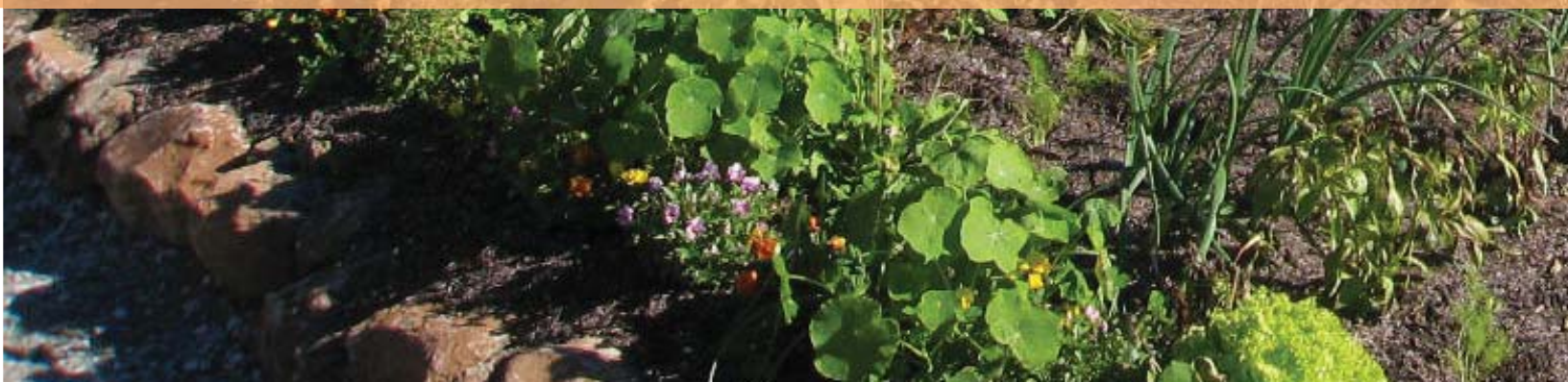




# Climate Action Plan





# Climate Action Plan

## 1

### Introduction

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#### **Purpose**

#### **Existing Conditions**

*Climate Action Goals, Policies and Programs*

*Climate Change (Reducing Carbon Footprint)*

*Climate Change (Adaptation)*

*Zero Waste*

#### **Additional City-Related Emission Reduction Programs**

*Land Use*

*Mobility*

*Natural Environment*

*Community Vitality*

*Safety*

*Noise*

## 2

### Appendix

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**Emission Reduction Targets based on programs**



## Introduction

The Mill Valley Climate Action Plan was adopted as part of the Mill Valley 2040 General Plan (October 2013). Language contained in this Climate Action Plan are excerpts from the larger Mill Valley 2040 General Plan that is available at [www.cityofmillvalley.org/generalplan](http://www.cityofmillvalley.org/generalplan)

## Purpose

Climate change is caused by an increase in the concentration of atmospheric greenhouse gases. Potential climate change impacts in Northern California include declining water supplies, spread of disease, diminished agricultural productivity, sea level rise, and increased incidence of wildfire, flooding, and landslides. Like many communities, Mill Valley is addressing these potential impacts by thinking differently about its resources, taking actions to reduce the community's contribution to greenhouse gas production, and identifying strategies to allow the community to adapt to potential foreseen changes.

While the Climate Action Element is not a mandatory element of the General Plan, the City of Mill Valley has designed the MV2040 General Plan so that it also serves as the City's Climate Action Plan, identifying the ways in which the City will comply with state mandates for reducing greenhouse gas emissions. Greenhouse gas (GHG) emission reduction policies and programs are identified throughout this element and the rest of the General Plan with a leaf symbol (🌿). In addition, an assessment of potential reduction in GHG emissions, based on the emission reduction measures in the MV2040 General Plan, is included in Appendix C of this General Plan.

## Existing Conditions

### Overview of Climate Change

The United Nations Intergovernmental Panel on Climate Change (IPCC), the authoritative global scientific consortium on climate change, has provided overwhelming scientific evidence that human-induced greenhouse gas (GHG) emissions are now producing climate impacts with dangerous consequences. According to

# SEA LEVEL RISE

Projected will expand the areas subject to **flooding** to include low-lying areas of Mill Valley from Bothin Marsh to Sycamore Park.



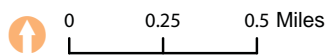
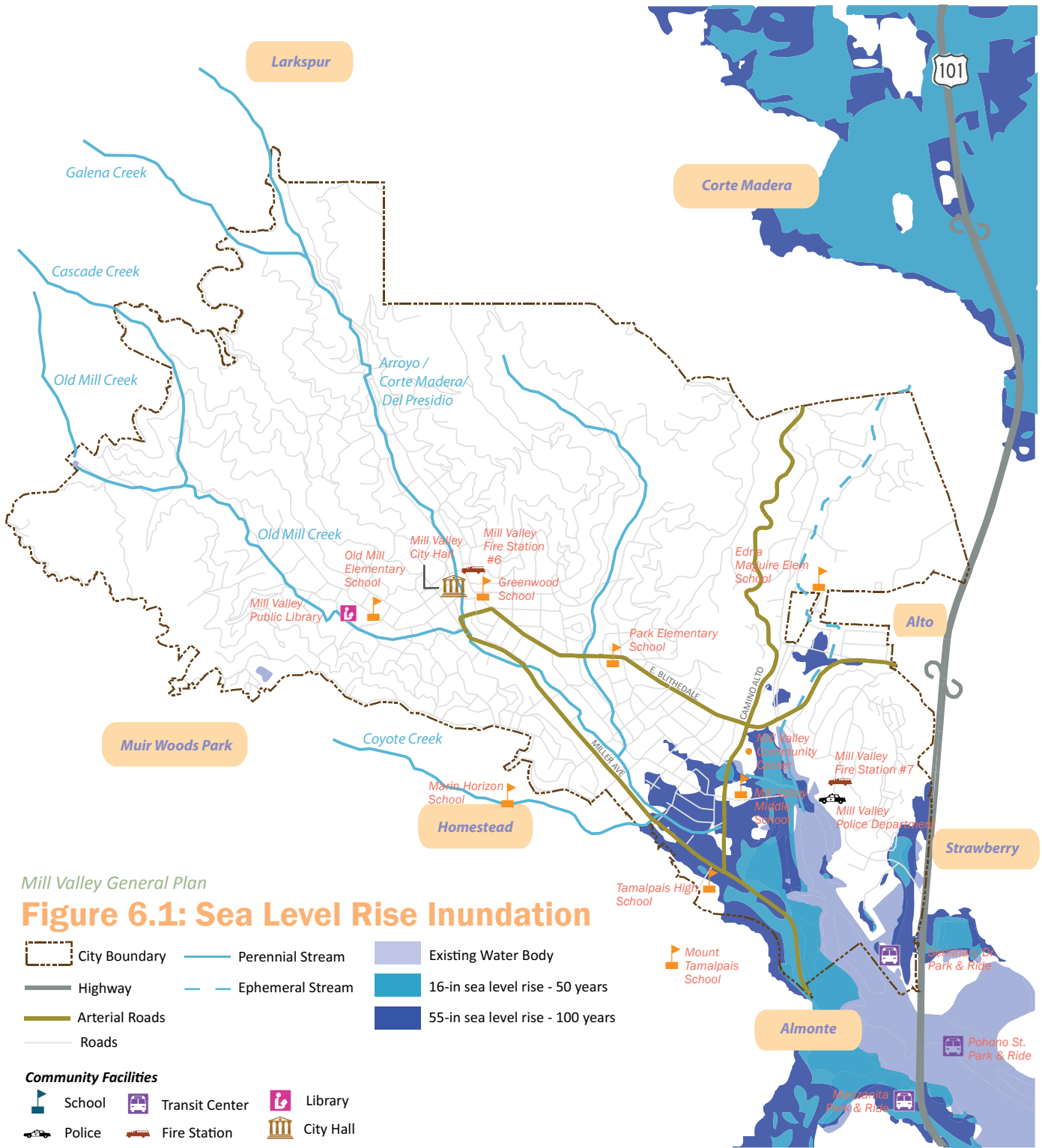
research by Lawrence Berkeley Laboratory and James Hansen, NASA's Chief Climate Scientist, recent global emissions trend lines – if unchanged – are likely to produce the following:

- **Temperature:** Average temperatures could increase as much as 10 degrees Fahrenheit (°F) by the end of the century, with 3.6 °F considered the “tipping point” beyond which runaway climate impacts – including full melting of the polar ice – are inevitable.
- **Fire Risk:** The occurrence of large wildfires could increase by as much as 35 to 55 percent.
- **Water Availability:** By 2050, the average April measurement of the Sierra snowpack will drop by 13 feet, resulting in a loss of 36 percent of California's water supply. These impacts will dramatically increase competition for scarce water resources, severely reduce the state's agricultural production, and further intensify the frequency and duration of droughts.
- **Public Health:** The frequency and intensity of conditions conducive to air pollution, harsh heat, and vector borne disease will increase.
- **Sea Level Rise:** Sea levels could rise from as little as 2 to 3 feet if emissions trend downward to as much as 8.5 to 35 feet by the end of the century if emissions continue to rise in a “business as usual” scenario.

Between 1900 and 2000, sea level rise on San Francisco Bay (underneath the Golden Gate) was seven inches, primarily due to thermal expansion from global warming, and this rate of increase is accelerating. According to the Bay Conservation and Development Commission (BCDC) September 2008 report “A Sea Level Rise Strategy for the San Francisco Bay Region”:

*Recent analyses indicate that sea level rise from warming oceans may be 1.4 meters (about 55 inches) over the next 100 years, or even higher depending upon the rate at which glaciers and other ice sheets on land melt. BCDC's illustrative maps show that a one-meter rise in the level of the Bay could flood over 200 square miles of land and development around the Bay. Initial estimates indicate that over \$100 billion worth of public and private development could be at risk.<sup>1</sup>*

<sup>1</sup> San Francisco Bay Conservation and Development Commission, “A Sea Level Rise Strategy for the San Francisco Bay Region,” September 2008, [http://www.bcdc.ca.gov/meetings/commission/2008/2008-09-18\\_slr\\_strategy.pdf](http://www.bcdc.ca.gov/meetings/commission/2008/2008-09-18_slr_strategy.pdf), accessed June 28, 2013.



Source: City of Mill Valley, 2012; Marin Map, 2012; BCDC, UCGS, 2009; WRT 2013

## Trends in Sustainability

# #1

Climate change is going to continue to affect the way we live.

- *Climate change will increase the frequency and intensity of conditions conducive to air pollution, harsh heat, and vector-borne disease.*
- *Between 1900 and 2000, sea level rise in San Francisco Bay was seven inches, primarily due to thermal expansion from global warming, but this rate of increase is accelerating.<sup>1</sup>*
- *Estimates of future sea level rise range from as little as 2 to 3 feet if current emission rates trend downward to as much as 8.5 to 35 feet by the end of the century if emissions continue to rise.<sup>2</sup>*
- *Based on current trends, by 2050 the average April measurement of the Sierra snowpack will drop by 13 feet, resulting in a loss of 36 percent of California's water supply.<sup>3</sup>*
- *Treating and delivering water accounts for approximately 20 percent of all electricity used in California and is the largest single-purpose use of electricity in Marin County.<sup>4</sup>*
- *Sea level is projected to rise 16 inches by 2050 and 55 inches by the end of the century due to the effects of climate change.<sup>5</sup>*
- *Projected sea level rise will expand the areas subject to flooding to include low-lying areas of Mill Valley from Bothin Marsh to Sycamore Park.*
- *By 2050, daily high tides will inundate the same area currently subject to flooding by a 100-year flood event.<sup>6</sup>*
- *Marin County obtains 80 percent of its water supply from local reservoirs and imports about 20 percent from the Russian River watershed. Impacts on water supply are likely to be a major result of a changing climate, due to higher temperatures and more erratic, less predictable supply patterns.*



Flooding in Downtown Mill Valley after a rain storm, February 2014



In the face of large-scale damage estimates from even the most conservative sea level rise estimates, in addition to many other negative environmental and economic impacts of global warming, leading scientists are urging policy-makers to take early and strong action both to mitigate emissions and to begin adapting to likely climate impacts. See Figure 6.1 for expected sea level rise inundation areas.

Early action on GHG reduction can produce substantial benefits from the transition to a “low-carbon community.” These benefits include new jobs in building energy retrofits and renewable energy projects, public health benefits from reduced air pollution, and enhanced local energy security and economic sustainability from reduced dependence on fossil fuels.

### State of California Initiatives

The State of California has led the country in addressing climate change by enacting the following legislative initiatives:

#### Emissions Reduction Goals

- **Assembly Bill (AB) 32 – 2006:** AB 32, The Global Warming Solutions Act of 2006, remains the nation’s leading legislation to address GHG emissions. AB 32 institutes a mandatory limit on greenhouse gas pollution and requires a reduction in emissions to 1990 levels by the year 2020, which is about a 24-percent reduction statewide from current levels. The bill also directs the California Air Resources Board (CARB) to establish a mandatory reporting system to monitor emission levels and adopt regulations to achieve the targeted GHG reductions by 2012. In December 2008, CARB adopted a Scoping Plan to achieve the state’s 2020 climate goal.
- **Executive Order S-3-05 – 2005:** In 2005, as a companion measure to AB 32, Governor Schwarzenegger signed Executive Order S-3-05 to commit California to a statewide emissions reduction of 80 percent below 1990 levels by the year 2050.
- **Senate Bill (SB) 1771 – 2000:** This bill requires the California Energy Commission (CEC) to prepare an inventory of the state’s greenhouse gas emissions, study data on climate change, and provide government agencies and businesses with information on the costs and methods for reducing GHGs. It also established the California Climate Action Registry to serve as a certi-



Ground mounted solar panels behind Mill Valley’s Public Safety Building

fyng agency for companies and local governments to quantify and register their emissions for possible future trading systems.

### Support for Renewable Energy

- **California Solar Initiative Program – 2006:** This \$2.8-billion program provides incentives for residential and commercial solar development over 11 years.
- **Assembly Bill (AB) 811 – 2008:** This 2008 bill allows California municipalities to help citizens finance renewable and energy efficiency projects by issuing a bond to pay for initial installation costs. Repayment is stretched out over the life of the project and is made through a voluntary assessment on the building’s property tax, which transfers to the new owner at time of sale.
- **Senate Bill (SB) X1-2 – 2011:** This bill applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt the new goal of 20 percent of retail sales from renewables by the end of 2013, 25 percent by the end of 2016, and 33 percent by the end of 2020.

### Low-Carbon Transportation and “Smart” Growth

- **Assembly Bill (AB) 118 – 2008:** This bill establishes the California Alternative and Renewable Fuel and Vehicle Technology Program, which provides grants and rebates to support the development, manufacture, and purchase of electric vehicles (EVs), natural gas vehicles (NGVs), hydrogen fuel cell vehicles (FCVs), biofuel vehicles, and other low-emissions vehicle technologies.
- **Senate Bill (SB) 375 – 2007:** This law requires climate impacts to be addressed by local General Plans and directs CARB to work with metropolitan planning organizations (MPOs) to set and achieve regional targets for GHG reductions based on changes in land use and transportation. In the Bay Area, the Association of Bay Area Governments is the lead agency for SB 375 planning.
- **Assembly Bill (AB) 1493 – 2002:** This bill requires CARB to adopt regulations that achieve the maximum feasible reduction of greenhouse gases from vehicles.



Electric Vehicle in Downtown Mill Valley

## Marin County Initiatives

### Cities for Climate Protection Campaign

In 2002, the Marin County Board of Supervisors adopted a resolution joining the Cities for Climate Protection Campaign (CCP) sponsored by ICLEI – Local Governments for Sustainability. By 2007, all 11 Marin municipalities had joined the CCP, which calls on local jurisdictions to achieve the following five milestones:

- 1. Emissions Inventory.** Conduct an inventory of current greenhouse gas (GHG) emissions and forecast the growth in emissions that will occur without preventative action. Mill Valley has conducted three inventories to date (2000, 2005, and 2010).
- 2. Emissions Reduction Targets.** Set a GHG reduction target The County of Marin set a target to reduce GHG emissions communitywide to 15 percent below 2000 levels by the year 2020 and an internal goal of 15 to 20 percent below 2000 levels by the year 2020 for County operations. The City of Mill Valley has established similar targets: 15 percent below 2005 levels communitywide and 20 percent below 2005 levels for municipal activities by the year 2020.
- 3. Climate Action Plan.** Develop a local Climate Action Plan that describes the policies, programs, and measures that will be implemented to meet local and state targets. This General Plan serves as Mill Valley’s Climate Action Plan. Policies and programs identified with a leaf (🌿) serve as emission reduction measures for the Climate Action Plan. Appendix C contains an analysis of anticipated emission reductions based on General Plan goals, policies, and programs. Climate Action policies include:
  - Green building, energy efficiency, and renewable energy to address the energy use and consumption of natural resources to construct, renovate, operate and maintain buildings
  - Land use and transportation to identify more efficient ways to utilize land and move about
  - Natural systems, sequestration, and offsets to absorb or sequester greenhouse gases
  - Waste reduction, recycling, and Zero Waste to divert and/or eliminate all materials from landfill
  - Water conservation
  - Climate change/adaptation to prepare for future scenarios such as sea level rise




New lighting at Mill Valley Middle School



Electric vehicle owned by the City of Mill Valley



Electric vehicle charging station near Hauke Park

**4. Implementation.** Implement the local action plan. Appendix A of this General Plan contains the Implementation Plan. Emission reduction programs are identified using the  icon, and implementation progress will be monitored as part of the annual review process for the General Plan.

**5. Monitoring. Monitor progress and report results.** The City of Mill Valley continues to document and update its emissions inventory to mark its progress toward meeting the City's emission reduction targets. Annual reporting to benchmark potential emission reductions in association with the implementation of emission reduction measures can be incorporated into the annual General Plan review process as well.

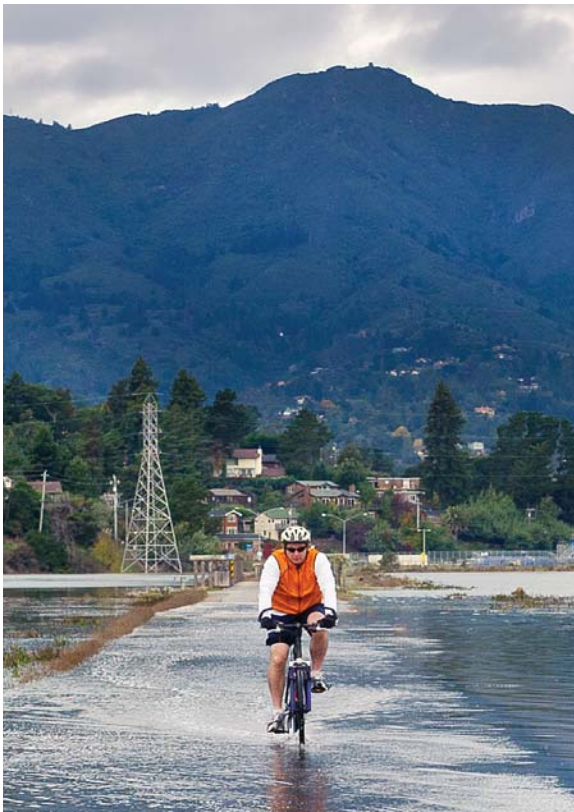
### **Marin Climate and Energy Partnership**

Recognizing the need for a collaborative approach to GHG reductions, city and county leaders launched the Marin Climate and Energy Partnership (MCEP) in 2007. The City of Mill Valley is a member of MCEP and works with representatives from the County of Marin and all of the other Marin cities and towns to address and streamline the implementation of a variety of GHG reduction measures, including development of enhanced green building ordinances, countywide Zero Waste efforts, and countywide efforts to transition to a localized, climate-friendly food system. MCEP is also coordinating efforts to document and monitor progress in meeting emission reduction targets for the year 2020.

### **Marin County's Greenhouse Gas Emissions**

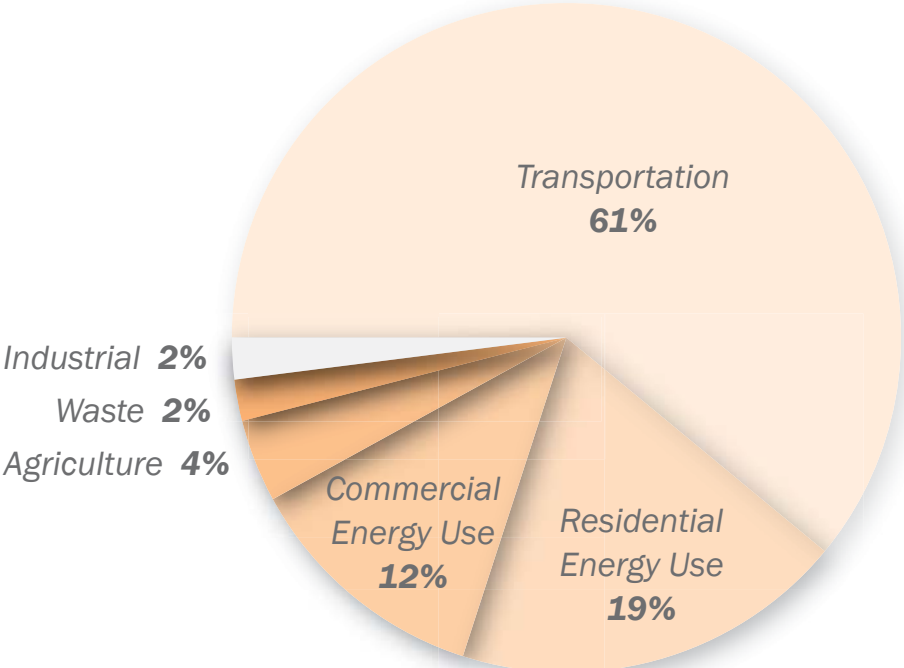
In 1990, Marin County GHG emissions were calculated at about 2.6 million tons. By 2000, emissions were estimated at about 3.1 million tons – a 15-percent increase since 1990. Between 2000 and 2005, emissions began decreasing, so the net increase in emissions between 1990 and 2005 is estimated at 6 percent. Figure 6.2 shows the distribution of countywide emissions by sector in 2005, and Figure 6.3 illustrates emission trends over the past 15 years.

In 2006, the County of Marin developed a strategic plan to reduce annual GHG emissions to 15 percent below 1990 levels by 2020. The keystone of this plan is the initiation of Marin Clean Energy, a community choice aggregation program that procures renewable



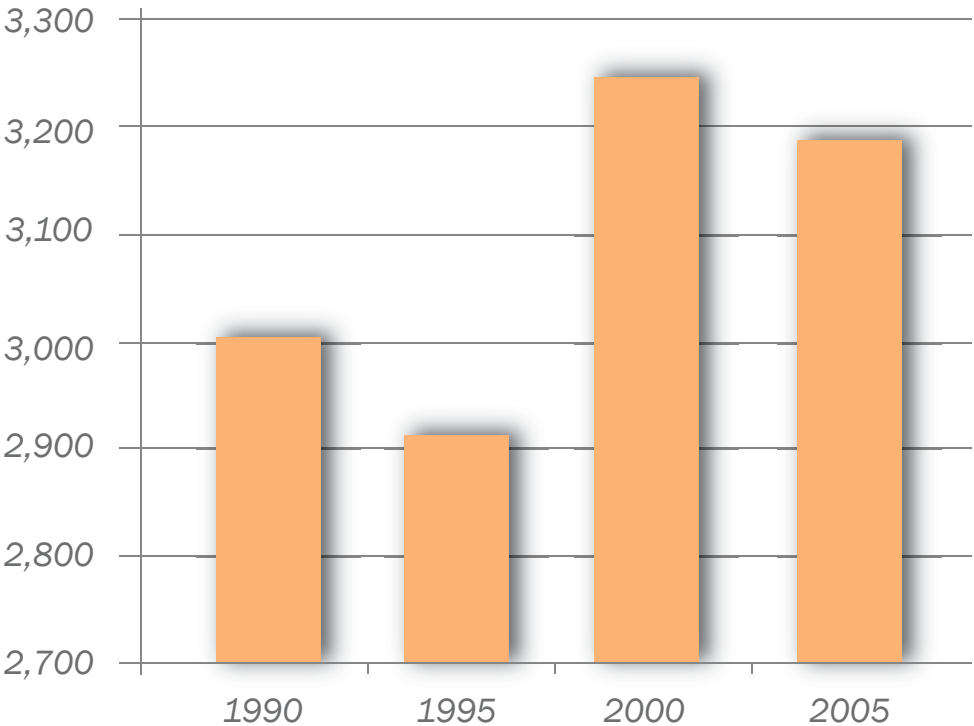
Bicyclist on flooded Bay Trail  
Source: Tim Porter, *Marin Magazine*

Figure 6.2 | Marin County Greenhouse Gas Emissions by Sector, 2005



Source: Mill Valley, February 18, 2010 "Draft Framework: Addressing Climate Change" Presentation

Figure 6.3 | Marin County Greenhouse Gas Emission Trends, 1990-2005



Source: Mill Valley, February 18, 2010 "Draft Framework: Addressing Climate Change" Presentation

Transportation  
generates  
**1/2**  
of Mill Valley's  
greenhouse  
gas emissions



Click Off 2008

Source: Mill Valley Arts Commission

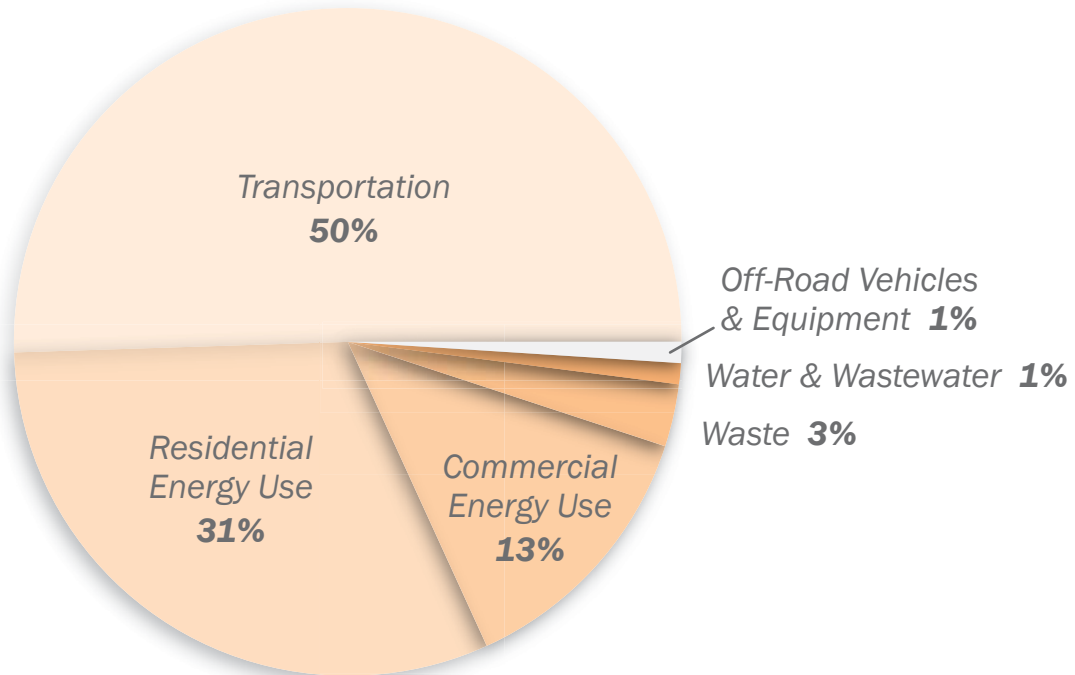
sources of electricity and partners with PG&E to deliver electricity. Participation in MCE is projected to reduce GHGs by 302,320 tons equivalent carbon dioxide (CO<sub>2</sub>e) to 534,369 tons annually by 2020. Other high-impact measures in the 2006 plan include expanded recycling and solid waste reduction.

Trends in  
Sustainability

#2 The Air We Breathe

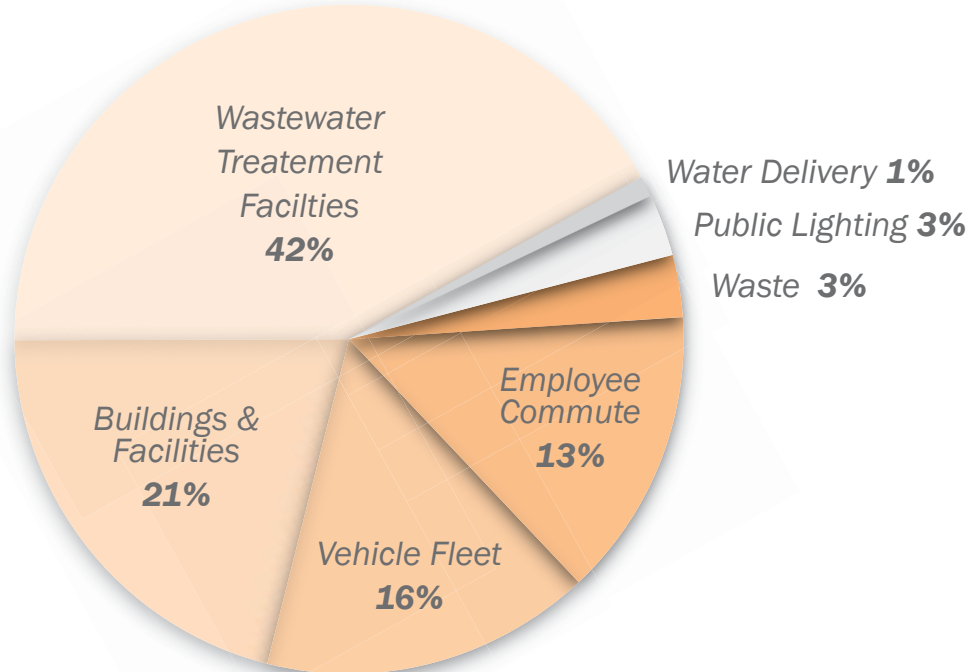
- Mill Valley generates approximately 87,258 metric tons equivalent carbon dioxide (CO<sub>2</sub>e) per year.<sup>7</sup>
- Transportation (e.g., cars, buses, trucks, etc.) generates half of Mill Valley's greenhouse gas emissions, compared to 50 percent for the Bay Area, 41 percent for California, and 14 percent for the world.<sup>8</sup>
- The Environmental Protection Agency (EPA) Air Quality Index (AQI) level for Mill Valley is 30.4, which means air quality is satisfactory and air pollution poses little or no risk. This level compares favorably to the U.S. average AQI of 32 (as a lower AQI is better).<sup>9</sup>
- For six out of seven monitored air pollutants, Mill Valley's levels are consistent with national averages or significantly better.<sup>10</sup>
- In 2010, levels of nitrogen dioxide (which is produced by motor vehicles and power plants and results in a brownish haze) were 12.4 parts per billion (ppb), which is greater than the national average (9.4 ppb) but within EPA's adopted standards.<sup>11</sup>
- The Bay Area Air Quality Management District (BAAQMD) declared 11 "Spare the Air" days for the Bay Area in 1991, 25 in 1996, and 8 in 2011. According to the EPA's AirNow website, however, Marin County had zero unhealthy air days between 2000 and 2010.<sup>12</sup>

Figure 6.4 | Mill Valley 2005 Baseline:  
Community Greenhouse Emissions by Sector



Source: Mill Valley GHG Emissions Inventory Report, 2010

Figure 6.5 | Mill Valley 2005 Baseline:  
Government Greenhouse Emissions by Sector



Source: Mill Valley GHG Emissions Inventory Report, 2010

## Mill Valley's Greenhouse Gas Emissions

### 2005 Baseline Emissions Inventory

Mill Valley's greenhouse gas emissions inventory sets a baseline emissions level for the year 2005 and projects future emissions levels for the year 2020. The baseline and projection are used to determine the amount of emissions reduction necessary to achieve the City's adopted reduction targets for both the community and internal government operations.

In 2005, Mill Valley as a community emitted over 90,000 metric tons equivalent carbon dioxide (CO<sub>2</sub>e) of greenhouse gases. Half of these emissions were related to transportation. Residential energy use was the second largest source of emissions (31 percent), followed by commercial/industrial energy use (13 percent) and waste (3 percent).

In 2005, internal government operations were estimated to have contributed 3,000 metric tons CO<sub>2</sub>e of greenhouse gas emissions – just over 3 percent of total citywide emissions. The largest emission sources were wastewater treatment and water management, building and facility energy use, vehicle fleet, and employee commute. Waste and streetlight energy use contributed the remainder.

### Comparison of 2005 and 2010 Emissions

In June 2013, Mill Valley updated its greenhouse gas inventory report comparing the 2005 baseline year with 2010 data. 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 distribution of 2010 emissions by sector and operation remains similar to 2005 data, with the transportation sector still making up the greatest percentage of the community's greenhouse gas emissions (50 percent), followed by the residential (32 percent) and commercial (14 percent) sector. The encouraging news is that Mill Valley reduced community greenhouse gas emissions nearly 4 percent between 2005 and 2010, from 90,806 metric tons in 2005 to 87,258 metric tons in 2010 – a reduction of 3,548 metric tons CO<sub>2</sub>e. Reductions occurred in all sectors except the wastewater sector. See Table 6.1 for details.



Mill Valley is home to the first Leadership in Energy and Environmental Design (LEED) for Homes residence in Marin County.

Photo: Mariko Reed



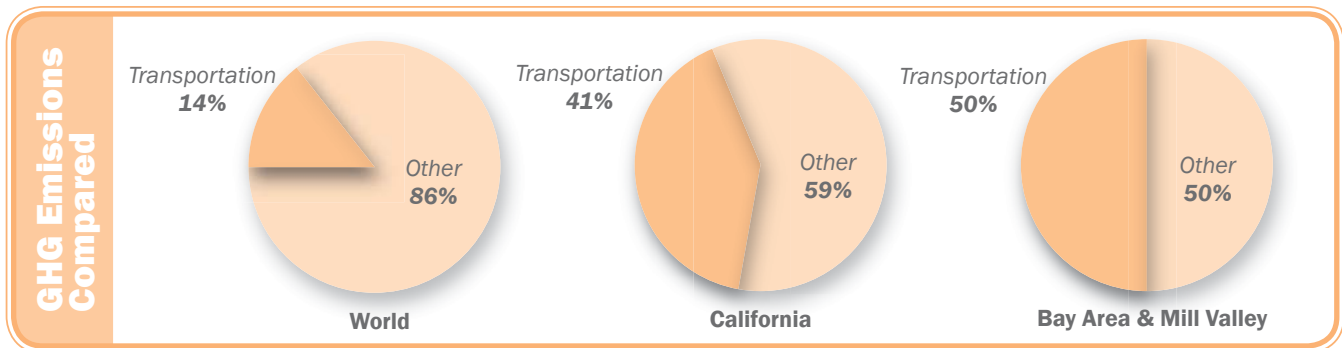


Table 6.1 | Mill Valley Community Greenhouse Gas Emissions by Sector, 2005 & 2010

Sector	2005 Greenhouse Gas Emissions		2010 Greenhouse Gas Emissions		Change in Metric Tons CO2e	% Change in Metric Tons
	Metric Tons CO2e	% of Total	Metric Tons CO2e	% of Total		
Residential	28,040	31%	27,578	32%	-462	-1.6%
Commercial	12,242	13%	11,897	14%	-345	-2.8%
Transportation	45,522	50%	44,048	50%	-1,474	-3.2%
Off-Road	1,129	1%	987	1%	-143	-12.6%
Water	359	<1%	251	<1%	-109	-30.2%
Wastewater	410	<1%	426	<1%	16	+3.8%
Waste	3,104	3%	2,072	2%	-1,032	-33.2%
<b>Total</b>	<b>90,806</b>	<b>100%</b>	<b>87,258</b>	<b>100%</b>	<b>-3,548</b>	<b>-3.9%</b>

Source: Mill Valley 2010 Emissions Inventory

Note: Emissions are arranged by sector to facilitate detailed analysis of emissions sources and comparison of increases and decreases between 2005 and 2010. The inventory provides a snapshot of the years 2005 and 2010 and does not intend to imply there is necessarily a trend line between those years. Total emissions may have gone up or down during the years between 2005 and 2010.

Table 6.2 | Mill Valley Government Greenhouse Gas Emissions by Sector, 2005 & 2010

Sector	2005 Greenhouse Gas Emissions		2010 Greenhouse Gas Emissions		Change in Metric Tons CO2e	% Change in Metric Tons
	Metric Tons CO2e	% of Total	Metric Tons CO2e	% of Total		
Buildings & Facilities	649.6	21%	663.5	21%	13.9	+2%
Wastewater Treatment Facilities*	1,306.1	42%	1,262.9	41%	-43.2	-3%
Vehicle Fleet	482.4	16%	476.7	15%	-5.7	-1%
Public Lighting	90.2	3%	81.0	3%	-9.1	-10%
Water Delivery*	41.7	1%	31.2	1%	-10.5	-25%
Waste	93.2	3%	61.2	2%	-32.0	-34%
Employee Commute	434.7	14%	524.2	17%	89.5	+21%
<b>Total</b>	<b>3,097.9</b>	<b>100%</b>	<b>3,100.8</b>	<b>100%</b>	<b>2.9</b>	<b>0.1%</b>

Source: Mill Valley 2010 Emissions Inventory

\*Note: Wastewater treatment and water delivery are not operated by the City of Mill Valley

In summary, the comparison of Mill Valley's GHG reductions between 2005 and 2010 shows the following:

- Great strides were made in the waste sector, with 31 percent less waste going to the landfill. Some of this diversion in waste is related to the City's new curbside composting program.
- In the transportation sector, emissions dropped by 3.2 percent due, in part, to improvements in fuel efficiency.
- Reductions in the off-road sector were due to a 30-percent decrease in emissions from construction equipment.
- Reductions in electricity usage, a decline in the carbon intensity of electricity provided by PG&E, and the introduction of greener electricity provided by the Marin Clean Energy program (MCE) were largely responsible for the decrease in emissions in the residential and commercial sectors. An integral part of the formation of the MCE was the establishment of the Community Choice Aggregation (CCA) Marin Clean Energy (MCE) program, whereby electrical energy is provided to customers from a wide range of renewable energy sources that generate fewer GHG emissions. Currently, the program offers two options for energy purchases: (1) a "Light Green" option that generates a minimum of 25 percent from renewable energy sources and provides a 53-percent decrease in GHG emissions, and (2) a "Dark Green" option that generates 100 percent renewable energy content and is 100 percent GHG-free.
- A decrease in water usage led to declines in emissions in the water sector.



Home with solar hot water panels in Mill Valley

Within government operations, emissions were flat, increasing by just 2.9 metric tons, or 0.1 percent. Decreases occurred in all sectors except the buildings and facilities sector (+13.9 metric tons CO<sub>2</sub>e) and the employee commute sector (+89.5 metric tons CO<sub>2</sub>e), which experienced a 21-percent increase in emissions. The increase in emissions from buildings and facilities was due to an increase in natural gas consumption. The increase in employee commute emissions was apparently due to an increase in the number of miles employees drove to work, but may also be due to differences in sampling (as commute emissions are derived from employee surveys). Excluding the employee commute sector, emissions from government operations dropped by 3.3 percent.

Emissions generated by the City’s wastewater treatment plant were responsible for the greatest share of government operations emissions (41 percent), followed by the buildings and facilities sector (22 percent). See Table 6.2 for details.

### 2020 Emissions Reduction Targets

The City of Mill Valley has adopted a greenhouse gas emissions reduction target of 15 percent below 2005 levels for community emissions and 20 percent below 2005 levels for municipal operations by the year 2020.

Emission reduction programs are identified in this General Plan with a leaf symbol (🌿). These policies and programs serve as the City’s Climate Action Plan and are intended to reduce GHG emissions to meet the targets.

The comparison of 2005 and 2010 emissions data illustrates that Mill Valley is making progress toward accomplishing its greenhouse gas reduction goal for community emissions. However, with the projected increase of population, jobs, and traffic volumes, Mill Valley is expected to emit 8 percent more greenhouse gases in 2020 than in 2005 under a “business as usual” scenario (see Table 6.3). Implementing the policies and programs identified in this General Plan, and monitoring and capturing data to account for emission reductions associated with the General Plan programs, will therefore be important for meeting Mill Valley’s GHG emission reduction targets.

Table 6.3 | Projected Growth in Mill Valley Community Greenhouse Gas Emissions by Sector (Business as Usual)

Sector	2005 Emissions (Metric Tons CO2e)	2010 Emissions (Metric Tons CO2e)	2020 Projected Emissions (Metric Tons CO2e)	Growth (2010-2020)
Transportation	45,522	44,048	48,233	9.5%
Residential	28,040	27,578	28,255	2.5%
Commercial / Industrial	12,242	11,897	12,428	4.5%
Waste	3,104	2,072	2,079	3.3%
Off-Road Vehicles & Equipment	1,129	987	990	3.3%
Wastewater	410	426	427	3.3%
Water	359	251	251	3.3%
<b>Total</b>	<b>90,806</b>	<b>87,258</b>	<b>92,663</b>	<b>6.2%</b>

Source: Climate Action Plan Analysis, See Appendix C.



### #3 New technologies and practices will promote a more sustainable future.

- *Solar energy is projected to grow exponentially as its cost continues to decline. Projections indicate that by 2030 solar electricity is likely to cost half what coal electricity does today.*
- *Cellulosic biofuels offer the promise of creating a viable energy source from waste products, such as wood waste, grasses, corn stalks, and other non-food products.*
- *Green information and communications technologies such as the following hold promise for increasing the energy and resource efficiency of most aspects of urban development:*
  - *Traffic congestion monitoring and pricing systems*
  - *Water monitoring (leakage detection, purification)*
  - *Building applications (temperature, light, humidity)*
  - *Intelligent public transportation and logistics*
  - *Public shared offices with teleconferencing*
  - *Home and office smart appliances*
  - *Smart grids*
  - *Carbon inventories and carbon accounting*
- *Implementation of carbon taxes will help create disincentives for using fossil fuels and account for the impact their use has on the earth's climate.*
- *Responding to the effects of climate change will require implementation of adaptation strategies, including major investments in infrastructure to prevent coastal flooding and to store dwindling seasonal water supplies.*
- *The combination of high oil prices, fuel shortages, and supply disruptions is expected to continue the trend toward more compact, transit-supported development patterns.*
- *There is expected to be increased focus on local and regional food production in and around cities as higher fuel prices and unexpected energy shortages drive up food prices.*
- *Water conservation, efficiency, and reuse technologies such as the following hold substantial promise for providing greater water supply security:*
  - *Greywater systems*
  - *Low-flow fixtures*
  - *Xeriscape landscaping*

## Climate Action Goals, Policies & Programs

As stated earlier, the Climate Action Element is not a mandatory General Plan element, but the City of Mill Valley is using the MV2040 General Plan as a mechanism for creating goals and policies that address climate change. Goals and policies addressing greenhouse gas (GHG) emission reduction are identified throughout this element and the rest of the General Plan with a leaf symbol (🌿).

### CLIMATE-1 | Climate Change and Greenhouse Gas Emissions Reduction

**Reduce the community's carbon footprint.**

#### CL.1 Clean Energy and Energy Efficiency

Support and provide incentives for using and investing in clean energy and energy efficiency solutions.

**CL.1-1** Work with the State of California, County of Marin, local agencies, and energy providers to increase the proportion of renewable power used by residents and business and provide financial and technical assistance for clean energy installation and energy-efficiency upgrades throughout Mill Valley. 🌿

**CL.1-2** Continue to work with Marin Clean Energy (MCE), PG&E, or other clean energy providers to encourage greater resident participation and use of greener energy supplies. 🌿

**CL.1-3** Monitor and continue efforts to reduce energy consumption and waste throughout all City facilities.

**CL.1-4** Continue to encourage efforts at the Sewerage Agency of Southern Marin (SASM) to pursue sustainability efforts such as exploring the use of solar applications, capturing and reusing methane, and generating electricity through waste to energy technology. 🌿

**CL.1-5** Update the City's green building ordinance to support best practices and other available green building standards to conserve energy and resources, including:

- Design guidelines, development standards, and permitting procedures to encourage emerging green building technologies;
- Outdoor lighting standards that prevent light levels in all new development, parking lots, and street lighting from exceeding state standards;
- Guidelines for residential solar and wind energy systems such as optimal roof orientation, clear access without obstructions, roof framing and design, installation of electrical conduit to accept electric system wiring, installation of plumbing to support a solar hot water system, and provision of space for a solar hot water storage tank in locations

where a solar electric or hot water system will be cost-effective; and

- Guidelines to encourage new development to include wiring and staging to allow for solar- and/or electric-ready technologies and to achieve net zero building efficiency.

**CL.1-6** Consider requiring that energy audits for residential and commercial building be performed prior to completion of sale, and that audit results and information about opportunities for energy improvement be presented to potential buyers. 🌿

**CL.1-7** Replace street and public parking lot lights with more energy-efficient lamps as technology creates more efficient and better quality lighting. 🌿

**CL.1-8** Participate in opportunities such as those provided by Assembly Bill 811 and other public financing programs that support the installation of renewable energy systems and other energy-efficient upgrades for public agencies and private property owners. 🌿

**CL.1-9** Improve air quality by discouraging wood burning and providing incentives to replace existing inefficient wood-burning devices. 🌿

## CL.2 Carbon Offsets

Offset carbon emissions through carbon credits or allowances, and through natural sequestration methods.

**CL.2-1** Provide educational opportunities and creative incentives for City-sponsored events, community organizations, residents, and businesses to reduce their carbon footprint using validated offset or carbon reduction programs, such as “Resilient Neighborhoods.” 🌿

**CL.2-2** Create a process to apply on- or off-site carbon offsets to new development, increased intensity of use, and/or other activities that increase greenhouse gas emissions. 🌿

## CL.3 Monitoring

Establish a baseline and monitor the City and community contribution to greenhouse gas emissions.

**CL.3-1** Monitor and update, as necessary, the City Council-adopted greenhouse gas emission reduction targets of 20 percent below 2005 levels by 2020 for internal government operations and 15 percent below 2005 levels communitywide by 2020. 🌿

**CL.3-2** Collaborate with the community to identify emission reduction measures that will meet adopted emission reduction targets.

## CLIMATE-2 | Climate Change Adaptation

*Develop strategies for adapting to climate change.*

### CL.4 Adapting to Climate Change

Ground climate change adaptation strategies in the best-available scientific understanding of hazards, risks, impacts, and vulnerabilities, and make adaptation planning and implementation a City budgeted item and operational priority.

**CL.4-1** Immediately begin to develop plans and policies that will guide the City's ability to recognize, understand, and respond to the effects of climate change on the community (rather than waiting for more complete understanding of climate change and/or data). Adjust plans and actions according to new data and information and establish a permanent adaptation funding mechanism through the City's budget.

**CL.4-2** Plan and fund long-term adaptation strategies to help the people, places, natural systems, and infrastructure that are vulnerable to the effects of climate change, including but not limited to sea level rise and more extreme heat and storm conditions.

**CL.4-3** Encourage adaptation across multiple sectors, geographical scales, and levels of government. Build on the existing efforts and knowledge of a wide range of stakeholders who understand local or regional risks and needs.

**CL.4-4** Update community hazard mitigation plans to recognize that the effects of climate change will also affect the type and intensity of potential community hazards and to anticipate impacts and responses. Include planning for extreme heat and storm events, identifying populations and neighborhoods most vulnerable to these events.



Mill Valley home with green roof

## CLIMATE-3 | Zero Waste


**Implement Zero Waste strategies for solid waste management.**

### CL.5 Recycling and Waste Management


Reduce the volume of the waste stream by encouraging recycling and composting and moving toward Zero Waste objectives that minimize or eliminate waste sent to landfills.

**CL.5-1** Develop a Zero Waste Strategic Plan for Mill Valley that addresses: 

- Establishing a Zero Waste goal and timeframe;
- Supporting and promoting ongoing green waste recycling and composting opportunities for Mill Valley residents and businesses;
- Requiring all events needing a special events permit from the City to provide adequate recycling facilities and compostable materials;
- Scheduling periodic workshops on composting and providing starter kits to interested residents;
- Revising and updating the City's solid waste ordinance and construction and demolition ordinance to stay current with best practices and waste reduction policies; and
- Encouraging school-, business-, and neighborhood-based litter contests with prizes of local goods and services provided by local merchants.

**CL.5-2** Adopt new City waste reduction policies and strengthen existing policies in association with the Zero Waste Strategic Plan, as follows: 

- Revise and update Mill Valley's existing solid waste ordinance to keep pace with changes in the solid waste industry.
- Modify the construction and demolition ordinance to comply with the Marin Hazardous and Solid Waste Joint Powers Authority (JPA) model ordinance to ensure consistency among member agencies and help haulers comply.
- Continue to revise the ordinance that addresses construction/salvage/resale of construction and demolition materials.

**CL.5-3** Work with the Marin Hazardous and Solid Waste Joint Powers Authority (JPA) and Mill Valley's hauler to increase take back, reuse, and diversion, as follows: 

- Join the JPA in endorsing an Extended Producer Responsibility resolution that will support product design and packaging that integrates reuse and recycling.
- Negotiate franchise agreement language with Mill Valley Refuse to encourage "greener" operations, including food waste pick-up, and to maximize diversion.
- Work with JPA member agencies to promote regional bans on problem materials (Styrofoam, plastic bags) that are difficult to reuse or recycle.



- Work with Mill Valley Refuse to develop commercial and maintain residential food waste collection routes and to create centrally located facilities to process all green and food waste. Process this waste in anaerobic digesters for soil amendments and the production of biogas.
- Encourage the JPA to establish a landfill “tipping fee” to fund substantially enhanced Zero Waste and related sustainability efforts.
- Establish an Environmentally Preferable Procurement policy that emphasizes waste reduction.
- Adopt and enforce a multi-family dwelling and business recycling ordinance.

**CL.5-4** Educate residents and businesses on waste reduction strategies, as follows: 

- Encourage reduced consumption by increasing customer awareness of on-line and local resources that encourage material exchange, repair, and reuse.
- Partner with Master Gardeners and others to promote backyard composting.
- Expand education for City employees and the public about the benefits of waste reduction through informational materials and organized events.



Eco-stations set up at local event to reduce waste



Composting demonstration at Mill Valley’s Health and Wellness Fair, January 2014

## Additional City-Related Emission Reduction Programs

### LAND USE

**LU.5-2** Establish a coordinated network of pedestrian and bicycle amenities and safety improvements, including sidewalks, bike lanes, seating areas, trash receptacles, and bike parking, that will link local businesses and customers. 🌿

**LU.5-4** Encourage property owners in the East Blithedale/Alto Center commercial area to improve and modernize existing facilities so as to provide safe and efficient multi-modal access and circulation and attract major community-serving tenants. 🌿

### MOBILITY

**M.3-1** Coordinate with the Transportation Authority of Marin, the County of Marin, cities, regional transportation leaders, and local bicycle/pedestrian groups and organizations to advance alternative fuel and non-motorized forms of transportation within the City and to identify, develop, and/or fund alternative transportation and transit opportunities within Marin County. 🌿

**M.3-2** Work with public and private schools, Marin Transit, and the Transportation Authority of Marin to offer better options for transporting students to and from school, such as carpooling, shuttle or school buses, Safe Routes to School, and staggered start times at local schools. 🌿

**M.3-3** Establish methodologies that are practical and acceptable to the community to track community progress in reducing vehicular emissions. Document and report periodic changes in vehicle miles traveled by local residents to identify and track potential changes in vehicular travel. 🌿

**M.4-1** Improve the efficiency and safety of the transportation network for all travel modes by using best available practices, design, and technology, such as traffic recognition technology, transit and emergency signal priority, synchronized signal timing, improved signage, pedestrian crossings, bicycle detection at signalized intersections, and real-time transit data. Evaluate traffic signal timing and synchronization on a regular basis (every three years) to ensure that signals functioning at maximum efficiency for all users. Budget for regular upgrades to equipment and technology. 🌿

**M.4-2** Foster safe and efficient transportation links for cars, transit, bicycles, and pedestrians from Mill Valley to regional transportation services and facilities, such as the implementation of the Miller Avenue Streetscape Plan. 🌿

**M.4-3** Consider feasibility assessments for bicycle and pedestrian facilities and pathways, such as Alto Tunnel, Camino Alto, Horse Hill, and other possibilities that may provide safe and convenient connections between Mill Valley and the rest of Marin County. 🌿

**M.4-5** Identify and improve local pedestrian and bicycle routes that link Mill Valley neighborhoods to high-activity centers such as schools, parks, the Community Center, City Hall, the Public Library, and local business centers. 🌿

**M.4-6** Determine the location, dimensions, and legal status of public rights-of-way, including streets and steps, lanes and paths, to develop appropriate standards for maintenance and improvements and to clarify right-of-way status, where necessary, for the benefit of the overall transportation network and the community. 🌿

**M.5-1** Promote alternate travel modes (walking, cycling, public transit, ride sharing), through education and outreach including provision of accessible information about bus schedules, pedestrian pathways, trails, the 511 Rideshare Program, and related vanpool incentive programs. 🌿

**M.5-2** Promote a sponsored bike share or informal carpool program for downtown and/or other location(s) in town. 🌿

**M.5-3** Promote greater community participation in Street Smarts Marin, Safe Routes to School, the Neighborhood Traffic Calming program, and similar safe driving and driver courtesy programs. 🌿

**M.6-1** Make the purchase of high-efficiency vehicles a priority for the City fleet. 🌿

**M.6-2** Provide City 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, and encourage carpooling to meetings, events, and site visits. 🌿

**M.7-1** Work with property owners to expand the number and convenience of low- and zero-emission fueling stations in the City. 🌿

**M.7-2** Use the City's building and zoning codes and applicable development standards as an incentive for greater use of low- and zero-emission vehicles. 🌿

**M.7-3** Establish regulations that will accommodate innovations in alternative transportation, vehicles, and fuels such as electric vehicle charging facilities and infrastructure, in public facilities and private development, including all new and redeveloped public and private parking lots. 🌿



**M.8-1** Modify the City’s parking regulations to allow the use of the latest parking “best practices” in concert with other City development standards and guidelines. 🌿

**M.8-2** Establish design guidelines and development standards that result in more efficient utilization of a project site for vehicle access and parking. 🌿

**M.9-9** Consider replacing traditional motor vehicle-focused level of service standards with multi-modal considerations to ensure that roadway capacity is not overbuilt and all modes of transportation are considered when assessing traffic impacts and planning improvements. 🌿

**M.10-5** Continue to renovate, repair and maintain the City’s steps, lanes and paths that provide pedestrian connections to residential and commercial areas and complete emergency evacuation routes. 🌿

**M.11-6** Implement the Miller Avenue Streetscape Plan to provide pedestrian and bicycle connections between downtown and the County bike lane and multi-use path. 🌿

**M.13-2** Promote three-way collaboration among Safe Routes to School, the Bicycle and Pedestrian Advisory Committee, and the Mill Valley Police Department to advance education, safety, and enforcement programs that encourage more walking and cycling. 🌿

**M.14-1** Improve public transit infrastructure (e.g., lighting, benches, shelters, trash cans, safe and convenient bike racks and lockers, park and ride areas, news racks, real-time transit arrival information, etc.). 🌿

**M.14-3** Coordinate with the regional transit providers and the Transportation Authority of Marin to pursue funding opportunities to expand local and regional bus routes and frequency. 🌿

**M.14-4** Meet regularly with Marin Transit to provide efficient and adequate commuter service for Mill Valley residents and employees. 🌿

**M.15-1** Identify and consider the feasibility of a local shuttle operation through various program and/or funding opportunities, including but not limited to: 🌿

- Pilot projects;
- Dial-a-ride and on-call shuttle service programs (providing service from neighborhoods to arterial streets);
- Shared use of existing community shuttle services (e.g., Redwoods shuttle);
- Joint use of shuttles, such as working with schools to use shuttles in between peak times of commuter use;

- Public, private, and subscription funding sources; and
- Service connections with regional transit systems.

**M.16-3** Use a “Complete Streets” approach to funding roadway improvements and maintenance that result in safe and efficient travel for all users (vehicles, pedestrians, transit riders, and bicyclists), and a regular and consistent standard of maintenance for the City’s transportation network. 🌿

**M.17-6** Create opportunities to allow shared and reciprocal use of public and private parking spaces that serve more than a single location or use. 🌿

**M.17-11** Continue to work with public and private schools within Mill Valley, and local schools with Mill Valley students, to identify incentives to reduce student driving and encourage carpooling (thereby reducing emissions, parking demand, and traffic congestion at pick-up and drop-off). 🌿

## COMMUNITY VITALITY

**CV.1-4** Encourage “green” businesses that are non-polluting, offer or support environmentally sustainable goods or services, and/or actively promote telecommuting, alternative work schedules, and alternative transportation modes. 🌿

**CV.4-3** Encourage new development, particularly in infill areas, to provide small plazas, pocket parks, civic spaces, and other gathering places that are available to the public to help meet recreational demands. 🌿

**CV.7-1** Develop joint-use agreements or other collaborative means between the City and the owners of identified facilities to allow the use of existing community facilities (the Public Library, Community Center, Golf Course, parks, churches, and schools) on a formal and informal basis to expand opportunities for physical or social activities during off-peak hours in proximity to neighborhoods and to create additional revenue sources for enhancing and maintaining existing facilities. 🌿

**CV.8-1** Coordinate with paramedics, community-based organizations, and County and City staff to identify residents most at risk for falls and provide them with assessments of their homes and regular check-ins to reduce the risk of injuries related to falls. 🌿

**CV.8-5** Work with the Chamber of Commerce, local businesses, community organizations, and residents to promote “Healthy Retail,” a local food processing and distribution network that connects local agriculture to local retailers, restaurants, schools, hospitals, and other institutions. 🌿

**CV.8-7** Promote community gardens, edible schoolyards, and edible landscapes that support sustainable and organic farming practices. 🌿

## NATURAL ENVIRONMENT

**NE.3-3** In conjunction with the Sewerage Agency of Southern Marin (SASM) Board, assess the SASM treatment plant to attain greater efficiency, including advanced wastewater treatment capacity for water recycling and reuse on public and private properties. 🌿

**NE.3-4** Continue to take actions to reduce inflow and infiltration (“I&I”) in Mill Valley’s sanitary sewer collection system to reduce spills to the bay during rain events. 🌿

**NE.3-6** Continue to work with the County of Marin and other agencies to implement the Marin County Stormwater Pollution Prevention Program (MCSTOPP) and the National Pollutant Discharge Elimination System (NPDES) Permit that require watershed-based regional water quality standards and urban run-off management and reduction best practices and standards for all new development and redevelopment. 🌿

**NE.3-7** Encourage and educate residents and businesses to implement integrated pest management principles, reduce or discontinue the use of pesticides and herbicides, and reduce or discontinue the use of toxic cleaning substances. 🌿

**NE.4-1** Reduce water use in City buildings by: 🌿


- Assessing, maintaining, and repairing existing plumbing fixtures, pipes, and irrigation systems in all City buildings and facilities, including building and parking lot landscaping, public restrooms, parks, golf courses, and other recreational facilities, to minimize water use;
- Upgrading City plumbing and irrigation systems with water-conserving technology;
- Exploring options for installation of greywater systems as appropriate in City buildings and facilities;
- Auditing the City’s water and wastewater pumps and motors to evaluate equipment efficiency;
- Developing and implementing a motor/pump efficiency cycling schedule to use the most efficient water or wastewater motors/pumps first and least efficient ones last;
- Replacing the least efficient motors and pumps with more efficient units;
- Implementing methane capture for energy production at the wastewater treatment plant;
- Using recycled water for City facilities and operations where appropriate; and


- Retrofitting existing City buildings and facilities to meet water efficiency standards of the Leadership in Energy and Environmental Design (LEED) rating system for “Existing Buildings.”


**NE.4-2** Reduce water consumption in the community by: 

- Partnering with the Marin Municipal Water District (MMWD) to highlight the existence of rebates for the installation of indoor and outdoor water efficiency fixtures and appliances, and promoting existing and proven water conservation measures through educational programs and other initiatives;
- Partnering with MMWD, conservation organizations, installers, and manufacturers to promote the installation of greywater systems and rainwater catchment;
- Exploring incentives for promoting the installation of greywater systems and/or water-efficient landscaping at commercial and residential properties;
- Requiring water efficiency audits at point of sale for commercial and residential properties;
- Adopting a retrofit program to encourage or require installation of water conservation measures in existing businesses and homes;
- Consistent with upgrades to the Sewerage Agency of Southern Marin (SASM) wastewater treatment facility to provide advanced wastewater treatment and supply, requiring dual plumbing for use of recycled water for new commercial and/or residential developments;
- Using bay-friendly landscaping and gardening guidelines developed by StopWaste.Org or other similar best practices in the design, construction, and maintenance of residential and commercial landscapes; and
- Reviewing the City’s zoning regulations and design guidelines to address lot coverage standards and increase the use of pervious paving for driveways, patios, walkways, and other hardscape features.

**NE.4-3** Establish local greywater system guidelines. 

**NE.4-4** Evaluate existing City-owned landscapes and parking lots to consider options to convert reflective and impervious surfaces to pervious landscape, and install or replace vegetation with drought-tolerant, low-maintenance native species or edible landscaping that can also provide shade and reduce the effects of intense sunlight and heat. 

**NE.4-5** Work with the Marin Municipal Water District (MMWD) to establish and promote incentives for water conservation. 

**NE.5-2** Encourage the use of environmental monitoring applications and other technology to engage the community in resource protection and preservation. 

**NE.5-5** Build community support for sustainability through engaging and fun activities and challenges such as the “Low Carbon Diet,” “Resilient Neighborhoods,” and other programs. 🌿

**NE.6-1** Use the City’s website and notification systems to disseminate best practices associated with resource management programs and practices and hazard mitigation to the community. 🌿

**NE.6-2** Consider creating a “Sustainability Coordinator” City staff position or a Sustainability Commission to initiate, coordinate, and implement sustainable policies and programs as well as researching and writing successful grant applications to support sustainability efforts. 🌿

**NE.6-3** Continue coordination efforts with Marin County and other jurisdictions to jointly create and implement common sustainability practices. 🌿

**NE.6-4** Adopt purchasing practices and standards that support climate action policies and reductions in greenhouse gas emissions. 🌿



# Appendix - Emission Reduction Targets based on programs

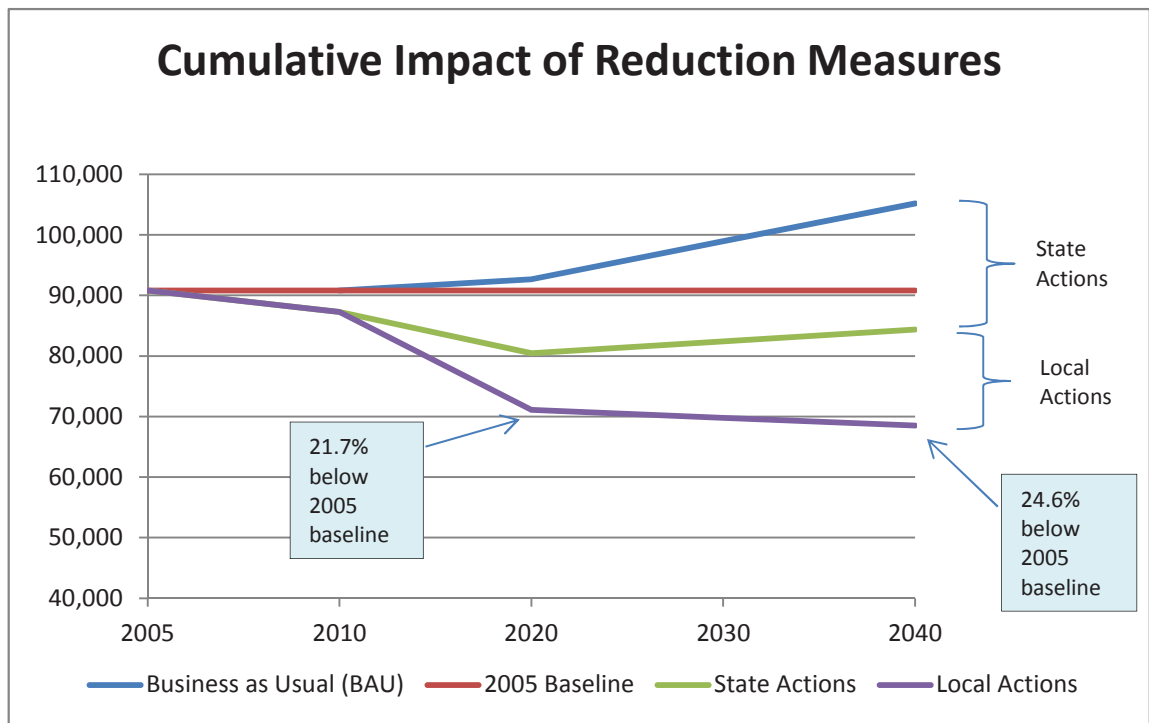
GHG EMISSIONS REDUCTION SUMMARY City of Mill Valley General Plan 2040			
ERM	Measure	GHG Emissions Reductions (MTCO <sub>2</sub> e/yr)	
		2020	2040
<b>Local Actions</b>			
<u>1</u>	Recycled Water	-0.3	-8.3
<u>2</u>	Reduce Infiltration & Inflow to Wastewater Treatment Plant	-3.1	-9.3
<u>3</u>	Municipal Indoor Water Conservation	-1.0	-1.5
<u>4</u>	Municipal Outdoor Water Conservation	-1.6	-2.4
<u>5</u>	Wastewater Treatment Plant Energy Efficiency Projects	-21.3	-21.3
<u>6</u>	Cogeneration at Wastewater Treatment Plant	0.0	-110.0
<u>7</u>	Indoor Water Efficiency and Conservation	-1,234.6	-1,938.1
<u>8</u>	Outdoor Water Efficiency and Conservation	-16.8	-26.3
<u>9</u>	Greywater	-0.3	-6.7
<u>10</u>	Rainwater Catchment	0.0	-0.2
<u>11</u>	Food and Greenwaste	-689.2	-801.5
<u>12</u>	C&D Waste	-117.7	-136.9
<u>13</u>	Paper Waste	-1,013.4	-1,177.9
<u>14</u>	Food Waste to Energy	0.0	-134.2
<u>15</u>	Resilient Neighborhoods & Businesses	-330.0	-1,650.0
<u>16</u>	Green Purchasing	-8.6	-9.6
<u>17</u>	Energy Efficiency Beyond Title 24	-8.8	-12.6
<u>18</u>	Energy Audits	-37.6	-249.7
<u>19</u>	Marin Clean Energy	-4,582.0	-3,849.0
<u>20</u>	Municipal Streetlights	-38.7	-51.5
<u>21</u>	Municipal Energy Efficiency and Renewable Energy Projects	-46.6	-127.5
<u>22</u>	Energy Efficiency	-402.1	-2,085.7
<u>23</u>	Renewable Energy	-117.3	-1,308.5
<u>24</u>	Tree Planting	-8.5	-28.3
<u>25</u>	EV Parking	-31.0	-155.1
<u>26</u>	Carpool Parking	-16.9	-84.7
<u>27</u>	School Transportation	-50.1	-100.2
<u>28</u>	Bicycle and Pedestrian Transportation	-285.0	-955.4
<u>29</u>	Public Transportation	-101.2	-402.8
<u>30</u>	Carpooling	-200.0	-320.6
<u>31</u>	Bike Sharing	-13.8	-55.3
<u>32</u>	High-Efficiency City Vehicles	18.3	-36.6
<u>33</u>	City Employee Commute Incentives	-3.9	-11.2
TOTAL - LOCAL ACTIONS		-9,363	-15,869
<b>State Actions</b>			
<u>RPS</u>		-834	-700
<u>TITLE 24</u>		-116	-1,893
<u>PAVLEY 1 and LCFS</u>		-10,991	-17,919
<u>CSI</u>		-277	-277
TOTAL - STATE ACTIONS		-12,217	-20,788
<b>Projected Emissions</b>			
Projected BAU Community-Wide GHG Emissions		92,663	105,168
Emission Reductions from Local and State Actions		-21,580	-36,657
Community-Wide Emissions with Local and State Actions Implemented		71,083	68,510
<b>Reduction from 2010 Emissions</b>			
2010 Community-Wide GHG Emissions		87,258	87,258
Community-Wide Emissions with Local and State Actions Implemented		71,083	68,510
% Reduction from 2010 Emissions		18.5%	21.5%
<b>Reduction from 2005 Baseline Emissions</b>			
2005 Community-Wide GHG Emissions		90,806	90,806
Community-Wide Emissions with Local and State Actions Implemented		71,083	68,510
% Reduction from 2005 Baseline		21.7%	24.6%

**GHG EMISSIONS REDUCTION SUMMARY**  
 City of Mill Valley General Plan 2040

Electricity Reductions		VMT Reductions	
2020	2040	2020	2040
1,908	47,825		
15,379	46,137		
2,854	4,280		
9,041	13,562		
104,497	104,497		
0	544,393		
2,252,492	3,536,103		
96,494	151,482		
1,966	38,662		
119	1,186		
0	664,246		
704	1,009		
72,439	349,261		
140,299	187,115		
228,765	626,365		
712,979	3,797,759		
999,341	6,567,532		
-22,908	-114,542		
		35,795	178,973
		105,858	211,716
		602,378	2,019,737
		213,910	851,412
		422,786	677,787
		29,200	116,800
		8,205	23,667
261,973	3,668,494		
1,402,947	1,402,947		
<b>TOTALS</b>	<b>6,281,288</b>	<b>1,418,130</b>	<b>4,080,092</b>

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	2005	2010	2020	2030	2040
<b>Business as Usual (BAU)</b>		90,806	92,663	98,915	105,168
<b>2005 Baseline</b>	90,806	90,806	90,806	90,806	90,806
<b>State Actions</b>	90,806	87,258	80,446	82,412	84,379
<b>Local Actions</b>	90,806	87,258	71,083	69,797	68,510



## FORECAST

### Household Growth Projections, One Bay Area May 2012, Appendix A

Jurisdiction	2010	2040	2020 Estimated	2010-2040*
Belvedere	930	970	943	40
Corte Madera	3,790	4,080	3,887	290
Fairfax	3,380	3,620	3,460	240
Larkspur	5,910	6,450	6,090	540
Mill Valley	6,080	6,540	6,233	460
Novato	20,280	21,450	20,670	1,170
Ross	800	860	820	60
San Anselmo	5,240	5,530	5,337	290
San Rafael	22,760	26,490	24,003	3,730
Sausalito	4,110	4,460	4,227	350
Tiburon	3,730	4,000	3,820	270
Unincorporated Marin County	26,190	27,570	26,650	1,380
<b>TOTAL</b>	<b>103,200</b>	<b>112,020</b>	<b>106,140</b>	<b>8,820</b>

\*Calculation corrects errors in One Bay Area report

### Housing Unit Growth Projections, One Bay Area May 2012, Appendix A

Jurisdiction	2010	2040	2020 Estimated	2010-2040*
Belvedere	1,050	1,070	1,057	20
Corte Madera	4,030	4,250	4,103	220
Fairfax	3,590	3,790	3,657	200
Larkspur	6,380	6,770	6,510	390
Mill Valley	6,530	6,920	6,660	390
Novato	21,160	22,220	21,513	1,060
Ross	880	940	900	60
San Anselmo	5,540	5,790	5,623	250
San Rafael	24,010	27,400	25,140	3,390
Sausalito	4,540	4,790	4,623	250
Tiburon	4,030	4,250	4,103	220
Unincorporated Marin County	29,500	30,550	29,850	1,050
<b>TOTAL</b>	<b>111,240</b>	<b>118,740</b>	<b>113,740</b>	<b>7,500</b>

\*Calculation corrects errors in One Bay Area report

**Employment Growth Projections, One Bay Area May 2012, Appendix A**

Jurisdiction	2010	2040	2020 Estimated	2010-2040*
Belvedere	430	480	447	50
Corte Madera	7,940	8,260	8,047	320
Fairfax	1,490	1,820	1,600	330
Larkspur	7,190	7,810	7,397	620
Mill Valley	5,980	6,780	6,247	800
Novato	20,890	24,390	22,057	3,500
Ross	510	590	537	80
San Anselmo	3,740	4,350	3,943	610
San Rafael	37,620	44,960	40,067	7,340
Sausalito	6,220	7,630	6,690	1,410
Tiburon	2,340	2,690	2,457	350
Unincorporated Marin County	16,380	19,360	17,373	2,980
<b>TOTAL</b>	<b>110,730</b>	<b>129,120</b>	<b>116,860</b>	<b>18,390</b>

\*Calculation corrects errors in One Bay Area report

**Household Size Projections, ABAG Projections 2009**

Jurisdiction	2020	2035
Belvedere	2.24	2.24
Corte Madera	2.36	2.30
Fairfax	2.22	2.20
Larkspur	2.04	2.10
Mill Valley	2.24	2.23
Novato	2.57	2.53
Ross	3.04	3.04
San Anselmo	2.34	2.35
San Rafael	2.51	2.48
Sausalito	1.77	1.82
Tiburon	2.41	2.44
Unincorporated Marin County	2.65	2.64
Marin County	2.46	2.45

**Marin County Average Daily VMT Forecasts,  
MTC 2035 Travel Forecast Data Summary, Table F5**

2010	6,407,040
2020	7,015,781
Years compounded	10
Compound Annual Growth Rate	0.91%
Percent change 2010 to 2020	9.50%

**Marin County Average Daily VMT Forecasts,  
MTC 2035 Travel Forecast Data Summary, Tables F4 and F5**

2010	6,407,040
2035	8,071,230
Years compounded	25
Compound Annual Growth Rate	0.93%
Percent change 2010 to 2040	31.93%

**ABAG Housing Needs Determination for Mill Valley, 2009-2014**

	Number	Percent
Very Low	74	25%
Low	54	18%
Moderate	68	23%
Above Moderate	96	33%
Total	292	100%
Unit type assumptions:		
Multi-Family	196	67%
Single Family	96	33%

**Emission Factors, 2020**

PG&E	0.0001251 MTCO <sub>2</sub> e/kWh
MEA	0.0001157 MTCO <sub>2</sub> e/kWh
DA	0.0002999 MTCO <sub>2</sub> e/kWh
Electricity, weighted average	0.0001246 MTCO <sub>2</sub> e/kWh
Natural Gas	0.0053156 MTCO <sub>2</sub> e/therm
Gasoline/off-road	0.0087800 MTCO <sub>2</sub> /gallon
Diesel/off-road	0.0102100 MTCO <sub>2</sub> /gallon
Transportation coefficient	0.0003704 MTCO <sub>2</sub> e/mile

**Emission Factors, 2040**

PG&E	0.0001251 MTCO <sub>2</sub> e/kWh
MEA	0.0001157 MTCO <sub>2</sub> e/kWh
DA	0.0002999 MTCO <sub>2</sub> e/kWh
Electricity, weighted average	0.0001246 MTCO <sub>2</sub> e/kWh
Natural Gas	0.0053156 MTCO <sub>2</sub> e/therm
Gasoline/off-road	0.0087800 MTCO <sub>2</sub> /gallon
Diesel/off-road	0.0102100 MTCO <sub>2</sub> /gallon
Transportation coefficient	0.0003384 MTCO <sub>2</sub> e/mile

NATURAL ENVIRONMENT

*NATURAL-5: Considering the Ecosystem in City Decision-Making: All planning and decision-making processes should integrate sustainability and resource conservation.*

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.7.42/NE.6-3	Continue coordination efforts with Marin County and its jurisdictions to jointly develop, create and implement common sustainability practices.	ERM.7    ERM.8 ERM.11   ERM.12 ERM.13   ERM.22 ERM.23
P.7.44/NE.6-4	Adopt purchasing practices and standards that support climate action policies and reductions in greenhouse gas emissions.	ERM.16

NATURAL ENVIRONMENT

*NATURAL-3: Water: Protect and Improve Water Quality, System Supply and System Integrity*

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.3.17 /NE.3-3	Assess the SASM treatment plant to attain greater efficiency, including advanced wastewater treatment capacity for water recycling and reuse on public and private properties.	ERM.1
P.3.18/NE.3-4	Continue to take actions to reduce Inflow and Infiltration ("I&I") in MV's sanitary sewer collection system to reduce spills to the bay during rain events.	ERM.2
P.3.19/NE.3-6	Continue to work with Marin County and other agencies to implement the Marin County Stormwater Pollution Prevention Program (MCSTOPP) and the National Pollution Discharge Elimination System (NPDES) Permit that require watershed-based regional water quality standards and urban run-off management and reduction best practices and standards for all new development and redevelopment.	n/a
P.3.20/NE.3-7	Encourage and educate residents and businesses to implement integrated pest management principles, reduce or discontinue the use of pesticides and herbicides, and reduce or discontinue the use of toxic cleaning substances.	n/a
P.4.21/NE.4-1	<p>Reduce water use in City buildings:</p> <ul style="list-style-type: none"> <li>• Assess, maintain and repair existing plumbing fixtures, pipes, and irrigation systems in all City buildings and facilities to minimize water use, including building and parking lot landscaping, public rest rooms and parks, golf courses and other recreational facilities.</li> <li>• Upgrade City plumbing and irrigation systems with water conserving technology.</li> <li>• Audit the City's water and wastewater pumps and motors to evaluate equipment efficiency.</li> <li>• Develop and implement a motor/pump efficiency cycling schedule to use the most efficient water or wastewater motors/pumps first and least efficient ones last.</li> <li>• Replace least efficient motors and pumps with more efficient units.</li> <li>• Implement methane capture for energy production at the wastewater treatment plant.</li> <li>• Use recycled water for agency facilities and operations where appropriate.</li> <li>• Retrofit existing agency buildings and facilities to meet water efficiency standards for the LEED Standards Rating Systems for Existing Buildings.</li> </ul>	ERM.1 ERM.3 ERM.4 ERM.5 ERM.6



P.4.22/NE.4-2	<p>Reduce Water in the Community:</p> <ul style="list-style-type: none"> <li>• Partner with MMWD to highlight the existence of rebates for the installation of indoor and outdoor water efficiency fixtures and appliances, and promote existing and proven water conservation measures through educational programs and other initiatives.</li> <li>• Partner with MMWD, conservation organizations, installers and manufacturers to promote the installation of rainwater catchment and grey water systems.</li> <li>• Require water efficiency audits at point of sale for commercial and residential properties.</li> <li>• Adopt a retrofit program to encourage or require installation of water conservation measures in existing businesses and homes.</li> <li>• Require dual plumbing for use of recycled water for new commercial and/or residential developments.</li> <li>• Mandate the use of the Bay Friendly Landscaping and Gardening Guidelines, developed by StopWaste.Org, in the design, construction and maintenance of residential and commercial landscapes.</li> <li>• Code change to require pervious paving in lot coverage</li> </ul>	ERM.7 ERM.8 ERM.9 ERM.10
P.4.23/NE.4-3	Establish local rainwater storage and greywater system guidelines.	ERM.9 ERM.10
P.4.24/NE.4-4	Evaluate existing City-owned landscapes and parking lots to consider options to convert reflective and impervious surfaces to pervious landscape, and install or replace vegetation with drought-tolerant, low, maintenance native species or edible landscaping that can also provide shade and reduce the effects of intense sunlight and heat.	ERM.8
P.4.25/NE.4-5	Work with Marin Municipal Water District (MMWD) to establish and promote all incentives for water conservation.	ERM.7 ERM.8

## NATURAL ENVIRONMENT

***NATURAL-4: Leadership and Education: Increase the community's knowledge and understanding of ecologically significant and sensitive natural communities, natural processes, and any corresponding hazards where the natural environment and human settlement meet.***

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.6.30/NE.5-1	Coordinate with the Mill Valley Library, Parks & Recreation Department, and local public and private schools to integrate sustainability and local natural resource appreciation and engagement into educational and recreation programs.	ERM.7 ERM.8 ERM.11 ERM.12 ERM.13
P.6.31/NE.5-2	Encourage the use of environmental monitoring "apps" and other technology to engage the community in resource protection and preservation.	ERM.7 ERM.8 ERM.11 ERM.12 ERM.13
P.6.34/NE.5-5	Build community support for sustainability through engaging and fun activities and challenges such as the "Low Carbon Diet", "Resilient Neighborhoods" and other programs.	ERM.15
P.6.38/NE.5-9	Encourage a "pack it out" ethic to reduce litter and promote individual responsibility for helping to maintain natural areas.	ERM.11 ERM.13

**CLIMATE ACTION**

***CLIMATE-1: Climate Change: Reduce the Community's Carbon Footprint***

<b>EIR Program #/ MV2040 Program #</b>	<b>Description</b>	<b>Emissions Reduction Measure</b>
P.8.45/CL.1-5	Update the City's Green Building Ordinance and support best practices and other green building standards to conserve energy and resources, including: 1) design guidelines, development standards and permitting procedures to encourage emerging green building technologies. 2) outdoor lighting standards that require light levels in all new development, parking lots and street lighting to not exceed state standards. 3) guidelines for residential solar and wind energy systems such as optimal roof orientation, clear access without obstructions; roof framing and design; installation of electrical conduit to accept solar electric system wiring; installation of plumbing to support solar hot water system and provision of space for solar hot water storage tank. in locations where a solar electric or hot water system will be cost-effective; 4) Guidelines to encourage new development to include wiring and staging to allow for solar- and/or electric-ready technologies and to achieve net zero building efficiency.	ERM.23 ERM.10 ERM.17 ERM.22
P.8.47/CL.1-6	Require the performance of energy audits for residential and commercial buildings prior to completion of sale, and that audit results and information about opportunities for energy improvement be presented to potential buyers.	ERM.18
P.8.48/CL.1-2	Continue to work with Marin Energy Authority (MEA), PG&E or other clean energy providers to encourage greater residential and business participation and use of greener energy supplies.	ERM.19
P.8.49/CL.1-7	Replace street and public parking lot lights with more energy efficient lamps as technology creates more efficient and better quality lighting.	ERM.20
P.8.50/CL.1-8	Participate in opportunities such as those provided by Assembly Bill 811 and other public financing programs that support the installation of renewable energy systems and other energy efficient upgrades for public agencies and private property owners.	ERM.21 ERM.22 ERM.23
P.9.51/CL.2-1	Provide educational opportunities and creative incentives for City-sponsored events, community organizations, residents, and businesses to reduce their carbon footprint using validated offset or carbon reduction programs, such as "Resilient Neighborhoods"	ERM.15
P.9.52/CL.2-2	Create a process to apply on- or off-site carbon offsets to new development, increased intensity of use and/or other activities that increase greenhouse gas emissions.	ERM.24

## CLIMATE ACTION

### CLIMATE-3: Zero Waste: Implement Zero Waste Strategies for Solid Waste Management

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.5.26/CL.5-1	Develop a Zero Waste strategic plan for Mill Valley that would address: 1) Establish Zero Waste goal and timeframe Supporting and promoting on-going green waste recycling and composting opportunities for Mill Valley residents and businesses. 2) Requiring all events needing a permit from the City to include recycling and/or compostable materials as part of special event permits. 3) Scheduling periodic workshops on composting and provide starter kits to interested residents.4) Revising and updating the City’s solid waste ordinance and construction and demolition ordinance to stay current with best practices and waste reduction policies. 5) Encouraging school, business and neighborhood based litter contests with prizes of local goods and services provided by local merchants.	ERM.11 ERM.12 ERM.13
P.5.27/CL.5-2	Adopt and strengthen existing City waste reduction policies in association with Zero Waste Strategic Plan. 1) Revise and update Mill Valley’s existing Solid Waste Ordinance to keep pace with changes in the solid waste industry.2) Modify the Construction and Demolition Ordinance to comply with the Waste JPA’s model ordinance to ensure consistency among member agencies and help haulers comply. 3) Adopt a Deconstruction/Salvage/Resale of construction and demolition materials ordinance. 4) Adopt and enforce a multi-family dwelling and business recycling ordinance.	ERM.12 ERM.13
P.5.28/CL.5-3	Work with Marin Solid and Hazardous Waste Joint Powers Authority (JPA) and Mill Valley’s Hauler to increase take back, reuse and diversion: 1) Join the Marin Solid and Hazardous Waste JPA in endorsing an Extended Producer Responsibility resolution. 2) Revise Franchise agreement language with Mill Valley Refuse to encourage “greener” operations, including food waste pickup, and to maximize diversion. 3) Work with Waste JPA member agencies to promote regional bans on problem materials (Styrofoam, plastic bags) that are difficult to reuse or recycle. 4) Work with Mill Valley Refuse to develop commercial and residential food waste collection routes and to create centrally located facilities to process all green and food waste. Process this waste in anaerobic digesters for soil amendments and the production of biogas. 5) Encourage the JPA to establish a landfill “tipping fee” to fund substantially enhanced zero waste and related sustainability efforts. 6) Establish an Environmentally Preferable Procurement policy that emphasizes waste reduction.	ERM.11 ERM.13 ERM.14
P.5.29/CL.5-4	Educate residents and businesses on waste reduction strategies. 1) Encourage reduced consumption by increasing customer awareness of on-line and local resources that encourage material exchange, repair and reuse. 2) Partner with Master Gardeners and others to promote backyard composting. 3) Expand education to city employees and the public about the benefits of waste reduction through informational materials and organized events.	ERM.11 ERM.13

## HAZARDS & SAFETY

*HAZARD-1: Community Hazard Resilience: Minimize loss of life, property and important elements of the natural ecosystem and maximize Mill Valley's ability to prepare for, respond to and recover from disaster.*

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.12.62/HZ.1-3	Strengthen requirements for public right-of-way improvements, fire sprinklers, vegetation management, fire resistive construction and other hazard mitigation programs and insure that regulations are regularly and consistently enforced to minimize threats to life and property through adequate code enforcement staffing and procedures.	Not quantifiable

**COMMUNITY VITALITY & LAND USE**

***VITALITY-1 Economic Vitality: Maintain a strong, diverse and vibrant local economy that welcomes those who want to make a positive economic impact, create sustainable commercial success, support Mill Valley's small town character, and enhance the quality of life of the community.***

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.1.83/CV.1-4	Encourage "green businesses" that are non-polluting, that offer or support environmentally sustainable goods or services, or that actively promote telecommuting, alternative work schedules and transportation modes.	ERM.12

***LAND-3 Commerical Areas: Maintain and Enhance the City's Principal Commercial Areas (Downtown, Miller Avenue, Blithedale/Alto Center).***

P.6.92/LU.5-2	Establish a coordinated network of pedestrian and bicycle amenities and safety improvements, including sidewalks, bike lanes, seating areas, trash receptacles and bike parking that will link local businesses and customers	ERM.28
P.6.94/LU.5-4	Encourage property owners in the East Blithedale/Alto Center commercial area to improve and modernize existing facilities so as to provide safe and efficient multi-modal access and circulation and attract major community serving tenants.	ERM.28

***VITALITY-3 Healthy Community: Create a built environment and local social structure that encourage physical activity and Strengthen Opportunities for Social Interaction and Building Community Relationships.***

P.8.101/LU.4-3	Promote and encourage new development to provide small plazas, pocket parks, civic spaces, and other gathering places that are available to the public, particularly in infill areas, to help meet recreational demands.	ERM.28
P.9.102/CV.8-2	Create ""Safe Routes for Seniors"" by identifying the routes that older adults take to access medical care, food and social events in the community and make those safer.	ERM.28
P.9.107/CV.8-7	Promote community gardens, edible schoolyards and edible landscapes that support sustainable and organic farming practices	Not quantifiable
P.9.105/CV.1-2	Work with the Chamber of Commerce, local businesses, community organizations and residents to improve Healthy Retail by supporting local food processing and distribution needs that connect local agriculture to local retailers, restaurants, schools, hospitals and other institutions.	Not quantifiable

***VITALITY-3 Healthy Community: Maintain a broad range of public and private programs that meet diverse community needs for mental health, arts, recreational, intellectual, educational and cultural programs.***

P.10.108/CV.7-1	Develop joint-use agreements or other collaborative means that to allow the use of existing community facilities (parks, library, community center, golf course, churches, and schools) on a formal and informal basis to: expand opportunities for physical or social activities during off-peak hours in proximity to neighborhoods, and create additional revenue sources for enhancing and maintaining existing facilities	ERM.28
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## MOBILITY

***MOBILITY-2: Sustainable Transportation: Reduce transportation-related emissions by reducing traffic congestion and vehicle-miles traveled while promoting the use of lower emission vehicles and non-automotive modes of travel.***

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.3.162/M.3-1	Coordinate with the Transportation Authority of Marin, Marin County, cities and regional transportation leaders, and local bicycle/pedestrian groups and organizations to advance alternative fuel and non-motorized forms of transportation within the City to identify, develop and/or fund alternative transportation and transit opportunities within Marin County.	ERM.25 ERM.28 ERM.29
P.3.163/M.3-2	Work with public and private schools, Marin Transit and the Transportation Authority of Marin to better transport students to and from school, such as carpooling, shuttle or school buses, and Safe Routes to School.	ERM.27
P.4.165/M.4-1	Improve the efficiency and safety of the transportation network for all travel modes by using best available practices, design and technology, such as transit and emergency signal priority, synchronized signal timing, improved signage, pedestrian crossings, bicycle detection at signalized intersections and real-time transit data	ERM.27 ERM.28 ERM.29
P.4.166/M.4-2	Foster safe and efficient transportation links for cars, transit, bicycles and pedestrians from Mill Valley to regional transportation services and facilities.	ERM.28 ERM.29
P.4.167/M.4-3	Consider feasibility assessments for bicycle and pedestrian facilities and pathways, such as Alto Tunnel, Camino Alto, Horse Hill, and other possibilities that may provide safe and convenient connections between Mill Valley and the rest of Marin County.	ERM.28
P.4.169/M.4-5	Identify and improve local pedestrian and bicycle routes that link Mill Valley neighborhoods to high activity centers such as schools, parks, the Community Center, City Hall, the public library, and local business centers	ERM.27 ERM.28
P.4.170/M.4-6	Determine the location, dimensions and legal status of public rights-of-way, including streets and steps, lanes and paths, to develop appropriate standards for maintenance and improvements and to clarify right-of-way status, where necessary, for the benefit of the overall transportation network and the community.	ERM.28
P.5.171/M.5-1	Promote alternate travel modes (walking, cycling, public transit, ride sharing), through education and outreach including provision of accessible information about bus schedules, pedestrian pathways, trails, 511 Rideshare Program, and related vanpool incentive programs.	ERM.28 ERM.29 ERM.30
P.5.172/M.5-2	Promote a sponsored bike share or informal carpool program for downtown, and/or other location(s) in town.	ERM.30 ERM.31
P.5.173/M.5-3	Promote greater community participation in Street Smarts Marin, Safe Routes to School, the Neighborhood Traffic Calming program and similar programs.	ERM.27 ERM.28
P.6.174M.6-1	Make the purchase of high efficiency vehicles a priority for the City fleet.	ERM.32

P.7.176/M.6-2	Provide City 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, and encourage carpooling to meetings, events and site visits.	ERM.33
P.7.177/M.7-2	Use the City's building and zoning codes and applicable development standards as an incentive for greater use of low and zero emission vehicles.	ERM.25
P.7.178/M.7-3 and M.8-1	Amend the City's parking regulations to accommodate low and zero emission vehicles, and carpool vehicles at public facilities and private development.	ERM.25 ERM.26
P.8.179/M.8-1	Modify the City's parking regulations to allow the use of the latest parking "best practices" in concert with other City development standards and guidelines.	n/a
P.8.180/M.8-2	Establish design guidelines and development that result in more efficient utilization of a project site for vehicle access and parking.	n/a



## MOBILITY

***MOBILITY-3: Sustainable Transportation: Create a safe and sustainable transportation network that balances the needs of pedestrians, bicyclists, motorists, and transit users.***

EIR Program #/ MV2040 Program #	Description	Emissions Reduction Measure
P.10.188/M.9-9	Replace traditional motor vehicle focused level of service standards with multi-modal considerations to ensure that roadway capacity is not overbuilt and all modes of transportation are considered when assessing traffic impacts and planning improvements.	ERM.28
P.11.193/M.10-5	Continue to renovate, repair and maintain Steps, Lanes and Paths that provide pedestrian connections to residential and commercial areas and complete emergency evacuation routes.	ERM.28
P.12.198/M.11-6	Implement Miller Avenue Streetscape Plan to connect pedestrians and bicyclists between downtown to the County bike lane and Multi-Use Path.	ERM.28
P.12.200/M.13-2	Promote three-way collaboration among Safe Routes to School, the Bicycle and Pedestrian Advisory Committee (BPAC), and Mill Valley Police Department to advance education, safety, and enforcement programs that encourage more walking and cycling.	ERM.27 ERM.28
P.14.205/M.14-1	Improve public transit infrastructure (e.g., benches, shelters, trash cans, safe and convenient bike racks and lockers, park and ride, news racks, real-time transit arrival information, etc.).	ERM.29
P.14.207/M.14-3	Coordinate with the regional transit providers and the Transportation Authority of Marin (TAM) to pursue funding opportunities to expand local and regional bus routes and frequency.	ERM.29
P.14.208/M.14-4	Meet regularly with Marin County Transit to provide efficient and adequate commuter service for Mill Valley residents and employees.	ERM.29
P.15.211/M.15-1	Continue to explore a local shuttle operation through various program and/or funding opportunities, including but not limited to: 1) pilot projects, 2) dial a ride and on-call shuttle service programs (providing service from neighborhoods to arterials), 3) shared use of existing community shuttle services (e.g. Redwoods shuttle), 4) joint use of shuttle -- such as working with schools to utilize shuttle in between peak commuter usage. 5) public, private and subscription funding sources. 6) Any proposed shuttle should coordinate service connections with regional transit systems	ERM.29

***MOBILITY-4 Parking: Recognize on- and off-street parking as a finite resource and effectively manage parking demand and capacity for all uses.***

P.16.221/M.17-5	Provide secure bicycle parking Downtown and near popular citywide destinations, including public facilities, schools, commercial and business centers, transit stops, and recreational destinations.	ERM.27 ERM.28
P.17.5/M.17-6	Create opportunities to allow shared public and private parking spaces that serve more than a single location or use.	Not quantifiable
P.17.9/M.16-3	Use a "Complete Streets" approach to funding roadway improvements and maintenance that results in safe and efficient travel for all users (vehicles, pedestrians, transit riders and bicyclists), and regular consistent standard of maintenance for the City's transportation network.	ERM.28

**RECYCLED WATER**  
**Emissions Reduction Measure ERM.1**

Related EIR/MV2040 Program #	NE.3.P.3.17/NE.3-3
Reductions (MTCO <sub>2</sub> e)	Implementation action: <p style="margin-left: 40px;">-0.3 2020: Treat and distribute an additional 7 MG of wastewater per year.</p> <p style="margin-left: 40px;">-8.3 2040: Treat and distribute recycled water from a 1 MGD facility.</p>
Methodology	<p>CAPCOA Measure WSW-1 used for estimating recycled water use. Recycled water treatment and distribution uses an average 1,200 to 3,000 kWh/MG. CAPCOA recommends using the average of 2,100 kWh/MG.</p> <p>The wastewater treatment plant currently provides approximately 7 MG/year for landscape irrigation. In order to maximize water reclamation, SASM would need to provide a process to remove salt from the wastewater. Without implementing this process, it is possible to increase reclamation to up to 14 MG/year. The 2040 estimate assumes a feasible process is identified to remove salt from the wastewater.</p> <p>Recycled water assumed to be available for the typical irrigation season of May through October.</p>
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>California Energy Commission, "Refining Estimates of Water-Related Energy Use in California," PIER Final Project Report, prepared by Navigant Consulting, Inc., CEC-500-2006-118, December 2006.</p> <p>Email from Mark Grushayev, SASM, Feb. 14, 2013.</p> <p>Email from Stephen Danehy, Jan. 12, 2013.</p> <p>San Francisco Bay Regional Water Control Board, Order No. R2-2012-0094, NPDES No. CA0037711  <a href="http://www.swrcb.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0094.pdf">http://www.swrcb.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0094.pdf</a></p>

**Calculation**

Electricity required to treat and distribute MMWD water	2,373 kWh/MG
Electricity required to treat and distribute recycled water	2,100 kWh/MG
Avoided electricity use	273 kWh/MG
2020: additional annual production 7 MG	1,908 kWh
2040: 1 MGD facility annual production 175.5 MG	47,825 kWh
Reduction in GHG emissions for MGD facility	0.3 MTCO <sub>2</sub> e
Reduction in GHG emissions for 1 MGD facility	8.3 MTCO <sub>2</sub> e

**REDUCE INFLOW AND INFILTRATION TO WASTEWATER TREATMENT PLANT**  
***Emissions Reduction Measure ERM.2***

Related EIR/MV2040 Program #	NE.3.P.3.18/NE.3-4
Reductions (MTCO <sub>2</sub> e)	Implementation options: -3.1 2020: Reduce inflow and infiltration by 10 million gallons annually. -9.3 2040: Reduce inflow and infiltration by 30 million gallons annually.
Methodology	Average daily flow rate for the wastewater treatment plant is 3.27 million gallons per day (MGD). Approximately 1,194 million gallons (MG) wastewater treated Average dry weather flow is 2.47 MGD. Approximately 902 MG of annual treated wastewater is base wastewater flow.  Approximately 292 MG is annual rainwater-dependent infiltration and inflow. The City of Mill Valley represents 40.9% of this total, or approximately 119 MG.
Sources	San Francisco Bay Regional Water Control Board, Order No. R2-2012-0094, NPDES No. CA0037711 <a href="http://www.swrcb.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0094.pdf">http://www.swrcb.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0094.pdf</a>  Sewage Spill Reduction Action Plan: Annual Report on Flow Monitoring, prepared by RMC, October 2010.  Email from Mark Grushayev, SASM, Feb. 14, 2013.

***Calculation***

	2020	2040
Electricity required to treat wastewater	1,538 kWh/MG	1,538 kWh/MG
Inflow and Infiltration reduced (million gallons)	10 MG	30 MG
Avoided electricity use	15,379 kWh	46,137 kWh
Reduction in GHG emissions	3.1 MTCO <sub>2</sub> e	9.3 MTCO <sub>2</sub> e

**MUNICIPAL INDOOR WATER CONSERVATION**  
***Emissions Reduction Measure ERM.3***

Related EIR/MV2040 Program #	NE.3.P.4.21/NE.4-1
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Reduce indoor water use by 20% 2020: Reduce indoor water use by 30%
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).  The Water Conservation Act (SBX 7-7) requires the state to achieve a 20% reduction in urban per capita water use by the year 2020.  Calculation includes emissions avoided for treating and transporting potable water by MMWD and treating wastewater by SASM.
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.  Water Consumption: Bob Fairchild, MMWD, bfairchild@marinwater.org.

***Calculation***

	2020	2040
Municipal indoor water use	3,648,744 gallons	3,648,744 gallons
Water use reduction	20%	30%
Reduction in electricity use	2,854 kWh	4,280 kWh
GHG emissions reduction	1.0 MTCO <sub>2</sub> e	1.5 MTCO <sub>2</sub> e

**MUNICIPAL OUTDOOR WATER CONSERVATION**  
***Emissions Reduction Measure ERM.4***

Related EIR/MV2040 Program #	NE.3.P.4.21/NE.4-1
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Reduce outdoor water use by 20%. 2040: Reduce outdoor water use by 30%.
	-1.6
	-2.40
Methodology	Water efficient landscapes can reduce outdoor water use by up to 70% (CAPCOA Measure WUW-3). Water-efficient landscape irrigation systems reduce outdoor water use by 6.1% (CAPCOA Measure WUW-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.  Water Consumption: Bob Fairchild, MMWD, bfairchild@marinwater.org.

**Calculation**

	2020	2040
Municipal outdoor water use	17,042,432 gallons	17,042,432 gallons
Annual electricity used by City for irrigation	4,774 kWh	4,774 kWh
Water use reduction	20%	30%
Avoided electricity for operating irrigation systems	955 kWh	1,432 kWh
Avoided water-related electricity	8,087 kWh	12,130 kWh
Total electricity reduction	9,041 kWh	13,562 kWh
GHG emissions reduction	1.6 MTCO <sub>2</sub> e	2.4 MTCO <sub>2</sub> e

## WASTEWATER TREATMENT PLANT ENERGY EFFICIENCY PROJECTS

### *Emissions Reduction Measure ERM.5*

Related EIR/MV2040 Program #	NE.3.P.4.21/NE.4-1
Reductions (MTCO <sub>2</sub> e)	Implementation action:  -21.3 2040: Complete all identified projects. -21.3 2040: Complete all identified projects.
Methodology	Annual kWh savings for identified projects provided by the Marin Energy Management Team (MarinEMT). Completed projects are included in the analysis since their energy savings were not reflected in the 2010 Inventory.
Sources	Library condensing unit replacement project: MarinEMT, June 2010. Public Safety Building Lighting Retrofit: MarinEMT, May 2011. SASM projects: Integrated Audit Report completed by BASE Energy, Inc., in partnership with PG&E and MarinEMT, November 2009. For further information, contact Dana Armanino, Sustainability Planner, County of Marin, darmanino@marincounty.org.

### *Calculation*

SASM Project	2020 Electricity Savings	2040 Electricity Savings
Belt Filter Press Upgrade	29,684 kWh	29,684 kWh
Variable Frequency Drive for Scrubber Blower	61,946 kWh	61,946 kWh
High Efficiency Motors	12,867 kWh	12,867 kWh
<b>TOTAL</b>	<b>104,497 kWh</b>	<b>104,497 kWh</b>
Emission reduction	21.3 MTCO <sub>2</sub> e	21.3 MTCO <sub>2</sub> e

**COGENERATION AT WASTEWATER TREATMENT PLANT**  
**Emissions Reduction Measure ERM.6**

Related EIR/MV2040 Program #	NE.3.P.4.21/NE.4-1
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2040: Capture 100% of methane produced from wastewater treatment and combust methane in a cogeneration system to produce electricity. -110.0
Methodology	CAPCOA Measure AE-6 used for estimating electricity generated from capturing and combusting methane for cogeneration. Volume of digester gas produced in 2010 and fraction of methane in the digester gas provided by Stephen Danehy, General Manager, Sewerage Agency of Southern Marin.  SASM states that cogeneration at the wastewater treatment plant is not feasible at this time. The analysis assumes a feasible alternative can be identified by 2040.
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.  Email from Stephen Danehy, January 4, 2013. Email from Mark Grushayev, SASM, February 13, 2013.

**Calculation**

	2040
Volume of digester gas produced in 2010	30,580 ft <sup>3</sup> /day
Fraction of methane in digester gas in 2010	0.63
Heating Value of Methane	1,012 BTU/ft <sup>3</sup> CH <sub>4</sub>
Energy conversion factor	0.00009 kWh/BTU
Efficiency factor	0.85
Electricity generated	544,393 kWh
GHG emissions reduction	110.0 MTCO <sub>2</sub> e

## INDOOR WATER EFFICIENCY AND CONSERVATION

### *Emissions Reduction Measure ERM.7*

Related EIR/MV2040 Program #	NE.3.P.4.22; NE.3.P.4.25; NE.5.P.6.30; NE.5.P.6.31; NE.6.P.7.42/NE.4-2; NE.4-5NE.5-1
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Reduce indoor water use by 20%. 2040: Reduce indoor water use by 30%. -1,234.6 -1,938.1
Methodology	20% reduction in indoor water use is based on the following:  Installing all low-flow water fixtures can reduce indoor residential water use by 20% and indoor non-residential water use by 17-31% (CAPCOA Measure WUW-1).  2010 California Green Building Standards Code requires all new construction to reduce indoor water use by 20%.  The Water Conservation Act (SBX 7-7) requires the state to achieve a 20% reduction in urban per capita water use by the year 2020.  67% of water consumption is for indoor use, and hot water use is 30% of indoor water use. Calculation includes emissions avoided for treating and transporting potable water by MMWD and treating wastewater by SASM.
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.  EBMUD Indoor Water Conservation Study (p. 31), 2003, <a href="http://www.ebmud.com/sites/default/files/pdfs/residential-indoor-wc-study.pdf">http://www.ebmud.com/sites/default/files/pdfs/residential-indoor-wc-study.pdf</a> .  ICLEI Climate and Air Pollution Planning Assistant - CAPP V1.5  Personal communication with Dan Carney, MMWD.

#### *Calculation*

	2020	2040
Indoor water consumption 2040 BAU	406,722,007 gallons	425,665,131 gallons
Percent water reduction	20%	30%
Indoor water consumption reduction	81,344,401 gallons	127,699,539 gallons
Water and wastewater-related electricity saved	318,089 kWh	499,356 kWh
Indoor hot water consumption reduction	24,240,632 gallons	38,054,463 gallons
Natural gas required to heat one gallon of water	0.0098 therms	0.0098 therms
Electricity required to heat one gallon of water	0.19 kWh	0.19 kWh
Percent water heaters that use natural gas	58%	58%
Therms saved	137,784 therms	216,302 therms
Electricity saved	1,934,402 kWh	3,036,746 kWh
GHG emissions reduction	1,234.6 MTCO <sub>2</sub> e	1,938.1 MTCO <sub>2</sub> e



## OUTDOOR WATER EFFICIENCY AND CONSERVATION

### *Emissions Reduction Measure ERM.8*

Related EIR/MV2040 Program #	NE.3.P.4.22; NE.6.P.7.42/ NE.4-2; NE.6-3
Reductions (MTCO <sub>2</sub> e)	Implementation action: -16.8 2020: Reduce outdoor water use by 20%. -26.3 2040: Reduce outdoor water use by 30%.
Methodology	<p>Reductions in outdoor water use is based on the following:</p> <p>Water efficient landscapes can reduce outdoor water use by up to 70% (CAPCOA Measure WUW-3).</p> <p>Water-efficient landscape irrigation systems reduce outdoor water use by 6.1% (CAPCOA Measure WUW-4).</p> <p>In compliance with AB 1881, MMWD has adopted a Water Efficient Landscape Ordinance that limits landscape water use.</p> <p>The Water Conservation Act (SBX 7-7) requires the state to achieve a 20% reduction in urban per capita water use by the year 2020.</p> <p>33% of water consumption is for outdoor use. Calculation includes emissions avoided for treating and transporting potable water by MMWD.</p>
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>Personal communication with Dan Carney, Water Conservation Manager, MMWD.</p>

#### *Calculation*

	2020	2040
Outdoor water consumption 2010	202,681,520 gallons	202,681,520 gallons
Outdoor water consumption BAU	203,357,953 gallons	212,829,373 gallons
Percent outdoor water reduced	20%	30%
Outdoor water consumption reduction	40,671,591 gallons	63,848,812 gallons
Electricity saved	96,494 kWh	151,482 kWh
GHG emissions reduction	16.8 MTCO <sub>2</sub> e	26.3 MTCO <sub>2</sub> e

## GREYWATER

### *Emissions Reduction Measure ERM.9*

Related EIR/MV2040 Program #	NE.3.P.4.22; NE.3.P.4.23/ NE.4-2; NE.4-3
Reductions (MTCO <sub>2</sub> e)	Implementation action: -0.3 2020: 50 households using greywater systems. -6.7 2040: 1,000 households using greywater systems.
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	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.  MMWD potable water production for 2010 provided by Nancy Gibbs, MMWD Business Systems Analyst. MMWD electricity consumption provided by Jon LaHaye, MMWD Principal Engineer. kWh/MG was calculated from this data.

#### *Calculation*

	2020	2040
Greywater generation per residential occupant per day	40 gallons	40 gallons
Greywater generation per household per year available for irrigation	16,571 gallons	16,296 gallons
Number of participating households	50	1,000
Avoided electricity use per household per year	39 kWh	39 kWh
Avoided GHG emissions per household per year	0.01 MTCO <sub>2</sub> e	0.01 MTCO <sub>2</sub> e
Electricity reduction	1,966 kWh	38,662 kWh
GHG emissions reduction	0.3 MTCO <sub>2</sub> e	6.7 MTCO <sub>2</sub> e

**RAINWATER CATCHMENT**  
**Emissions Reduction Measure ERM.10**

Related EIR/MV2040 Program #	NE.3.P.4.22; NE.3.P.4.23; NE.7.P.8.45/ NE.4-2; NE.4-3; CL1-5
Reductions (MTCO <sub>2</sub> e)	Implementation options: 0.0 2020: 25,000 gallons of water storage capacity installed. -0.2 2040: 250,000 gallons of water storage capacity installed.
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	2040
Number of storage tanks	50	500
Average rainwater storage capacity per tank	500 gallons	500 gallons
Total storage tank capacity	25,000 gallons	250,000 gallons
Avoided water-related electricity use per storage tank per year	2 kWh	2 kWh
Electricity reduction	119 kWh	1,186 kWh
Avoided GHG emissions per storage tank per year	0.0004 MTCO <sub>2</sub> e	0.0004 MTCO <sub>2</sub> e
GHG emissions reduction	0.02 MTCO <sub>2</sub> e	0.21 MTCO <sub>2</sub> e

**FOOD AND GREEN WASTE**  
***Emissions Reduction Measure ERM.11***

Related EIR/MV2040 Program #	NE.4.P.5.26; NE.4.P.5.28; NE.4.P.5.29; NE.5.P.6.30; NE.5.P.6.31; NE.5.P.6.38; NE.6.P.7.42/ CL.5-1; CL.5-3; CL.5-4; NE.5-1; NE.5-2; NE.5-9
Reductions (MTCO <sub>2</sub> e)	Implementation action:  -689.2 2020: Divert 90% of food and green waste from landfill. Compost food waste and green waste and/or use food waste to produce soil amendments and biogas.  -801.5 2040: Divert 100% of food and green waste from landfill. Compost food waste and green waste and/or use food waste to produce soil amendments and biogas.
Methodology	22.85% of landfilled waste is food waste. 7.98% of landfilled waste is yard waste. 10.9% of alternative daily cover (ADC) is plant debris. GHG emissions calculated using ICLEI Clean Air and Climate Protection 2009 Software, Version 3.0.
Sources	Landfill waste characterization: Marin County Hazardous and Solid Waste Management JPA, "Final Draft Zero Waste Feasibility Study," prepared by R3 Consulting Group, December 2009. <a href="http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf">http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf</a>  ADC waste characterization: CalRecycle, "Alternative Daily Cover (ADC) by Jurisdiction of Origin and Material Type," <a href="http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=ReportName%3dEdrsJurisAndMaterials%26CountyID%3d21%26ReportYear%3d2010">http://www.calrecycle.ca.gov/LGCentral/Reports/Viewer.aspx?P=ReportName%3dEdrsJurisAndMaterials%26CountyID%3d21%26ReportYear%3d2010</a> .

***Calculation***

	2020	2040
Landfilled food waste emissions BAU	624.5 MTCO <sub>2</sub> e	653.6 MTCO <sub>2</sub> e
Landfilled yard waste emissions BAU	123.6 MTCO <sub>2</sub> e	129.3 MTCO <sub>2</sub> e
ADC plant debris emissionsBAU	17.8 MTCO <sub>2</sub> e	18.6 MTCO <sub>2</sub> e
Percent waste diverted from landfill	90%	100%
TOTAL emissions reduction	689.2 MTCO <sub>2</sub> e	801.5 MTCO <sub>2</sub> e

## CONSTRUCTION AND DEMOLITION WASTE

### *Emissions Reduction Measure ERM.12*

Related EIR/MV2040 Program #	NE.4.P.5.26; NE.4.P.5.27; NE.5.P.6.30; NE.5.P.6.31; NE.6.P.7.42/CL.5-1; CL.5-2; NE.5-1; NE.5-2
Reductions (MTCO <sub>2</sub> e)	Implementation action:  -117.7 2020: Divert 90% of wood and textile waste from landfill.  -136.9 2040: Divert 100% of wood and textile waste from landfill.
Methodology	9.57% of landfilled waste is wood and textile waste.  Mill Valley Municipal Code Chapter 14.42 requires 90% of C&D waste to be diverted from the landfill by December 31, 2018, and 94% to be diverted by December 31, 2025.  GHG emissions calculated using ICLEI Clean Air and Climate Protection 2009 Software, Version 3.0.
Sources	Landfill waste characterization: Marin County Hazardous and Solid Waste Management JPA, "Final Draft Zero Waste Feasibility Study," prepared by R3 Consulting Group, December 2009. <a href="http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf">http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf</a>

#### *Calculation*

	2020	2040
Landfilled wood and textile waste emissions BAU	130.8 MTCO <sub>2</sub> e	136.9 MTCO <sub>2</sub> e
Percent diverted from landfill	90%	100%
GHG emissions reduction	117.7 MTCO <sub>2</sub> e	136.9 MTCO <sub>2</sub> e

**PAPER WASTE**  
***Emissions Reduction Measure ERM.13***

Related EIR/MV2040 Program #	NE.4.P.5.26; NE.4.P.5.27; NE.4.P.5.28; NE.4.P.5.29; NE.5.P.6.30; NE.5.P.6.31; NE.5.P.6.38; NE.6.P.7.42/CL.5-1; CL.5-2; CL.5-3; CL.5-4; NE.5-1; NE.5-2; NE.5-9; NE.6-3
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Divert 90% of paper waste from landfill. 2040: Divert 100% of paper waste from landfill.
	-1,013.4
	-1,177.9
Methodology	23.48% of landfilled waste is paper waste.  GHG emissions calculated using ICLEI Clean Air and Climate Protection 2009 Software, Version 3.0.
Sources	Landfill waste characterization: Marin County Hazardous and Solid Waste Management JPA, "Final Draft Zero Waste Feasibility Study," prepared by R3 Consulting Group, December 2009. <a href="http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf">http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf</a>

***Calculation***

	2020	2040
Landfilled paper waste emissions BAU	1,134.6 MTCO <sub>2</sub> e	1,187.5 MTCO <sub>2</sub> e
Less waste emissions reduced from City's green purchasing program	-8.6 MTCO <sub>2</sub> e	-9.6 MTCO <sub>2</sub> e
Percent diverted from landfill	90%	100%
GHG emissions reduction	1,013.4 MTCO <sub>2</sub> e	1,177.9 MTCO <sub>2</sub> e

**FOOD WASTE TO ENERGY**  
***Emissions Reduction Measure ERM.14***

Related EIR/MV2040 Program #	NE.4.P.5.28/CL.5-3
Reductions (MTCO <sub>2</sub> e)	<p>Implementation action:</p> <p>2040: Produce electricity from food waste at the wastewater treatment plant at the rate of 10 tons food waste per day.</p> <p style="text-align: right;">-134.2</p>
Methodology	<p>2,200 tons of food waste were landfilled in 2010.</p> <p>Central Marin Sanitation Agency's Food-to-Energy (F2E) Program is expecting to process 10-15 tons of commercial food waste collected by Marin Sanitary Service and Mill Valley Refuse Service per day.</p> <p>3,300 cu. ft. methane produced from 1 wet ton of food waste.</p> <p>CAPCOA Measure AE-6 used for estimating electricity generated from combusting methane for cogeneration.</p>
Sources	<p>U.S. Environmental Protection Agency Region 9, "Anaerobic Digestion of Food Waste," prepared by East Bay Municipal Utility District, March 2008.</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>Email from Mark Grushayev, SASM, Feb, 14, 2013.</p>

***Calculation***

	2040
Food waste delivered per day	10 tons
Food waste processed per year	2,600 tons
Methane production rate	3,300 ft <sup>3</sup> CH <sub>4</sub> /ton
Methane production	8,580,000 ft <sup>3</sup> CH <sub>4</sub>
Heating Value of Methane	1,012 BTU/ft <sup>3</sup> CH <sub>4</sub>
Energy conversion factor	0.00009 kWh/BTU
Efficiency factor	0.85
Electricity generated	664,246 kWh
GHG emissions avoided	134.2 MTCO <sub>2</sub> e

## RESILIENT NEIGHBORHOODS AND BUSINESSES

### *Emissions Reduction Measure ERM.15*

Related EIR/MV2040 Program #	NE.5.P.6.34; NE.7.P.9.51/NE.5-5; CL.2-1
Reductions (MTCO <sub>2</sub> e)	Implementation options: 2020: 100 participating households. 2040: 500 participating households.
	-330.0
	-1,650.0
Methodology	Based on a pilot program in Marin, 98 households reduced emissions by 3.3 metric tons CO <sub>2</sub> e on average, excluding actions related to solid waste reduction (to avoid double-counting), air travel, upstream emissions, and purchased carbon and travel offsets.
Sources	Tamra Peters, Director, Resilient Neighborhoods, tamra@resilientneighborhoods.org.

#### *Calculation*

	2020	2040
Number of households	6,233 households	6,540 households
Total participants	100 participants	500 participants
Emissions reduction per household	3.30 MTCO <sub>2</sub> e	3.30 MTCO <sub>2</sub> e
Reduction in GHG emissions	330.0 MTCO <sub>2</sub> e	1,650.0 MTCO <sub>2</sub> e



**GREEN PURCHASING**  
***Emissions Reduction Measure ERM.16***

Related EIR/MV2040 Program #	NE.6.P.7.44/NE.6-4
Reductions (MTCO <sub>2</sub> e)	Implementation action: -8.6 2020: Increase the recyclable content of waste and reduce municipal waste from City Hall, the Corporation Yard, and Police and Fire stations. Divert 90% of paper waste from landfill. -9.6 2040: Divert 100% of paper waste from landfill.
Methodology	Assume 100% diversion of paper product waste from landfilled waste.  23.48% of landfilled waste is paper waste.  GHG emissions calculated using ICLEI Clean Air and Climate Protection 2009 Software, Version 3.0.
Sources	Landfill waste characterization: Marin County Hazardous and Solid Waste Management JPA, "Final Draft Zero Waste Feasibility Study," prepared by R3 Consulting Group, December 2009. <a href="http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf">http://www.marinrecycles.org/Docs/Final_Draft_Zero_Waste_Feasibility_Study_121609.pdf</a>

***Calculation***

	2020	2040
Tons of landfilled paper product waste from City Hall, Corp Yard, and Police and Fire Stations BAU	19.8 tons	19.8 tons
Emissions from paper product waste BAU	9.6 MTCO <sub>2</sub> e	9.6 MTCO <sub>2</sub> e
Diversion of paper waste from landfill	90%	100%
Reduction in GHG emissions	8.6 MTCO <sub>2</sub> e	9.6 MTCO <sub>2</sub> e

## ENERGY EFFICIENCY REDUCTIONS BEYOND TITLE 24

### *Emissions Reduction Measure ERM.17*

Related EIR/MV2040 Program #	NE.7.P.8.45/ CL.1-5
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: 10% of new construction projects elect to reduce energy use by 15% Title 24 requirements. 2040: 10% of new construction projects elect to reduce energy use by 15% Title 24 requirements.
	-8.8
	-12.6
Methodology	CAPCOA Measure BE-1 used for estimating building energy savings.
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*

<i>Residential</i>	2020	2040
Percent over Title 24 Energy Requirements	15 %	15 %
Percent of participating new residential units	10%	10%
New construction electricity use, BAU	824,326 kWh	2,472,979 kWh
New construction electricity use, after Title 24	638,784 kWh	915,441 kWh
Additional reduction in electricity use	704 kWh	1,009 kWh
New construction natural gas use, BAU	80,566 therms	241,699 therms
New construction natural gas use, after Title 24	73,565 therms	100,605 therms
Additional reduction in natural gas use	982 therms	1,343 therms
GHG emissions reductions	5.4 MTCO <sub>2</sub> e	7.3 MTCO <sub>2</sub> e

<i>Commercial</i>	2020	2040
Percent over Title 24 Energy Requirements	15 %	15 %
Percent of participating new commercial space	10%	10%
New construction electricity use, BAU	1,356,351 kWh	4,069,052 kWh
New construction electricity use, after Title 24	1,279,920 kWh	1,958,096 kWh
Additional reduction in electricity use	4,992 kWh	7,637 kWh
New construction natural gas use, BAU	46,158 therms	138,473 therms
New construction natural gas use, after Title 24	41,168 therms	64,247 therms
Additional reduction in natural gas use	445 therms	694 therms
GHG emissions reductions	3.4 MTCO <sub>2</sub> e	5.3 MTCO <sub>2</sub> e

**Reductions in Energy Use for Every 1% Over 2008 Title 24  
Energy Requirements, Zone 5**

	Electricity	Natural Gas	Source
Commercial	0.26%	0.72%	CAPCOA Measure BE-1
Residential - Multifamily	0.09%	0.88%	
Residential - Single	0.04%	0.91%	
Residential - Townhome	0.05%	0.90%	
Residential (33% single, 67% multifamily)	0.07%	0.89%	Calculation

**ENERGY AUDITS**  
**Emissions Reduction Measure ERM.18**

Related EIR/MV2040 Program #	NE.7.P.8.47/CL.1-6
Reductions (MTCO <sub>2</sub> e)	Implementation action:  2020: Provide incentives to encourage voluntary energy audits for residential and commercial buildings prior to completion of sale.  2040: Require energy audits for residential and commercial buildings prior to completion of sale.
	-37.6
	-249.7
Methodology	204 housing units sold annually, based on 10-year average for 2002-2011 (Marin County Assessor).
Sources	Marin County Assessor, <a href="http://www.co.marin.ca.us/depts/AR/main/Sales.cfm">http://www.co.marin.ca.us/depts/AR/main/Sales.cfm</a>

**Calculation**

	2020	2040
Average household electricity use BAU	6,341 kWh	6,341 kWh
Average household natural gas use BAU	620 therms	620 therms
Number of housing units sold annually	204 units	204 units
Number of housing units sold during period	1,428 units	5,508 units
Number of housing units provided energy audits	143 units	5,508 units
Percent of participating housing units	80%	10%
Number of housing units implementing energy efficiency projects	114 units	551 units
Electricity reduction	10%	10%
Natural gas reduction	10%	10%
Annual electricity savings	72,439 kWh	349,261 kWh
Natural gas savings	7,080 therms	34,135 therms
Electricity emissions reductions	14.1 MTCO <sub>2</sub> e	68.2 MTCO <sub>2</sub> e
Natural gas emissions reductions	37.6 MTCO <sub>2</sub> e	181.4 MTCO <sub>2</sub> e

**MARIN CLEAN ENERGY**  
***Emissions Reduction Measure ERM.19***

Related EIR/MV2040 Program #	NE.7.P.8.48/ CL.1-2
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: 80% of residential and commercial electricity load using MEA electricity. 2040: 80% of residential and commercial electricity load using MEA electricity.
	-4,582.0
	-3,849.0
Methodology	Assumes the same proportion of participants will enroll in the Light Green Program and Deep Green Program as in 2010. Assumes MEA will increase its Eligible Renewable sources to 55% and its non-GHG emitting sources to 80% by 2020.
Sources	Marin Energy Authority, "Revised Community Choice Aggregation Implementation Plan and Statement of Intent," October 4, 2012. CO2 emission factors and energy source data provided by Justin Kudo, Account Manager, MEA.

***Calculation***

	2020	2040
Projected electricity load BAU	72,745,329 kWh	77,470,009 kWh
Electricity reductions from local and State actions	6,281,288 kWh	21,638,313 kWh
Projected net electricity load	66,464,041 kWh	55,831,696 kWh
MEA at 80% of load	53,171,233 kWh	44,665,357 kWh
Reduction in GHG emissions	4,582.0 MTCO <sub>2</sub> e	3,849.0 MTCO <sub>2</sub> e

MEA	2010	2011	2020 (Projected)	2040 (Projected)
Eligible Renewable	26.9%	27.1%	55.0%	55.0%
Non-GHG Emitting Sources	77.5%	61.5%	80.0%	80.0%
GHG Emitting Sources	22.5%	38.5%	20.0%	20.0%
Emission Factor MTCO <sub>2</sub> e/kWh	0.0001486	0.0002228	0.0001157	0.0001157

**STREETLIGHTS**  
**Emissions Reduction Measure ERM.20**

Related EIR/MV2040 Program #	NE.7.P.8.49/CL.1-7
Reductions (MTCO <sub>2</sub> e)	Implementation actions: -38.7 2020: Replace all cobra head fixtures with LED lamps. -51.5 2040: Replace all streetlights with LED lamps.
Methodology	Quantify potential emissions reductions by substituting equivalent LED lamps for existing streetlights.
Sources	Streetlight inventory and potential LED replacement lamps provided by MarinEMT. LED replacement lamps are for illustrative purposes only; actual replacement lamps will require further analysis. Electricity usage derived from the PG&E LS-2 rate schedule, effective 6/27/12.

*Calculation*

Lamp Type	Quantity	Annual Energy Use (kWh)	2010 GHG Emissions (MTCO <sub>2</sub> e)	Potential Replacement Lamp	Annual Energy Use (kWh)	MEA Electricity Emissions (MTCO <sub>2</sub> e)	Reduction in Annual Energy Use (kWh)	2040 Electricity Emissions Reductions (MTCO <sub>2</sub> e)
<i>Cobra Head</i>								
HPS 70w, 120v	449	156,252	31.80	LED 37w	68,966	7.98	87,286	23.82
HPS 100w, 120v	51	25,092	5.11	LED 54w	10,955	1.27	14,137	3.84
HPS 150w, 120v	52	37,440	7.62	LED 90w	18,658	2.16	18,782	5.46
HPS 200w, 120v	35	33,600	6.84	LED 106w	15,414	1.78	18,186	5.05
HPS 250w, 120v	3	3,600	0.73	LED 139w	1,692	0.20	1,908	0.54
<b>SUBTOTAL</b>	<b>590</b>	<b>255,984</b>	<b>52.10</b>		<b>115,685</b>	<b>13.39</b>	<b>140,299</b>	<b>38.71</b>
<i>Others</i>								
HPS 70w, 120v	157	54,636	11.12	LED 37w	24,115	2.79	30,521	8.33
HPS 100w, 120v	53	26,076	5.31	LED 54w	11,384	1.32	14,692	3.99
HPS 150w, 120v	3	2,160	0.44	LED 90w	1,076	0.12	1,084	0.32
HPS 200w, 120v	1	960	0.20	LED 106w	440	0.05	520	0.14
<b>SUBTOTAL</b>	<b>214</b>	<b>83,832</b>	<b>17.06</b>		<b>37,016</b>	<b>4.28</b>	<b>46,816</b>	<b>12.78</b>
<b>TOTAL</b>	<b>804</b>	<b>339,816</b>	<b>69.16</b>		<b>152,701</b>	<b>17.67</b>	<b>187,115</b>	<b>51.49</b>

Fixture	kWh/ month
HPS 70w (120v)	29
HPS 100w (120v)	41
HPS 150w (120v)	60
HPS 200w (120v)	80
HPS 250w (120v)	100
LED 35.01-40.0w	12.8
LED 50.01-55.0w	17.9
LED 85.01-90.00	29.9
LED 90.01-95.00	31.6
LED 105.01-110.00	36.7
LED 135.01-140	47

**MUNICIPAL ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS**  
***Emissions Reduction Measure ERM.21***

Related EIR/MV2040 Program #	NE.7.P.8.50/CL.1-8
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Complete all identified projects. 2040: Complete all identified projects.
	-46.6
	-127.5
Methodology	Annual kWh savings for identified projects provided by the Marin Energy Management Team (MarinEMT). Completed projects are included in the analysis since their energy savings were not reflected in the 2010 Inventory.
Sources	Library condensing unit replacement project: MarinEMT, June 2010. Public Safety Building Lighting Retrofit: MarinEMT, May 2011. SASM projects: Integrated Audit Report completed by BASE Energy, Inc., in partnership with PG&E and MarinEMT, November 2009. For further information, contact Dana Armanino, Sustainability Planner, County of Marin, darmanino@marincounty.org

***Calculation***

Project	2020 kWh Savings	2040 kWh Savings	Note
Library- Condensing Unit Replacement	3,112	3,112	Complete February 2011
Public Safety Building - Lighting Retrofit	20,940	20,940	Completed May 2011
SASM - Lighting Retrofit	38,113	38,113	
Public Safety Building - PV System	166,600	166,600	Completed October 2010
Community Center - PV System, roof		33,600	
Community Center - PV, parking areas		280,000	
City Hall - PV, roof		15,400	
SASM - PV, roof		68,600	
Total electricity reductions	228,765	626,365	
GHG emissions reductions	46.6	127.5	

**ENERGY EFFICIENCY**  
***Emissions Reduction Measure ERM.22***

Related EIR/MV2040 Program #	NE.6.P.7.42; NE.7.8.45; NE.7.P.8.50/NE.6-3; CL.1-5; CL.1-8
Reductions (MTCO <sub>2</sub> e)	Implementation action: -402.1 2020: 5% of existing housing units and commercial buildings utilize regulatory incentives and public financing programs (including AB 811) to reduce energy use by 20%. -2,085.7 2040: 25% of existing housing units and commercial buildings utilize regulatory incentives and public financing programs (including AB 811) to reduce energy use by 20%.
Methodology	Energy Upgrade California demonstrated energy savings averaging 31% Btu for projects completed in Marin County between June 2010 and May 2012. This action conservatively assumes energy savings of 20%.
Sources	Marin County Energy Watch Partnership, Dana Armanino, Sustainability Planner, County of Marin, darmanino@marincounty.org

***Calculation***

	2020	2040
Community electricity use BAU	71,297,908 kWh	75,955,174 kWh
Community natural gas use BAU	4,944,301 therms	5,226,670 therms
Percent of participating households and businesses	5%	25%
Electricity reduction	20%	20%
Natural gas reduction	20%	20%
Annual electricity savings	712,979 kWh	3,797,759 kWh
Natural gas savings	49,443 therms	261,334 therms
Electricity emissions reductions	139.3 MTCO <sub>2</sub> e	696.5 MTCO <sub>2</sub> e
Natural Gas emissions reductions	262.8 MTCO <sub>2</sub> e	1,389.1 MTCO <sub>2</sub> e
<b>TOTAL emissions reductions</b>	<b>402.1 MTCO<sub>2</sub>e</b>	<b>2,085.7 MTCO<sub>2</sub>e</b>

**RENEWABLE ENERGY**  
**Emissions Reduction Measure ERM.23**

Related EIR/MV2040 Program #	NE.6.P.7.42; NE.7.P.8.50/NE.6-3; CL.1-8
Reductions (MTCO <sub>2</sub> e)	Implementation action:  -117.3 2020: Utilize building construction standards, regulatory incentives, and public financing programs (including AB 811) to develop renewable energy projects for residential and commercial buildings.  -1,308.5 2040: Utilize building construction standards, regulatory incentives, and public financing programs (including AB 811) to develop renewable energy projects for residential and commercial buildings.
Methodology	As of 12/31/10, there were 308 small commercial (<10 kW) and residential photovoltaic systems installed in Mill Valley, representing approximately 4.7% of housing units. There were 6 large (>=10 kW) commercial (including government) solar energy installations.  An average of 37 residential systems were installed between 2007 and 2012 with an average 7,407 kWh generated per system. The analysis assumes the current annual rate of residential installation will continue through 2040. Systems installed between 2010-2016 are credited to the California Solar Initiative as a State Action.
Sources	Single family housing units: 2007-2011 American Community Survey 5 Year Estimates, Table DP04, plus projected development.  California Solar Initiative, <a href="http://www.californiasolarstatistics.ca.gov/">http://www.californiasolarstatistics.ca.gov/</a> .  Marin County Energy Watch Partnership, Dana Armanino, Sustainability Planner, County of Marin, <a href="mailto:darmanino@marincounty.org">darmanino@marincounty.org</a>

**Calculation**

<b>Residential Renewable Energy</b>	<b>2020</b>	<b>2040</b>
Total housing units	6,660	6,920
Detached single family detached housing units	4,582	4,667
Average number of residential solar systems installed annually	37	37
Number of participating detached single family houses	147	884
Average electricity generated per installation	5,479	5,479
Annual electricity savings	807,212 kWh	4,843,271 kWh
Electricity emissions reductions	157.7 MTCO <sub>2</sub> e	946.0 MTCO <sub>2</sub> e



<b>Commercial Renewable Energy</b>	<b>2020</b>	<b>2040</b>
Commercial electricity use BAU	31,772,515 kWh	34,485,216 kWh
Average number of commercial solar systems installed annually	0.3	n/a
Number of participating commercial buildings	2	n/a
Average electricity generated per installation	96,065	n/a
Percent of commercial electricity use offset by renewable energy	n/a	5%
Annual electricity savings	192,129 kWh	1,724,261 kWh
Electricity emissions reductions	40.4 MTCO <sub>2</sub> e	362.5 MTCO <sub>2</sub> e

**TREE PLANTING**  
**Emissions Reduction Measure ERM.24**

Related EIR/MV2040 Program #	NE.7.P.9.52/CL.2-2
Reductions (MTCO <sub>2</sub> e)	Implementation actions: -8.5 2020: Plant 40 new trees per year. -28.3 2040: Plant 40 new trees per year.
Methodology	CAPCOA Measure V-1. Assumed default annual sequestration rate of .0354 MTCO <sub>2</sub> 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**

	<b>2020</b>	<b>2040</b>
Annual sequestration rate per tree	0.0354 MTCO <sub>2</sub>	0.0354 MTCO <sub>2</sub>
Trees planted per year	40	40
GHG emissions reduction	8.5 MTCO <sub>2</sub> e	28.3 MTCO <sub>2</sub> e

**EV PARKING**  
**Emissions Reduction Measure ERM.25**

Related EIR/MV2040 Program #	G.2.P.3.162; G.2.P.7.177; G.2.P.178/M.3-1; MM.7-2; M.8-1
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions:</p> <p>Utilize local resources, building and zoning codes, and parking regulations to provide EV charging facilities that enhance the adoption of electric vehicles. Programs will facilitate the development of:</p> <p>-31.0 2020: 20 parking spaces with charging facilities.</p> <p>-155.1 2040: 100 parking spaces with charging facilities.</p>
Methodology	<p>Average trip length was determined by modeling trip lengths from Highway 101 interchanges for Mill Valley to the downtown. Each parking space was assumed to be associated with two round trip EV vehicle trips per day.</p> <p>Assumes electric vehicle efficiency of .32 kWh/mile, based on the Nissan Leaf fuel economy for city driving.</p>
Sources	<p>Trip lengths modeled with Google Maps, maps.google.com.</p> <p>Electric vehicle fuel economy from www.fueleconomy.gov.</p>

**Calculation**

Average trip length	2.45 miles	
Miles impacted annually per parking space	3,579 miles	
Annual emissions per parking space BAU	1.69 MTCO <sub>2</sub> e	
Annual electricity use per parking space	1,145 kWh	
Electric vehicle emissions per parking space	0.14 MTCO <sub>2</sub> e	
Emissions reductions per parking space	1.55 MTCO <sub>2</sub> e	
Total annual emissions reduction for:		Electricity Use
20 parking spaces	31.0 MTCO <sub>2</sub> e	22,908 kWh
100 parking spaces	155.1 MTCO <sub>2</sub> e	114,542 kWh

**CARPOOL PARKING**  
*Emissions Reduction Measure ERM.26*

Related EIR/MV2040 Program #	G.2.P.178/ M.8-1
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions: Utilize zoning and parking regulations to provide parking spaces dedicated to carpools to help reduce VMT. Programs will facilitate the development of:</p> <p>-16.9      2020: 20 carpool parking spaces. -84.7      2040: 100 carpool parking spaces.</p>
Methodology	Average trip length was determined by modeling trip lengths from Highway 101 interchanges for Mill Valley to the downtown. Each carpool vehicle was assumed to be occupied by two people (thereby avoiding one vehicle trip) and each carpool parking space was assumed to be associated with one round trip vehicle trip per day.
Sources	Trip lengths modeled with Google Maps, maps.google.com.

*Calculation*

Average trip length	2.45 miles	
Miles generated annually by two SOV drivers	3,579 miles	
Annual emissions generated annually by two SOV drivers	1.69 MTCO <sub>2</sub> e	
Emissions reductions per parking space	0.85 MTCO <sub>2</sub> e	
Total annual emissions reduction for:		VMT Reductions
20 parking spaces	16.9 MTCO <sub>2</sub> e	35,795 VMT
100 parking spaces	84.7 MTCO <sub>2</sub> e	178,973 VMT

**SCHOOL TRANSPORTATION**  
***Emissions Reduction Measure ERM.27***

Related EIR/MV2040 Program #	G.2.P.163; G.2.P.4.165; G.2.P.4.169; G.2.P.5.173; G.3.P.12.200; G.4.P.16.221/ M.3-2; M.4-1M.4-5; M.5-3; M.13-2; M.17-5
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions:</p> <p>Increase use carpooling, shuttle or school buses, and Safe Routes to School to transport students to local schools.</p> <p>-50.1 2020: Increase alternative transportation mode share by 10%.</p> <p>-100.2 2040: Increase alternative transportation mode share by 20%.</p>
Methodology	<p>Average trip length was determined by modeling trip lengths to Mill Valley Schools.</p> <p>3,287 students enrolled in Mill Valley schools in 2010.</p> <p>180 days in a school year.</p> <p>49% of students travelled in Family Vehicles in 2010; 51% traveled by alternative transportation (20% walk, 11% bike, 5% school bus, 12% carpool, 0.1% transit, 2% other).</p>
Sources	<p>Trip lengths modeled with Google Maps, maps.google.com.</p> <p>Travel mode data from Safe Routes to School surveys, <a href="http://www.saferoutestoschools.org/mv.html#surveys">http://www.saferoutestoschools.org/mv.html#surveys</a>.</p>

***Calculation***

Average trip length	0.9 miles	
Students in Mill Valley schools in 2010	3,287 students	
Miles travelled annually by students (all mode shares)	1,058,580 miles	
Increase in alternative transportation mode share	10%	20%
VMT avoided	105,858 VMT	211,716 VMT
Emissions reductions	50.1 MTCO <sub>2</sub> e	100.2 MTCO <sub>2</sub> e

## BICYCLE AND PEDESTRIAN TRANSPORTATION

### *Emissions Reduction Measure ERM.28*

Related EIR/MV2040 Program #	CV.3.P.6.92; CV.3.P.6.94; CV.4.P.8.101; CV.P.9.102; CV.5.P.10.108; G.2.P.3.162; G.2.P.4.165; G.2.P.4.166; G.2.P.4.167; G.2.P.4.169; G.2.P.4.170; G.2.P.5.171; G.2.P.5.173; G.3.P.0.188; G.3.P.11.193; G.3.P.12.198; G.3.P.12.200; G.4.P.16.221; G.4.P.17.9/LU.5-2; LU.5-4; CV.4-3; CV.8-2; CV.7-1; M.3-1; M.4-1; M.4-2; M.4-3; M.4-5; M.4-6
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions:</p> <p>-285.0      2020: Increase walking and biking mode share to 17%.</p> <p>-955.4      2040: Increase walking and biking mode share to 25%.</p>
Methodology	<p>According to a 2007 survey prepared for the Marin County Nonmotorized Transportation Pilot Program, 11.8% of utilitarian trips (trips made to a destination and not solely for recreation or exercise) in 2007 were made by walking and 1.8% by bicycle, for a total mode share of 13.6%.</p> <p>Studies cited by CAPCOA show:</p> <p>Pedestrian network improvements can reduce VMT 1-2%.</p> <p>Traffic calming measure can reduce VMT by 0.25 to 1%.</p> <p>Each additional mile of bike lanes per square mile increases the share of workers commuting by bicycle by 1%.</p> <p>Mill Valley Bicycle and Pedestrian Plan proposes an additional 1.44 miles of Class II bicycle lanes and 1.97 miles of Class III bicycle routes, for a total of 3.40 miles of new bikeways. There were a total of 7.10 existing bikeways in 2008.</p>
Sources	<p>2010 U.S. Census, SF1:DP-1.</p> <p>Average daily walking and bicycling data: Federal Highway Administration, "Interim Report to the U.S. Congress on the Nonmotorized Transportation Pilot Program SAFETEA-LU Section 1807," November 2007.</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>City of Mill Valley Bicycle and Pedestrian Transportation Plan, prepared by Alta Planning + Design, 2008 update.</p>

*Calculation*

	2020	2040
Average daily walking and bicycling for utilitarian purposes per adult in Marin	0.62 miles	0.62 miles
Population 18 years and over in Mill Valley, 2010	10,612 people	10,612 people
Population 18 years and over in Mill Valley	10,647 people	11,143 people
Annual walking and biking miles BAU	2,409,510 miles	2,521,734 miles
Walking and biking mode share for utilitarian trips, 2010	13.6 %	13.6 %
Increase walking and biking mode share to:	17 %	25 %
VMT avoided	602,378 VMT	2,019,737 VMT
Emissions reductions	285.0 MTCO <sub>2</sub> e	955.4 MTCO <sub>2</sub> e

**PUBLIC TRANSPORTATION**  
***Emissions Reduction Measure ERM.29***

Related EIR/MV2040 Program #	G.2.P.3.162; G.2.P.4.165; G.2.P.4.166; G.2.P.5.171; G.3.P.14.205; G.3.P.14.207; G.4.P.14.208; G.4.P.15.211/M.3-1; M.4-1; M.4-2; M.5-1; M.14-3
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions:</p> <p>Increase public transportation use as an alternative to the single occupancy vehicle.</p> <p>-101.2      2020: Increase public transportation mode share to 10%.</p> <p>-402.8      2040: Increase public transportation mode share to 15%.</p>
Methodology	<p>8% of workers commuted to work via public transportation.</p> <p>Census data for public transportation use is only available for commuting to work. VMT reductions were calculated assuming 365 days per year of additional public transportation miles in order to estimate public transportation use for other purposes.</p> <p>Average trip length was determined by modeling trip lengths from Highway 101/Mill Valley interchanges to downtown Mill Valley.</p>
Sources	<p>2006-2010 American Community Survey, DP03.</p> <p>Trip lengths modeled with Google Maps, maps.google.com.</p>

***Calculation***

	2020	2040
Workers 16 years and over in Mill Valley, 2010	6,789 people	6,789 people
Workers 16 years and over in Mill Valley	6,812 people	7,129 people
Percent using public transportation for commuting, 2010	8%	8%
Average trip length	2.45 miles	2.45 miles
Increase public transportation mode share to:	10%	15%
VMT avoided	213,910 VMT	851,412 VMT
GHG emissions reductions	101.2 MTCO <sub>2</sub> e	402.8 MTCO <sub>2</sub> e

## CARPOOLING

### *Emissions Reduction Measure ERM.30*

Related EIR/MV2040 Program #	G.2.P.5.171; G.2.P.5.172/M.5-1; M.5-2
Reductions (MTCO <sub>2</sub> e)	<p>Implementation actions: Increase carpooling and implement ridesharing programs as an alternative to the single occupancy vehicle.</p> <p>-200.0 2020: Increase carpooling mode share to 8%.</p> <p>-320.6 2040: Increase carpooling mode share to 10%.</p>
Methodology	<p>5% of workers carpoled to work in 2010.</p> <p>Census data for carpooling is only available for commuting to work. VMT reductions were calculated assuming 365 days per year of additional SOV miles avoided in order to estimate carpooling and ridesharing for other purposes.</p> <p>Average trip length was determined by modeling trip lengths from Highway 101/Mill Valley interchanges to downtown Mill Valley.</p>
Sources	<p>2006-2010 American Community Survey, DP03.</p> <p>Trip lengths modeled with Google Maps, maps.google.com.</p>

### *Calculation*

	2020	2040
Workers 16 years and over in Mill Valley, 2010	6,789 people	6,789 people
Workers 16 years and over in Mill Valley	6,812 people	7,129 people
Percent carpooling for commute, 2010	5%	5%
Average trip length	2.45 miles	2.45 miles
Increase carpooling mode share to:	8%	10%
VMT avoided	422,786 VMT	677,787 VMT
GHG emissions reductions	200.0 MTCO <sub>2</sub> e	320.6 MTCO <sub>2</sub> e



**BIKE SHARING**  
***Emissions Reduction Measure ERM.31***

Related EIR/MV2040 Program #	G.2.P.5.172/M.5-2
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Implement bike share program with 10 bikes. 2040: Implement bike share program with 40 bikes.
	-13.8
	-55.3
Methodology	Bike fleet comprises 40 bikes. Average trips per bike per day is 8. Average trip length is 2 miles. Average trip length was determined by modeling trip lengths between shopping centers, the community center, the high school, and the downtown.
Sources	Trip lengths modeled with Google Maps, maps.google.com.

***Calculation***

	2020	2040
Number of bikes provided	10 bikes	40 bikes
Number of trips per bicycle per day	8 trips	8 trips
Percent of trips that replace vehicle use	50%	50%
Average trip length	2.0 miles	2.0 miles
VMT avoided	29,200 VMT	116,800 VMT
Emissions reductions	13.8 MTCO <sub>2</sub> e	55.3 MTCO <sub>2</sub> e

**HIGH-EFFICIENCY CITY VEHICLES**  
***Emissions Reduction Measure ERM.32***

Related EIR/MV2040 Program #	G.2.P.7.174/M.6-1
Reductions (MTCO <sub>2</sub> e)	Implementation action: 2020: Replace 10 vehicles with hybrid vehicles. 2040: Replace 20 vehicles with hybrid vehicles.
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 7,500 miles annually. Emissions reduction calculated for CO <sub>2</sub> only since N <sub>2</sub> O and CH <sub>4</sub> emissions are dependent on VMT and VMT is unaffected.
Sources	<a href="http://www.fueleconomy.gov">www.fueleconomy.gov</a>

***Calculation***

	2020	2040
Annual mileage per vehicle	7,500 VMT	7,500 VMT
Annual fuel use per vehicle at 20 MPG fuel economy	375 gallons	375 gallons
Annual fuel use per vehicle at 45 MPG fuel economy	167 gallons	167 gallons
Annual fuel saved per car replaced	208 gallons	208 gallons
Annual emissions reduced per vehicle	1.8 MTCO <sub>2</sub>	1.8 MTCO <sub>2</sub>
Number of vehicles replaced with hybrid vehicles	10 vehicles	20 vehicles
GHG emissions reductions	18.3 MTCO <sub>2</sub> e	36.6 MTCO <sub>2</sub> e

## CITY EMPLOYEE COMMUTE INCENTIVES

### *Emissions Reduction Measure ERM.33*

Related EIR/MV2040 Program #	G.2.P.7.176/M.6-2
Reductions (MTCO <sub>2</sub> e)	<p>Implementation action:</p> <p>Provide City 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.</p> <p>-3.9 2020: 5.2% of employees participate in program.</p> <p>-11.2 2040: 15% of employees participate in program.</p>
Methodology	<p>CAPCOA Measure TRT-1. Assuming a low density suburb and 100% of employees are eligible for incentives, VMT reduction is 5.2%.</p> <p>Average trip length was determined by modeling trip lengths from Highway 101/Mill Valley interchanges to downtown Mill Valley.</p>
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>Trip lengths modeled with Google Maps, maps.google.com.</p>

#### *Calculation*

	2020	2040
Employee commute VMT, BAU	1,058,622 VMT	524 VMT
Reduction in VMT	5.2%	15.0%
VMT avoided for Government Operations Inventory	55,048 VMT	79 VMT
Emissions reduction for Government Operations Inventory	27 MTCO <sub>2</sub> e	79 MTCO <sub>2</sub> e
Number of City employees	140	140
Number of participating City employees	7	21
Daily VMT per employee within City limits	4.9 miles	4.9 miles
Annual participating City employee VMT within City limits	1,127 miles	1,127 miles
VMT avoided within City limits	8,205 miles	23,667 miles
Emissions reductions	3.9 MTCO <sub>2</sub> e	11.2 MTCO <sub>2</sub> e

**RENEWABLE PORTFOLIO STANDARD**  
**State Action**

Reductions (MTCO2e)	Implementation action:  2040: 33% of PG&E electricity comes from eligible renewable energy sources.  2040: 33% of PG&E electricity comes from eligible renewable energy sources.
-833.6	
-700.2	
Methodology	The Renewable Portfolio Standard (RPS) requires electricity providers to increase the portion of energy that comes from renewable sources to 20% by 2010 and by 33% by 2020.  Assumes the following breakdown of the electricity load in 2020 and 2040: MEA, 80%; PG&E, 16%; Direct Access, 4%.
Sources	Marin Energy Authority, "Revised Community Choice Aggregation Implementation Plan and Statement of Intent," October 4, 2012.

**Calculation**

	2020	2040
Electricity use, BAU	72,745,329 kWh	77,470,009 kWh
Electricity savings from local and State actions	6,281,288 kWh	21,638,313 kWh
Net electricity use	66,464,041 kWh	55,831,696 kWh
PG&E electricity use (16% of total load)	10,634,247 kWh	8,933,071 kWh
GHG emission reductions	833.6 MTCO2e	700.2 MTCO2e

PG&E	2010	2020 (projected)	2040 (projected)
Eligible Renewable	15.9%	33%	33%
Non-GHG Emitting Sources	55.6%	72.7%	72.7%
GHG-Emitting Sources	44.4%	27.3%	27.3%
Emission Factor (MTCO2e/kWh)	0.0002035	0.0001251	0.0001251

**Title 24**  
**State Action**

Reductions (MTCO <sub>2e</sub> )	Implementation action:
-116.0	2020: Implement Title 24 and subsequent building standards updates that ultimately achieve zero net energy use for new residential and non-residential construction.
-1,892.6	2040: Implement Title 24 and subsequent building standards updates that ultimately achieve zero net energy use for new residential and non-residential construction.
Methodology	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 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.
Sources	California Energy Commission, "Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings," prepared by Architectural Energy Corporation, November 7, 2007.  California Energy Commission, <a href="http://www.energy.ca.gov/title24/2013standards/background.html">http://www.energy.ca.gov/title24/2013standards/background.html</a>  California Energy Commission, <a href="http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2012-5-31-Item-05-Adoption_Hearing_Presentation.pdf">http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2012-5-31-Item-05-Adoption_Hearing_Presentation.pdf</a>

*Calculation*

	2008 Reductions from 2005 Standards (assumed for development after 2010)		2013 Reductions from 2008 standards (assumed for development after 2015)	Projected -- Reductions from 2010 Baseline		
	Electricity Savings	Natural Gas Savings	Energy Savings	2020	2030	2040
<b>Reductions from Title 24 Upgrades</b>				Energy Savings	Energy Savings	Energy Savings
Single-family New Construction	22.70%	10.00%	25.00%	100%	100%	100%
Multi-family New Construction	19.70%	7.00%	14.00%	50%	100%	100%
Residential New Construction, 33% single, 67% multifamily	20.69%	7.99%	17.62%	66%	100%	100%
Non-residential New Construction	4.90%	9.40%	30.00%	50%	100%	100%

**Projected Residential Development with Title 24 Energy Reductions**

	2011-2015	2016-2020	2021-2030	2031-2040	TOTAL through 2020	GHG Reductions through 2020	TOTAL through 2040	GHG Reductions through 2040
New Residential (units)	65	65	130	130	130		390	
Electricity Use BAU	412,163	412,163	824,326	824,326	824,326		2,472,979	
Electricity Use Savings	85,261	100,281	547,669	824,326	185,543	36	1,557,538	304.2
Natural Gas Use BAU	40,283	40,283	80,566	80,566	80,566		241,699	
Natural Gas Use Savings	3,217	3,784	53,527	80,566	7,001	37	141,094	750.0

**Projected Non-Residential Development with Title 24 Energy Reductions**

	2011-2015	2016-2020	2021-2030	2031-2040	TOTAL through 2020	GHG Reductions through 2020	TOTAL through 2040	GHG Reductions through 2040
Electricity Use BAU	678,175	678,175	1,356,351	1,356,351	1,356,351		4,069,052	
Electricity Use Savings	33,231	43,200	678,175	1,356,351	76,430	16	2,110,956	443.8
Natural Gas Use BAU	23,079	23,079	46,158	46,158	46,158		138,473	
Natural Gas Use Savings	2,169	2,820	23,079	46,158	4,990	27	74,226	394.6

## PAVLEY AND LOW CARBON FUEL STANDARD

### *State Action*

<p>Reductions (MTCO<sub>2</sub>e)</p> <p style="text-align: center;">-10,990.8</p> <p style="text-align: center;">-17,918.7</p>	<p>Implementation action:</p> <p>2020: State implements Pavley 1 and the Low Carbon Fuel Standard.</p> <p>2040: State implements Pavley 1 and the Low Carbon Fuel Standard.</p>
<p>Methodology</p>	<p>Assembly Bill 1493 (Pavley) requires carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks in two phases. Pavley 1 took effect for model years 2009 through 2016. The second phase, which is not included in this analysis, will take effect for model years 2017 through 2025.</p> <p>The Low Carbon Fuel Standard (CLFS) will reduce the carbon intensity of California's transportation fuels and encouraging the use of cleaner transportation fuels such as electricity, natural gas, hydrogen and low-carbon biofuels.</p> <p>Transportation emissions estimated using EMFAC 2011.</p>
<p>Sources</p>	<p>California Air Resources Board, EMFAC Emissions Database,  <a href="http://www.arb.ca.gov/jpub/webapp//EMFAC2011WebApp/emsSelectionPage_1.jsp">http://www.arb.ca.gov/jpub/webapp//EMFAC2011WebApp/emsSelectionPage_1.jsp</a></p>

### *Calculation*

	2020	2040
VMT BAU	101,962,139 VMT	122,845,455 VMT
VMT after local actions	100,544,009 VMT	118,765,363 VMT
Emissions 2040 without Pavley and LCFS	48,233 MTCO <sub>2</sub> e	58,112 MTCO <sub>2</sub> e
Emissions 2040 after local actions w/Pavley and LCFS	37,242 MTCO <sub>2</sub> e	40,193 MTCO <sub>2</sub> e
Reduction in emissions	10,991 MTCO <sub>2</sub> e	17,919 MTCO <sub>2</sub> e

## CALIFORNIA SOLAR INITIATIVE

### *State Action*

Reductions (MTCO <sub>2</sub> e)	<p>Implementation action:</p> <p>2040: State implements California Solar Initiative (CSI) program through 2016.</p> <p>-276.9</p> <p>2040: State implements California Solar Initiative (CSI) program through 2016.</p> <p>-276.9</p>
Methodology	<p>An average of 37 residential systems were installed annually between 2007 and 2012 with an average 7,407 kWh generated per system.</p> <p>Two commercial systems were installed (excluding government), one in 2007 and one in 2011, with an average 129,865 kWh generated annually.</p> <p>The analysis assumes the current rate of installation and average system size will continue through the conclusion of the program in 2016.</p>
Sources	<p>California Solar Initiative, <a href="http://www.californiasolarstatistics.ca.gov/">http://www.californiasolarstatistics.ca.gov/</a>.</p> <p>Electricity production estimates from Jonathan Whelan, Senior Project Manager, Optony, Inc.</p>

### *Calculation*

#### ***Residential Renewable Energy***

Average residential systems installed 2007-2012	37
Number of systems projected to be installed 2011-2016	221
Average electricity generated per installation	5,479
Annual electricity savings	1,210,818 kWh
Electricity emissions reductions	236.5 MTCO <sub>2</sub> e

#### ***Commercial Renewable Energy***

Commercial systems installed 2007-2012	2
Number of systems projected to be installed 2011-2016	2
Average electricity generated per installation	96,065
Annual electricity savings	192,129 kWh
Electricity emissions reductions	40.4 MTCO <sub>2</sub> e

