



Town of Tiburon

CLIMATE ACTION PLAN 2030

Public Review Draft

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WHAT YOU CAN DO

LOW CARBON TRANSPORTATION	
	<ul style="list-style-type: none">• Drive an all-electric or plug-in hybrid vehicle.• Bike, walk, or take transit whenever possible.• Reduce the number of miles you drive by working from home when possible.• Shut your car off when waiting in line at the ATM or in the school pick up/drop off lane.
RENEWABLE ENERGY & ELECTRIFICATION	
	<ul style="list-style-type: none">• Switch to MCE Deep Green or PG&E Solar Choice 100% renewable electricity.• Install a solar energy system on your home or business and consider battery storage.• Replace appliances that use natural gas for ones that use electricity.• Investigate heat pump technology so you can swap out heaters and furnaces that use natural gas when it's time to replace them.
ENERGY EFFICIENCY	
	<ul style="list-style-type: none">• Replace indoor and outdoor lights with LED bulbs and turn them off when not in use.• Have an energy assessment done for your home or business.• Upgrade insulation, seal leaks, and install a programmable thermostat.• Purchase Energy Star appliances and equipment.
WASTE REDUCTION	
	<ul style="list-style-type: none">• Buy only as much as you need.• Put your food scraps in the green can and/or compost them at home.• Donate extra food and used clothing and housewares.• Don't be a "wishful" recycler. Be scrupulous about how you sort your recyclables.
WATER CONSERVATION	
	<ul style="list-style-type: none">• Replace your lawn with a drought-tolerant garden.• Install a drip irrigation system, program it to run early in the morning, and check it regularly for leaks.• Install low water flow faucets, showerheads, and toilets.• Buy water-efficient dishwashers and clothes washers when it's time to replace them.
COMMUNITY ENGAGEMENT	
	<ul style="list-style-type: none">• Sign up for Resilient Neighborhoods and join a Climate Action Team.• Calculate and commit to reducing your carbon footprint by taking the actions identified in this plan.• Get your business certified as a Green Business with the Marin Green Business Program.

CHAPTER 1: INTRODUCTION

The need for local governments to act on climate change has never been more urgent, as demonstrated by 2020's devastating wildfires layered over a global pandemic. Tiburon has long been dedicated to environmental leadership, and this plan continues that legacy by incorporating new ideas and ambitious targets. The following plan outlines a path towards reducing local greenhouse gas (GHG) emissions through the year 2030.

WHAT IS A CAP?

A Climate Action Plan (CAP) is a public document which:

- Helps us to understand how the community contributes to climate change
- Sets targets for how much to reduce these contributions by a certain year
- Outlines a path to meet that goal.

This CAP is grounded in Tiburon's understanding that climate change is already impacting California and the world and will continue to affect Marin's residents and businesses for the foreseeable future, as well as other communities around the world. The Town also recognizes that local governments play a strong role in reducing GHG emissions in their municipal operations and communities and mitigating the future impacts of climate change.

The CAP seeks to reimagine a community that is substantially less dependent on fossil fuels and provides a prosperous environment for both current and future generations, while not exporting environmental damage and GHG emissions to other parts of the Bay Area, nation, or world.

The CAP was developed with the assistance of Marin Climate and Energy Partnership (MCEP), a partnership program of Marin cities and towns, the County, and Marin regional agencies. The actions included in this plan draw on a model climate action plan developed by MCEP, which is intended to support countywide implementation efforts. Although the CAP specifically addresses the incorporated areas of Tiburon, many of the actions identified in this plan will require the coordinated effort of Marin's local governments. The model plan has already been adopted by San Rafael, San Anselmo, Corte Madera, and the County of Marin and is currently being used to update additional Climate Action Plans for other cities and towns in Marin.

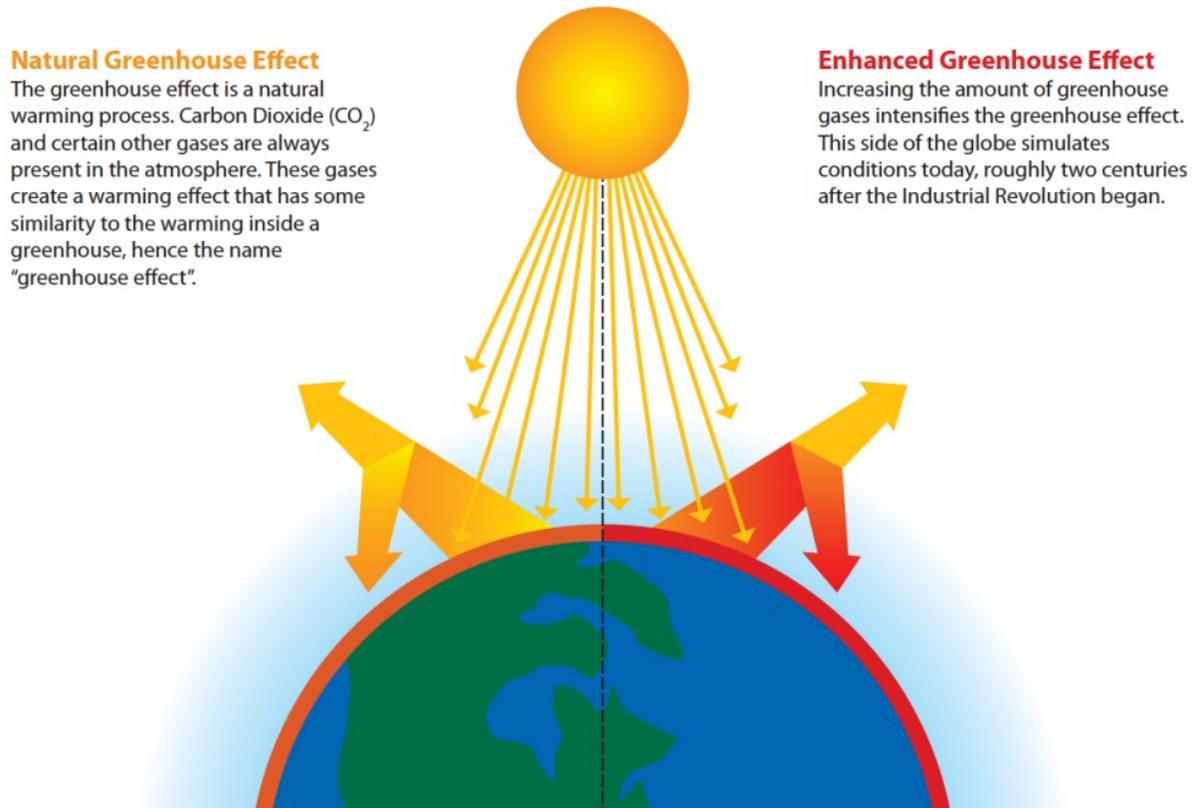
Through the actions outlined in this plan, such as increasing energy efficiency in buildings, electrifying buildings and appliances, accelerating zero emission vehicle adoption, and using clean, renewable energy sources, the community can experience lower fuel and energy bills, improved air quality, reduced emissions, and an enhanced quality of life. The Town's preparation of GHG emissions inventories and Climate Action Plans are part of an ongoing planning process that includes assessing, planning, mitigating, and adapting to climate change.

WHAT ARE GREENHOUSE GAS EMISSIONS AND HOW DO THEY CONTRIBUTE TO CLIMATE CHANGE?

Greenhouse gases (GHGs) are gases in Earth's atmosphere that allow the sun's rays to enter our atmosphere and trap the resulting heat generated by the rays. These gases are naturally occurring and make Earth suitable for life.

While we depend a certain level on these gases to keep our earth habitable, certain human activities have been shown to emit GHGs, increasing their concentration in the atmosphere to unsustainable levels and trapping more heat, resulting in an increase in Earth's average temperature (Figure 1). This intensification of the natural greenhouse effect affects local and global climate patterns, and which in turn amplifies many hazards including flooding, wildfire, drought, and storms.

FIGURE 1: THE GREENHOUSE EFFECT



Source: California Waterboard/Marion Koshland Science Museum Of The National Academy Of Sciences

These GHGs include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (Table 1) ¹. Each one has a different degree of impact on climate change. To facilitate comparison across different emission sources with mixed and varied compositions of several GHGs, the term "carbon dioxide equivalent" or CO₂e is used across this CAP. One metric ton of CO₂e may consist of any combination of GHGs and has the equivalent Global Warming Potential (GWP) as one metric ton of carbon dioxide (CO₂). As gathering data and quantifying emissions can be quite difficult for some sources, community inventories at the local government level typically concentrate on the three primary GHGs: CO₂, CH₄, and N₂O.

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

TABLE 1: GREENHOUSE GASES

Gas	Chemical Formula	Emission Source	Global Warming Potential
Carbon Dioxide	CO ₂	Combustion of natural gas, gasoline, diesel, and other fuels	1
Methane	CH ₄	Combustion, anaerobic decomposition of organic waste in landfills, wastewater, and livestock	28
Nitrous Oxide	N ₂ O	Combustion, wastewater treatment	265
Hydrofluorocarbons	Various	Leaked refrigerants, fire suppressants	4 to 12,400
Perfluorocarbons	Various	Aluminum production, semiconductor manufacturing, HVAC equipment manufacturing	6,630 to 11,100
Sulfur Hexafluoride	SF ₆	Transmission and distribution of power	23,500

Source: International Panel on Climate Change (IPCC) Fifth Assessment Report, 100-year values, 2014

According to the U.S. Environmental Protection Agency’s 2019 “Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018,” the majority of GHG emissions comes from fossil fuel combustion which in turn is used for electricity, transportation, industry, heating, etc. The burning of fossil fuels occurs across nearly every sector of the global economy, in ways that have become foundational to the ways that most people move, eat, and live.

It is the charge of this plan to diminish our community’s dependence on fossil fuels and drastically decrease our associated GHG emissions.

HOW WILL CLIMATE CHANGE IMPACT CALIFORNIA AND TIBURON?

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

California is already experiencing climate change impacts. Sea levels along the coast of southern and central California have risen about 6 inches over the past century and even moderate tides and storms are now producing extremely high sea levels.² Since 1950, the areas burned by wildfire each year has been increasing, as warming temperatures extend the fire season and low precipitation and snowpack create conditions for extreme, high severity wildfires to spread rapidly. Seventeen of the state’s twenty largest fires have occurred since 2003, and the seven largest fires have occurred since 2017.³ The megafires of 2020, sparked in many cases by lightning strikes, burned over 4 million acres across California.

² Louise Bedsworth, Dan Cayan, Guido Franco, Leah Fisher, Sonya Ziaja, “Statewide Summary Report,” in California’s Fourth Climate Change Assessment, publication number: SUMCCCA4-2018-013, 2018, p. 31.

³ Cal Fire, “Top 20 Largest Wildfires,” 1/26/21.

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

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

Overall temperatures are projected to rise substantially throughout this century. In Tiburon, temperatures are expected to rise about 4°F by 2100 if global emissions peak around 2040 and then decline, the so-called “low emissions” scenario. If the world fails to act and we continue the path we are on, temperatures are projected to rise 7°F by the end of the century (the “high emissions” scenario).

As the climate changes, some of the more serious threats to public health will stem from more frequent and intense extreme heat days and longer heat waves. Extreme heat events are likely to increase the risk of heat-related illness, such as heat stroke and dehydration, and exacerbate existing chronic health conditions. Extreme heat days in Tiburon are expected to increase from 4 days to 11 days under the low emissions scenario and to as many as 19 days under the high emissions scenario.

Higher temperatures will make Marin more vulnerable to wildfire and sea level rise. By the end of the century, sea level is projected to rise 2.4 to 3.4 feet, and possibly as much as 10 feet. At 5 feet of sea level rise, flooding may inundate downtown Tiburon, Blackie’s Pasture and Greenwood Cove, the Cove Shopping Center, and Paradise Cay. Flooding will be even worse during storms, which are expected to increase in frequency and intensity.

WHAT ROLE DOES GOVERNMENT PLAY?

International, national, and statewide GHG reduction goals and policies affect the Town’s own goals and policies. Whether trying to meet or exceed those goals, California and Marin are known for their environmental stewardship and willingness to be leaders on the international and national stage.

International	<ul style="list-style-type: none"> • The United Nations coordinates global commitments and targets to reduce emissions (such as the Paris Climate Accord) • The United Nations also supports the advancement of climate science through the Intergovernmental Panel of Climate Change (IPCC). The IPCC coordinates the work of scientists across the world to continually update models and assess the science related to climate change. This work in turn informs the way that national, state, and local governments understand and address the human activities that contribute to climate change and the ways that climate change might impact earth’s environment.
National	<ul style="list-style-type: none"> • Currently, there is no federal legislation mandating comprehensive GHG emissions reporting or reduction in the United States.

State	<ul style="list-style-type: none"> • California first established statewide GHG emission reduction targets in 2005. • California has used its climate goals to develop regulations to reduce emissions across a variety of sectors, including: <ul style="list-style-type: none"> ○ Setting more strict fuel economy standards for vehicle manufacturers that would like to sell cars in the state ○ Establishing zero-net energy building requirements for all new homes constructed on or after January 1, 2020 ○ Direct management of emissions from power plants and other stationary sources • California has also used SB 375, which was passed in 2008, to reduce emissions from cars and light trucks by promoting compact mixed-use, commercial, and residential development. SB 375 required local governments in California to consider GHG emissions, leading to successful proliferation of climate action plan development throughout the state.
Local	<ul style="list-style-type: none"> • Looks at GHG emissions generated by their communities. • Sets long term GHG emission reduction targets that align meet or exceed statewide goals through local Climate Action Plans. • Develops policies and programs to achieve CAP GHG emission reduction goals.

TIBURON’S CAP HISTORY & CLIMATE ACTION TO DATE

The Town first adopted a CAP in 2011 based on a long-standing commitment to environmental stewardship and sustainability. The Plan established GHG emission levels for 2005 and established a goal to reduce emissions 15% below 1990 levels by 2020, which was in line with the State’s goal to reduce statewide emissions to 1990 levels by 2020.

As of 2018, the Town had reduced emissions 26% below 2005 levels, exceeding both the Town’s goal and the statewide target.

In 2020, the Town began an update to the CAP. This CAP builds on the successes of the 2011 document while setting a new emissions reduction target for 2030 and beyond.

The Town has been a pioneer in efforts to reduce GHGs. This is a partial listing of the many actions the Town has implemented since recognizing the critical need to act.

RENEWABLE ENERGY & ELECTRIFICATION

- **Marin Clean Energy.** In 2010, the Town joined the County and several Marin cities and towns to form Marin Clean Energy (MCE), a Community Choice Energy agency. As a public agency, MCE is chartered to source clean, competitively priced electricity on behalf of residents and businesses in participating jurisdictions. MCE provides customers with 60% - 100% renewable energy and has plans to provide all customers with 100% renewable energy by 2022.
- **Deep Green Electricity.** In 2017, the Town began purchasing 100% renewable electricity from MCE for all municipal facilities.
- **Solar Installation.** The Town installed a 22 kW solar PV system on Town Hall in 2006 and a 11 kW solar shade structure at the police station in 2021.

ENERGY EFFICIENCY

- **Energy Efficiency Upgrades.** The Town has replaced some of the lighting in Town owned buildings with LEDs and replaces with energy efficient lighting during routine replacements/maintenance.
- **LED Streetlights.** The Town has converted 44% of its streetlights to LED fixtures. LED lighting uses about half the electricity of conventional lighting.
- **Green Building Ordinance.** The Town has adopted green building regulations that exceed State building code requirements since 2008.

LOW CARBON TRANSPORTATION

- **Electric Vehicles (EVs).** The Town's fleet includes three zero emission passenger vehicles, one electric bicycle, and one electric utility cart.
- **Bicycle and Pedestrian Network Improvements.** The Town has completed pedestrian and bicycle infrastructure and safety improvements to encourage residents, employees, and visitors to walk, bike and take transit rather than drive to their destinations. In 2016, the Town adopted an updated Bicycle and Pedestrian Master Plan that provides for a town-wide network of bicycle and pedestrian facilities, including sidewalks, paths, bike lanes, and bike routes, along with bicycle and pedestrian-related programs and support facilities.

WASTE REDUCTION

- **Curbside Composting.** The Town update its franchise agreement with Mill Valley Refuse to provide curbside composting of green waste and food scraps.
- **Plastic Bag Ban.** In 2014, the Town adopted an ordinance that prohibits stores from providing single-use plastic carry-out bags to customers.

COMMUNITY COLLABORATION

- **Marin Climate and Energy Partnership.** The Town is a member of the Marin Climate & Energy Partnership (MCEP). Created in 2007, MCEP is a countywide partnership that allows its members to work collaboratively, share resources, and secure funding to: 1) discuss, study and implement overarching policies and programs, ranging from emission reduction strategies to adaptation, contained in each agency's Climate Action Plan; and 2) collect data and report on progress in meeting each partner member's individual GHG emission targets. MCEP'S [website](#) provides information on climate action plans and GHG emission in Marin and links to the Marin communities' plans and reports. MCEP's [Marin Sustainability Tracker](#) compares the progress Marin's jurisdictions are making on 11 metrics related to energy, waste, transportation, water, and GHG reduction.

CHAPTER 2: GREENHOUSE GAS EMISSIONS INVENTORY, FORECAST, AND REDUCTION TARGETS

TIBURON PROFILE

Located on a peninsula in Marin County approximately seven miles north of the Golden Gate Bridge, Tiburon is a small town with a land area of 4.5 square miles and an estimated current population of 9,540.⁴ Primarily a residential community of single-family homes, Tiburon has a relatively small percentage of land devoted to multi-family development and commercial uses. There are two commercial areas that provide necessary goods and services for residents, as well as public and private schools for grades K-8, a post office, a library, police and fire stations, and a Town Hall. With abundant parks and open space, and both public and private recreational facilities, there are many recreational opportunities within town.

Tiburon enjoys a temperate climate, with cool, wet, and almost frostless winters and cool, dry summers with frequent fog or wind. Natural gas consumption rises in the winter months and fluctuates according to average low temperatures during the rainy season. Water use rises during the summer, and outdoor water use is largely dependent upon local rainfall patterns and weather conditions. Approximately 75% of Tiburon's housing stock was built before 1980, providing excellent opportunities to upgrade homes to include more energy-efficient and decarbonized features.⁵ The commercial sector of the built environment, which includes retail and office buildings as well as public and government buildings, uses about 28% of all electricity and 14% of natural gas consumed in Tiburon. As such, the commercial sector has a significant role to play in reducing GHG emissions.

While there are no large employment centers, Tiburon provide about 2,910 jobs.⁶ Most people who work in Tiburon also live in the county (69%), while about 7% come from Sonoma County and the rest from other Bay Area counties. Although some residents work in Tiburon (23%), a majority commute to jobs in San Francisco (35%), elsewhere in Marin County (30%), and other locations outside Marin County.⁷ An estimated 60% of Tiburon residents drive to work alone, 5% carpool, 15% take the ferry, 2% take the bus, and 1% walk or bicycle. In 2018, approximately 16% of residents worked from home.⁸ During the coronavirus pandemic of 2020-2021, it is estimated that average mobility, based on distance traveled, declined 55-70% in Marin County.⁹ Although it is unknown how changing transportation

⁴ California Department of Finance, Report E-5, January 1, 2020.

⁵ U.S. Census, American Community Survey 2018 ACS 1-Year Estimates.

⁶ Association of Bay Area Governments, Plan Bay Area 2040 Projections.

⁷ Census Transportation Planning Products, 2012-2016 data set. These numbers do not take into account shifting employment locations due to the coronavirus pandemic of 2020-2021.

⁸ U.S. Census, American Community Survey 2018 ACS 1-Year Estimates.

⁹ Unacast, <https://www.unacast.com/covid19/social-distancing-scoreboard?view=county&fips=06041>, accessed 1/27/21.

patterns are likely to persist once the pandemic has subsided, there is an opportunity to significantly reduce vehicle miles traveled (VMT) by working at home.

Tiburon Boulevard, a state highway maintained by Caltrans, runs along the length of the peninsula and connects to Highway 101. As the principal roadway on a peninsula, most vehicle trips in Tiburon require some segment to be driven on this roadway. Walking or biking are viable ways to get around the flatter areas of town, especially in the neighborhoods located close to schools and commercial areas. There is one Class 1 multi-use path that runs along the Richardson Bay shoreline to the downtown area, where it becomes a striped bicycle lane for a short segment. More residents walking and biking to destinations will help to reduce transportation emissions, improve public health, and build community. Understanding time, safety, and access constraints to biking and walking is essential to encourage residents to shift away from single occupancy vehicles.

Public transit is limited within Tiburon, with one bus route operated by Marin Transit running between downtown Tiburon and Strawberry approximately every half hour. Marin Transit uses renewable diesel in most of its fleet and began introducing electric buses in 2019. Ferry service is located in the downtown and provides a convenient way for residents to commute to San Francisco.

With a median household income significantly higher than the average California household (\$155,915 vs. \$75,235) and a great majority of well-educated residents (76% have a bachelor's degree or higher), Tiburon residents, on average, have access to more resources, which may allow them to be early adopters of new eco-friendly technologies.¹⁰ For example, Marin County is a leader in zero emission vehicles (ZEVs) in California with 8,600 ZEVs in Marin as of January 2020, and about 4% of registered automobiles. In Tiburon, ZEVs make up nearly 7% of all registered vehicles. Public information campaigns, incentives, and regulatory mechanisms to accelerate solar and battery storage installation, electric vehicle adoption, and electrification of buildings and appliances are strategies that can be used to reduce GHG emissions.

COMMUNITY EMISSIONS INVENTORY

The first step toward developing a climate action plan is to identify sources of emissions and establish baseline levels. In 2020, the Marin Climate & Energy Partnership prepared a Greenhouse Gas Emissions Inventory for Tiburon community emissions for the years 2005 through 2018. The inventory quantifies GHG 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. Emissions are quantified according to methodologies established by the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (v. 1.2). The inventory provides a detailed understanding of where the highest emissions are coming from, and, therefore, where the greatest opportunities for emissions reductions lie. The inventory also establishes a baseline emission inventory against which to measure future progress.

Community emissions are quantified according to these seven sectors:

- The **Built Environment - Electricity** sector represents emissions generated from the use of electricity in homes and commercial and public buildings and facilities, and electric vehicle charging in Tiburon.

¹⁰ 2019 American Community Survey 5-Year Estimates.

- The **Built Environment – Natural Gas** sector represents emissions generated from the use of natural gas in homes and commercial and public buildings and facilities in Tiburon. Propane used in homes is included in this sector, representing about 1% of emissions.
- The **Transportation** sector includes tailpipe emissions from passenger vehicle trips originating and/or ending in Tiburon, a share of tailpipe emissions generated by medium and heavy-duty vehicles travelling on Marin County roads, and emissions from transit vehicles when operating within the Town limits. Electricity used to charge electric vehicles is embedded in electricity consumption reported in the Built Environment – Electricity sector.
- The **Waste** sector represents fugitive methane emissions that are generated over time as organic material decomposes in the landfill. Although most methane is captured or flared off at the landfill, approximately 25% escapes into the atmosphere.
- The **Off-Road** sector represents emissions from the combustion of gasoline and diesel from the operation of off-road vehicles and equipment used for construction and landscaping.
- The **Water** sector represents emissions from energy used to pump, convey, treat, and distribute potable water from the water source to water users in Tiburon.
- The **Wastewater** sector represents stationary, process, and fugitive GHGs that are created during the treatment of wastewater generated by the community and emissions created from energy used to process wastewater.

Community GHG emissions totaled 60,101 metric tons in 2005 and 44,676 metric tons in 2018, falling 26%, or 15,425 metric tons CO₂e. As shown in Table 2, reductions occurred in all inventoried sectors. The largest decline occurred in the Built Environment - Electricity sector, due to a 17% reduction in electricity consumption and a significant improvement in the carbon intensity of electricity. Emissions declined 76% in this sector and 8,373 metric tons between 2005 and 2018.

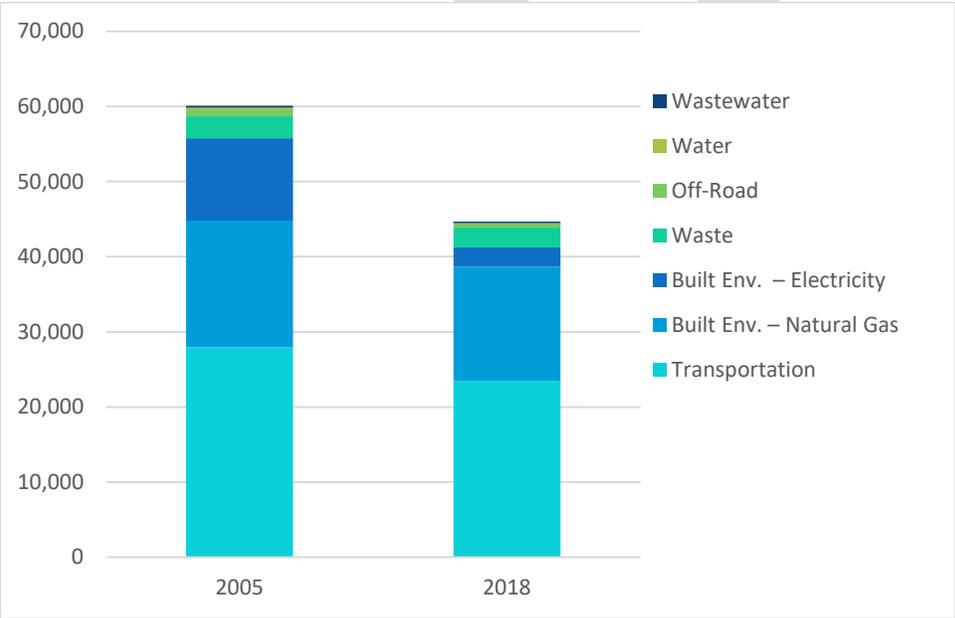
TABLE 2: COMMUNITY EMISSIONS BY SECTOR, 2005 TO 2018

Year	Built Env. – Electricity	Built Env. – Natural Gas	Transportation	Waste	Off-Road	Water	Wastewater	Total	% Change from 2005
2005	10,961	16,865	27,938	2,945	776	376	240	60,101	
2006	10,364	17,256	28,338	2,933	803	332	239	60,264	0%
2007	13,639	16,998	28,065	2,642	961	448	256	63,009	0%
2008	13,661	17,472	27,555	2,200	794	413	259	62,354	5%
2009	12,225	17,501	27,507	1,896	696	415	250	60,490	4%
2010	8,792	18,158	26,222	1,864	651	238	238	56,163	1%
2011	8,068	18,206	26,512	1,822	648	168	235	55,660	-7%
2012	8,261	17,133	26,675	1,900	642	183	243	55,038	-7%
2013	7,672	16,567	26,161	1,940	637	216	247	53,441	-8%
2014	6,903	13,817	25,641	1,949	622	186	242	49,360	-11%
2015	6,536	13,779	25,196	2,014	606	151	239	48,521	-18%
2016	5,335	15,094	24,487	2,368	590	101	229	48,205	-19%

Year	Built Env. – Electricity	Built Env. – Natural Gas	Transportation	Waste	Off-Road	Water	Wastewater	Total	% Change from 2005
2017	2,511	14,990	24,046	2,474	574	29	224	44,848	-20%
2018	2,588	15,218	23,439	2,642	554	10	224	44,676	-25%
2005-2018	-8,373	-1,647	-4,499	-302	-222	-366	-16	-15,425	-26%
2005-2018	-76%	-10%	-16%	-10%	-29%	-97%	-7%	-26%	

Figure 2 compares sector emissions between 2005 and 2018. The chart shows how the share of emissions for the Built Environment – Electricity sector has shrunk over the years as energy use has declined and electricity has become cleaner. PG&E has been steadily increasing the amount of renewable energy in its electricity mix, which was 58% less carbon intensive in 2018 than it was in 2005. MCE Clean Energy (MCE), which began serving Tiburon in 2010, provides its customers with electricity that is generated from 60% and 100% renewable sources.

FIGURE 2: EMISSIONS BY SECTOR, 2005 AND 2018



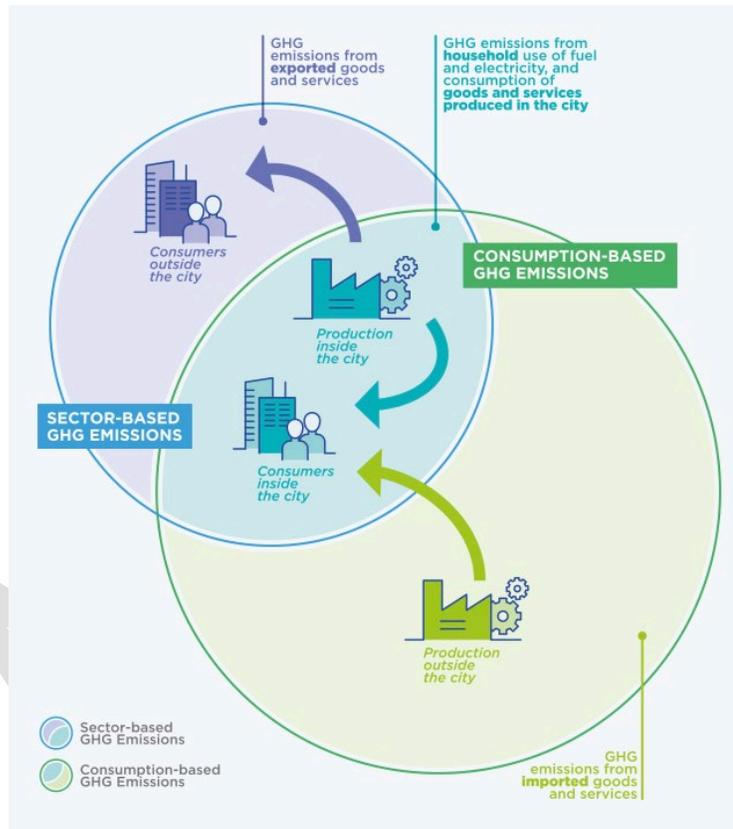
CONSUMPTION-BASED INVENTORY

In addition to the sectors outlined above, which measures the emissions that are generated within the Town's borders, there are also emissions associated with the goods and services that residents in Tiburon consume. These are referred to as "consumption-based emissions". Rather than assessing emissions that are generated within a jurisdictional boundary, consumption-based inventories estimate the emissions based on the goods and services consumed within a place. This includes emissions from raw material extraction, manufacturing, distribution, retail, and disposal. Historically, local governments have only included emissions that occur within their boundaries, including emissions associated with goods that will eventually be exported (Figure 4). However, in communities like Tiburon (as in many other communities in the United States) where goods are more often imported than exported, consumption emissions can be up to 800% higher than their sector-based emissions inventory. Consumption emissions are harder to track and have fewer defined pathways for policy intervention from local governments, so the Town continues to follow ICLEI's Community Protocol and focus on actionable programs and policies to address local emissions. This CAP, wherever possible, seeks to take into account the whole picture of local contributions to climate change and includes measures to address these emissions in the built environment.

In 2016, the Bay Area Air Quality Management District (BAAQMD) and U.C. Berkeley developed consumption-based inventories for Bay Area communities to better understand how purchasing habits contribute to global climate change. A consumption-based inventory includes emission sources that don't get counted in the typical "activity-based" GHG inventory, as well as other items that are difficult to quantify like airplane travel and upstream emissions from the production, transport, and distribution of food and household goods. Figure 4 shows the results of the consumption-based inventory for Tiburon and Belvedere households. According to this inventory, the average household generates 55.6 MTCO₂e per year. Under the activity-based GHG inventory, the average Tiburon household generates 11.9 MTCO₂e per year, about 21% of the consumption-based estimate. For more information on the consumption-based inventories, visit <https://coolclimate.org/inventory>.

Although this consumption-based inventory is informative, it is not updated regularly and therefore does not provide a useful way to track changes in emissions levels over time. Tiburon's Greenhouse Gas Inventory instead focuses on emission sources that the Town has some control over and that can be reliably quantified using established protocols and tracked annually in order to inform decision-making and measure progress. The Town will continue to monitor

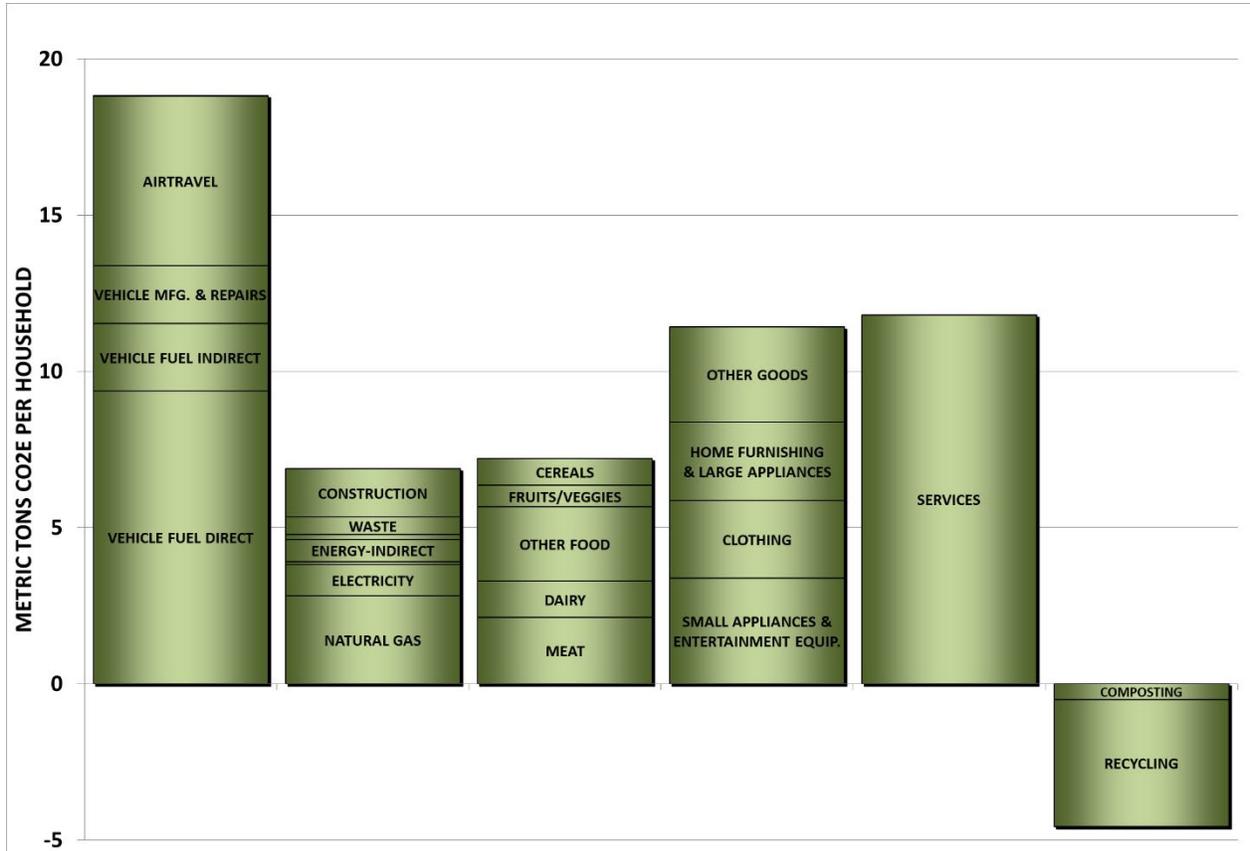
FIGURE 3: SECTOR-BASED VS. CONSUMPTION-BASED GHG



Source: C40 Cities, "Consumption-Based GHG Emissions of the C40 Cities"

the availability and applicability of consumption-based inventories and protocols to incorporate these tools into the annual inventory and implementation planning process.

FIGURE 4: AVERAGE TIBURON/BELVEDERE HOUSEHOLD CARBON FOOTPRINT



Source: CoolClimate Network

COMMUNITY EMISSIONS FORECAST

The Climate Action Plan includes a business-as-usual (BAU) forecast in which emissions are projected in the absence of any policies or actions that would occur beyond the base year to reduce emissions. The forecasts are derived by “growing” 2018 emissions by forecasted changes in population, number of households, and jobs. Transportation emissions are projected utilizing data provided by the Metropolitan Transportation Commission (MTC), which incorporate the vehicle miles traveled (VMT) reductions expected from the implementation of [Plan Bay Area 2020](#) and the [Regional Transportation Plan](#) adopted in 2017. As shown in Table 3, emissions are expected to rise about 1.8% by 2030 and 0.8% by 2040. Because ABAG and MTC have not developed projections for 2050, the rate of population growth forecasted by the California Department of Finance for Marin County was used to project population, household, jobs, and VMT for 2050. The Department of Finance projects that Marin’s population will decrease 3.6% between 2040 and 2050. As a result, emissions would be approximately 44,615 MTCO_{2e} by 2050 under the BAU forecast, a decrease of 0.1% from 2018 levels.

TABLE 3: TIBURON COMMUNITY EMISSIONS FORECAST

Forecast Category	2018	2030	2040	2050
Population	9,209	9,275	9,430	9,093
Households	3,928	3,940	3,895	3,756
Jobs	2,916	2,930	2,925	2,820
Emissions (MTCO ₂ e)	44,676	45,473	45,041	44,615

COMMUNITY EMISSIONS REDUCTION TARGETS

The State of California has adopted goals to reduce California’s GHG emissions. Passed in 2006, the California Global Warming Solutions Act (Assembly Bill 32) established the State’s first target to reduce statewide emissions to 1990 levels by 2020. Because reliable activity data is generally not available to determine 1990 emissions levels for local governments, the California Air Resources Board (CARB) recommended local governments pursue a target, comparable to the statewide target, to reduce emissions 15% below “current” emissions in its *Climate Change Scoping Plan*, which was published in 2008. Given the unreliability of 1990 data, Marin cities and towns have historically used 2005 as the baseline for its emissions inventories and has set GHG reduction goals relative to that year.

The State has established additional goals for future reductions. Senate Bill 32, passed in 2016, sets a target to reduce statewide emissions 40% below 1990 levels by 2030.

In 2015, Executive Order B-30-15 reaffirmed California’s goal to reduce emissions to 80% below 1990 levels by 2050, and in 2018, former Governor Brown issued [Executive Order \(EO\) B-55-18](#), which established a new statewide goal to achieve carbon neutrality by 2045. The Executive Order defines carbon neutrality as “the point at which the removal of carbon pollution from the atmosphere meets or exceed emissions” and states that carbon neutrality will require both GHG reductions consistent with existing statewide targets and carbon sequestration in forests, soils, and other natural landscapes. EO B-55-18 directs the California Air Resources Board to update future Scoping Plans to identify sequestration targets and recommend measures to achieve the new goal.

This climate action plan establishes targets that meet the state’s guidance for local jurisdictions as shown in Table 4.

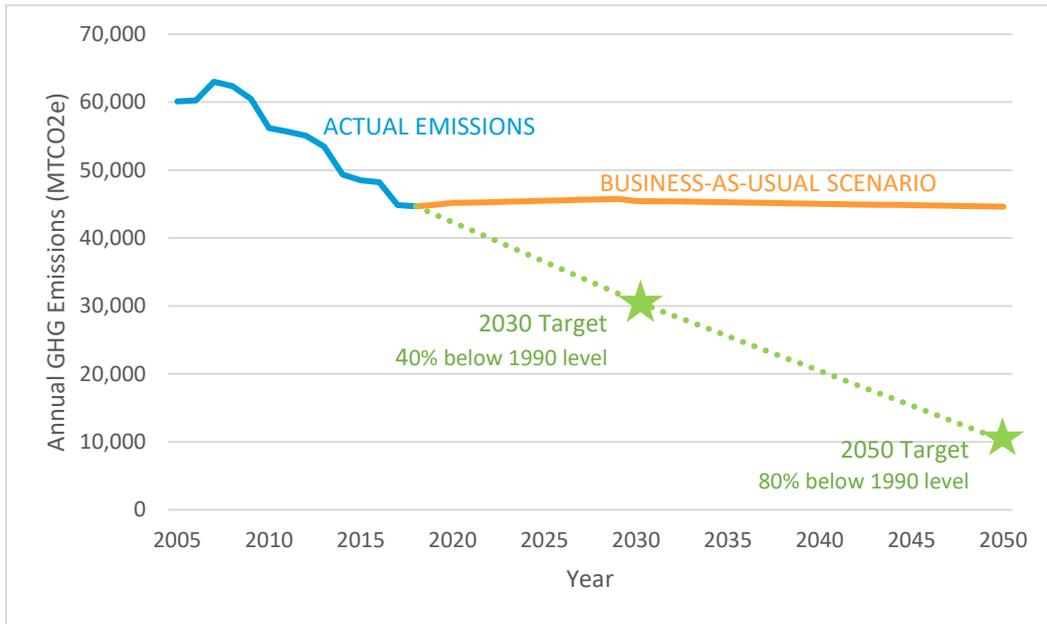
TABLE 4: GHG EMISSIONS TARGETS

	2030 Target	2050 Target
Target	40% below 1990 level ¹¹	80% below 1990 level
Reference	SB 32	EO B-30-15
2030 Emissions Limit to Meet Target (MTCO ₂ e)	30,652	10,217

¹¹ Consistent with the California Air Resource Board’s guidance to local governments, the Town is estimating 1990 levels as 15% below 2005 levels. The 2030 target is set at 40% below that level.

Figure 5 show the Town’s GHG emissions trend and forecast and how the local reduction targets compare to statewide targets (40% below 1990 levels by 2030 and 80% below 1990 levels by 2050).

FIGURE 5: COMMUNITY EMISSIONS TREND, FORECAST, AND TARGETS



CHAPTER 3: STRATEGIES TO REDUCE GREENHOUSE GAS EMISSIONS

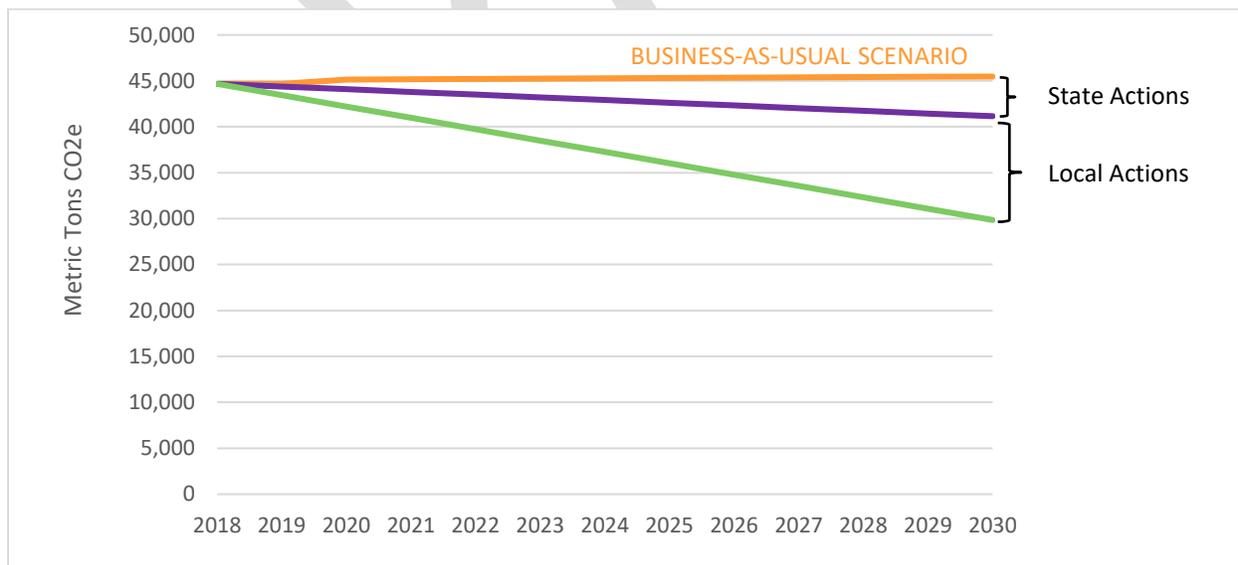
INTRODUCTION

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

The following sections identify the State and local strategies included in the CAP to reduce community emissions. The projected reductions from State and local emissions reduction actions total 15,619 MTCO₂e by 2030. Community emissions based on emissions reduction measures are projected to be 29,848 MTCO₂e by 2030 with the full implementation of the CAP, which is 42% below 1990 levels. This outcome would exceed the SB 32 target.

As shown in Figure 6, State actions represent about 28% of the reduction expected through implementation of the Climate Action Plan. Local mitigation actions designed to reduce emissions represent about 72% of the total. However, it is important to note that some of the local actions, such as increasing the number of zero emission passenger vehicles and buses in Marin County and reducing the amount of organic waste sent to the landfill, work in tandem with State legislation, programs, and goals.

FIGURE 6: CUMULATIVE IMPACT OF REDUCTION STRATEGIES



STATE ACTIONS

The Climate Action Plan incorporates State reduction strategies that have been approved, programmed, and/or adopted and will reduce local community emissions from 2018 levels. These programs require no additional local actions, although local actions may work to support these programs. State actions are quantified first and deducted from projected community emissions to provide a better picture of what still needs to be reduced at the local level to get to the overall reduction target. State actions, including regulations related to light and heavy-duty vehicles, renewable energy, and building energy codes, and their emissions reductions are shown in Table 5 and detailed in Appendix B: GHG Reduction Calculations.

TABLE 5: ESTIMATED EMISSIONS REDUCTIONS IN TIBURON FROM STATE ACTIONS

State Action	2030 Emissions Reductions MTCO ₂ e
Light and Heavy-Duty Vehicle Regulations	4,240
Renewable Portfolio Standard	37
Title 24 Building Energy Efficiency Standards	37
Total	4,314

LOCAL GREENHOUSE GAS EMISSIONS REDUCTION STRATEGIES

The local strategies presented in the following sections, and as summarized in Table 6 below, achieve GHG emissions reductions in the community of approximately 11,305 MTCO₂e in 2030.

TABLE 6: LOCAL EMISSIONS REDUCTION STRATEGIES

Strategy	GHG Reductions by 2030 (MTCO ₂ e)	% of Total
Low Carbon Transportation	4,197	37%
Renewable Energy & Electrification	3,155	28%
Energy Efficiency	2,175	19%
Waste Reduction	1,783	16%
Water Conservation	1	<1%
Community Engagement and Empowerment	-	-
Total	11,311	100%

Each of the following sections provide a summary table of local measures and associated GHG reductions, followed by a description of the specific actions the Town will undertake to implement each measure. The methodologies and implementation targets used to calculate emissions reductions are described in Appendix B. Sometimes, there is no direct or reliable way to estimate GHG savings for a particular measure or the savings are embedded in another measure. In this case, the reason is noted below the table. For example: Community Engagement is essential for success in many of the measures set forth throughout the plan but counting savings in this section would then be double-counting savings from other measures such as those in Low Carbon Transportation or Energy Efficiency. People need to know about a program to take advantage of it, but the actual emissions reductions will come from participating in the program itself. Therefore, the savings is counted for that program.



LOW CARBON TRANSPORTATION

More than half of Tiburon’s emissions comes from transportation, and reducing these emissions continues to be a challenge. Although improvements in fuel efficiency have reduced transportation emissions from passenger vehicles nearly 20% since 2005, vehicle miles traveled by cars in Tiburon have increased 1% over the same period. Surveys show that alternative transportation rates have remained stagnant, despite improvements in the bicycle and pedestrian network and public information campaigns to encourage residents to carpool, bicycle, walk, and take transit.

All of that is changing, however, with the increasing viability and availability of zero emission vehicles (ZEVs). This is especially true in Tiburon where the majority of electricity generation comes from clean, renewable sources. ZEVs include all-battery as well as plug-in hybrid vehicles. Marin County is a leader in ZEV adoption rates – second only to Santa Clara County – and ZEVs already comprise about 4% of registered passenger vehicles in Marin County. In Tiburon, ZEVs make up nearly 7% of all registered vehicles. The Town could significantly increase that rate by building out the EV charging infrastructure and encouraging ZEV ownership through incentives, public education, and development requirements. This effort would be supported by the State’s goals to put 5 million ZEVs on the road by 2030 and to require all new passenger vehicles sold in California to be zero emission by 2035. Improvements in battery and charging technology, expected cost reductions, and automakers’ commitments to significantly expand ZEV offerings point to an all-electric future.

However, ZEVs cannot alone meet Tiburon’s transportation emission reductions goals; reducing congestion, enabling better biking and walking opportunities, and incentivizing public transit all carry co-benefits and can be enjoyed by all.

What You Can Do

- Drive an all-electric or plug-in hybrid vehicle.
- Bike, walk, or take transit whenever possible.
- Reduce the number of miles you drive by working from home when possible and consolidating vehicle trips.
- Shut your car off when waiting in line at the ATM or in the school pick up/drop off lane.
- Better yet, encourage your child to walk or bike to school.

TABLE 7: LOW CARBON TRANSPORTATION STRATEGIES

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
LCT-C1	Zero Emission Vehicles	3,861
LCT-C2	Bicycling and Micromobility	71
LCT-C3	Walking	13
LCT-C4	Safe Routes to School	48
LCT-C5	Public Transit	68

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
LCT-C6	Employee Trip Reduction	11
LCT-C8	Zero Emission Landscape Equipment	55
LCT-M1	Zero Emission Town Vehicles	43
LCT-M2	Low Carbon Fuels	10
LCT-M3	Town Employee Commute	6
LCT-M4	Municipal Zero Emission Landscape Equipment and Small Off-Road Engines	9
TOTAL		4,197

LOW CARBON TRANSPORTATION ACTIONS

LCT-C1: Zero Emission Vehicles

Take actions that will result in 25% of passenger vehicles in the Tiburon to be zero emission vehicles (ZEVs), including plug-in electric vehicles (EVs) and hydrogen fuel cell electric vehicles, by 2030. Actions include:

1. Support development of a countywide EV plan that can be adopted by all Marin jurisdictions that identifies strategies to accelerate EV adoption. The plan will identify the number and type of chargers needed in each jurisdiction to achieve a minimum 25% ZEV penetration target; potential locations for public, workplace, and multi-family charging; best practices for charging station siting, installation and signage; and model code language and guides for permit streamlining and charging infrastructure requirements.
2. Provide directional signage to public EV chargers on local streets and, as appropriate, from state highways.
3. Work with the Transportation Authority of Marin (TAM), MCE, the California Energy Commission (CEC) and other entities to provide technical assistance and incentives, such as rebates, for multi-family and workplace charging sites.
4. Participate in a countywide effort by MCE, Pacific Gas & Electric (PG&E), and others to provide rebates for new or used electric vehicles.
5. As the Town's Green Building Ordinance is updated, require new and remodeled single-family, multi-family and commercial projects to install electrical service, add conduits and chargers, as appropriate, for potential electric vehicle use beyond state standards.
6. Participate in regional efforts and grant programs to encourage widespread availability of EV charging stations.
7. Participate in programs to promote EV adoption, including "Drive an EV" events and other media and outreach campaigns.
8. Encourage or require, as practicable, ride hailing and delivery service companies to utilize zero emission vehicles.
9. Promote adoption of electric bicycles, scooters, and motorcycles.

LCT-C2: Bicycling and Micromobility

Encourage bicycling and micromobility as an alternative to vehicular travel.

1. Promote bicycling and micromobility, including e-bikes, electric scooters, and electric skateboards, through outreach channels and partner agencies.
2. Establish and maintain a system of bicycle facilities that are consistent with the Tiburon Bicycle and Pedestrian Master Plan and “complete streets” policies.
3. Implement the Tiburon Bicycle and Pedestrian Master Plan’s recommendations to support and expand bicycling.

LCT-C3: Walking

Encourage walking as an alternative to vehicle use.

1. Establish and maintain a system of pedestrian facilities that are consistent with the Tiburon Bicycle and Pedestrian Master Plan and “complete streets” policies.
2. Implement the Tiburon Bicycle and Pedestrian Master Plan’s recommendations to support and expand walking.

LCT-C4: Safe Routes to School

Continue to support the Safe Routes to School Program and strive to increase bicycling, walking, carpooling (especially in a ZEV), and taking public transit to school.

1. Work with TAM and other organizations to promote school and student participation.
2. Identify issues associated with unsafe bicycle and pedestrian facilities between neighborhoods and schools, apply for Safe Routes to School grants, and execute plans to improve pedestrian and bicycle facilities.

LCT-C5: Public Transit

Support and promote public transit by taking the following actions:

1. Work with Marin Transit and Golden Gate Transit to maximize ridership through expansion and/or improvement of transit and ferry routes, schedules, and services.
2. Support a “Yellow School Bus” program and student use of regular transit to reduce school traffic.
3. Encourage transit providers, including school buses, to use renewable diesel as a transition fuel and to purchase electric buses whenever replacing existing buses.

LCT-C6: Employee Trip Reduction

Reduce vehicle miles traveled commuting to work through the following actions:

1. Work with the TAM, the Metropolitan Transportation Commission, and the Bay Area Air Quality Management District (BAAQMD) to promote transportation demand programs to local employers, including rideshare matching programs, vanpool incentive programs, emergency ride home programs, telecommuting, transit use discounts and subsidies, showers and changing facilities, bicycle racks and lockers, and other incentives to use transportation other than single occupant vehicles.
2. Embark on a behavior change and educational campaign to encourage employees to reduce vehicle trips.
3. Work with TAM on developing a countywide Transportation Demand Management Program to encourage trip reduction throughout the county.

LCT-C7: Smart Growth Development

Promote land use and development policies that prioritize infill housing and mixed-use development near commercial services and transit facilities.

Micromobility

Micromobility refers to forms of transportation, human-powered or electric, that can occupy space alongside bicycles. It includes electric scooters and skateboards, docked and dockless shared bikes, and other forms of small, lightweight devices operating at speeds typically below 20 mph. Micromobility devices do not have an internal combustion engine.

LCT-C8: Zero Emission Landscape Equipment

Encourage the use of zero emission landscape equipment instead of gasoline-powered equipment in commercial areas. Gas-powered leaf blowers and trimmers are currently prohibited in residential areas.

1. Consider offering a discount on business license fees for businesses that use zero emission landscape equipment.
2. Explore building code modifications to support zero emission landscape equipment.

LCT-M1: Zero Emission Town Vehicles

Purchase or lease zero-emission vehicles for the Town fleet whenever feasible, and when not, the most fuel-efficient models available. Strive to achieve a 100% electric light duty vehicle fleet by 2030.

LCT-M2: Low Carbon Fuels

Use low-carbon fuel such as renewable diesel as a transition fuel in the Town's fleet and encourage the Town's service providers and joint powers agencies to do the same until vehicles are replaced with zero-emissions vehicles.

LCT-M3: Town Employee Commute

Provide Town employees with incentives and/or reduce barriers to drive electric vehicles and use alternatives to single occupant auto commuting, such as discounted EV charging, transit use discounts and subsidies, bicycle facilities, showers and changing facilities, ridesharing services, vanpools, emergency ride home service, flexible schedules, and telecommuting when practicable.

LCT-M4: Municipal Zero Emission Landscape Equipment and Small Off-Road Engines

Replace gas-powered leaf blowers, mowers, brush cutters, hedgers, saws, and other landscape equipment and small off-road engines, including generators and pressure washers, with zero emission equipment.



RENEWABLE ENERGY AND ELECTRIFICATION

Energy that comes from renewable sources, including solar, wind, geothermal, and small hydroelectric, are the cleanest and most-environmentally friendly energy sources. Here in Marin County, where there is an abundance of sunny days, solar energy is a particularly good energy source. According to data provided by [Project Sunroof](#), 92% of buildings in Tiburon have roofs that are solar-viable. These 3,000 roofs could generate more than the total electricity used in Tiburon in 2018. Solar system costs keep falling, too, which make them an attractive option for home and commercial building owners.

When solar is not an option, due perhaps to a shady roof or a reluctant landlord, residents and business owners can purchase 100% renewable electricity from MCE and PG&E. MCE and PG&E electricity have a high percentage of renewable content, making it some of the cleanest electricity in the country. MCE's Light Green electricity was 74% GHG free in 2018, while MCE's Deep Green electricity comes from 100% renewable sources and is 100% GHG-free. The Town has been purchasing Deep Green electricity for governmental operations since 2017.

Since our electricity is so clean, it's a great idea to swap out appliances and heating and cooling systems that use natural gas for ones that use electricity. The County's Electrify Marin program provides rebates to replace natural gas appliances with efficient electric units, including water heaters, furnaces, ranges, and cooktops. Eventually, we'll need to replace the majority of natural gas appliance and equipment in existing buildings if we're going to hit our long-term goals.

Battery prices are falling and will soon be a cost-effective option, too. If you're concerned about losing electric service during a Public Safety Power Shutoff event, solar energy combined with battery storage may be for you and is certainly a cleaner choice than generators running on natural gas or fuel. Fortunately, ongoing research and development of energy storage systems are creating new business opportunities and making an all-electric, 100% renewable future possible.

What You Can Do

- Switch to MCE Deep Green or PG&E Solar Choice 100% renewable electricity.
- Install a solar energy system on your home or business and consider battery storage.
- Replace appliances that use natural gas for ones that use electricity.
- Investigate heat pump technology so you can swap out heaters and furnaces that use natural gas when it's time to replace them.

Reductions in battery prices may also soon prove to be a feasible and cost-effective option. Local concerns about losing electric service during a Public Safety Power Shutoff event, may be mitigated through solar energy combined with battery storage, and presents a cleaner choice than generators running on natural gas or fossil fuel. Ongoing research and development of energy storage systems are creating new business opportunities and making an all-electric, 100% renewable future possible.

TABLE 8: RENEWABLE ENERGY & ELECTRIFICATION STRATEGIES

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
RE-C1	Renewable Energy Generation and Storage	195
RE-C2	GHG-Free Electricity	1,426
RE-C3	Building and Appliance Electrification	1,534
RE-C4	Innovative Technologies ¹	-
RE-M1	Municipal 100% Renewable Electricity ²	-
TOTAL		3,155

¹ There is no emissions reduction because this is a supportive action.

² There is no emissions reduction associated with the action because the Town was purchasing Deep Green electricity in 2018.

RENEWABLE ENERGY & ELECTRIFICATION ACTIONS

RE-C1: Renewable Energy Generation and Storage

Accelerate installation of solar and other renewable energy systems and energy storage systems.

1. Provide solar permit streamlining and reduce or eliminate fees, as feasible.
2. Amend building codes, development codes, design guidelines, and zoning ordinances, as necessary, to facilitate small and medium-scale solar installations.
3. Encourage installation of solar panels over parking areas on commercial projects, schools, and large-scale residential developments through ordinance, development review, and/or agency incentives.
4. Identify and promote financing and loan programs for residential and non-residential projects.
5. Encourage installation of battery storage in conjunction with renewable energy generation projects through outreach and partner agency incentives.

RE-C2: GHG-Free Electricity

Encourage residents and businesses to switch to 100% renewable electricity (MCE Deep Green, MCE Local Sol, and PG&E Solar Choice) through engagement campaigns and partner agency incentives and work with MCE Clean Energy to assure that it reaches its goal to provide electricity that is 95% GHG-free by 2022.

RE-C3: Building and Appliance Electrification

Accelerate electrification of building systems and appliances that currently use natural gas, including heating systems, hot water heaters, stoves, ranges, and clothes dryers.

1. Explore opportunities to continue existing rebate programs, such as Electrify Marin.
2. Consider adopting an ordinance in 2024 that requires homeowners to replace natural gas appliances, such as water heaters, stoves, cooktops, clothes dryers, and heating systems with high-efficiency electric appliances at time of replacement where feasible.
3. Prohibit the use of natural gas end uses in new residential buildings in the Town’s green building ordinance that aligns with the 2022 California Building Standards code update. Extend the same prohibition to new nonresidential buildings in the 2025 code cycle.

RE-C4: Innovative Technologies

Investigate and pursue innovative technologies such as micro-grids, battery storage, and demand-response programs that will improve the electric grid’s resiliency and help to balance demand and renewable energy production in cooperation with local and regional partners such as MCE and PG&E, as feasible.

RE-M1: Municipal 100% Renewable Electricity

Continue to purchase 100% renewable energy for Town buildings and facilities through programs such as MCE Deep Green.

DRAFT



ENERGY EFFICIENCY

Increasing the efficiency of buildings is often the most cost-effective approach for reducing GHG emissions. Energy efficiency upgrades, such as adding insulation and sealing leaks in heating ducts, have demonstrated energy savings of up to 20%, while more aggressive “whole house” retrofits can result in even greater energy savings. Many of these improvements can be made inexpensively and without remodeling yet can be extremely cost-efficient, such as swapping out incandescent bulbs to LED bulbs, sealing air leaks, and installing a programmable thermostat. Energy Star-certified appliances and office equipment, high-efficiency heating and air conditioning systems, and high-efficiency windows not only save energy but reduce operating costs in the long run. Rebates, financing, and tax incentives are often available for residents and businesses to help defray the cost of upgrades.

The Tiburon community has been doing a good job reducing energy use. Since 2005, electricity consumption has declined an average of 1.3% per year and natural gas consumption has declined about 0.8% each year. There are opportunities to continue to work with the utilities and other partners to promote energy efficiency and electrification programs and continue to reduce energy use.

New construction techniques and building materials, known collectively as “green building,” can significantly reduce the use of resources and energy in homes and commercial buildings. Green construction methods can be integrated into buildings at any stage, from design and construction to renovation and deconstruction. The State of California requires green building and energy-efficiency through the Title 24 building codes. The State updates these codes approximately every three years, with increasing energy efficiency requirements since 2001. The State’s long-term energy efficiency goals are to have all new construction to be zero net electricity. Local governments can accelerate this target by adopting energy efficiency standards for new construction and remodels that exceed existing State mandates, or by providing incentives, technical assistance, and streamlined permit processes to enable quicker adoption.

What You Can Do

- Replace indoor and outdoor lights with LED bulbs and turn them off when not in use.
- Have an energy assessment done for your home or business.
- Upgrade insulation, seal leaks, and install a programmable thermostat.
- Purchase Energy Star appliances and equipment.
- Unplug electronic appliances when not in use and set the thermostat to use less heat and air conditioning.

TABLE 9: ENERGY EFFICIENCY STRATEGIES

ID	Strategy	GHG Reduction by 2030 (MTCO _{2e})
EE-C1	Energy Efficiency Programs	2,130
EE-C2	Energy Audits	42
EE-M1	Public Lighting ¹	-

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
EE-M2	Energy Efficiency Audit and Retrofits in Town Buildings	2
EE-M3	Energy Conservation in Town Buildings	1
TOTAL		2,175

¹ There is no emissions reduction associated with this action because the Town was purchasing GHG-free electricity in 2018.

ENERGY EFFICIENCY ACTIONS

EE-C1: Energy Efficiency Programs

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

1. Work with organizations and agencies such as the Marin Energy Watch Partnership, the Bay Area Regional Network (BayREN), MCE, Resilient Neighborhoods, and the Marin Climate & Energy Partnership to promote and implement energy efficiency programs and actions.
2. Continue and expand participation in energy efficiency programs as they become available.
3. Promote utility, state, and federal rebate and incentive programs.
4. Participate and promote financing and loan programs for residential and non-residential projects such as Property Assessed Clean Energy (PACE) programs, BayREN financing programs, PG&E on-bill repayment, and California Hub for Energy Efficiency Financing (CHEEF) programs.

EE-C2: Energy Audits

Investigate requiring energy audits for residential and commercial buildings at time of sale or major remodel. Requirements could include identification of electrification and energy efficiency opportunities and supporting programs could connect building owners to potential rebates and financing options.

EE-M1: Public Lighting

Replace remaining inefficient street, parking lot, and other outdoor lighting with LED fixtures.

EE-M2: Energy Efficiency Audit and Retrofits in Town Buildings and Facilities

Work with the Marin Energy Management Team to identify and implement energy efficiency projects in municipal buildings and facilities and electrification of existing building systems and equipment that use natural gas.

EE-M3: Energy Conservation in Town Buildings

Reduce energy consumption through behavioral and operational changes.

1. Establish energy efficiency protocols for building custodial and cleaning services and other employees, including efficient use of facilities, such as turning off lights and computers, thermostat use, etc.
2. Incorporate energy management software, electricity monitors, or other methods to monitor energy use in municipal buildings, where feasible.



WASTE REDUCTION

Consumption and disposal of goods generates significant GHG emissions during manufacturing, transport, distribution, and disposal. The best way to reduce emissions is to purchase and consume less in the first place, and then find someone who can reuse whatever you no longer need before considering recycling or disposal.

Due to the way the Town accounts for community emissions, the Town's Climate Action Plan does not take credit for reducing upstream emissions. Instead, our GHG accounting is directly concerned with emissions that are created from the anaerobic decomposition of organic waste in the landfill. The decomposition process creates methane, which is 28 times more potent as a GHG than carbon dioxide. Although landfills capture most of the methane, and some use that methane to create biogas or electricity, about one-quarter of it escapes into the atmosphere.

Diverting organic material from the landfill is a clear and viable option for reducing these emissions. Paper and cardboard can be recycled. Food scraps, some paper (like napkins and paper towels), and yard waste can be composted, either at home or at the landfill. Surplus food can be donated to non-profits that distribute it to those in need. The measures below are designed to maximize diversion of organic waste from the landfill by 2030, starting with encouraging residents and businesses to recycle and compost organic waste. To meet our diversion target, the Town will consider adopting an ordinance that mandates recycling and, as a last resort, setting trash collection fees that enable the waste haulers to invest in machinery that can sort trash and recover all compostable and recyclable materials before they are sent to the landfill.

What You Can Do

- Buy only as much as you need.
- Buy locally grown food and eat less meat.
- Put your food scraps in the green can and/or compost them at home.
- Donate extra food and used clothing and housewares.
- Don't be a "wishful" recycler. Be scrupulous about how you sort your recyclables. Check the [Recycle Right Guide](#) for tips.

These local measures also support state legislation to significantly reduce emissions from organic waste disposal. Senate Bill (SB) 1383 establishes targets to achieve a 50% reduction in statewide for waste disposal from the 2014 level by 2020 and a 75% reduction by 2025. The law also establishes a target that not less than 20% of currently disposed edible food is recovered for human consumption by 2025. In 2022, CalRecycle may begin to issue penalties for non-compliance. On January 1, 2024, the regulations may require local jurisdictions to impose penalties for non-compliance on regulated entities subject to their authority.

In addition, Assembly Bill (AB) 1826 requires businesses to recycle their organic waste, depending on the amount of waste they generate per week. The law phases in mandatory recycling of commercial organics over time. As of January 2019, businesses that generate 4 or more cubic yards of commercial solid waste per week are required to arrange for organic waste recycling services. If statewide disposal targets are not met by 2020, the law will be extended to cover businesses that generate 2 cubic yards or more of commercial solid waste.

TABLE 10: WASTE REDUCTION STRATEGIES

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
WR-C1	Commercial Organic Waste	149
WR-C2	Residential Organic Waste	494
WR-C3	Construction & Demolition and Self-Haul Waste	52
WR-C4	Mandatory Waste Diversion	545
WR-C5	Waste Processing Franchise Agreement and Infrastructure	519
WR-C6	Extended Producer Responsibility ¹	-
WR-C7	Inorganic Waste ¹	-
WR-M1	Waste from Town Operations	24
TOTAL		1,783

¹ There is no emissions reduction associated with this action because it is a supportive action.

WASTE REDUCTION ACTIONS

WR-C1: Commercial Organic Waste

Work with Zero Waste Marin, the Town’s waste hauler, and nonprofits such as Extra Food to divert commercial organic waste from the landfill through recycling, composting, and participation in waste-to-energy and food recovery programs.

1. Conduct outreach and education to businesses subject to State organic waste recycling mandates (AB 1826 and SB 1383) and encourage or enforce compliance with the law.
2. Refer new and major remodel commercial and multi-family residential project proposals to the Town’s waste hauler for review and comment and require projects to provide adequate waste and recycling facilities and access as feasible.
3. Encourage and facilitate commercial and multi-family property owners to require responsible use of on-site recycling facilities in lease and rental agreements and to train and regularly evaluate janitorial, landscape, and other property management services.
4. Assess capacity of existing food recovery programs, expand existing food recovery infrastructure if needed, monitor commercial generators for compliance, and conduct education and outreach.

WR-C2: Residential Organic Waste

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

WR-C3: Construction & Demolition Debris and Self-Haul Waste

1. Require all loads of construction & demolition debris and self-haul waste to be processed for recovery of materials as feasible.
2. Investigate creation of an ordinance requiring deconstruction of buildings proposed for demolition or remodeling when materials of significant historical, cultural, aesthetic, functional or reuse value can be salvaged.

WR-C4: Mandatory Waste Diversion

Adopt an ordinance requiring all commercial and residential accounts to subscribe to and fully participate in waste diversion activities, including recycling and organics collection provided by the Town’s waste hauler. Consider including phased implementation of the ordinance, penalties, and practical enforcement mechanisms.

WR-C5: Waste Processing Franchise Agreement and Infrastructure

1. Review and revise the Town's franchise agreement with waste haulers to ensure adequate recycling and composting capacity is available and waste reduction and diversion targets are met.
2. Ensure organic waste collection service (including green waste, food waste, fibers, and manure) that complies with SB 1383 regulations is provided to all residents and businesses.
3. Conduct a feasibility study (including cost estimates and estimated GHG reduction metrics) and consider investing in new solid waste processing infrastructure to remove recoverable materials (recycling and organics) from the waste stream and reduce contamination.
4. Require regular residential and commercial waste audits and waste characterization studies to identify opportunities for increased diversion and to track progress in meeting targets.

WR-C6: Extended Producer Responsibility

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

WR-C7: Inorganic Waste

Promote reuse, repair, and recycling of inorganic materials, and encourage reduced use of packaging and single use items through engagement campaigns.

WR-M1: Waste from Town Operations

Increase opportunities to reduce waste at Town facilities.

1. Embark on an educational and social marketing-based campaign to increase recycling, composting, reuse, and waste reduction at Town facilities.
2. Conduct periodic waste audits to understand where opportunities for increased diversion lie and to track progress.



WATER CONSERVATION

Marin is no stranger to periodic droughts and the need to conserve water, and the community has responded by reducing per capita water use by about 23%, from 144 gallons per person per day (gpcd) in 2005 to 111 gpcd in 2018. In addition to installing low-flow fixtures (showerheads, faucets and toilets) and water-efficient appliances (clothes washers and dishwashers), residents and businesses are planting native, drought-tolerant species and even replacing lawns with attractive, low-water use gardens. Good thing, because as temperatures continue to rise, we will experience more droughts and more intense heat waves than before.

Tiburon's Greenhouse Gas Inventory counts emissions that are generated from the energy used to pump, treat and convey water from the water source to water users in Tiburon. Far more emissions are created from the energy that is used to heat water, but those emissions are counted in the residential and commercial energy sectors. Therefore, the water sector comprises a much smaller share of community emissions than one might expect.

What You Can Do

- Replace your lawn with a drought-tolerant garden.
- Install a drip irrigation system, program it to run early in the morning, and check it regularly for leaks.
- Install low water flow faucets, showerheads, and toilets.
- Buy water-efficient dishwashers and clothes washers when it's time to replace them.

Water agencies that supply the Town's water are committed to using 100% renewable energy in their operations. Marin Municipal Water District (MMWD) began purchasing Deep Green electricity from MCE in 2017, and Sonoma County Water Agency, which provides 20-25% of MMWD's water started purchasing 100% renewable electricity in 2015. As a result, although we are targeting a 1% reduction in water consumption each year through 2030, emissions reductions are relatively small.

TABLE 11: WATER CONSERVATION STRATEGIES

ID	Strategy	GHG Reduction by 2030 (MTCO ₂ e)
WC-C1	Community Water Use	1
WC-M1	Municipal Water Use	Included in above

WATER CONSERVATION ACTIONS

WC-1: Water Conservation

Reduce indoor and outdoor water use in residential and commercial buildings and landscaping.

1. Work with the water district and other organizations to promote water conservation programs and incentives.

2. Educate residents and businesses about local and State laws requiring retrofit of non-compliant plumbing fixtures during remodeling and at resale.
3. Ensure all projects requiring building permits, plan check, or design review comply with State and water district regulations.
4. Encourage the installation of greywater and rainwater collection systems and the use of recycled water where available through ordinance and/or engagement campaigns.

WC-2: Municipal Water Use

Reduce indoor and outdoor water use in municipal facilities and operations.

1. Reduce indoor and outdoor water use in municipal facilities and operations.
2. Replace high water use plants and inefficient irrigation systems with water-efficient landscaping.
3. Replace inefficient plumbing fixtures with high-efficiency fixtures.
4. Use recycled water as available and practicable for parks and outdoor landscaping.

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COMMUNITY ENGAGEMENT

The Climate Action Plan contains actions that the Town will undertake to reduce community emissions. While the Town can compel some action by adopting ordinances and building regulations, much of the success of the plan will depend on informing community members and encouraging them to take action on their own. This section details the ways in which the Town will seek public engagement and work with local businesses and community groups to achieve the emissions reductions identified for actions in other sections of the plan.

The Town has been partnering with [Resilient Neighborhoods](#) to educate and empower residents to reduce their carbon footprints. The program consists of a free 5-session covers a range of action including consumption, support of local business, diet, water, waste, home energy, transportation including air travel, and being prepared to adapt to a changing climate. To start, participants calculate their household carbon footprint and then take actions to reduce their GHG emissions by at least 5,000 pounds or 25% while also earning Resilience Points for actions like being prepared for wildfires. Nearly 1,500 Marin County residents have participated in the program as of 2020.

What You Can Do

- Sign up for Resilient Neighborhoods and join a Climate Action Team.
- Calculate and commit to reducing your [carbon footprint](#) by taking the actions identified in this Plan.
- Get your business certified as a Green Business with the [Marin Green Business Program](#).

TABLE 12: COMMUNITY ENGAGEMENT STRATEGIES

ID	Strategy
CE-C1	Community Education
CE-C3	Community Outreach
CE-C4	Advocacy
CE-C5	Green Businesses

COMMUNITY ENGAGEMENT ACTIONS

CE-C1: Community Education

Work with community-based organizations, such as Resilient Neighborhoods, to educate and motivate community members to start or continue to reduce GHG emissions in their homes, businesses, transportation mode choices, and other activities, and increase community resilience through community-building activities.

CE-C2: Community Outreach

Implement a communitywide public outreach and behavior change campaign to engage residents, businesses, and consumers around the impacts of climate change and the ways individuals and organizations can reduce their GHG emissions and create a more sustainable, resilient, and healthier community. Emphasize and encourage citizens'

involvement in reaching the community's climate goals, including innovative means of tracking milestones and comparing Tiburon's performance with other communities and with state, national, and global benchmarks.

1. Conduct outreach to a wide variety of neighborhood, business, educational, faith, service, and social organizations.
2. Inform the public about the benefits of installing energy and water efficient appliances and fixtures, electrifying homes and commercial buildings, installing solar energy systems, and purchasing 100% renewable electricity.
3. Inform the public about the benefits of using carbon-free and low-carbon transportation modes, such as driving electric vehicles, walking, bicycling, taking public transportation, and ridesharing.
4. Partner with MCE, PG&E, MMWD, Mill Valley Refuse, Transportation Authority of Marin, Marin Transit, Golden Gate Transit, and other entities to promote available financing, audits, rebates, incentives, and services to the Tiburon community.
5. Utilize the Town's website, newsletter, recognition programs, and other forms of public outreach.
6. Participate in countywide outreach and education efforts, such as Drawdown Marin.

CE-C3: Advocacy

Advocate at the state and federal levels for policies and actions that support the rapid transition to GHG-free energy sources, electrification of buildings and the transportation fleet, and other impactful measures to sharply reduce greenhouse gas emissions.

CE-C4: Green Businesses

Encourage local businesses to participate in the Marin County Green Business Program.

CHAPTER 4: IMPLEMENTATION AND MONITORING

Plans are only effective if they're implemented and results are carefully evaluated. The Town will prepare an annual assessment of the progress it is making on implementing the actions contained in this Climate Action Plan and continue to quantify community and GHG emissions to determine if we are on track to meet our reduction targets.

TABLE 13: IMPLEMENTATION AND MONITORING STRATEGIES

ID	Strategy
IM-C1	Annual Monitoring
IM-C2	Update GHG Emissions Inventories
IM-C3	Funding Sources
IM-C4	Update the Climate Action Plan

IM-1: Annual Monitoring

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

IM-2: Update GHG Emissions Inventory

Update the GHG emissions inventory for community emissions annually.

IM-3: Funding Sources

Identify funding sources for recommended actions and pursue local, regional, state, and federal grants as appropriate. Investigate creation of a local carbon fund or other permanent source of revenue to implement the Climate Action Plan.

IM-4: Update the Climate Action Plan

Update the Climate Action Plan regularly to incorporate new long-term reduction targets and strategies to meet those targets.

LIST OF ABBREVIATIONS

AB	Assembly Bill
ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
BAU	business-as-usual
BCDC	San Francisco Bay Conservation and Development Commission
CALGreen	California Green Building Standards
CAP	Climate Action Plan
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
EIR	environmental impact report
EO	Executive Order
EV	electric vehicle
GHG	greenhouse gas
kW	kilowatt
kWh	kilowatt hour
IPCC	International Panel on Climate Change
LED	Light-emitting diode
MCE	MCE Clean Energy
MMWD	Marin Municipal Water District
MMTCO ₂ e	Million metric tons of carbon dioxide equivalent
MTC	Metropolitan Transportation Commission
MTCO ₂ e	metric tons of carbon dioxide equivalent
PG&E	Pacific Gas and Electric
RCP	representative concentration pathway
RPS	Renewables Portfolio Standard
SB	Senate Bill
TDM	transportation demand management
VMT	vehicle miles traveled
ZEV	zero emission vehicle

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APPENDIX A: GHG REDUCTION CALCULATIONS

GHG EMISSIONS REDUCTION SUMMARY Town of Tiburon Climate Action Plan		
	Measure	2030 GHG Emissions Reductions (MTCO ₂ e/yr)
Local Actions		
LCT-C1	Zero Emission Vehicles	-3,861
LCT-C2	Bicycling and Micromobility	-71
LCT-C3	Walking	-13
LCT-C4	Safe Routes to School	-48
LCT-C5	Public Transit	-68
LCT-C6	Employee Trip Reduction	-11
LCT-C8	Zero Emission Landscape Equipment	-55
LCT-M1	Zero Emission Town Vehicles	-43
LCT-M2	Low Carbon Fuels	-10
LCT-M3	Town Employee Commute	-6
LCT-M4	Municipal Zero Emission Landscape Equipment and SORE	-3
EE-C1	Energy Efficiency Programs	-2,130
EE-C2	Energy Audits	-42
EE-M1	Public Lighting	n/a
EE-M2	Energy Efficiency Audit and Retrofits	-2
EE-M3	Energy Conservation	-1
RE-C1	Renewable Energy and Storage	-195
RE-C2	GHG-Free Electricity	-1,426
RE-C3	Building and Appliance Electrification	-1,534
WR-C1	Commercial Organic Waste	-149
WR-C2	Residential Organic Waste	-494
WR-C3	C&D and Self-Haul Waste	-52
WR-C4	Mandatory Waste Diversion	-545
WR-C5	Waste Processing Infrastructure	-519
WR-M1	Waste from Town Operations	-24
WC-C1	Community Water Use	-1
TOTAL - LOCAL ACTIONS		-11,305
State Actions		
RPS		-37
TITLE 24		-37
Light and Heavy Duty Fleet Regulations		-4,240

TOTAL - STATE ACTIONS	-4,314
<i>Projected Emissions</i>	
Projected BAU Community GHG Emissions	45,473
Emissions Reduction from Local and State Actions	-15,619
Projected Community Emissions with Local and State Actions Implemented	29,854
<i>Reduction from 2005 Baseline Emissions</i>	
2005 Community GHG Emissions	60,101
Community Emissions with Local and State Actions Implemented	29,854
% Reduction from 2005 Emissions	50%
GHG Target to Meet State Goals	30,652
Estimated 1990 GHG Emissions	51,086
% Below 1990 Levels	42%
Emissions per Service Population	2.45

ZERO EMISSION VEHICLES <i>LCT-C1</i>	
Reductions (MTCO ₂ e) -3,861	2030
Targets	<p>25% of passenger vehicles in Marin are ZEVs in 2030 (approximately 50,108 ZEVs). 20% annual growth rate of registered ZEVs in Marin.</p> <p>99 public charging stations at public and private sites in Tiburon by 2030.</p>
Methodology and Assumptions	<p>Marin has approximately 1.5% of all ZEVs in California (DMV, 1-1-19) and 197,609 automobiles registered in the County (DMV, 2019). CARB's proposed strategy is to put 4.2 million ZEVs on the road by 2030, which is approximately 14% of light duty vehicles in California in 2030. In January 2018, Governor Brown issued Executive Order B-48-18 which set a new goal of having a total of 5 million ZEVs in California in 2030. In September 2020, Governor Gavin Newsom issued Executive Order N-79-20 which sets a goal for 100 percent of in-state sales of new passenger cars and light trucks to be zero-emission by 2035.</p> <p>In January 2019, DMV reports there were 4,309 battery EVs, 2,747 plug-in hybrid EVs, and 60 fuel cell vehicles, for a total of 7,116 ZEVs in Marin County. We assume a similar penetration rate in the unincorporated areas. We also conservatively assume the same percentage of EVs in 2030: 61% battery EVs and 39% plug-in hybrids.</p> <p>74% of the distance PHEVs drive is electric (Smart et al, 2014).</p> <p>EV kWh/mile is 0.32 (US Dept of Energy).</p> <p>Assuming the same share of ZEV ownership in 2030 as in 2019 (1.5%) means there would be approximately 75,000 ZEVs registered in Marin by 2030, or approximately 37% of existing automobile registrations. We are targeting approximately 90,000 ZEVs in Marin in 2030, or 45% of ZEVs registered in Marin. This would require an average annual growth rate of 26%. The number of ZEVs grew 33% in Marin between 2018 and 2019. This data suggests that an annual growth rate of 18% is feasible, especially as the number of models expands and battery technology and charging improves.</p> <p>Passenger VMT is adjusted to reflect the fact that approximately 35% of countywide commute VMT originates from workers who live outside Marin County (TAM). Measure does not apply to VMT generated by San Rafael workers and visitors who do not live in Marin.</p> <p>According to the Department of Energy, towns (population 2,500 to 50,000) need 54 public EV plugs per 1,000 PEVs, which would equal about 2,706 public EV plugs countywide for 50,100 PEVs. The analysis assumes 88% of EV charging is done at home.</p>

Sources	<p>California Air Resources Board, 2017 Scoping Plan.</p> <p>Smart, J., Bradley, T., and Salisbury, S., "Actual Versus Estimated Utility Factor of a Large Set of Privately Owned Chevrolet Volts," SAE Int. J. Alt. Power. 3(1):2014, doi:10.4271/2014-01-1803.</p> <p>U.S. Department of Energy, Alternative Fuels Data Center, https://www.afdc.energy.gov/vehicles/electric_emissions_sources.html. Sales weighted average of 2016 model year vehicles with sales in 2015: 2015 sales from "U.S. Plug-in Electric Vehicle Sales by Model" (https://www.afdc.energy.gov/data/vehicles.html); MPGs from 2016 Fuel Economy Guide (https://www.fueleconomy.gov/feg/)</p> <p>The International Council on Clean Transportation, "California's continued electric vehicle market development," May 2018, https://www.theicct.org/sites/default/files/publications/CA-cityEV-Briefing-20180507.pdf.</p> <p>US Department of Energy, "National Plug-In Electric Vehicle Infrastructure Analysis," September 2017. https://www.nrel.gov/docs/fy17osti/69031.pdf</p> <p>Bay Area Air Quality Management District, Vehicle Miles Dataportal, http://capvmt.us-west-2.elasticbeanstalk.com/, accessed 3/21/19.</p> <p>California Department of Transportation, "California County-Level Economic Forecast 2018-2050," September 2018.</p> <p>California Department of Motor Vehicles, "Estimated Vehicles Registered by County for the Period January 1 through December 31, 2018" and "Fuel Type by County as of 1/1/2019."</p> <p>Personal communication with Derek McGill, Planning Manager, Transportation Authority of Marin, dmcgill@tam.ca.gov, August 22, 2018.</p>
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Calculation

	2030
Number of registered Marin ZEVs in January 2019	7,116
Projected number of registered passenger vehicles in Marin	199,141
Percent of Marin ZEVs in target year	25%
Number of Marin ZEVs in target year	49,786
Increase in ZEVs	42,670
Additional ZEVs as a percent of Marin vehicles	21.4%
Tiburon passenger VMT	63,696,150 miles
VMT from non-Marin workers and visitors	9,495,818 miles
Tiburon passenger VMT from Marin-based vehicles	54,200,332 miles
VMT from additional ZEVs	11,613,589 miles
VMT driven with electricity	10,677,534 miles
Emissions without EV program	4,282 MTCO ₂ e
Tailpipe emissions reduction with EV program	3,937 MTCO ₂ e
Electricity used by ZEVs	3,416,811 kWh
Electricity emissions from ZEVs	76 MTCO ₂ e
Emissions reduction	3,861 MTCO ₂ e

BICYCLING AND MICROMOBILITY	
<i>LCT-C2</i>	
Reductions (MTCO ₂ e) -71	2030
Targets	0.03 miles of Class IV bike paths and 1.61 miles of Class II bike lanes constructed between by 2030.
Methodology and Assumptions	<p>Studies cited by CAPCOA show each additional mile of bike lanes per square mile increases the share of workers commuting by bicycle by 1% (CAPCOA SDT-5). We have applied this to the following population segments:</p> <ul style="list-style-type: none"> • Live in/work in area • Live in/work out of area • Live in area/non-worker • Live out of area/work in area <p>The Town's Bicycle and Pedestrian Master Plan identifies 1.61 miles of proposed Class II bike facilities and 0.03 miles of proposed Class IV facilities.</p>
Sources	<p>Tiburon Bicycle and Pedestrian Master Plan, July 20, 2016.</p> <p>Bay Area Air Quality Management District Vehicle Miles Traveled Dataportal, http://capvmt.us-west-2.elasticbeanstalk.com/data.</p> <p>California Air Pollution Control Officers Association, "Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures," August, 2010.</p>

Calculation

	2030
VMT generated by targeted population segments	56,390,160 VMT
Additional Class II/IV facilities	1.6 miles
New bike facilities/sq. mile	0.4
Reduction in local VMT	206,428 VMT
Emissions reductions	71.4 MTCO ₂ e

WALKING <i>LCT-C3</i>	
Reductions (MTCO ₂ e) -13	2030
Targets	2% reduction in VMT for vehicle trips that start and end in Tiburon by 2030
Methodology and Assumptions	Studies cited by CAPCOA show pedestrian network improvements can reduce VMT 1-2% (CAPCOA SDT-1). We apply this to passenger vehicle trips that start and end Tiburon and assume a 2% for 2030.
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. Bay Area Air Quality Management District Vehicle Miles Traveled Data Portal, http://capvmt.us-west-2.elasticbeanstalk.com/data

Calculation

	2030
Passenger vehicle trips starting and ending in Tiburon	1,868,174 VMT
% decrease in VMT due to pedestrian improvements	2.0%
Annual decrease in VMT	37,363 VMT
GHG emissions reductions	13 MTCO ₂ e

SAFE ROUTES TO SCHOOL <i>LCT-C4</i>					
Reductions (MTCO ₂ e)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; width: 50%;">0</td> <td style="width: 50%;">2020</td> </tr> <tr> <td style="text-align: center;">-48</td> <td>2030</td> </tr> </table>	0	2020	-48	2030
0	2020				
-48	2030				
Targets	Reduce school trips in family vehicle by 29%, from an average of 45% to 32%.				
Methodology and Assumptions	<p>To demonstrate the benefits of providing Safe Routes to Schools, the Marin County Bicycle Coalition recruited nine pilot schools in four different geographic locations. Initial surveys reported that 62% of the students were arriving by car, with only 14% walking, 7% biking to school, 11% carpool, and 6% arriving by bus. Every school in the pilot program held periodic Walk and Bike to School Days and participated in the Frequent Rider Miles contest, which rewarded children who came to school walking, biking, by carpool or bus. At the end of the pilot program, the participating schools experienced a 57% increase in the number of children walking and biking and a 29% decrease in the number of children arriving alone in a car.</p> <p>We assume a school-aged population of 1,460 in 2030 (Plan Bay Area). We assume 77% are elementary or middle school with an average trip length of 1.7 mile, and 23% are high school (9-12) with an average trip length of 2.3 miles, 180 school days, and an existing share of school trips completed in a family vehicle of 50% according to Safe Routes to School surveys taken at participating schools serving Tiburon in 2018.</p>				
Sources	<p>US Census Bureau, American Community Survey 5-Year Estimates 2012-2016, Table B14001.</p> <p>Safe Routes to School Marin County, http://www.saferoutestoschools.org/sr2s_ross_valley.html</p> <p>Safe Routes to School Marin County, http://www.saferoutestoschools.org/history.html#success</p>				

Calculation

	2030
School population miles travelled	966,053 miles
Percent of miles driven in a family vehicle	50%
Potential percent decrease in students driving to school	29 %
VMT avoided	140,078 VMT
Emissions reductions	48 MTCO ₂ e

PUBLIC TRANSIT <i>LCT-C5</i>	
Reductions (MTCO ₂ e) -68	2030
Targets	33% of Marin Transit and Golden Gate Transit buses will use be electric and 66% will use renewable diesel by 2030.
Methodology and Assumptions	<p>Marin Transit reports 3,674,440 revenue miles in FY 18/19 and 31.7% of those miles within unincorporated areas. Golden Gate Transit reports 3,467,056 revenue miles in FY 18/19 and 17.5% of those miles in unincorporated areas. Marin Transit's Draft Fixed Route Vehicle Replacement Plan indicates 3% of its fleet will be comprised of zero emission buses in 2020 and 33% of its fleet will be zero emission by 2030. In 2019, 72% of its buses were using renewable diesel and 3% of the fixed route buses were zero emission. Marin Transit and Golden Gate Transit have been using renewable diesel since 2016. We assume 33% will be driven by electric buses utilizing MCE electricity by 2030.</p> <p>CARB adopted the Innovative Clean Transit (ICT) Rule in December 2018. This rule outlines a transition of California transit agencies to a zero emission fleet by 2040. 100% of transit agencies' bus purchases must be zero emission beginning in 2029. Marin Transit's Draft Fixed Route Vehicle Replacement Plan (2019) identifies purchases that will achieve the ICT zero emission fleet mandate in 2040. As of October 2019, Golden Gate Transit had not yet developed a transition plan.</p>
Sources	<p>Marin Transit Board of Directors Staff Report, April 1, 2019</p> <p>Personal communication with Keith Nunn, Director of Maintenance, Golden Gate Transit, Oct. 22, 2019.</p> <p>Personal communication with Anna Penoyar, Senior Capital Analyst, Marin Transit, Oct. 22, 2019.</p>

Calculation

	2030
Transit miles, BAU	105,196 miles
Emissions, BAU	137 MTCO ₂ e
Renewable diesel VMT	67%
Electric bus VMT	33%
Emissions	69 MTCO ₂ e
GHG emissions reductions	68 MTCO ₂ e

EMPLOYEE TRIP REDUCTION <i>LCT-C6</i>	
Reductions (MTCO _{2e})	-11 2030
Targets	100% of covered employers provide and employee trip reduction program.
Methodology and Assumptions	CAPCOA TRT-1 indicates VMT reduction of 5.4% for suburban center location. Employer programs include carpooling, ride matching, preferential carpool parking, flexible work schedules for carpools, a half-time transportation coordinator, vanpool assistance, bicycle parking, showers, and locker facilities. This measure assumes voluntary employee participation. BAAQMD Transportation Fund for Clean Air guidance indicates a reduction of 0.2% of commute VMT for Guaranteed Ride Home Programs. MTC identifies 20 businesses with 50 or more employees in Tiburon and "Belvedere Tiburon." We assume 100% of these employers participate in the program by 2030. We assume 240 workdays per year.
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. BAAQMD Transportation Fund for Clean Air Guidance FYE 2018.

Calculation

	2030
Number of employees working in companies with 50 or more employees	164
Number of employees targeted for program	164
Average daily VMT for Tiburon worker	14.3
Estimated annual VMT	560,758
VMT reduction	5.6%
Annual decrease in VMT	31,402
GHG emissions reductions	11

ELECTRIC LANDSCAPE EQUIPMENT	
<i>LCT-C8</i>	
Reductions (MTCO _{2e})	-55 2030
Targets	50% reduction in fuel used in portable landscape equipment by 2030 due to switching to electric equipment.
Methodology and Assumptions	CARB is currently considering regulating small off-road engines (SORE) that will reduce smog-pollutant emissions from mobile sources by 80% in 2031 through a combination of regulatory and incentive approaches. SORE are spark-ignition engines rated at or below 19 kilowatts. Engines in this category are primarily used for lawn, garden, and other outdoor power equipment. CARB's goal is to require all new sales to be zero emissions equipment by 2028. For this action, portable landscape equipment includes lawn mowers, leaf blowers/vacuums, trimmers/edgers/brush cutters. This equipment consumed 332,153 gallons of gasoline in 2018 (OFFROAD2007). Similar to the off-road emissions inventory, we assume 3.6% of emissions are attributable to Tiburon based on its share of countywide households in 2018. Tiburon Municipal Code Ch. 30 prohibits gas-powered leaf blowers and trimmers in residential areas. We assume a 50% reduction in 2030 due to the Town's expanded action to ban all gasoline portable landscape equipment in residential and commercial areas by 2030.
Sources	OFFROAD2007

Calculation

	2030
Portable landscape equipment gasoline consumption, BAU	12,533 gallons
Emissions from potable landscape equipment, BAU	111 gallons
Reduction target	50%
Emissions reductions	55 MTCO _{2e}

ZERO EMISSION TOWN VEHICLES <i>LCT-M1</i>	
Reductions (MTCO ₂ e) -43	2030
Targets	All light-duty vehicles in Town's fleet are zero emissions by 2030.
Methodology and Assumptions	As vehicles are replaced, there will be opportunities to purchase/lease electric vehicles or improve vehicle fuel efficiency with similar models. We assume the Town will continue to purchase 100% renewable electricity, and therefore there are no emissions attributed to EV use.
Sources	Town of Tiburon 2016 Greenhouse Gas Inventory

Calculation

	2030
Gasoline consumption, 2016	9,741 gallons
Town vehicle fleet tailpipe emissions	86 MTCO ₂ e
Fuel efficiency improvement for fleet	50 %
Emissions reductions	43 MTCO ₂ e

LOW CARBON FUELS <i>LCT-M2</i>	
Reductions (MTCO ₂ e) -10	2030
Targets	100% of diesel use is replaced with renewable diesel by 2030.
Methodology and Assumptions	Emission factor for renewable diesel derived from data from Nexgen Fuel.
Sources	Town of San Anselmo 2016 Greenhouse Gas Emissions Inventory http://www.nexgenfuel.com/fleets-commercial-use/

Calculation

	2030
Diesel use, BAU	1,694 gallons
Renewable diesel percentage	100%
Emissions from diesel fuel	17 MTCO ₂ e
Emissions from renewable diesel fuel	7 MTCO ₂ e
Emissions reductions	10 MTCO ₂ e

TOWN EMPLOYEE COMMUTE <i>LCT-M3</i>	
Reductions (MTCO ₂ e) -6	2030
Targets	5.6% reduction in employee commute VMT by 2030.
Methodology and Assumptions	CAPCOA Measure TRT-1. VMT reduction is 5.4% for a suburban center location. BAAQMD Transportation Fund for Clean Air guidance indicates a reduction of 0.2% of commute VMT for Guaranteed Ride Home Programs.
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. BAAQMD Transportation Fund for Clean Air Guidance FYE 2018.

Calculation

	2030
Employee commute VMT, BAU	291,299 VMT
Reduction in VMT	5.6%
VMT avoided	16,313 VMT
Emissions reduction	6 MTCO ₂ e

MUNICIPAL ZERO EMISSION LANDSCAPE EQUIPMENT AND SMALL OFF-ROAD ENGINES <i>LCT-M4</i>	
Reductions (MTCO ₂ e) -9	2030
Target	100% of landscape equipment and small off-road engines are replaced with zero emissions equipment by 2030.
Methodology and Assumptions	<p>CARB is currently considering regulating small off-road engines (SORE) that will reduce smog-pollutant emissions from mobile sources by 80% in 2031 through a combination of regulatory and incentive approaches. SORE are spark-ignition engines rated at or below 25 horsepower or 19 kilowatts. Engines in this category are primarily used for lawn, garden, and other outdoor power equipment including generators, power washers, and utility carts. Construction and agricultural equipment are regulated by the federal government and not subject to CARB regulation. CARB's goal is to require all new sales of regulated equipment to be zero emissions equipment by 2028.</p> <p>The Town has approximately XX pieces of equipment that would be subject to SORE zero emissions regulations, including blowers, mowers, hedge trimmers, brush cutters and clearing saws (under 40 cc), chain saws (under 45 cc), pressure washers, and generators. We target 100% to be replaced with zero emissions equipment by 2030. We further assume average annual gasoline consumption of 35 gallons per equipment.</p>
Sources	<p>CARB Small Engine Fact Sheet, https://ww3.arb.ca.gov/msprog/offroad/sore/sm_en_fs.pdf?_ga=2.15457782.1959742507.1598026042-1995196326.1515467224</p> <p>CARB List to Determine Preempt Off-Road Applications, https://ww3.arb.ca.gov/msprog/offroad/preempt.htm</p> <p>Town of Tiburon</p>

Calculation

	2030
Number of small off-road engines replaced with zero emissions equipment	30
Estimate annual gasoline used for small landscape equipment	1,050 gallons
Emissions reduced	9 MTCO ₂ e

ENERGY EFFICIENCY PROGRAMS	
<i>EE-C1</i>	
Reductions (MTCO ₂ e) -2,130	2030
Targets	Electricity and natural gas consumption is reduced an average of 1% per year between 2018 and 2030.
Methodology and Assumptions	<p>We are forecasting an annual electricity savings of 1% and an annual natural gas savings of 1% based on the following:</p> <p>The National Action Plan for Energy Efficiency states among its key findings "consistently funded, well-designed programs are cutting annual savings for a given program year of 0.15 to 1 percent of energy sales."</p> <p>The American Council for an Energy-Efficiency Economy (ACEE) reports for states already operating substantial energy efficiency programs, energy efficiency goals of one percent, as a percentage of energy sales, is a reasonable level to target.</p> <p>MCE Clean Energy's Implementation Plan states "MCE's goal is to increase annual savings through energy efficiency programs to two percent (combined MCE and PG&E programs) of annualized electric sales...by the end of 2018."</p> <p>Electricity consumption declined an average of 1.5% per year in Tiburon between 2005 and 2018. Natural gas consumption declined an average of 1.0% per year between 2005 and 2018.</p>
Sources	<p>Marin Clean Energy Revised Community Choice Aggregation Implementation Plan and Statement of Intent, July 18, 2014.</p> <p>National Action Plan for Energy Efficiency, July 2006, Section 6: Energy Efficiency Program Best Practices (pages 5-6).</p> <p>Energy Efficiency Resource Standards: Experience and Recommendations, Steve Nadel, March 2006 ACEEE Report E063 (pages 28-30).</p>

Calculation

	2030
Residential and commercial electricity use, 2018	39,426,978 kWh
Electricity savings less State actions	4,731,237 kWh
Residential and commercial natural gas use, 2018	2,828,104 therms
Natural gas savings	339,372 therms
GHG emissions reductions	2,130 MTCO ₂ e

ENERGY AUDITS <i>EE-C2</i>	
Reductions (MTCO ₂ e) -42	2030
Targets	54 housing units implement energy efficiency projects between 2025 and 2030 due to ordinance requiring energy audits at time of sale.
Methodology and Assumptions	Assumes program will be implemented in 2025 and program will require audits at time of sale but energy efficiency projects will be voluntary. Assumes 5% of audited housing units will implement energy efficiency upgrades based on findings from the City of Berkeley's Building Energy Saving Ordinance. Assume 31% Btu energy use reduction based on demonstrated Energy Upgrade California projects completed in Marin County between June 2010 and May 2012. 135 housing units sold annually, based on 2005-2018 average (Marin County Assessor).
Sources	Marin County Assessor, http://www.marincounty.org/depts/ar/divisions/assessor/sales City of Berkeley, "Building Energy Savings Ordinance (BESO) Findings through Nov. 2016," December 7, 2016, https://www.cityofberkeley.info/uploadedFiles/Planning_and_Development/Level_3_-_Energy_and_Sustainable_Development/Energy%20Commission%20Presentation%20Berkeley.pdf Marin County Energy Watch Partnership, Dana Armanino, Sustainability Planner, County of Marin, darmanino@marincounty.org

Calculation

	2030
Average household electricity use 2018	7,530 kWh
Average household natural gas use 2018	648 therms
Average number of housing units sold annually	135 units
Number of housing units provided energy audits	676 units
Percent of participating housing units	5%
Number of housing units implementing energy efficiency projects	34 units
Electricity reduction	31%
Natural gas reduction	31%
Annual electricity savings	78,951 kWh
Natural gas savings	6,799 therms
Electricity emissions reduction	5 MTCO ₂ e
Natural gas emissions reduction	36 MTCO ₂ e
Total GHG emissions reduction	42 MTCO ₂ e

PUBLIC LIGHTING <i>EE-M1</i>	
Reductions (MTCO ₂ e)	0 2030
Targets	Complete conversion of remaining streetlights to LED by 2030.
Methodology and Assumptions	The Town had converted 9 of its 277 streetlights by 2018. The action assumes the Town will convert the remaining fixtures by 2030. Since the Town was purchasing 100% renewable energy in 2018 for all of its facilities, there are no additional GHG reductions for this action.
Sources	Town of Tiburon Public Works Department

Calculation

Electricity use, 2018	122,122 kWh
Electricity savings	58,061 kWh
GHG emissions reduction	0.0 MTCO ₂ e

ENERGY EFFICIENCY AUDIT AND RETROFITS <i>EE-M2</i>	
Reductions (MTCO ₂ e) -2	2030
Targets	Complete all projects by 2030.
Methodology and Assumptions	<p>Projects to be completed are as follows:</p> <ol style="list-style-type: none"> 1) Install energy-efficient lighting at Town Hall. 2) Install energy-efficiency lighting at Police Station 3) Install energy-efficiency lighting at Corporate Yard 4) Replace split gas heat condensers in Police Station 5) Replace heat pumps in Police Station 6) Install vending machine controller 6) Install window film or shade screens in Town Hall <p>Since 2010, the Town has replaced some of the lighting in Town owned buildings with LEDs and energy efficient lighting. Therefore, some of the potential annual electricity savings identified in the Marin Energy Management report and identified in the table below has already been achieved.</p> <p>The Town purchased 100% renewable energy in 2018 for all of its facilities and commits to continue doing so in CAP Action RE-M1. As a result, there are no additional GHG reductions for projects that reduce electricity use.</p>
Sources	Marin Energy Management report for the Town of Tiburon, December 9, 2010.

Calculation

Project	Annual Electricity Savings (kWh)	Annual Natural Gas Savings (therms)
Lighting - Town Hall	1,939	
Lighting - Police Station	68	
Lighting - Corporate Yard	5,247	
Split gas heat condensers - Police Station	2,216	450
Heat pumps - Police Station	14,717	
Vending machine controller	1,402	
Window film or shade screens - Town Hall	624	-20
Total savings	26,213	430
Emissions reductions (MTCO ₂ e)	0	2

ENERGY CONSERVATION <i>EE-M3</i>	
Reductions (MTCO ₂ e) -1	2030
Targets	Reduce energy use in municipal buildings by 5%.
Methodology and Assumptions	Energy management software is proven to reduce energy consumption by 10% through identifying inefficiencies within operations. A 5% reduction in energy use for miscellaneous behavioral changes by staff and mechanical operations, and upgrading to Energy Star equipment were assumed. Since the Town was purchasing 100% renewable energy in 2018 for all of its facilities, there are no additional GHG reductions for actions that reduce electricity use.
Sources	Tiburon 2016 GHG Inventory

Calculation

Electricity consumption in municipal buildings, 2018	224,397 kWh
Electricity use in municipal buildings	0 MTCO ₂ e
Natural gas consumption in municipal buildings, 2018	2,149 therms
Natural gas use in municipal buildings	11 MTCO ₂ e
Percent reduction in energy use	5%
Reduction in electricity consumption	11,220 kWh
GHG emissions reductions	1 MTCO ₂ e

RENEWABLE ENERGY & STORAGE <i>RE-C1</i>	
Reductions (MTCO ₂ e) -195	2030
Targets	Solar energy installations continue to grow by an average of 163 KW DC each year through 2030.
Methodology and Assumptions	<p>According to Project Sunroof, 92% of Tiburon buildings have roofs that are solar-viable. These 3,000 roofs have the capacity for 53 MW DC and could generate 73,300,000 kWh per year, which is more than the 39,400,000 kWh consumed in Tiburon in 2018. Project Sunroof estimates there are 329 existing solar installations in Tiburon.</p> <p>By 2018, approximately 2,566 KW of solar capacity had been installed in the Tiburon area (including unincorporated areas with a 94920 zip code) and 201 KW had been installed in 2018. Based on population estimates for the Town of Tiburon and the census tracts which comprise the 94920 zip code area, we estimate 81% of the solar energy systems are located within the Town limits.</p> <p>We assume new distributed solar capacity will be added at the same rate as in 2018 through 2030, or 163 KW DC each year.</p>
Sources	<p>Project Sunroof, https://www.google.com/get/sunroof/data-explorer/place/ChIJ2cX8c6yXhYARECyYKE9Ek1Q/, accessed December 18, 2020.</p> <p>California Distributed Generation Statistics, "NEM Currently Interconnected Data Set," https://www.californiadgstats.ca.gov/downloads/, April 2020.</p>

Calculation

	2030
Estimated solar capacity added 2019 within Town limits	163 KW DC
Additional solar through 2030	1,957 KW DC
kWh generated by 1 KW solar energy system	1,450 kWh
Additional electricity produced by distributed PV	2,837,094 kWh
GHG emissions reductions	195 MTCO ₂ e

GHG-FREE ELECTRICITY <i>RE-C2</i>	
Reductions (MTCO ₂ e) -1,426	2030
Targets	MCE electricity is 100% GHG-free by 2030.
Methodology and Assumptions	The MCE 2019 Resource Integration Plan states that MCE electricity is projected to be 100% GHG-free by 2022. MCE supplied 77% of the total electricity load in Tiburon in 2016. Assumes same percentage in 2030.
Sources	MCE 2019 Integrated Resource Plan (November 2018). https://www.mcecleanenergy.org/wp-content/uploads/2019/01/MCE-2019-Integrated-Resource-Plan_11-8-2018_V_12-21-18.pdf

Calculation

	2030
Electricity use, BAU	40,843,325 kWh
Electricity saved through State and local actions	7,629,949 kWh
Net electricity use	33,213,377 kWh
Projected MCE electricity use (77% of total)	25,572,714 kWh
Electricity emissions w/MCE BAU	1,426 MTCO ₂ e
Electricity emissions w/MCE	0 MTCO ₂ e
GHG emission reductions	1,426 MTCO ₂ e

BUILDING AND APPLIANCE ELECTRIFICATION

RE-C3.1

Reductions (MTCO ₂ e) -41	2030
Targets	9 cooktops, 14 water heaters and 28 heating systems are replaced with electric versions by 2030 through a Building Decarbonization incentive program.
Methodology and Assumptions	Potential number of appliance replacements is based on a Marin County grant application for a Building Decarbonization Pilot Program, which proposes to provide cash rebates for natural gas appliance swap-outs. The pilot program application estimates the following number of replacements during the pilot program period: stoves and cooktops, 20; water heaters, 30; and furnaces and heating systems, 60. We assume 3.7% of the replacements will take place in Tiburon homes based on Tiburon's share of countywide households. We assume the program can grow at an annual rate of 25% with continued rebates and program implementation.
Sources	2009 California Residential Appliance Saturation Study, Volume 2, Page 23. http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF County of Marin, Marin County Building Decarbonization Pilot Program for BAAQMD Climate Protection Grant Application, May 8, 2018.

Calculation

	2030
Estimated annual natural gas use for stoves and cooktops	28 therms
Estimated annual natural gas use for water heaters	163 therms
Estimated annual natural gas use for space heating	306 therms
Estimated annual electricity use for stoves and cooktops	71 kWh
Estimated annual electricity use for water heaters	1,382 kWh
Estimated annual electricity use for heat pump space heating	1,213 kWh
Number of units stoves and cooktops replaced	7 units
Number of units water heaters replaced	10 units
Number of furnaces and heating systems replaced	20 units
Natural gas savings	7,946 therms
Electricity consumption	38,577 kWh
GHG emissions reduction	41 MTCO ₂ e

BUILDING AND APPLIANCE ELECTRIFICATION

RE-C3.2

Action	Adopt an ordinance in 2024 that requires homeowners to replace natural gas appliances, such as water heaters, stoves, cooktops, clothes dryers, and heating systems with high-efficiency electric appliances at time of replacement where feasible.
Targets	24% of residential water heaters, 19% of residential cooktops, and 12% of residential dryers are replaced with high efficiency electric appliances.
Reductions (MTCO ₂ e) -976.9	2030
Methodology and Assumptions	We assume the ordinance applies to water heaters, stoves, cooktops, and clothes dryers in January 2025. We assume the high end of average life expectancies for these appliances. We further assume one-third of potential water heater replacements will be deemed infeasible due to interior location of the water heater.
Sources	2009 California Residential Appliance Saturation Study, Volume 2, Table 2-8 (PG&E for dryer), Table 2-24 (PG&E for dryer), and Table 2-26 (Forecast Zone 5 for water heater and range). http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF California Department of Finance, E-5 Population and Housing Estimates for 2010-2020 with 2010 Census Benchmark

Calculation

	2030
Number of housing units in Tiburon in 2020	4,049 units
Estimated annual natural gas use for stove or cooktop	28 therms
Estimated annual electricity use for induction stove or cooktop	71 kWh
% stoves and cooktops replaced	19%
Estimated annual natural gas use for water heater	163 therms
Estimated annual electricity use for heat pump water heater	1,382 kWh
% water heaters replaced	24%
Estimated natural gas use for clothes dryer	22 therms
Estimated electricity use for clothes dryer	648 kWh
% clothes dryers replaced	12%
Natural gas use eliminated	192,036 therms
Additional electricity use	1,803,304 kWh
GHG emissions reductions	977 MTCO ₂ e

BUILDING AND APPLIANCE ELECTRIFICATION

RE-C3.3

Action	Prohibit the use of natural gas end uses in new residential buildings in the Town's green building ordinance that aligns with the 2022 California Building Standards code update. Extend the same prohibition to new nonresidential buildings in the 2025 code cycle.
Reductions (MTCO ₂ e) -515.7	2030
Methodology and Assumptions	<p>We assume adoption of an ordinance in that bans natural gas use in new residential buildings beginning in 2023 and new non-residential buildings in 2026.</p> <p>Replacing residential space heating systems in Climate Forecast Zone 5 that use natural gas with systems that use heat pumps and electricity reduces emissions by an average of approximately 89% (derived from CRASS, Tables 2-9 and 2-26). We assume the same emissions reduction for electrifying non-residential space heating systems.</p> <p>An estimated 88% of new homes use natural gas for ranges and ovens and 58% use natural gas for dryers (CRASS, Table 2-22). We assume the ordinance reduces these numbers 100%.</p> <p>We assume all new homes use natural gas for primary space heating and water heating (CRASS, Table 2-25). We assume the ordinance reduces these numbers by 100%. Electricity used to power these systems is regulated under Title 24, which requires solar energy to supply energy requirements.</p> <p>Number of new housing units is based on Plan Bay Area 2040 population and household size estimates.</p> <p>CAPCOA Measure BE-1 used for estimating non-residential building electricity savings subject to Municipal Code Section 16-47.040.</p>
Sources	<p>2009 California Residential Appliance Saturation Study, Volume 2, Table 2-8 (PG&E for dryer and heat pump), Table 2-24 (PG&E for dryer), and Table 2-26 (Forecast Zone 5 for water heater and range). http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF</p> <p>California Energy Commission, California Commercial End-Use Survey (March 2006), https://ww2.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF</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>

Calculation

<i>Residential</i>	2030
New housing units, 2023-2030	21 units
Estimated natural gas use for space heating, per housing unit	306 therms
Estimated natural gas use for water heating, per housing unit	163 therms
Natural gas reduced beyond Title 24 requirements for heating systems	95,676 therms
Estimated annual natural gas use for cooktop and range	28 therms
Estimated natural gas use for clothes dryer	22 therms
Total natural gas reduced for appliances	786 therms
Estimated electricity use for cooktop and range	71 kWh
Estimated electricity use for clothes dryer	648 kWh
Total electricity used for electrified appliances	9,652 kWh
GHG emissions reductions	512.4 MTCO _{2e}

<i>Commercial</i>	2030
Natural gas reduced beyond Title 24 requirements	615 therms
GHG emissions reductions	3.3 MTCO _{2e}

COMMERCIAL ORGANIC WASTE <i>WR-C1</i>	
Reductions (MTCO ₂ e) -149	2030
Targets	Outreach to covered businesses. 30% are compliant.
Methodology and Assumptions	<p>Passed in 2014, AB 1826 requires businesses to recycle their organic waste, depending on the amount of waste they generate per week. Organic waste means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed in with food waste. The law phases in mandatory recycling of commercial organics over time. In 2017, businesses that generate 4 cubic yards of organic waste per week must arrange for organic waste recycling services and divert all organic waste they produce. In 2019, the law extends to businesses that generate 4 cubic yards or more of commercial solid waste. The State law is intended to reduce statewide disposal of organic waste by 50% by 2020. If that target is not met, the law will be extended to cover businesses that generate 2 cubic yards or more of commercial solid waste.</p> <p>The Town can assist Zero Waste Marin (a.k.a., the Marin Hazardous and Solid Waste Joint Powers Authority) and Marin Sanitary Service by conducting outreach, maintaining a registry of all businesses (including self-haulers) to track compliance with AB 1826, and hiring additional MSS or City dedicated to these efforts.</p> <p>According to CalRecycle, 55% of franchised commercial waste is recoverable for compost and mulch and paper recycling.</p> <p>This measure makes the following assumptions: 29% of landfilled waste is generated by commercial uses (based on electricity consumption split in the community); 60% of commercial waste will be subject to AB 1826 by 2020; and 90% of commercial waste will be subject to AB 1826 by 2030. Based on current compliance rates, this measure assumes 30% of all businesses that meet the 2019 threshold will be compliant by 2020 and 30% of all business that meet the post-2020 threshold will be compliant by 2030.</p>
Sources	<p>Personal communication with Kim Schiebly, Marin Sanitary Service, Kim.Scheibly@marinsanitary.com</p> <p>CalRecycle, 2014 Disposal-Facility-Based Characterization of Solid Waste in California: Significant Tables and Figures, https://www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2014/SigTableFig.pdf</p>

Calculation

	2030
Commercial waste as a percentage of total landfilled waste	27%
Commercial landfilled waste (excluding self-haul, sludge and municipal waste)	2,178 tons
Waste generated by covered businesses	1,960 tons
Recoverable organic waste generated by covered businesses (55%)	1,078 tons
Percent diverted from landfill	30%
Tons diverted from landfill	323 tons
GHG emissions reduction	149 MTCO ₂ e

RESIDENTIAL ORGANIC WASTE <i>WR-C2</i>	
Reductions (MTCO ₂ e) -494	2030
Targets	50% diversion of residential organic waste by 2030.
Methodology and Assumptions	This measure continues and expands activities already occurring, including quarterly mailings by Mill Valley Refuse, tabling at community events, a marketing campaign by Zero Waste Marin, and community education by Resilient Neighborhoods. Under this measure, the Town will utilize its website, communication tools, and social media to promote these activities and expand their reach and encourage Mill Valley Refuse to increase and expand their outreach through other channels such as on-bill and email response messaging. A 2014 Marin Sanitary Service (MSS) waste characterization study found that 38% of residential solid waste sent to the landfill was compostable organic waste (30% food scraps, 4% food-soiled paper, and 4% plant debris). MSS estimates that approximately 1% of food waste is currently collected and composted. Curbside collection of food waste has been available in Tiburon since 2010 with weekly service for co-collection of plant debris and food scraps. Based on MSS's experience, this measure assumes an additional 5% of residential organic waste will be diverted by 2020 due to education and outreach activities. Based on the current residential waste diversion rate of 72%, we assume 50% of residential organic waste can be diverted by 2030.
Sources	Personal communication with Kim Schieibly, Marin Sanitary Service, Kim.Scheibly@marinsanitary.com

Calculation

	2030
Residential waste as a percent of total landfilled waste	73%
Residential landfilled waste (excluding self-haul, sludge and municipal waste)	5,781.9 tons
Compostable organic waste generated by residents	2,197.1 tons
Percent diverted from landfill	50%
Tons diverted from landfill	1,099 tons
GHG emissions reduction	494 MTCO ₂ e

CONSTRUCTION AND DEMOLITION DEBRIS AND SELF-HAUL WASTE	
<i>WR-C3</i>	
Reductions (MTCO ₂ e) -52	2030
Targets	75% diversion of C&D waste by 2030.
Methodology and Assumptions	<p>Tiburon currently complies with the State's Green Building Code (CALGreen) by requiring development projects to direct all construction and demolition (C&D) materials to a certified facility that diverts at least 65% of nonhazardous C&D debris to recycle or salvage. However, recoverable material is still deposited in the landfill, primarily due to self-haul activity (clean-up and loads that are generated from projects not covered by CALGreen), and C&D loads that contain low percentages of recoverable material. The Town can help to maximize the amount of recoverable material by providing outreach and education to waste generators, and by working with the County and CalRecycle to require processing of all loads for recoverable materials at the landfill or processing facility.</p> <p>According to Zero Waste Marin, 670.74 tons of self-haul and debris box waste originating in Tiburon was landfilled in 2016. According to statewide solid waste characterizations studies, self-haul waste contains approximately 28% lumber, 3% paper, and 10% green waste, all of which could be diverted from the landfill. The measure assumes that 50% of this waste can be diverted by 2020 and 75% can be diverted by 2030, based on State mandates (SB 1383).</p>
Sources	<p>Personal communication with Garth Schultz, R3 Consulting Group, gschultz@r3cgi.com</p> <p>Personal communication with Judith Silver, Zero Waste Marin, jsilver@marincounty.org</p> <p>CalRecycle, "2014 Disposal-Facility-Based Characterization of Solid Waste in California: Significant Tables and Figures," October 6, 2015.</p>

Calculation

	2030
Self-haul landfilled waste	666.5 tons
Recoverable organic waste (26.4%)	176.0 tons
Percent organic material diverted from landfill	75%
Tons diverted from landfill	132 tons
GHG emissions reduction	52 MTCO ₂ e

MANDATORY WASTE DIVERSION <i>WR-C4</i>	
Reductions (MTCO ₂ e) -545	2030
Targets	Increase commercial AB1826 compliance rate to 50% and increase residential organic waste diversion rate to 80% by 2030.
Methodology and Assumptions	<p>This measure assumes Tiburon will adopt a mandatory waste diversion ordinance similar to the one adopted by the City of Palo Alto in January 2016 (Palo Alto Municipal Code Chapter 5.20). Palo Alto requires all residents, visitors, and businesses to place their discards in the appropriate container – recycle, compost, or garbage. There are four steps to compliance: 1) subscribe to recycle, compost, and garbage service from the city’s contract hauler; 2) set-up color-coded and labeled containers in convenient locations for patrons, employees, and residents; 3) train and educate tenants, residents, contractors and janitors about how to properly sort their waste and to ensure requirements are met; and 4) sort waste into proper containers. Requirements are phased in over time as follows:</p> <p>This measure assumes a similar ordinance would require all commercial accounts and multifamily buildings with 5 or more units to comply by 2020. We assume that a mandatory diversion ordinance could increase the AB 1826 compliance rate to 50% by 2030. Assuming that the ordinance is expanded to require residents to comply, we estimate an overall 80% compliance rate for residential compostable organic waste by 2030.</p>
Sources	City of Palo Alto, http://www.cityofpaloalto.org/gov/depts/pwd/zerowaste/projects/ordinance.asp CalRecycle, "2014 Disposal-Facility-Based Characterization of Solid Waste in California: Significant Tables and Figures," October 6, 2015.

Calculation

	2030
Additional commercial organic waste diverted	539.0 tons
Additional residential organic waste diverted	659.1 tons
GHG emissions reduction	545 MTCO ₂ e

WASTE PROCESSING INFRASTRUCTURE	
<i>WR-C5</i>	
Reductions (MTCO ₂ e) -519	2030
Targets	Increase diversion rate of recoverable organic waste to 95% by 2030.
Methodology and Assumptions	This measure assumes that new solid waste processing infrastructure is procured by 2030, but not 2020. Waste processing infrastructure could ultimately ensure that 95% of all recoverable organic waste collected by the franchised waste hauler is diverted from the landfill by 2030.
Sources	Personal communication with Kim Schiebly, Marin Sanitary Service, Kim Schiebly, Kim.Schiebly@marinsanitary.com CalRecycle, 2014 Disposal-Facility-Based Characterization of Solid Waste in California: Significant Tables and Figures, https://www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2014/SigTableFig.pdf

Calculation

	2030
Landfilled waste, excluding self-haul and sludge	8,104 tons
Tons diverted by other measures	2,674 tons
Diversion target (95% for 2030)	3,850 tons
Remaining tons to be diverted	1,175 tons
Recoverable organic waste (50% of total)	4,052 tons
GHG emissions reduction	519 MTCO ₂ e

WASTE FROM TOWN OPERATIONS <i>WR-M2</i>	
Reductions (MTCO ₂ e) -24	2030
Targets	75% of recoverable organic waste currently landfilled is diverted by 2030.
Methodology and Assumptions	This measure assumes 75% of recoverable organic waste currently landfilled could be diverted by 2030.
Sources	Personal communication with Charlie Wicke, Marin Sanitary Service, Charlie.Wicke@marinsanitary.com

Calculation

	2030
Waste generated by Town operations	145 tons
Recoverable organic waste (50%)	72 tons
Percent diverted from landfill	75%
Tons organic waste diverted from landfill	54 tons
GHG emissions reduction	24 MTCO ₂ e

COMMUNITY WATER USE <i>WC-C1</i>	
Reductions (MTCO ₂ e) -1	2030
Targets	1% annual water consumption reduction.
Methodology and Assumptions	<p>District-wide Marin Municipal Water District (MMWD) water consumption fell 19.6% between 2005 and 2015, or approximately 2% per year. We conservatively assume water consumption will continue to fall an average of 1% per year based on the following legislation and water conservation programs:</p> <ul style="list-style-type: none"> -The Town has adopted CALGreen Tier 1 for residential buildings, which requires additional water conservation actions above the base code. -MMWD's regulations meet or exceed State law that requires single family homes and commercial and multi-family buildings to replace all non-compliant plumbing fixtures when remodeling and upon resale (resale requirement for commercial and multi-family buildings will be in effect on January 1, 2019). -MMWD provides rebates for water-efficient toilets, clothes washers, hot water recirculation systems, turf replacement, pool covers, mulch, graywater systems, and rain barrels. -MMWD provides residential and commercial building and landscape water audits and free-water saving devices (faucet aerators, showerheads, toilet leak test dye tablets, hose nozzles, etc.). -MMWD provides residential and commercial building and landscape water audits and free-water saving devices (faucet aerators, showerheads, toilet leak test dye tablets, hose nozzles, etc.). -MMWD has adopted a landscape water conservation ordinance which applies to all new construction and rehabilitated landscape projects requiring a building permit, plan check, or design review. Irrigation controllers are required under CALGreen. -New commercial and multi-family construction is required to meet CALGreen code. MMWD requires all plumbing installed, replaced, or moved on any new or existing service to have high efficiency fixtures and meet minimum requirements. -MMWD has adopted a Water Waste Ordinance and requires drinking water and linen washing upon request at restaurants and hotels. -MMWD requires applicants for new water service and applicants requesting an enlarged water service for substantial residential or commercial remodels to install a graywater recycling system to reuse the maximum practicable amount of graywater on site. -MMWD conducts outreach and provides water conservation information to water users on its website. -MMWD provides virtual water-friendly garden tours on its website and the City partners with the Marin Master Gardeners to provide demonstration gardens at Falkirk Cultural Center.

	<p>GHG reduction calculations are based upon the following:</p> <ul style="list-style-type: none"> -The California Energy Commission estimates that it takes 3,500 kWh of electricity per million gallons to convey, treat and distribute water from the water source to the customer in northern California. -MMWD began purchasing 100% renewable electricity in 2017 and Sonoma County Water agency, which provides approximately 25% of water, began purchasing 100% renewable electricity in 2015. We assume the water agencies will continue this practice.
Sources	<p>Personal communication with Carrie Pollard, Sonoma Marin Water Saving Partnership</p> <p>The Climate Registry for Sonoma County Water Agency emission factors Refining Estimates of Water-Related Energy Use in California, California Energy Commission, Dec. 2006</p>

Calculation

	2030
Water consumption, BAU	373 MG
Annual water consumption reduction	1 %
Potential annual water savings by 2030	45 MG
GHG emissions reduction	1 MTCO ₂ e

LIGHT AND HEAVY DUTY FLEET REGULATIONS

State Action

Program Description	Current federal and State regulations and standards will reduce transportation emissions from the light and heavy duty fleet. These include: <ol style="list-style-type: none"> 1. Pavley Standards which increase fuel economy standards for light-duty vehicles for 2009-2016 model years. 2. Advanced Clean Cars Program which will reduce greenhouse gas and smog emissions for light-duty vehicles sold between 2017 and 2025. New automobiles will emit 34 percent fewer GHG emissions and 75 percent fewer smog-forming emissions. 3. ARB Tractor -Trailer Greenhouse Gas Regulations which accelerate the use of low rolling resistance tires and aerodynamic fairing to reduce GHG emissions in the heavy-duty truck fleet. 4. Heavy Duty GHG Emissions Standards (Phase One) which establish GHG and fuel efficiency standards for medium duty and heavy duty engines and vehicles for 2014-2018 model years.
Reductions (MTCO ₂ e) -4,240	2030
Methodology and Assumptions	Transportation emissions estimated using EMFAC 2017. Emission factors have been adjusted to account for the SAFE Vehicle Rule Part One and the Final SAFE Rule. In order to be consistent with the methodology used in the Greenhouse Gas Inventory, results are adjusted to reflect the global warming potential of methane and nitrous oxide as reported in the IPCC Fifth Assessment Report.
Sources	California Air Resources Board, EMFAC2017 v.1.0.2. California Air Resources Board, EMFAC2014 Volume III - Technical Documentation, v1.0.7, May 12, 2015 California Air Resources Board, "EMFAC Off-Model Adjustment Factors for Carbon Dioxide (CO ₂) Emissions to Account for the SAFE Vehicle Rule Part One and the Final SAFE Rule," June 26, 2020, https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf?utm_medium=email&utm_source=govdelivery

Calculation

	2030
Passenger VMT BAU	63,696,150 VMT
Passenger VMT, net reductions from other measures	52,587,032 VMT
Commercial VMT BAU	1,163,828 VMT
Emissions, BAU	19,528 MTCO ₂ e
Emissions with regulations	15,288 MTCO ₂ e
Reduction in emissions	4,240 MTCO ₂ e

RENEWABLE PORTFOLIO STANDARD <i>State Action</i>	
Program Description	Established in 2002 in Senate Bill 1078, the Renewable Portfolio Standard program requires electricity providers to increase the portion of energy that comes from eligible renewable sources, including solar, wind, small hydroelectric, geothermal, biomass and biowaste, to 20 percent by 2010 and to 33 percent by 2020. Senate Bill 350, passed in September of 2015, increases the renewable requirement to 50 percent by the end of 2030. Senate Bill 100, passed in September 2018, accelerated the RPS standard to 60 percent by 2030 and zero-carbon by 2045.
Reductions (MTCO ₂ e) -37	2030
Methodology and Assumptions	<p>This State Action assumes PG&E and Direct Access entities will meet the Renewable Portfolio Standard requirements and that these entities will carry the same share of the community's electricity load as in 2016. GHG reductions related to MCE's GHG reduction policies are quantified separately as a local action.</p> <p>California Public Utilities Code Section 454.52 requires each load-serving to procure at least 50 percent eligible renewable energy resources by 2030 and to meet the economywide reductions of 40% below 1990 levels by 2030.</p> <p>For 2030, the CPUC has set electric sector GHG reductions at a level that represents a 50% reduction from 2015 levels. We therefore apply a 50% reduction to PG&E and DA 2015 CO₂ emission factors to forecast 2030 emission factors. CH₄ and N₂O factors are kept constant at 2018 levels.</p>
Sources	<p>GHG Calculator, version 3c_Oct2010. https://ethree.com/public_projects/cpuc2.php</p> <p>PG&E, "Greenhouse Gas Emission Factors: Guidance for PG&E Customers," November 2015, https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf</p> <p>California Public Utilities Commission "CPUC Adopts Groundbreaking Path to Reduce Greenhouse Gases in Electric Sector," Press Release Docket #: R.16-02-007, Feb. 8, 2018.</p>

Calculation

	2030
Electricity use, BAU	40,843,325 kWh
Electricity saved through other State actions	29,241 kWh
Electricity saved through local actions	7,647,282 kWh
Net electricity use (PG&E)	7,388,044 kWh
Net electricity use (DA)	241,904 kWh
Electricity emissions, BAU	753 MTCO ₂ e
Electricity emissions w/RPS	716 MTCO ₂ e
GHG emission reductions	37 MTCO ₂ e

TITLE 24 ENERGY EFFICIENCY STANDARDS

State Action

Program Description	The California Energy Commission (CEC) promotes energy efficiency and conservation by setting the State's building efficiency standards. Title 24 of the California Code of Regulations consists of regulations that cover the structural, electrical, mechanical, and plumbing system of every building constructed or altered after 1978. The building energy efficiency standards are updated on an approximate three-year cycle, and each cycle imposes increasingly higher demands on energy efficiency and conservation. 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.
Reductions (MTCO ₂ e) -37	2030
Methodology	<p>Estimated residential energy use assumes homes use natural gas for primary space heating and water heating. We assume all new homes install central air conditioning and outdoor lighting. Only end uses covered by Title 24 are included in the analysis.</p> <p>Estimated energy reductions for the 2016 and 2019 building codes based on information provided by the California Energy Commission. CAPCOA Measure BE-1 used for estimating building energy savings. We assume all residential electricity use subject to Title 24 is offset by mandatory solar installation beginning with the 2019 building code.</p> <p>We assume 30 new units are built between 2020 and 2030, based on Plan Bay Area 2040 population and household size projections.</p>
Sources	<p>California Energy Commission, 2016 Energy Standards Overview (June 15, 2016), https://www.lgc.org/wordpress/wp-content/uploads/2016/02/2016-Energy-Standards-Overview-California-Energy-Commission.pdf</p> <p>California Energy Commission, https://ww2.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf</p> <p>California Energy Commission, California Commercial End-Use Survey (March 2006), https://ww2.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF</p> <p>2009 California Residential Appliance Saturation Study (CRASS), Volume 2. http://www.energy.ca.gov/2010publications/CEC-200-2010-004/CEC-200-2010-004-V2.PDF</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>

Calculation

Reductions from Title 24 Upgrades	2016 Reductions from 2013 Standards (assumed for development after 2017)	Energy Savings for 2019 Code (assumed for development 2020-2022)		Projected average reduction 2023-2030 from 2018 baseline	
	Energy Savings	Electricity Savings	Natural Gas Savings	Electricity Savings	Natural Gas Savings
	Residential New Construction	28.00%	100%	7%	100%
Non-residential New Construction	5.00%	30%	30%	50%	50%

Projected Residential Development with Title 24 Energy Reductions

	2018-2019	2020-2022	2023-2030	TOTAL through 2030	GHG Reductions through 2030
New Residential (units)	2	9	21	32	
Electricity Use BAU , subject to Title 24	80	8,564	19,982	28,626	
Electricity Use Savings	1	8,564	21	8,586	1
Natural Gas Use BAU, subject to Title 24	938	4,223	9,854	15,016	
Natural Gas Use Savings	239	296	4,927	5,462	29

Projected Non-Residential Development with Title 24 Energy Reductions

	2018-2019	2020-2022	2023-2030	TOTAL through 2030	GHG Reductions through 2030
Electricity Use BAU , subject to Title 24	0	14,083	32,861	46,944	
Electricity Use Savings	0	4,225	16,431	20,656	1
Natural Gas Use BAU	0	590	1,968	2,558	
Natural Gas Use Savings	0	177	984	1,161	6