08.

SUSTAINABILITY

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CONTENTS

8.1 PURPOSE OF THE CHAPTER

Tiburon recognizes its responsibility to live sustainability and ensure that the earth's finite resources are used conservatively and, to the extent possible, are preserved for future generations. Tiburon seeks to create and maintain the conditions which humans and nature can co-exist in productive harmony while continuing to prosper and maintain a high quality of life. Planning is crucial to ensure new development uses renewable energy sources and sustainable building materials and has the smallest impact possible on the climate. This chapter presents a framework for governing future decisions about how the Town will provide a sustainable community.

The Sustainability chapter includes the following sections.

8.2 Sustainability. Describes the concept of sustainability and the ecological footprint.

8.3 Climate Change Impacts. Provides an overview of existing and projected climate change impacts in California and Tiburon, including rising temperatures, extreme heat events, wildfire, drought, and storms.

8.4 Greenhouse Gas Emissions and the Climate Action Plan. Describes greenhouse gas emissions and the Town's actions to quantify and reduce community-wide greenhouse gas emissions.

8.5 Goals, Policies, and Programs. Identifies goals, policies, and programs to create a sustainable community.

8.2 SUSTAINABILITY

In 1987, the United Nations Brundtland Commission defined sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." Today, we often think of sustainability as the integration of environmental, social, and economic health and vitality to create thriving, diverse, and resilient communities for this generation and generations to come. The practice of sustainability recognizes how these issues are interconnected and requires a systems approach to addressing complex problems. Similarly, issues related to sustainability are addressed throughout the General Plan. Nonetheless, Chapter 5 Equity, Diversity and Inclusion provides a special focus on social equity, while Chapter 2 Land Use addresses economic development. This chapter focuses on climate change, while Chapter 9 addresses other dominate environmental issues such as loss of biodiversity, land degradation, and air and water pollution.

One way to measure sustainability is through the "ecological footprint" which measures the demand on and supply of nature. The ecological footprint measures how fast populations consume resources and generate waste and compares that to how fast nature can absorb the waste and generate new resources.[1] If a population's ecological footprint exceeds the region's biocapacity, that region runs a biocapacity deficit. Today, more than 80% of the world's population live in countries that are running ecological deficits. To live within the means of our planet's resources, the world's Ecological Footprint would have to equal the available biocapacity per person on our planet, which is currently 1.6 global hectares. The average American's ecological footprint is 8.1 global hectares, while the United States' biocapacity is 3.4 global hectares per person. That means Americans uses more than five times the productive capacity of the planet and more than twice what the United States can sustainably provide for its citizens.

[1] *For a more thorough discussion see the Global Footprint Network at www.footprintnetwork.org.*

8.3 CLIMATE CHANGE IMPACTS

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. Eighteen of the state's twenty largest fires have occurred since 2003, and the eight 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.

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) (Cal-Adapt).

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.

As described in Section 11.2 of the Safety + Resilience chapter, the Town's Local Hazard Mitigation Plan and the Marin County Vulnerability Assessment (2022) adaptation and resilience requirements of Gov't. Code §65302(g)(4)(A). Section 11.5 discusses sea level rise impacts and adaptation strategies in Tiburon.

[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," https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf, accessed 7/29/22.

8.4 GREENHOUSE GAS EMISSIONS AND CLIMATE ACTION PLAN

The earth's atmosphere contains a group of naturally occurring gases that maintain a habitable climate. These gases allow sunlight to enter the earth's atmosphere freely and prevent some of the sun's heat from exiting the atmosphere. Because of their ability to contain heat, the gases are known as greenhouse gases, or GHGs. Natural levels of GHGs exist in balanced proportion, resulting in steady maintenance of the temperature within earth's atmosphere. However, emissions of GHGs from human activities, such as electrical production and motor vehicle use, continue to elevate the concentrations of GHGs, upsetting their natural balance. When GHG concentrations exceed natural concentrations in the atmosphere, the "greenhouse effect" of trapped heat is enhanced, and the phenomenon known as global warming occurs.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) is responsible for advancing knowledge on human-induced climate change. Its reports play a key role in establishing GHG reduction targets and international agreements to reduce emissions. In 2015, all the members of the United Nations Framework Convention on Climate Change – including the United States, China, India, and the European Union – signed on to the historic "Paris Agreement". The central aim of the agreement was to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above preindustrial levels and

Town of Tiburon

CLIMATE ACTION PLAN 2030

Adopted
September 21, 2022

MARIN CLIMATE & ENERGY PARTNERSHIP

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to pursue efforts to limit the temperature increase even further to 1.5 degrees.

Global temperatures have already increased by an average of 1.1 degrees Celsius, or 2 degrees Fahrenheit, since the 19th century as humans have emitted heat-trapping gases into the atmosphere by burning coal, oil, and gas for energy, and cutting down forests. The goal of limiting global temperature increase to no more than 1.5 degrees Celsius above preindustrial levels would require nations to all but eliminate their fossil-fuel emissions by 2050, and most are far off-track. The world is currently on pace to warm somewhere between 2 degrees and 3 degrees Celsius this century, experts have estimated.

Since 2005, the State of California has responded to growing concerns over the effects of climate change by passing a series of target-setting legislation and adopting a comprehensive approach to addressing GHG emissions in the public and private sectors. In 2006, the state adopted Assembly Bill 32, which established long-term targets to reduce GHG emissions to 1990 levels by 2020. In 2016, Senate Bill 32 established a goal to reduce statewide emissions 40 percent below 1990 levels by 2030. In 2022, Assembly Bill 1279 set a statewide target to reduce emissions 85 percent below 1990 levels by 2045 and achieve carbon neutrality in that year.

The Town of Tiburon recognizes its vital role in reducing greenhouse gas emissions and adapting to climate change. In 2022, the Town adopted Climate Action Plan 2030 that establishes actions the Town's government and community can take to reduce emissions 50 percent below 1990 levels by the year 2030 and put the town on a trajectory to achieve carbon neutrality by 2045.

The Town conducts annual inventories of community-wide greenhouse gas emissions to identify baseline emissions and track progress in meeting reduction targets. The inventories estimate the amount of carbon dioxide, methane, and nitrous oxide that are generated by activities within the Tiburon town limits. These greenhouse gas emissions are weighted according to their global warming potential and totaled as "carbon dioxide equivalents" or CO_2e. Emissions at the local government level are typically reported in metric tons, or $MTCO_2e$.

Community emissions are quantified according to these seven sectors:

- The **Built Environment – Electricity** sector represents emissions generated from the use of electricity in Tiburon homes and commercial, industrial, and governmental buildings and facilities.
- The **Built Environment – Natural Gas** sector represents emissions generated from the use of natural gas in Tiburon homes and commercial, industrial, and governmental buildings and facilities. Propane used as a primary heating source is also included, although it represents less than 1% of emissions in this sector.
- The **Transportation** sector includes tailpipe emissions from passenger

vehicle trips originating and ending in Tiburon, as well as a share of tailpipe emissions generated by medium and heavy-duty vehicles and buses traveling on Marin County roads. The sector also includes emissions from Marin Transit and Golden Gate Transit buses a as these vehicles travel within Tiburon's boundaries. Electricity used to power electric vehicles is embedded in electricity consumption reported in the Built Environment - Electricity sectors.

- The **Waste** sector represents fugitive methane emissions that are generated over time as organic material decomposes in the landfill. Although most methane is captured or flared off at the landfill, approximately 25% escapes into the atmosphere.
- The **Off-Road** sector represents emissions from the combustion of gasoline and diesel fuel from the operation of off-road vehicles and equipment used for construction and landscape maintenance.
- The **Water** sector represents emissions from energy used to pump, treat, and convey potable water from the water source to Tiburon water users.
- The **Wastewater** sector represents stationary, process and fugitive greenhouse gases that are created during the treatment of wastewater generated by the community, as well as emissions created from electricity used to convey and treat wastewater.

The most recent inventory was conducted for the year 2020.

Table S-1

COMMUNITY-WIDE GHG EMISSIONS BY SECTOR, 2020

SECTOR	GHG EMISSIONS (metric tons CO_2e)
Built Environment - Electricity	1,838
Built Environment – Natural Gas	15,045
Transportation	23,789
Waste	1,889
Off-Road	516
Water	14
Wastewater	216
TOTAL	**43,307**

Community-wide GHG emissions totaled 43,307 MTCO2e in 2020, which is 19 percent below estimated 1990 levels. Emissions by sector are shown in Table S-1. It is important to note that the Town's GHG emissions inventories are not "consumption-based" inventories and do not take into account lifecycle emissions that are generated by mining, production, manufacturing, or transport of food and products outside the Town limits, nor do they include certain emissions generated outside the community's borders, such as airplane travel by residents.

Emissions are projected to increase 7.1 percent between the 2020 and 2030 and to drop slightly by 2040, settling at 46,240 MTCO2e, in the absence of any policies or actions that would occur to reduce emissions. The forecast is derived by "growing" baseline emissions by forecasted changes in population, number of households, jobs and vehicle miles traveled according to projections developed by the Association of Bay Area Governments and the Metropolitan Transportation Commission.

The Town's Climate Action Plan 2030 identifies state and local actions and performance targets that, if fully implemented and achieved, will meet the Town's goal to reduce emissions 50 percent below 1990 levels. The top local actions are as follows:

Electric Vehicles. The plan targets 45 percent of passenger vehicles registered in Marin County to be plug-in electric vehicles by 2030. (6,340 MTCO2e)

Electrification of Buildings. The plan includes adoption of ordinances that will require new homes and commercial buildings to be all-electric and replacement of natural gas appliances and heating systems with high-efficient electric versions, including heat pump technology, upon burnout. (2,030 MTCO2e)

Energy Efficiency. The plan includes continued promotion and participation in energy efficiency and conservation programs to reduce energy consumption in the built environment. (1,170 MTCO2e)

Waste Reduction. The plan includes actions to significantly reduce organic waste from landfills. (1,830 MTCO2e)

Community Education. The plan includes actions to educate and motive residents to reduce their carbon input by participating in the Resilient Neighborhoods program. (960 MTCO2e)

Carbon Offsets. To ensure emissions are reduced 50 percent below 1990 levels by 2030, the Town will consider annually purchasing carbon offsets – preferably in a local program that sequesters carbon in Marin County – in the amount needed to bridge the gap between the GHG reduction achieved in 2030 and the target. (2,260 MTCO2e)

8.5 GOALS, POLICIES, AND PROGRAMS

GOAL S-A

Create a sustainable community that ensures residents may meet their own needs without compromising the needs of future generations.

GOAL S-B

Reduce greenhouse gas emissions in the community and within government operations to mitigate the effects of climate change.

POLICY S-1 GREENHOUSE GAS EMISSION REDUCTIONS.

Mitigate the impacts of climate change by reducing community greenhouse gas emissions.

Program S-a Emissions Reduction Targets.

Implement strategies to achieve reductions in greenhouse gas emissions at least 50 percent below 1990 levels by 2030, and to support the State's goal to achieve zero net emissions statewide by 2045.

Program S-b Climate Action Plan.

Implement the Town's Climate Action Plan and periodically update the plan to incorporate new emission reduction targets, strategies, and best practices.

Program S-c Monitoring Emissions.

Periodically update the greenhouse gas emissions inventory for community and government operations emissions to track progress in reducing emissions & implementing the Climate Action Plan.

Program S-d Carbon Offsets.

Explore the purchase of verifiable carbon offsets to help achieve the Town's greenhouse gas reduction goal.

Program S-e Public Education.

Educate the community on the impacts of climate change and actions individuals and businesses can take to reduce greenhouse gas emissions, shift to renewable energy and zero emission vehicles, reduce waste and water use, and adapt to climate change.

POLICY S-2 RENEWABLE ENERGY.

Accelerate the conversion to renewable energy sources.

Program S-f Building and Appliance Electrification.

Consider building regulations which preclude gas appliances and infrastructure in new buildings and regulations and require gas appliances to be replaced with high-efficiency electric at burnout.

Program S-g Municipal Energy Use.

Evaluate solar energy production and storage systems at all municipal buildings and facilities and plan for replacement of natural gas appliances and equipment. Continue to purchase 100% renewable energy for Town buildings and facilities.

Program S-h Community Energy Use.

Encourage residents and businesses to install solar energy production and storage systems by streamlining regulations and permit processes, or to purchase 100% renewable energy through energy providers.

POLICY S-3 BUILDING ENERGY EFFICIENCY.

Encourage energy efficiency improvements in existing residential and commercial buildings to reduce energy use.

Program S-i Green Building Regulations.

Consider adopting green building regulations for new construction and building remodels and additions that exceed minimum State building and energy code requirements.

Program S-j Energy Efficiency Programs.

Promote programs and incentives to property owners to improve energy efficiency. Consider requiring energy audits at time of building sale or major remodel.

POLICY S-4 LOW CARBON TRANSPORTATION.

Minimize transportation-related greenhouse gas emissions.

Program S-k Zero Emission Vehicles.

Implement a comprehensive program to significantly increase the use of zero emission vehicles through public education and promotion, adoption of building code requirements for electric vehicle charging facilities in new construction, and installation of Level 2 and 3 public charging facilities.

Program S-l Fleet Vehicle Replacements.

Give priority to electric and zero emissions vehicles, as feasible, when replacing vehicles in the Town's fleet with the goal of achieving a zero-emissions fleet by 2030.

POLICY S-5 WASTE DIVERSION TARGETS.

Strive to meet or exceed waste diversion and food recovery targets set by the state.

Program S-m Business Waste Management Plans.

Require that businesses prepare and implement waste management plans to maximize recycling and food recovery and minimize disposal of organic waste where appropriate as a condition of approval of use permits.

Program S-n Organic Waste Reduction.

Work with the Town's waste hauler and Zero Waste Marin to develop and implement programs to educate and motivate residents and business owners to increase recycling of materials and food recovery and reduce disposal of organic waste.

Program S-o Construction and Demolition Debris.

Modify the solid waste disposal ordinance to maximize the recovery and recycling of construction debris consistent with the Marin Zero Waste model ordinance.

POLICY S-6 MUNICIPAL WASTE REDUCTION.

Maximize recycling, composting, reuse, waste reduction, and food recovery within municipal operations and at public parks and facilities.

Program S-p Recycling Facilities.

Provide sufficient recycling and composting bins for public and staff use.

Program S-q Environmentally Preferable Purchasing.

Adopt municipal purchasing procedures to give preference to purchasing products that are recyclable, made from recycled materials, and minimize packaging.

POLICY S-7 TOWN FACILITIES AND OPERATIONS.

Continue to pursue opportunities to improve energy efficiency and reduce resource consumption in Town-owned facilities and operations.

POLICY S-8 GREEN BUILDING IN TOWN FACILITIES

Apply green building principles to the design, construction, and operation of new Town and Town-sponsored facilities to provide long-term cost savings and to serve as an example for the community.

POLICY S-9 GREEN BUILDING.

Integrate energy efficiency, conservation, and other green building incentives into the zoning permit and building permit processes.

LOW CARBON TRANSPORTATION AND TOWN FACILITIES AND OPERATIONS