry machines. Greywater assumed to be used for landscape irrigation for the typical irrigation season of May through October.				
Sources	<p>California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.</p> <p>MMWD potable water production for 2010 provided by Nancy Gibbs, MMWD Business Systems Analyst.</p> <p>California Energy Commission, "Refining Estimates of Water-Related Energy Use in California," December 2006.</p>				

Calculation

	2020	2030
Greywater generation per residential occupant per day	40 gallons	40 gallons
Greywater generation per household per year available for irrigation	17,155 gallons	17,301 gallons
Number of households installing greywater systems	10	200
Gallons of water saved per year	171,550 gallons	3,460,200 gallons
Avoided GHG emissions per year	0.0 MTCO ₂ e	0.1 MTCO ₂ e

MUNICIPAL WATER CONSERVATION <i>Government Operations Action 4-5</i>					
Action	Reduce water use by 20% by installing water-efficient fixtures, reducing outdoor water requirements, and modifying behavior.				
General Plan Programs	RCS-2.2.b: Water Conservation. Institute a water conservation program for all Town facilities, to include the installation of waterless urinals and low-flow toilets, sinks and showers. Include funding for these improvements in the CIP. RCS-2.2.c: Public Facilities Conservation. Strongly encourage the use of recycled water and drought-resistant landscaping in Town facilities, public roadway landscape, and in new development.				
Reductions (MTCO ₂ e)	<table border="1"> <tr> <td>0.00</td> <td>2020</td> </tr> <tr> <td>0.00</td> <td>2030</td> </tr> </table>	0.00	2020	0.00	2030
0.00	2020				
0.00	2030				
Methodology	Reduction in indoor water use is based on the following: Installing all low-flow water fixtures can reduce indoor non-residential water use by 17-31% (CAPCOA Measure WUW-1). Calculation includes emissions avoided for treating and transporting potable water by MMWD.				
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.				

Calculation

	2030
Municipal water use	198,211 gallons
Water use reduction	20%
Reduction in water use	39,642 gallons
GHG emissions reduction	0.00 MTCO ₂ e

TREE PLANTING ON PRIVATE LAND <i>Community Action 5-1</i>	
Action	Require new development to plant trees and limit tree removal in order to achieve net new tree planting.
Reductions (MTCO ₂ e)	2020 2030
	-8.9 -26.6
Methodology	Sequestration: CAPCOA Measure V-1. Assumed default annual sequestration rate of .0354 MTCO ₂ accumulation per tree per year and an active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death.
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.

Calculation

	2020	2030
Annual sequestration rate per tree	0.0354 MTCO ₂	0.0354 MTCO ₂
Number of net new trees planted each year	50	50
Number of years	5	15
Number of trees planted over period in active growing stage in inventory year	250	750
GHG emissions reduction from sequestration	8.9 MTCO ₂ e	26.6 MTCO ₂ e

TREE PLANTING ON PUBLIC LAND <i>Government Operations Action 5-2</i>	
Action	Implement a tree planting program that increases tree cover by 10 new trees per year.
Reductions (MTCO ₂ e)	
-1.8	2020
-5.3	2030
Methodology	Sequestration: CAPCOA Measure V-1. Assumed default annual sequestration rate of .0354 MTCO ₂ accumulation per tree per year and an active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death.
Sources	California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.

Calculation

	2020	2030
Annual sequestration rate per tree	0.0354 MTCO ₂	0.0354 MTCO ₂
Number of net new trees planted each year	10	10
Number of years	5	15
Number of trees planted over period in active growing stage in inventory year	50	150
GHG emissions reduction from sequestration	1.8 MTCO ₂ e	5.3 MTCO ₂ e

RENEWABLE PORTFOLIO STANDARD

State Action

Program Description	Established in 2002 in Senate Bill 1078, the Renewable Portfolio Standard program requires electricity providers to increase the portion of energy that comes from eligible renewable sources, including solar, wind, small hydroelectric, geothermal, biomass and biowaste, to 20 percent by 2010 and to 33 percent by 2020. Senate Bill 350, passed in September of 2015, increases the renewable requirement to 50 percent by the end of 2030. Senate Bill 100, passed in September 2018, accelerated the RPS standard to 60 percent by 2030 and zero-carbon by 2045.
Reductions (MTCO ₂ e) -198.3 -426.0	2020 2030
Methodology	<p>This State Action assumes PG&E and Direct Access entities will meet the Renewable Portfolio Standard requirements and that these entities will carry the same share of the community's electricity load as in 2016. GHG reductions related to MCE's GHG reduction policies are quantified separately as a local action.</p> <p>California Public Utilities Code Section 454.52 requires each load-serving entity to procure at least 50 percent eligible renewable energy resources by 2030 and to meet the economywide reductions of 40% below 1990 levels by 2030.</p> <p>The CPUC calculator version 3c provides projected emission factors for 2020. That number is higher than PG&E's 2018 emission factor. We therefore assume the same 2018 PG&E emission factor for 2020. For 2030, the CPUC has set electric sector GHG reductions at a level that represents a 50% reduction from 2015 levels. We therefore apply a 50% reduction to PG&E and DA 2015 emission factors to forecast 2030 emission factors.</p>
Sources	<p>GHG Calculator, version 3c_Oct2010.</p> <p>PG&E, "Greenhouse Gas Emission Factors: Guidance for PG&E Customers," November 2015, https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf</p> <p>California Public Utilities Commission "CPUC Adopts Groundbreaking Path to Reduce Greenhouse Gases in Electric Sector," Press Release Docket #: R.16-02-007, Feb. 8, 2018.</p>

Calculation

	2020	2030
Electricity use, BAU	59,408,237 kWh	61,088,141 kWh
Electricity saved through local actions	1,548,914 kWh	15,142,130 kWh
Net electricity use (PG&E)	8,730,720 kWh	6,933,053 kWh
Net electricity use (DA)	4,286,233 kWh	3,403,692 kWh
Electricity emissions, BAU	1,961 MTCO ₂ e	1,557 MTCO ₂ e
Electricity emissions w/RPS	1,763 MTCO ₂ e	1,131 MTCO ₂ e
GHG emission reductions	198.3 MTCO ₂ e	426.0 MTCO ₂ e

Title 24 <i>State Action</i>	
<p>Reductions (MTCO₂e)</p> <p style="text-align: right;">-7.6</p> <p style="text-align: right;">-175.5</p>	<p>Implementation action:</p> <p>2020: Implement Title 24 and subsequent building standards updates that ultimately achieve zero net energy use for new residential and non-residential construction.</p> <p>2030: Implement Title 24 and subsequent building standards updates that ultimately achieve zero net energy use for new residential and non-residential construction.</p>
<p>Methodology</p>	<p>The California Energy Commission's 2007 Integrated Policy Report established the goal that new building standards achieve "net zero energy" levels by 2020 for residences single family and low-rise multifamily 3 stories or less) and by 2030 for commercial buildings. The California Public Utility Commission's (CPUC) California Long Term Energy Efficiency Strategic Plan, dated July 2008, endorses the Energy Commission's zero net energy goals for all newly constructed homes by 2020 and for all newly constructed commercial buildings by 2030.</p>
<p>Sources</p>	<p>California Energy Commission, "Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings," prepared by Architectural Energy</p> <p>California Energy Commission, http://www.energy.ca.gov/title24/2013standards/background.html</p> <p>California Energy Commission, http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2012-5-31-Item-05-Adoption_Hearing_Presentation.pdf</p>

Calculation

Reductions from Title 24 Upgrades	2016 Reductions from 2013 Standards (assumed for development after 2018)	Energy Savings for 2019 Code (assumed for development 2020-2023)	Projected average reduction 2023-2030 from 2018 baseline	
	Energy Savings	Energy Savings	Electricity Savings	Natural Gas Savings
Residential New Construction	28%	53%	100%	50%
Non-residential New Construction	5%	30%	50%	50%

Projected Residential Development with Title 24 Energy Reductions

	2019	2020-2022	2023-2030	TOTAL through 2020	GHG Reductions through 2020	TOTAL through 2030	GHG Reductions through 2030
New Residential (units)	8	5	11	8		23	
Electricity Use BAU	41,289	23,225	54,192	41,289		118,706	
Electricity Use Savings	11,561	12,309	54,192	11,561	1	78,062	5.1
Natural Gas Use BAU	3,747	2,108	4,919	3,747		10,774	
Natural Gas Use Savings	1,049	1,117	2,459	1,049	6	4,626	24.6

Projected Non-Residential Development with Title 24 Energy Reductions

	2019	2020-2022	2023-2030	TOTAL through 2020	GHG Reductions through 2020	TOTAL through 2030	GHG Reductions through 2030
Electricity Use BAU	123,701	480,746	1,121,741	123,701		1,726,188	
Electricity Use Savings	6,185	144,224	560,871	6,185	1	711,279	59.2
Natural Gas Use BAU	2,832	11,006	25,680	2,832		39,518	
Natural Gas Use Savings	142	3,302	12,840	142	1	16,283	86.6

LIGHT AND HEAVY DUTY FLEET REGULATIONS

State Action

Reductions (MTCO ₂ e)	<p style="text-align: center;">-2,476.2 2020</p> <p style="text-align: center;">-14,957.5 2030</p>
Methodology	<p>Current federal and State regulations and standards will reduce transportation emissions from the light and heavy duty fleet. These include:</p> <ol style="list-style-type: none"> 1. Pavley Standards which increase fuel economy standards for light-duty vehicles for 2009-2016 model years. 2. Advanced Clean Cars Program which will reduce greenhouse gas and smog emissions for light-duty vehicles sold between 2017 and 2025. New automobiles will emit 34 percent fewer GHG emissions and 75 percent fewer smog-forming emissions. 3. ARB Tractor -Trailer Greenhouse Gas Regulations which accelerate the use of low rolling resistance tires and aerodynamic fairing to reduce GHG emissions in the heavy-duty truck fleet. 4. Heavy Duty GHG Emissions Standards (Phase One) which establish GHG and fuel efficiency standards for medium duty and heavy duty engines and vehicles for 2014-2018 model years. <p>Transportation emissions estimated using EMFAC 2017.</p>
Sources	<p>California Air Resources Board, EMFAC2017 v.1.0.2.</p> <p>California Air Resources Board, EMFAC2014 Volume III - Technical Documentation, v1.0.7, May 12, 2015</p>

Calculation

	2020	2030
Passenger VMT, BAU	115,067,020 VMT	122,182,549 VMT
Passenger VMT, net reductions from other measures	114,099,496 VMT	120,216,835 VMT
Commercial VMT, BAU	10,993,896 VMT	11,955,693 VMT
Emissions, BAU	52,094 MTCO ₂ e	55,315 MTCO ₂ e
Emissions with regulations	49,618 MTCO ₂ e	40,357 MTCO ₂ e
Reduction in emissions	2,476 MTCO ₂ e	14,957 MTCO ₂ e