

Chapter 5

Municipal Greenhouse Gas Reduction Goals and Measures



Photo: Golden Gate Transit District

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5.1 Introduction

The CAP Update includes a variety of strategies that will reduce emissions from municipal operations. Several of the CAP Update strategies build on existing County programs and actions, whereas others provide new opportunities to address climate change. Statewide sustainability effort will have a substantial impact on future GHG emissions. Local strategies adopted by the County will supplement these state programs and achieve additional GHG emissions reductions for municipal operations.

The following sections summarize the state and local strategies included in the CAP Update for municipal emissions. Estimated emissions reductions achieved by the CAP Update are presented, indicating that the County will meet and exceed its 2020 Municipal Emissions Reduction Target. Costs, savings, and co-benefits are also described. Please refer to Appendix C for additional information on each strategy, including detailed objectives and assumptions used to quantify emissions reductions and costs.

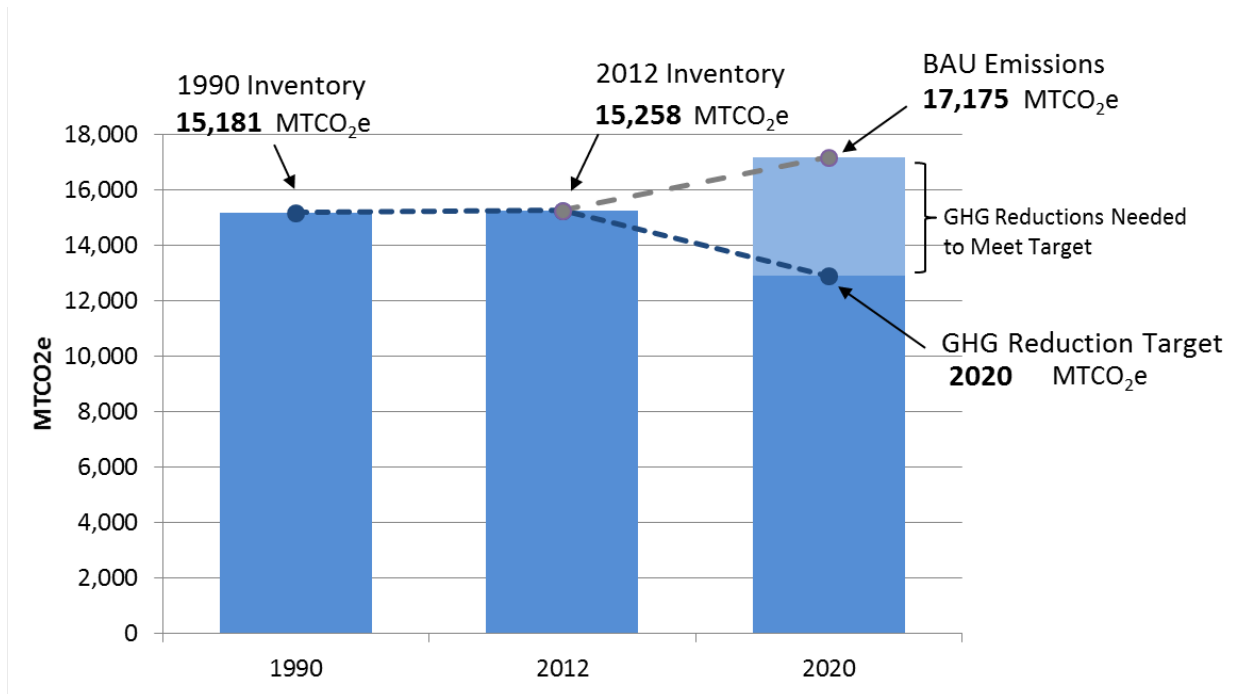
5.2 Marin County Greenhouse Gas Reduction Goals

In the 2006 GHG Reduction Plan, the County adopted an emissions reduction target for municipal emissions of 15% below 1990 levels by 2020. When comparing the original 1990 emissions inventory with the updated 2012 inventory, municipal emissions appear to have increased slightly (0.2% greater than 1990 levels). However, there were significant data gaps in the 1990 municipal inventory, which makes comparisons between years problematic; for example, PG&E was unable to provide electricity and natural gas usage data for 1990 for some municipal accounts, so actual 1990 emissions are different and may be higher than reported in this document (see Section 3.2.3, *Previous Inventories*, for additional discussion). Consequently, municipal emissions in 2012 are likely lower than they actually were in 1990, and the county may be able to reduce emissions by more than 15% below 1990 levels by 2020. Because of these data limitations, this CAP Update retains the current emissions target of 15% below 1990 levels by 2020. The 2020 Municipal Emissions Reduction Target reflects the County's continued commitment to implement achievable emissions reductions at the municipal level. The major obstacle to increasing the stringency of this target is that the target is based on the 1990 inventory, which had significant data gaps and technical issues as discussed above. If a more accurate and complete 1990 inventory of emissions was available, the County could potentially be on track to meet the current target and could consider a more aggressive target for the year 2020.

Meeting the target will depend on a combination of state and local policies. Achieving this goal would avoid the generation of more than 4,500 MTCO_{2e} and reduce 2020 Municipal GHG emissions to approximately 13,000 MTCO_{2e}. The strategies outlined in this chapter represent a combination of local and state initiatives that will collectively lower future municipal GHG emissions in the county consistent with the County's reduction target (see Figure 5-1).

The County's 2020 Municipal Emissions Reduction Target aligns with and exceeds statewide goals established by AB 32, which commits to reducing statewide GHG emissions to 1990 levels by 2020. The AB 32 Scoping Plan provides a roadmap for achieving these reductions and recommends a complementary reduction goal for local governments of 15% below current emissions levels (2008), which is roughly equivalent to 1990 emission levels. Because the County's 2012 municipal emissions are already about equal to 1990 levels, and the County's 2020 Municipal Emissions Reduction Target is 15% below 1990 levels by 2020, the Municipal Emissions Reduction Target is more aggressive than the AB 32 scoping plan recommended target for local governments with this complementary reduction goal.

Figure 5-1. Marin County 2020 Municipal Emissions Reduction Goal



Municipal Emissions Reductions in Context

Implementation of the CAP Update would avoid the generation of more than 4,500 MTCO₂e for the County government, which is equivalent to the following actions (U.S. Environmental Protection Agency 2014a):

- Removing nearly 1,000 passenger vehicles from the road each year;
- Reducing gasoline consumption by more than 500,000 gallons per year; and
- Providing renewable energy to power nearly 450 homes each year.

5.3 Climate Action Plan Framework

5.3.1 Reduction Measures

The CAP Update comprises a variety of state and local actions to reduce GHG emissions associated with municipal operations. As for community emissions, statewide efforts to reduce GHG emissions are an important part of the County's strategy to reduce municipal emissions. For example, the state's Pavley vehicle fleet regulations will improve the fuel efficiency of vehicles throughout the state, including those used by Marin County employees to commute to work and those vehicles within the County's municipal vehicle fleet. Vehicle emissions will therefore be reduced much more than if Pavley had not been established. The CAP Update includes the local impact of four state actions to reduce GHG emissions, as discussed further in Section 5.5.1.

The County has identified eight local municipal actions to supplement the statewide initiatives. Although identified individually in the CAP Update, these actions will be implemented together as part of a comprehensive GHG emissions reduction program. Coordinating GHG reduction programs will streamline CAP implementation and potentially boost GHG reduction outcomes through synergies created among measures.

Together, the CAP Update actions will improve building energy efficiency and renewable energy production, increase alternative modes of transportation for municipal employees, reduce emissions from County-owned vehicles, and reduce water consumption and waste generation. The actions were selected following a comprehensive review of candidate strategies recommended by the California Attorney General, CAPCOA, existing CAPs throughout California, and the *Marin Countywide Plan*.

A number of the actions build on existing County programs, whereas others provide new opportunities to address climate change. Successful implementation of these actions will require commitment and dedication from the County and its various departments. As discussed in Chapter 7, *Greenhouse Gas Reduction Measure Implementation Program*, the County will adaptively manage the implementation of the CAP Update to maximize GHG reductions and operational efficiency for each action. Accordingly, the County may revise actions or add new actions to ensure that the County achieves its 2020 Municipal Emissions Reduction Target. If adopted and implemented prior to 2020, new federal programs that achieve local GHG reductions beyond state and local mandates may also be added to the County's CAP.

5.3.2 Emissions Reductions

Emissions reductions achieved in 2020 are estimated for a range of state and local strategies. Strategies that do not currently support a quantitative reduction analysis are provided as supporting measures that strengthen the quantified measures (see Appendix C). Although emissions reductions have not been quantified for these strategies, they are still a key part of the CAP Update and ensure a comprehensive approach to climate action planning. Further development and implementation of these strategies may result in sufficient data to quantify the GHG reductions in the future. Please refer to Appendix C for additional information on emission reduction quantification methods.

5.3.3 Cost–Effectiveness Analysis

A cost–effectiveness analysis was not performed for municipal measures.

5.3.4 Co-Benefits

Municipal GHG reduction measures will result in environmental and community benefits that supplement the expected GHG emission reductions. As for the community measures, many of the municipal actions will reduce criteria air pollutants in the county, including ozone, carbon monoxide, and fine particulates, which will improve public health. The co-benefits for municipal measures are very similar to those for community measures, which include the conservation of natural resources, reducing dependence on foreign oil supplies, reducing material consumption and the need for landfill space, and reducing the need for potable water resources.

The combined implementation of the CAP Update actions provides an opportunity to lower carbon emissions and achieve a diverse suite of community co-benefits. Table 5-1 provides additional information on the relevant co-benefits for each municipal CAP strategy area.

5.4 Meeting Marin County’s Greenhouse Gas Reduction Goals

Combined, the state and local strategies included in the CAP Update are expected to reduce 2020 municipal GHG emissions by 4,683 MTCO_{2e}, which exceeds the 2020 Municipal Emissions Reduction Target by 412 MTCO_{2e}. This is equivalent to removing nearly 1,000 passenger vehicles from the road each year (U.S. Environmental Protection Agency 2014a). As shown in Table 5-1, the majority (70%) of emissions reductions are achieved by state programs, such as the Pavley standards and RPS, which is typical of other CAPs throughout California. Local strategies implemented by the County supplement reductions achieved by the state programs to help meet and exceed the reduction target. Strategies not currently quantified, as well as local effects of the state’s cap-and-trade program, will likely contribute additional reductions beyond those estimated by the CAP Update.

Table 5-1. Achieving Marin County’s 2020 Municipal Greenhouse Gas Reduction Target—Sector View

| Parameter | Emissions (MTCO₂e) |
|---|--------------------------------------|
| 2020 BAU Community GHG Emissions Forecast | 17,175 |
| 2020 Municipal Emissions Reduction Target (15% below 1990 levels) ^a | 12,904 |
| Total₁ Reductions Needed to Reach Target | 4,272 |
| 2020 Emissions Reductions from State Strategies | 3,245 |
| 2020 Emissions Reductions from Local Strategies | 1,438 |
| Energy Efficiency and Renewable Energy | 451 |
| Vehicle Fleet and Employee Commute | 851 |
| Waste Reduction, Reuse, and Recycling | 34 |
| Water Conservation and Wastewater Treatment ^b | 102 |
| Total₂ Emissions Reductions Achieved by the CAP Update | 4,683 |
| Emissions Reductions in Excess of Target (Total ₂ minus Total ₁) | 412 |

Notes:

BAU = business as usual.























MTCO₂e = metric tons of carbon dioxide equivalent.

^a Total GHG emissions in 1990 were 15,181 MTCO₂e; a 15% reduction equals 12,904 MTCO₂e.

^b Water conveyance measures result in water efficiency improvements to reduce water consumption, which will contribute to reductions in building energy use. For example, efficient faucets that use less water will require less energy for hot water heating.

Table 5-2 summarizes the municipal CAP Update strategies, including their estimated GHG reduction in 2020. Many of the local strategies are also cost effective, particularly those that target energy efficiency and renewable energy (see Appendix C for details). In addition to reducing GHG emissions, all local strategies will result in community co-benefits, such as improved public health, resource conservation, and better air quality.

Table 5-2. Summary of 2020 GHG Emissions Reductions by Municipal Measure (MTCO₂e)

| State Strategy | | 2020 GHG Reduction | % Total of Reductions | Co-Benefits ^a |
|---|--|--------------------|-----------------------|---|
| State-1. Renewables Portfolio Standard | | 403 | 9% |   |
| State-2. Pavley and Low Carbon Fuel Standard | | 2,653 | 57% |   |
| State-3. Advanced Clean Cars | | 161 | 3% |   |
| State-4. Assembly Bill 32 Vehicle Efficiency Measures | | 29 | 0.6% | |
| Strategy Area | Local Strategy | 2020 GHG Reduction | % Total of Reductions | |
|  ENERGY EFFICIENCY AND RENEWABLE ENERGY | Energy-1. Energy Efficiency | 341 | 7% |   |
| | Energy-2. Solar Energy | 111 | 2% |   |
|  VEHICLE FLEET AND EMPLOYEE COMMUTE | Trans-1. New Vehicles | 62 | 1% |   |
| | Trans-2. Alternative Transportation | 8 | 0.2% |   |
| | Trans-3. Trip Reduction | 781 | 17% | |
|  WASTE REDUCTION, REUSE, AND RECYCLING | Waste-1. Increase Recycling at County Facilities | 34 | 0.7% |   |
|  WATER CONSERVATION AND WASTEWATER TREATMENT | Water-1. Water Conservation | 101 | 2% |   |

Notes:

See Figure 4-2 for the key to the co-benefits symbols.

5.5 Measures to Reduce GHG Emissions

5.5.1 State Programs

Just like for community emissions, programs and initiatives undertaken by the state will contribute to local municipal emissions reductions. For example, the state’s Pavley vehicle standards will increase the fuel efficiency of the cars that County employees drive to work in the future. More fuel-efficient vehicles use less fuel and produce fewer GHG emissions, so emissions from employee commutes will decrease as a result of the Pavley regulations.

The County quantified four statewide initiatives that will contribute to municipal emissions reductions. The majority of emissions reductions are gained from mandates for renewable energy

generation and vehicle standards. Specifically, the state's RPS will increase the amount of electricity generated by renewable resources, reducing GHG emissions from electricity consumption. GHG reductions will also be achieved by statewide initiatives to improve vehicle engine efficiency and reduce the carbon intensity of transportation fuels.

5.5.2 Local Measures

5.5.2.1 Energy Efficiency and Renewable Energy

County-owned buildings along with streetlights and traffic signals consumed enough electricity and natural gas in 2012 to emit nearly 5,600 MTCO_{2e}, representing 37% of total municipal emissions in 2012. These emissions are anticipated to grow by 22% to over 6,700 MTCO_{2e} in 2020, due to the construction of the new emergency operations facility. The CAP Update includes two major strategies to reduce emissions in the building energy sector, including energy conservation and solar power.

The first strategy, *Energy-1, Energy Efficiency*, includes wide variety of actions that the County will implement to reduce energy consumption in County facilities. This strategy includes energy efficiency measures at the new emergency operations facility that will reduce electricity use by 1.17 million kilowatt-hours and natural gas use by more than 800 therms. Under *Energy-1*, the County will conduct energy efficiency retrofits of some existing County buildings to improve building-wide energy efficiency by at least 20%. By 2020, the County plans to replace traditional desktops and laptops with tablet computers, which use significantly less energy. The County plans to use software to manage computer energy use and to require employees to turn off computers before they go home. Shade trees will also be planted to reduce the heating and cooling load of buildings. To reduce energy use from streetlights and traffic signals, the County will ensure that all streetlights use LED bulbs.

The second strategy, *Energy-2, Solar Power*, aims to replace utility-supplied electricity with energy generated by solar photovoltaic panels on County roofs. The County will require, where feasible, new or major rehabilitation of County-owned buildings are constructed to allow for easy, cost-effective installation of solar energy systems in the future. The County also plans to install solar panels on unused space over carports and parking areas.

5.5.2.2 Vehicle Fleet and Employee Commute

The County operates a vehicle fleet including gasoline and diesel cars, trucks, vans, and buses. In 2012 these vehicles consumed nearly 300,000 gallons of gasoline and diesel fuels, contributing nearly 3,000 MTCO_{2e} to the 2012 Municipal Inventory (18%). On-road vehicle emissions from employee commutes also contribute to municipal emissions. In 2012, County employees traveled over 17 million miles, emitting almost 7,000 MTCO_{2e}. This represents over 40% of the 2012 Municipal Inventory, and is the largest sector of the inventory in terms of emissions. Together, vehicle fleet and employee commute emissions compose 61% of total municipal emissions in 2012. Consequently, there is a major opportunity to reduce municipal GHG emissions by implementing programs that target the fuel efficiency of County-owned vehicles and the commuting habits of employees.

Trans-1, New Vehicles, attempts to reduce emissions through vehicle technology. While certain vehicles used in County services such as emergency vehicles or heavy duty equipment are not suited

for replacement, many County vehicles can be replaced with hybrid vehicles or electric vehicles, both of which produce fewer GHGs than traditional vehicles (i.e., vehicles fueled with gasoline or diesel). Through Trans-1, the County plans to expand on the fuel-efficient fleet vehicles program by purchasing at least 25 new hybrid vehicles and 20 new electric vehicles by 2020 to replace conventional gasoline and diesel vehicles.

In addition to vehicle technology, the CAP Update will reduce GHG emissions through the use of alternative transportation by employees. Trans-2, *Alternative Transportation*, will institute a Guaranteed Ride Home program, which would provide a free shuttle or taxi ride home to employees in case of an emergency (illness, family crisis, unscheduled overtime). This program would be offered to any employee who uses any alternative to driving alone to work (public transit, carpooling, vanpooling, biking, or walking) on the day of the emergency, further encouraging alternative modes of transportation. Trans-2 would also reestablish the Green Commute Program, which could include allowing County employees to purchase public transit fares with pre-tax dollars up to IRS limits, providing employees with low-cost monthly transit passes and/or providing direct incentives to employees that take commute alternatives. Trans-2 also aims to encourage the use of EVs by County employees by installing 10 new 120-volt EV charging stations at County facilities by 2020. The availability of additional charging stations at County facilities is expected to increase the purchase and use of EVs by County employees.

Finally, the County plans to reduce employee commute emissions by encouraging trip reduction. Trans-3, *Trip Reduction*, encourages employees to telecommute and implements a Municipal Parking Management Program to discourage private vehicle use. These programs will reduce the number of trips that employees take to commute to work.

The employee commute programs are anticipated to result in large GHG emission reductions because employee commuting represents the largest sector of the municipal inventory (representing 40% of total emissions) and because the County is committed to implementing aggressive programs to reduce these emissions by encouraging employees to carpool, take alternative modes of transportation to work, and telecommute. Together, these actions will result in sizeable emission reductions for the County.

5.5.2.3 Waste Reduction, Reuse, and Recycling

County employees generate waste through their daily activities and facility operations. Some portion of this waste ultimately is placed in a landfill where it decays and releases methane. In 2012, GHG emissions related to municipal waste generation were estimated at almost 50 MTCO_{2e}, a small part of the County's municipal emissions (less than 1%). Although the total GHG savings potential in this sector is small, there are ample opportunities to reduce these emissions because the waste diversion rate at many County facilities is less than the community diversion rate for the County as a whole.

Waste-1, *Increase Recycling at County Facilities*, will expand County recycling efforts and include the addition of food scrap recycling where feasible. This strategy aims to increase the diversion rate at many County facilities, including Civic Center, the County Jail, 120 North Redwood, and the Kerner Campus to over 80%. It also sets a target diversion rate of 95% for the Marin County Fair and the Marin Home Show. These actions will reduce the amount of waste going to landfill, along with the GHG emissions associated with this landfilled waste.

5.5.2.4 Water Conservation and Wastewater Treatment

The County serves as a consumer of water, just like the many residents and businesses in the county. In 2012, the County consumed more than 78 million gallons of water. In 2012, emissions associated with providing water for municipal uses resulted in 29 MTCO_{2e} (less than 1% of total emissions). The County will already be working with the water agencies to maintain the pumps for maximum efficiency and to upgrade equipment as needed for maximum energy efficiency (see Section 4.5.2 above).

Emissions are generated when wastewater produced by municipal operations is treated at wastewater treatment plants; these emissions account for 1% of the 2012 Municipal Inventory. The most direct way to reduce these emissions is to reduce wastewater generation, which is primarily accomplished through water conservation efforts aimed at reducing potable water use. If less potable water is used in kitchens and bathrooms, then less wastewater is generated and less wastewater needs to be treated.

As a water consumer, the County can save energy and avoid future GHG emissions by reducing its overall water consumption. Although the total GHG savings potential in this sector is small, the County is committed to a regionally sustainable water supply and can serve as a leader to other jurisdictions and its citizens in this regard.

The CAP Update has one strategy to reduce water use and associated GHG emissions. Water-1, *Water Conservation*, aims to reduce water use through a number of actions. The County will promote site appropriate, low-water use, and drought tolerant native plants in public facilities. Water-1 also involves water conservation for both existing and new buildings by reducing water use by 30–40%, consistent with CALGREEN Tier 1 Voluntary standards for non-residential development. The County will consider installing and or using a water monitoring and management system for all of the County's irrigation needs. This could be accomplished by participation in the California Irrigation Management Information System (CIMIS), such as by installation of a climate station in the county or by using CIMIS irrigation scheduling tools. The County also plans to develop a master plan of County facilities to address water efficient landscape, irrigation and maintenance practices.

The County is also using as much recycled water as the water districts can supply for landscaping water use and other non-potable water uses. While not quantified in the CAP update, the County's current use of recycled water contributes to energy and emission reductions in the water and wastewater sector by offsetting more energy intensive sources of potable water.

Water-1 will also reduce emissions in the wastewater sector, because using less water also means generating less wastewater.