CLIMATE ACTION PLAN

TOWN OF ATHERTON
INCORPORATED SEPTEMBER 12, 1923
CALIFORNIA

Town of Atherton's Climate Action Plan

Technical Appendix: Supplementary Findings and 2019 Greenhouse Gas Emissions Inventory

Images from left to right: Tree planting at Holbrook Palmer Park, the view from the Library, and the next generation learning at the 2023 Love Our Earth Festival

Table of Contents

Executive Summary

Cities and Towns are on the front lines when it comes to climate change. This includes embracing clean technologies and voluntarily decarbonizing our communities. Atherton's Climate Action Plan (CAP) establishes the goal of reducing carbon emissions at least 49 percent below 2005 levels by 2030, an interim step toward the ultimate goal of achieving carbon neutrality by 2045.

Atherton has already made significant progress in its climate action efforts. Between 2005 and 2019, Atherton reduced its emissions by 19,654 metric tons (MT) of carbon dioxide equivalents (mtCO2e), a reduction of 27 percent below 2005 levels. In order to achieve at least a 49 percent reduction by 2030, Atherton would need to reduce total emissions by about 36,366 mtCO2e, significantly increasing the scale and speed of reductions. This "bending of the carbon curve" is essential to meeting the goal of carbon neutrality before 2045 and averting worsened climate change impacts.

To meet this goal, this CAP provides a roadmap to reduce emissions in four sectors: 1) energy, 2) transportation and land use, 3) solid waste, 4) and carbon sequestration and water conservation. The CAP identifies key actions or strategies that need to be accomplished within the next decade to stay on pace with achieving our goals.

This CAP also focuses on our municipal operations as well as issues and activities in the community, including how residents and institutions can contribute to Atherton's emission reduction goals. It provides an ambitious, community-focused platform to advance policies that enhance quality of life and wellbeing, embrace smart city innovation and improve social equity. We engaged experts and community leaders to plan the best path forward for Atherton, and we hope you will join us on this journey.

Even if all emissions were eliminated today, we would still see climate change impacts in the future, including sea-level rise, hotter temperatures, and increased fire risk. Atherton understands the importance of laying out a framework for enhancing Atherton's resilience to these impacts. This CAP describes the process Atherton will embark on to develop a climate change resiliency plan moving forward.

The community's investment to support the CAP will be many times greater than Atherton's own costs. Atherton will need to support residents' and institutions' efforts to find funding and motivation to decarbonize their buildings, vehicles, and lifestyles. At the same time, Atherton should discourage carbon-emitting activities through fee-based systems or carbon taxes to shift community investment away from fossil fuels to clean technologies.

To ensure full implementation of the CAP, an interdepartmental team of Town staff, in collaboration with the Environmental Programs Committee, must be assembled to maintain momentum and ensure accountability. Staff will continue to provide annual progress reports, including greenhouse gas (GHG) inventories, and will prepare an update to the CAP on a regular basis.

This CAP provides a pathway to accelerate our historical success. It is also a call to action to residents, community institutions to take an active part in our transition to a low-carbon future and clean economy. In this process, we will foster a vibrant economy, increase our resiliency, and support Atherton's vision for a livable and sustainable community for all generations to come.

1

INTRODUCTION

The Town of Atherton is pleased to present an update to our 2016 Climate Action Plan (CAP). This document serves as a companion to the update providing technical information on climate science, Atherton's emissions, and strategic planning. Our Town cannot solve the climate crisis alone. This Technical Appendix documents how Atherton plans to collaborate with our partners in county, state, and federal government, along with community organizations and local businesses, to create new programs, services, and policies that will support our community in taking actions that reduce greenhouse gas (GHG) emissions.

Building on a Foundation

Since the adoption of the inaugural CAP in 2016, the Town has committed to the process of implementing its 25 policies that address the range of GHG sources in our jurisdiction. This included a January 2017 prioritization process was recommended by the Town's Environmental Programs Committee and approved by the City Council. This focus staff on 16 priority measures designed to help us reach 78.4 percent of targeted GHG reductions by 2020 and 81.8 percent by 2030.

Since then, the Town has implemented a number of the CAP's measures, including a shift to clean, renewable energy sources through Peninsula Clean Energy. After bringing on a Sustainability Coordinator in 2021 to help the process of implementing and monitoring progress, the Town prepared a November 2021 Status Report, which confirmed that the Town's 2020 GHG reduction target had been met and set the stage for the 2023 CAP update.

As we make the next collective push toward a decarbonized future, the Town has more information and experience that can be used to refine the CAP and ensure that we help California reach a net zero environment within 22 years.

Vision for a Better Future
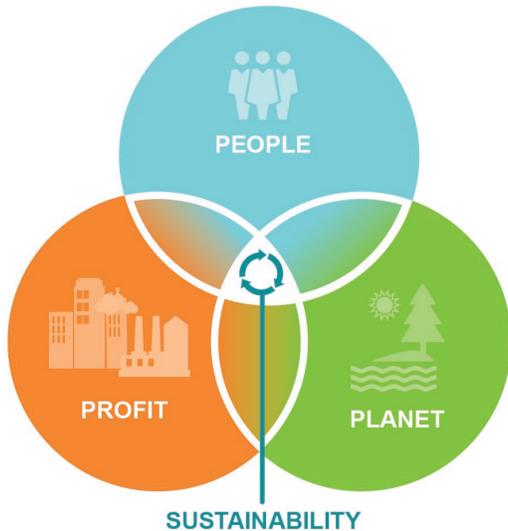
In 2045, our vision is to have a carbon neutral community. All of our energy comes from renewable sources and is reliable. Residents and institutions have converted combustion sources to electrified power, helping decarbonize our community. Mobility options are zero carbon, shared and active, and congestion and air pollution are greatly reduced. Nearly all of our waste is reused, repurposed, or recycled. All community members have reliable access to affordable, clean water.

We have created a culture of awareness and action. We utilize smart city technology and principles to advance efficiency in our energy, water, waste, and transportation systems and infrastructure.

Environmental, economic, and social needs are considered and are in balance. Our prosperous economy and quality of life have benefited from this transformation. We are now connected, equitable, and resilient.

Benefits of Climate Action

Beyond the direct benefit of a more stable climate, many climate actions generate additional benefits, such as the ones listed below.

Public Health

Actions to mitigate climate change can improve air quality and physical and mental health, as well as access to healthy food.

Research suggests that living within 50 to 200 meters of major roadways can trigger asthma symptoms among adults and children and contribute to the development of asthma in children.[1] Consequently, actions aimed at cutting gasoline consumption, reducing traffic congestion, taking vehicles off the road, and transitioning to an all-electric town vehicle fleet can reduce risk of cardiovascular disease, chronic and acute respiratory illnesses, cancer, and preterm births for those located near busy roads.

Actions that encourage active modes of transportation can reduce obesity and the risk of non-communicable diseases, improve mental health, and diminish the cost of public health services. Green infrastructure projects have been shown to increase recreational opportunities and physical fitness exercises such as dog walking or jogging.[2]

Denser, transit-oriented neighborhoods increase local access to essential services and nutritious food sources. Increased intake of more climate-friendly foods, such as whole grains and vegetables, can reduce the risk of chronic diseases. Adaptation actions that mitigate urban heat island effects, such as planting shade trees, lessen potential health risks to sensitive populations.

Health benefits from climate action bring tangible healthcare savings as well. The cost of reducing CO2 emissions is less than the medical costs of treating the health effects of climate change.[3]

Enhanced Resilience

Actions that address climate change can also bolster resilience to other hazards.

A microgrid resiliency project at the Miller Community Center in Seattle is an early example of what are expected to be many upcoming projects that leverage solar and battery storage to provide relief during emergencies. The local energy utility (Seattle City Light) is partnering with the Seattle Parks and Recreation to install a battery energy storage system, solar panels, and microgrid controls. When the project is complete in mid-2020, the microgrid will generate power and provide backup power storage for the community center when the grid is down, such as unplanned power outages and emergency events.[4]

Climate actions also can enhance community cohesion – the networks of formal and informal relationships among neighbors that foster a mutually supporting community.

- One study showed a direct link between increased vegetation and use of outdoor spaces for social activity.[5]
- Another study found that even small amounts of greenery increased the safety of urban areas.[6]
- A survey of residents in many different types of neighborhoods found that the more that neighborhoods were walkable and neighbors knew each other, the more likely neighborhood residents were to participate politically, trust others, and be socially engaged.[7]

Reduced Traffic Congestion

Climate actions can reduce traffic congestion.

Cities such as New York, Stockholm, and London have implemented congestion pricing—charging tolls to travel in designated urban areas during peak travel times to reduce the volume of traffic. Locally, the City/County Association of Governments of San Mateo County and the San Mateo County Transportation Authority are completing the San Mateo 101 Express Lanes Project—22 miles of express lanes on U.S.101 from the San Mateo County/Santa Clara County line to I-380 in South San Francisco. Slated to be complete in 2023, the project is designed to reduce traffic congestion and encourage carpooling and transit use on U.S. 101 in San Mateo County.[8] Locally, we have secured grants that will help us advance bicycle and pedestrian infrastructure on El Camino Real and Selby Lane.

Equity and Inclusion

Climate actions can foster a more equitable and inclusive community.

Town-driven climate action approaches have the potential to increase equity and inclusion in both the planning process as well as in long-term outcomes. To realize this promise, planners need to begin by considering how to integrate equity and inclusion from the very beginning of determining the CAP planning process. This should include partnering with socially vulnerable communities.

In Buffalo, N.Y., People United for Sustainable Housing (PUSH) used a Community Congress model to meaningfully engage residents in local planning efforts. This advanced their vision, priorities, and solutions. The

collective work of multiple partners resulted in development of a Green Development Zone that features green infrastructure, local food systems, affordable housing, and energy-efficient buildings.[9]

In San Mateo County, Peninsula Clean Energy partnered with Peninsula Family Service to offer incentives to enable low-income residents to purchase used electric vehicles with low mileage through the DriveForward[10] program. Electric vehicles save owners money on fueling and maintenance costs and reduce GHG emissions. The program is helping to increase EV ownership across the socioeconomic spectrum in San Mateo County.

Economic Stability and Growth

Climate actions can boost the local economy through local projects, programs, and jobs.

Investments in the construction, manufacturing, clean technology, green infrastructure, and civil engineering sectors not only provide businesses with opportunities for growth. They also create skilled, well-paying "green" jobs for the community. For example, many jobs in the renewable energy and energy efficiency sector are in installation, maintenance, and construction—making them inherently local and influential to the local economy. Cities can partner with workforce development organizations, business incubators, B-corporations, and green businesses to build a diverse workforce pipeline for these fields.

Studies have shown that energy efficiency investments create more jobs than those in fossil fuel industries—the estimate is approximately eight jobs per $1 million invested, compared to approximately three jobs per $1 million invested in fossil fuel industries.[11] Investments in climate actions can also save Atherton money. A study by the University of California Transportation Center estimated that maintenance of electric vehicles (EVs) would cost only 50 percent to 75 percent of the average maintenance cost of a conventional vehicle.[12]

The sectors most likely to benefit from climate actions and policies are those related to household spending, such as housing, wholesale, and retail. Manufacturers of energy efficiency equipment and appliances and renewable energy generation equipment also benefit.[13]

Carbon Sequestration

Many actions that address climate vulnerability and risk also reverse emissions of GHGs into the atmosphere.

Shade trees absorb, or sequester, carbon dioxide from the atmosphere. Studies show that a young tree sapling can sequester anywhere from 1.0 to 1.3 pounds of carbon each year, while a 50-year-old tree can sequester over 100 pounds annually.[14] Restoration of wetlands can both sequester carbon and be implemented in a way that may protect shoreline communities and habitats from sea-level rise and storm surge. Healthy soils on farmland also play an important role in absorbing carbon.

Actions to sequester carbon in trees, soils, and vegetation can minimize stormwater runoff and increase biodiversity of plants and animals. Biodiversity is critical to the health of the Town's Holbrook Palmer Park and other open spaces. Natural area conservation protects natural resources and environmental features that sequester carbon, reduce stormwater runoff, promote infiltration, prevent soil erosion, and increase ecosystem biodiversity.

Municipalities with urban forests should consider end-of-life practices for trees to ensure the carbon embedded in the tree is maintained after a tree is cut down.

2

CAP OVERVIEW

CAP Overview

Highlights of this CAP or What's New in This CAP

Since our first climate action plan (CAP) was adopted in 2016, much has changed related to climate protection. Consequently, this CAP includes the following updates and additions:

- Incorporates **new global, state, and local policies** and climate targets, including **carbon neutrality**.
- Documents **climate change impacts here in San Mateo County** and previews what we need to plan for.
- Documents our **community partners** and how we plan to work together to achieve our goals.
- Addresses **emissions from what we buy and consume** in addition to emissions we generate here.
- Provides more ways **individuals and institutions** can get involved.
- Focuses on equity, or how to **make sure everyone benefits,** especially the most vulnerable members of our community.

The Role of Equity

> "The poorest half of the global population are responsible for only around 10% of global emissions yet live overwhelmingly in the countries most vulnerable to climate change – while the richest 10% of people in the world are responsible for around 50% of global emissions."
> —OXFAM International

We cannot address climate change without also addressing equity.

Commonly, climate change disproportionately threatens those who are the least responsible for generating pollution, the most vulnerable to its impacts, and the least able to adapt. This is true globally, and it is also true in Atherton. Many climate change impacts, such as health impacts, will disproportionately affect socially vulnerable populations (see sidebar for the definition of "social vulnerability.") That's why the San Mateo County Board of Supervisors emphasized the need to take health, socio-economic, and racial equity into account in policymaking and climate solutions at all levels in their 2019 climate emergency declaration.[15]

According to Local Governments for Sustainability (ICLEI), an international organization of local and regional governments, climate equity ensures that all people have the opportunity to benefit equally from climate solutions, while not taking on an unequal burden of climate impacts.[16] Since greenhouse gas contribution typically increases with income[17] – this CAP asks those more responsible for contributing GHG emissions to do more to reduce those emissions. Simultaneously, the CAP outlines ways to assist low-income community members in accessing carbon-free energy and technologies. When all community members have the same ability to plan for and shape their futures, the result is a healthier and more resilient community.

However, achieving this vision requires hard work and intention. As Atherton implements the programs and policies that result from this CAP, we will continue to seek support and feedback from a diverse group of community stakeholders. Moving forward, Atherton will evaluate programs and policies using key performance metrics that encourage equitable engagement and impact.

What is "Social Vulnerability"?

This term refers to populations with greater vulnerability to climate impacts because of their social inequities, physical characteristics, or baseline conditions. These include, but aren't limited to:

- Children and the elderly
- People with limited English proficiency
- Low-income communities
- Communities of color
- LGBTI and/or gender non-conforming community members
- Undocumented immigrants
- Women
- Community members who practice a minority religion
- Community members with limited education or literacy
- Residents with unstable economic or housing situations

- People with disabilities or physical and mental health conditions
- Outdoor workers and others whose workplace conditions expose them to disproportionate risk, including people in the informal workforce
- People whose housing conditions expose them to disproportionate risk
- People who are disproportionately exposed to pollution and toxic hazards or natural hazards
- Community members without access to the internet or phone service
- Transit-dependent populations
- Community members who face multiple areas of vulnerability or intersectional vulnerability

How the CAP Came Together

This climate action plan (CAP) was developed in partnership with the City/County Association of Governments of San Mateo County (C/CAG) and the County of San Mateo Office of Sustainability through the San Mateo County Energy Watch program and its Regionally Integrated Climate Action Planning Suite (RICAPS) initiative. RICAPS is co-funded by C/CAG and PG&E.

RICAPS assists member jurisdictions and other interested local governments to develop climate action plans that are consistent with California Environmental Quality Act (CEQA) guidelines, including both the CEQA Guidelines Amendments effective December 28, 2018, and the Bay Area Air Quality Management District (BAAQMD)'s CEQA Air Quality Guidelines (updated April 2022). RICAPS tools include a Menu of Measures, forecasting tool, climate action plan template, and technical assistance from DNV GL, an environmental consultant. By combining resources, RICAPS promotes high-quality climate action plans that can be used to meet regulatory requirements and support planning efforts to reduce GHG emissions (ore information about these partners is found in Supplementary Findings E)

The template and Atherton's climate strategy is based on the ICLEI — Local Governments for Sustainability (ICLEI) 5-Milestone process.[18] To ensure equity when developing the CAP, Atherton used the Equitable, Community-Driven Climate Preparedness Planning framework from the Urban Sustainability Directors Network as well as resources in Supplementary Findings D: "Best Practices for Community Collaboration and Sustainability Planning" as a guide.[19]

The diagram below shows the steps Atherton has taken so far to develop this CAP update (Steps 1 through 4). Steps 5 and 6 will follow once the CAP is adopted (see details in Chapter 6: Implementation, Monitoring & Implementation section).

STEP 1 DATA COLLECTION	Collect data to gauge progress on the 2016 Climate Action Plan.
STEP 2 PROGRAM EVALUATION	Collaborate with internal and external partners to evaluate the efficacy of local, regional, and State programs needed to meet 2030 goals and beyond.
STEP 3 VISIONING	Collaborate with community to determine the vision for the plan's development. Including an understanding of unintended consequences of actions and potential impacts on equity in the alternatives analysis (i.e., creation of new inequities, or worsening, improvement, or neutral impacts on existing inequities).
STEP 4 PLAN UPDATE	• Refine and prioritize strategies to benefit communities and populations impacted by climate change and mitigate potential negative impacts. Amplify opportunities for enhancing co-benefits across sectors.
STEP 5 PLAN & PROJECT IMPLEMENTATION	Partner with community during implementation to reduce the risk of creating new inequities or worsening existing ones. Prioritize actions that focus on communities and populations with the greatest climate risk and geared towards addressing the contributing causes of increased climate risk. Improve data collection protocols to ensure progress can be measured.
STEP 6 MONITORING & REVIEW	Monitor and review plan implementation to ensure that actions are implemented as planned and with the desired outcomes. Engage community in monitoring to help maintain accountability through the Environmental Programs Committee. Update strategies in collaboration with the community based on information gathered regarding implementation, outcomes, and feedback from stakeholders. Share data and information regarding ongoing monitoring of the plan's implementation and outcomes with the community.

3
IMPACTS OF CLIMATE CHANGE

Impacts of Climate Change on Atherton

Climate Science 101

Climate change presents one of the most significant challenges of our time. As levels of greenhouse gas (GHG) emissions increase in the atmosphere, the Earth's climate system is being destabilized. GHG emissions are invisible, and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and three man-made gasses: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

As more greenhouse gasses are trapped inside the Earth's atmosphere, more of the sun's energy is trapped as heat, which means temperatures keep getting hotter. In fact, the world has already become nearly 1°F warmer since 1880, and we're seeing extreme consequences because of it, including more intense storms, greater wildfire risk, and rising sea levels.

Although we're already seeing impacts of climate change, there's a range of how relatively mild or devastating the future impacts might be, depending on how aggressively we take action to address it (see Chapter 3: Impacts of Climate Change, Future Projections section). Scientists have laid out four pathways, or scenarios, based on future levels of GHG emissions. The pathways range from the very optimistic to the highly pessimistic. The strategies laid out in this CAP are in alignment with the most optimistic pathway. For more information about the four pathways, see Supplementary Findings B.4.
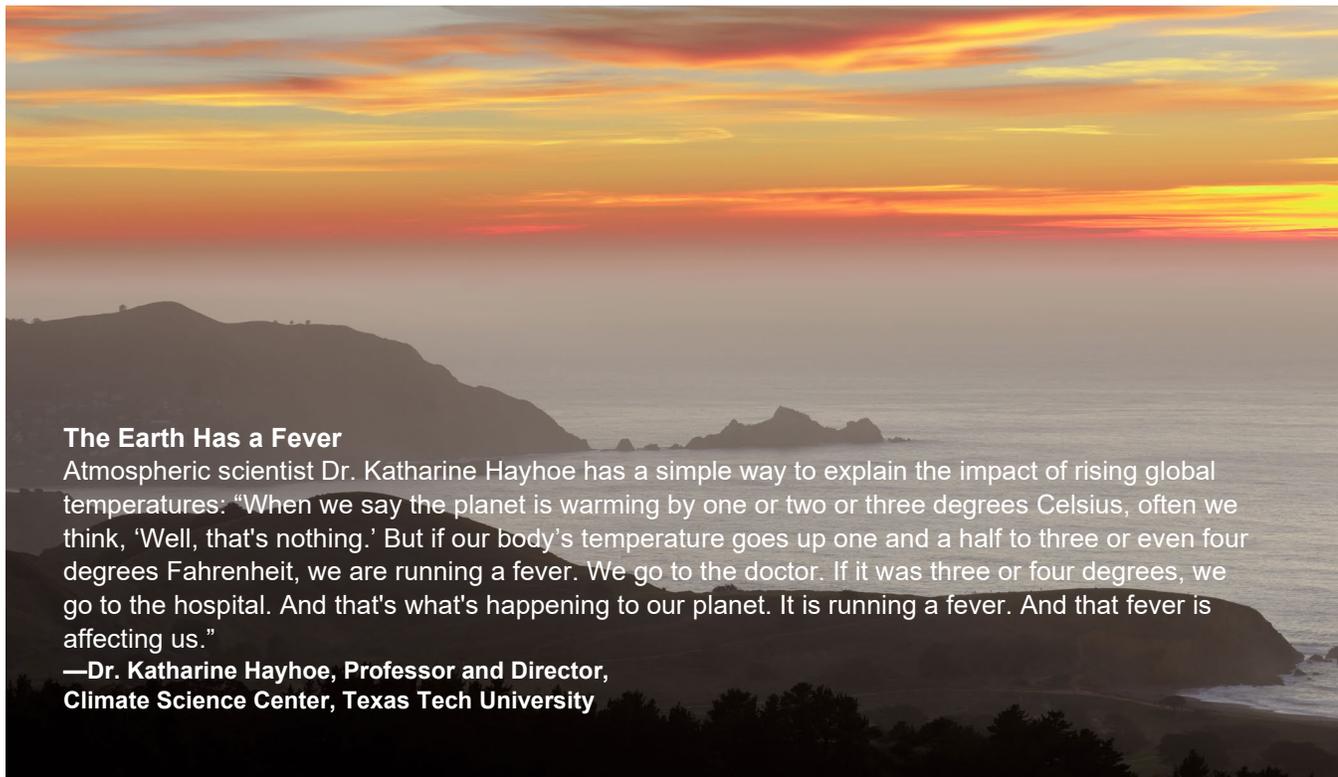
The Earth Has a Fever
Atmospheric scientist Dr. Katharine Hayhoe has a simple way to explain the impact of rising global temperatures: "When we say the planet is warming by one or two or three degrees Celsius, often we think, 'Well, that's nothing.' But if our body's temperature goes up one and a half to three or even four degrees Fahrenheit, we are running a fever. We go to the doctor. If it was three or four degrees, we go to the hospital. And that's what's happening to our planet. It is running a fever. And that fever is affecting us."
—Dr. Katharine Hayhoe, Professor and Director,
Climate Science Center, Texas Tech University

What's Already Being Experienced

Climate change has already affected and will continue to affect San Mateo County and Atherton**.**

Climate change will have many different effects on society and on the natural world. Plant and animal species are adapting to changing environments by migrating to new areas. As species move, they bring diseases with them to farms and human populations. Some species become extinct due to either human-caused climate change or to human activities such as habitat destruction or toxic pollution.

The region's **annual maximum temperature** increased 1.7°f from 1950-2005.

Coastal fog, which is critical to the region's climate and ecosystems, is less frequent than ever before.

Sea level has risen over 8 inches in the last century.

The forceful 2015-2016 El Niño weather pattern, which was one of the three largest in history, resulted in unprecedented outer coast **beach erosion** due to winter wave energy that was more than 50% greater than a typical winter.

The 2012-2016 statewide **drought** led to the most drastic moisture shortages in the last 1,200 years, resulting in a 1-in-500-year low in Sierra snowpack. This drastically reduced **snowpack** resulted in $2.1 billion in economic losses, 21,000 jobs lost statewide in agricultural and recreational sectors, and a continuing exhaustion of groundwater sources.

Future Projections

Even if considerable efforts to reduce greenhouse gas (GHG) emissions are conducted, San Mateo County will likely see substantial temperature increases by 2050. By 2100, temperature rise will be dependent on the emissions scenario. (For more information about the four emissions scenarios, see Supplementary Findings B.4.)

Precipitation in San Mateo County will continue to vary each year. The differences between wet and dry years are projected to become more extreme and damaging in the coming decades. If no action is taken to combat climate change, the Sierra snowpack, a critical source of water for the State, will decrease by an average of 64 percent by the end of the century.[20]

As temperature continues to increase, it is anticipated to cause longer and more intense California **droughts**, posing major problems for government operations, water supplies, ecosystems, agriculture, and recreation.

Studies suggest that even with significant emissions reductions, it is inevitable that there will be at least 6 feet of **sea-level rise** over the next several centuries due to the delayed effects of climate change.

Impacts on people

Climate change could have broad impacts to communities and people – hitting those most vulnerable first and worst. High levels of socioeconomic inequity in the bay area create large differences in the ability of individuals to prepare for and recover from heat waves, floods, and wildfires.

Direct effects include a broad spectrum of heat-related diseases, ranging from heat exhaustion to heat stroke to death, and injuries and fatalities that result from severe weather. Indirect effects of climate change on human health arise from the connection of climate and weather conditions with health responses. Examples include air pollution, pollen and allergens, decreases in water quality and more extensive harmful algal blooms, and changes in supply of water and food.

Impacts in San Mateo County and Atherton

Following are some of the key climate impacts that San Mateo County and Atherton have already seen and will likely see in the future.

Rising Temperatures

The Bay Area's average annual maximum temperature increased by 1.7°F (0.95°C) from 1950 to 2005. Even with significant efforts to mitigate climate change, the Bay Area will likely see annual mean warming of approximately 3.3°F by mid-century and as much as 4.4°F under the high-emissions scenario. By the end of the century, temperatures could rise by 4.2°F to 7.2°F.[22]

Extreme heat events occur when air temperatures reach or exceed 100°F. Across San Mateo County, air temperatures are expected to increase by an average of 5°F between 1995 and 2070 due to climate change. In the baseline year of 1995, approximately nine percent of the people in vulnerable communities in the county were at risk from the impacts of more than two high heat days per year. By 2030, nearly three times as many people will be at risk. By 2070, four times as many will be at risk. The greatest increases in the number of high heat days from 1995 to 2070 are projected to occur in Atherton, East Palo Alto, Foster City, Menlo Park, North Fair Oaks, and Redwood City.

The Climate Ready SMC Web Visualization Tool is an interactive website designed to provide an enhanced understanding of how a changing climate will impact our community (https://www.smcsustainability.org/climate-ready). The maps below demonstrate how the tool can be used to identify how projected high heat events in 2030 and 2070 could impact areas in Atherton. [Provide examples here.]

Impact of Heat on People

In a heat wave, the most dangerous places can be the ones where people spend the most time: inside houses and apartments. In poorly insulated buildings, heat can build up and not even dissipate at night. In 2018, a KQED investigation found that bay area homes without air conditioning were as much as 15 to 20 degrees hotter inside than outside overnight.[21]

These risks are compounded for low-income communities. A September 2017 Bay Area heat wave overwhelmed the protective and social infrastructure in San Francisco, resulting in 6 deaths and 38 hospitalizations. Members of socially vulnerable communities may not be able to afford to cool their work or living spaces or may be forced to choose between air conditioning and paying for basic necessities (e.g., food and rent).

Figure 1: Number of High Heat Days in Atherton for 2070
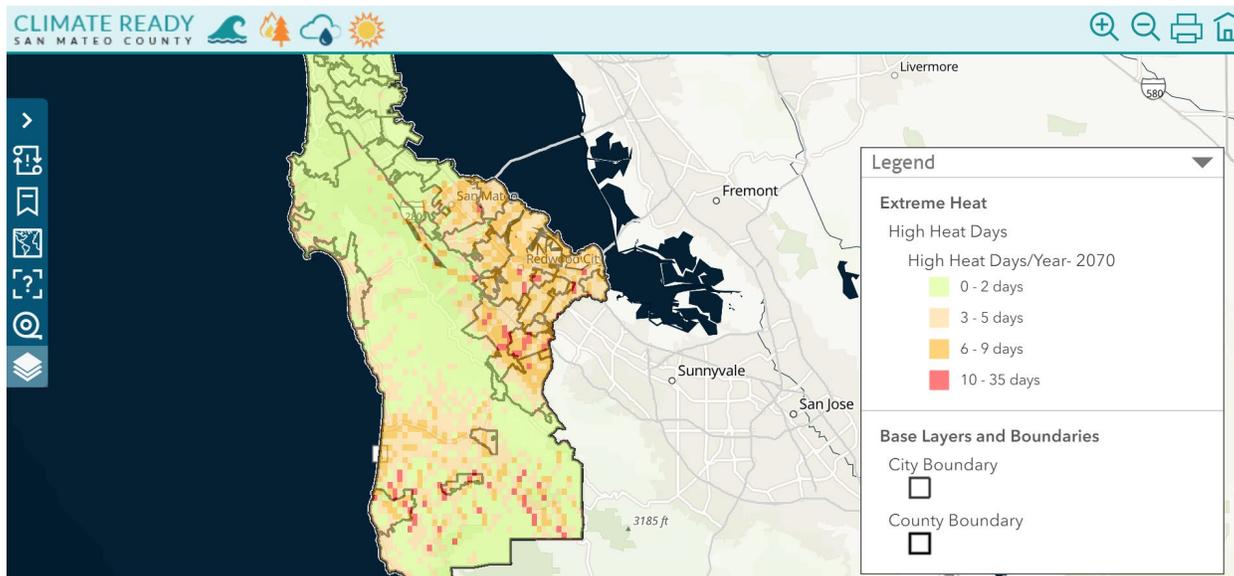
Only 10 percent of homes in the Bay Area currently have air conditioning.[23] Warming trends across San Mateo County are expected to cause more people to install and use air conditioning, resulting in an increase in GHG emissions. The largest increase in summer energy demand is expected in coastal cities as air conditioning adoption grows.

The amount and location of new air conditioning needed can be predicted through a metric called "cooling degree days" (CDD). This value quantifies how much the air temperature exceeds 65°F on a single day or period of days. As the temperature rises above 65°F outside, occupants inside get increasingly uncomfortable and will typically turn on air conditioning if it is available, so a larger CDD indicates a higher likelihood of increased energy consumption to cool homes and businesses.

In some San Mateo County communities, CDDs are projected to double or triple between present day and 2070. It is projected that the southeast, central-east, and coastal areas of the county will be impacted most dramatically, with the greatest percentage increases expected to occur in Pacifica, Daly City, and Brisbane Quarry. By 2070, the number of CDDs in Daly City will have nearly increased to the number of CDDs in North Fair Oaks in the baseline year of 1995.

Figure 2. Average Cooling Degree Days (CDD) by Jurisdiction
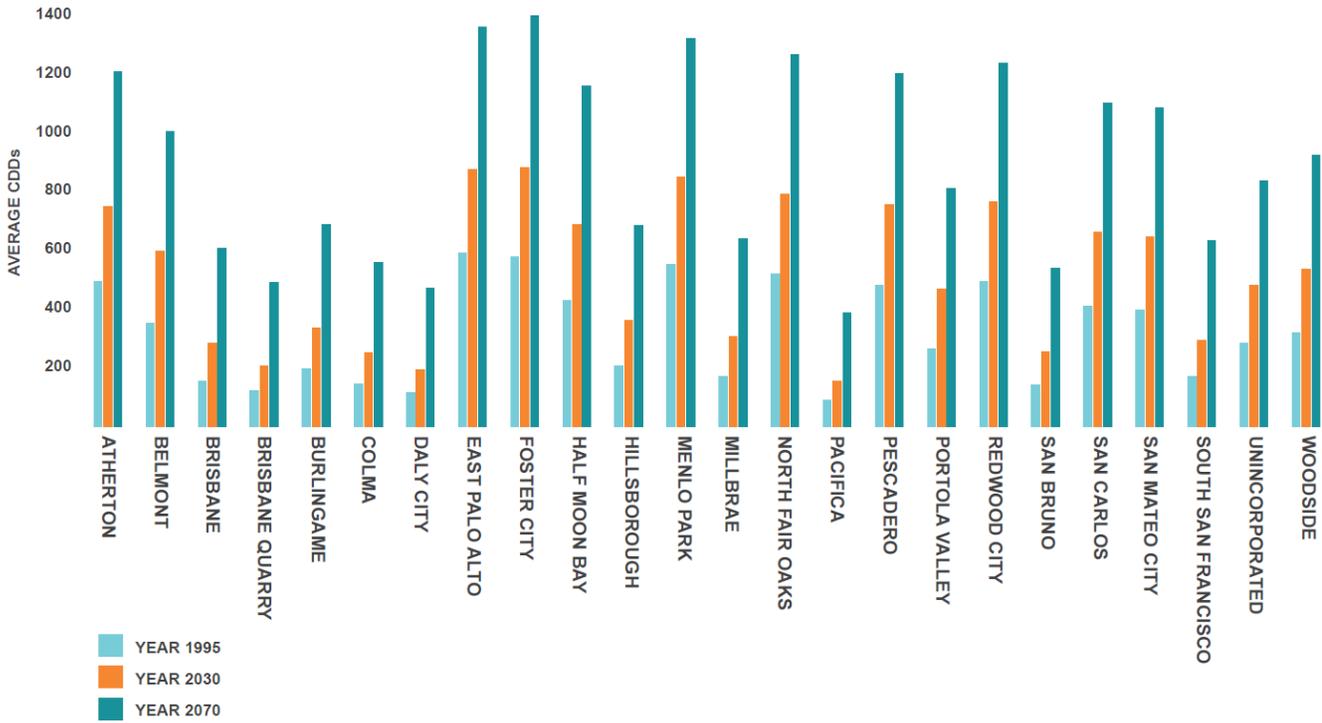

Figure 3. Average Cooling Degree Days (CDD) in [Community], Year 2070
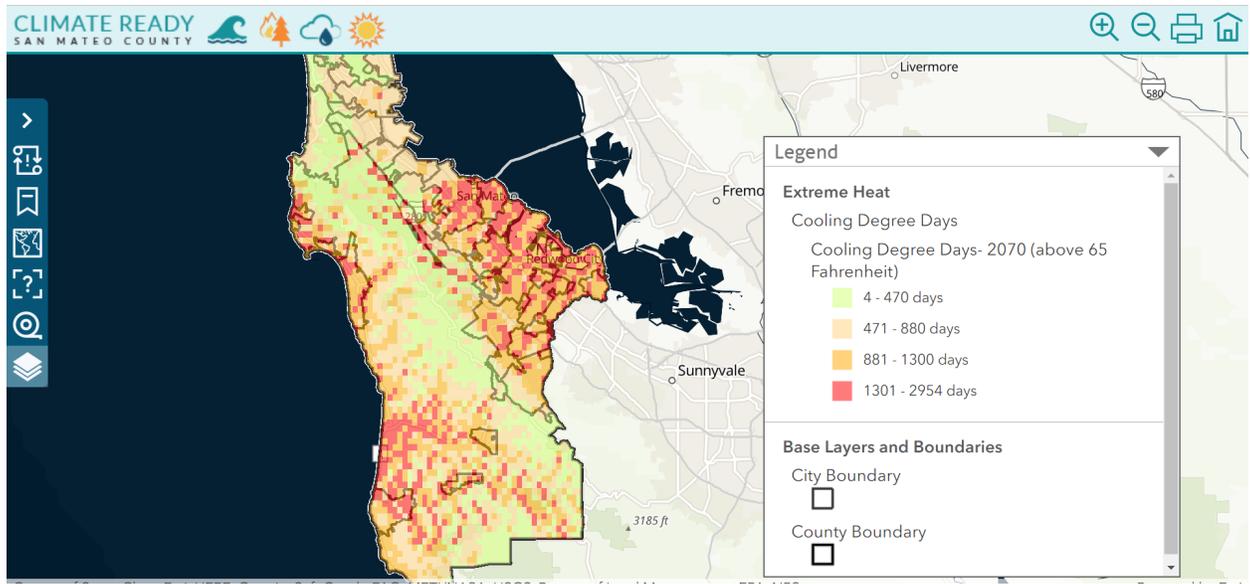
The map above illustrates the projected average number of CDDs in San Mateo County in 2070.

Sea-Level Rise

The San Francisco Bay Area is one of the top hotspots for sea-level rise in the nation. Average sea level in the Bay Area has risen 8 inches in the past 100 years, based on the San Francisco tide gauge.[25]

In 2018, the County of San Mateo finalized a _Sea-Level Rise Vulnerability Assessment_[26] for the County in coordination with cities, agencies, businesses, community groups, and others. Sea-level rise impacts include flooding, increased wave action, rising groundwater tables and saltwater intrusion, increased erosion (i.e., landward shoreline retreat) and changes in sediment supply.

The economic value of San Mateo County property at risk from sea-level rise exceeds that of any other county in the Bay Area. The assessed value of parcels in the study area exposed to near-term (present-day) flooding exceeds $1 billion, and the assessed value of parcels exposed to erosion and flooding in the long term (50 to 100 years) totals roughly $39.1 billion. In addition, the built and natural infrastructure meant to protect people and properties from flooding could be lost or severely affected, including more than 7,000 acres of wetlands (over 80 percent of all wetlands assessed) and as much as 24 miles of floodwalls and levees.

When population projections are taken into account, San Mateo County is one of six counties with more than 100,000 people in the nation (and the only one on the West Coast) that will be affected by three feet of sea-level rise.

Figure 4: Projected Sea-Level Rise (3.3 feet and 1 percent Annual Chance Storm) and Erosion

Impact of Sea-Level Rise and Flooding on People

Sea-level rise will have consequences for public health because health facilities will be affected and access to emergency medical services could be impaired. Flood events can lead to physical injury, illness, or disease (e.g., vector-borne diseases such as west Nile virus), and they can also cause loss of income and disruption of employment.

Flooding will impact people who rely on public transportation. Of the 1,979 bus stops in the county, 252 bus stops are currently located within the 1 percent flood zone. In 2030, 1,536 of the bus stops located within the county boundaries would be within the 1 percent flood zone, which is a 500 percent increase from present conditions. In 2070, 1,592 of the bus stops located within county boundaries would be within the 1 percent flood zone, which is an increase of about 4 percent from 2030.[24]

(4.5 feet and 1 percent Annual Chance Storm) - San Mateo County Shoreline[27]
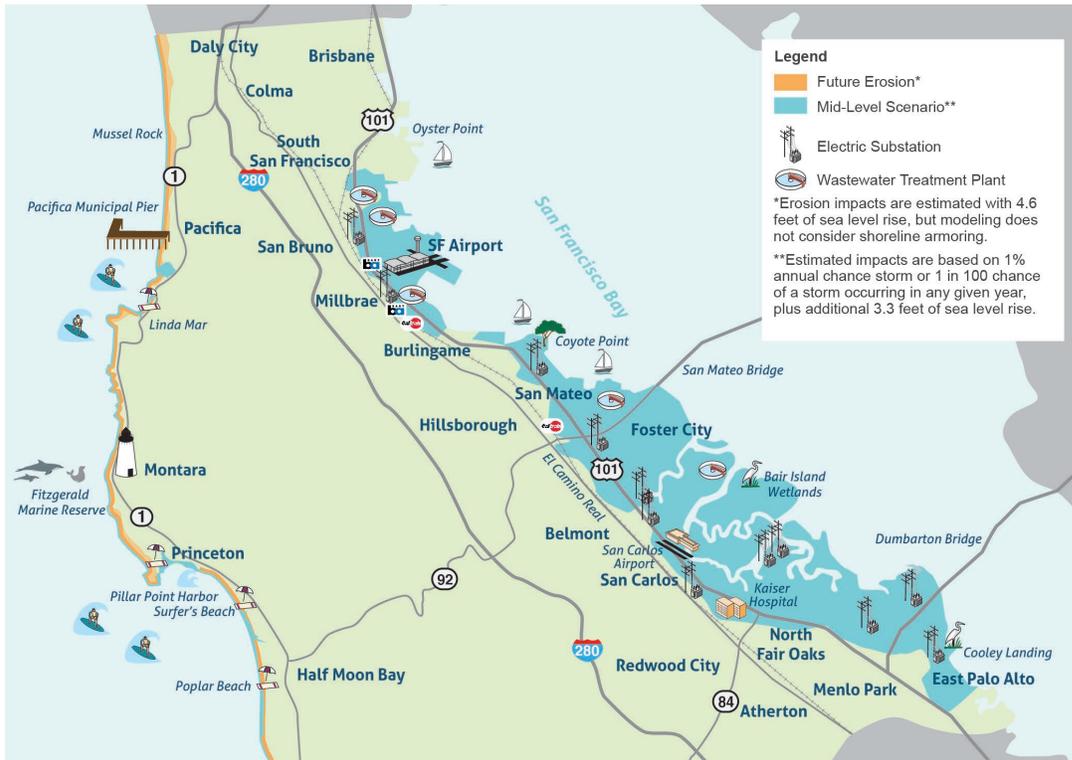

The model projects that a flood with a one percent chance of occurring will affect a slightly greater area in 2070 than in 2030. The impacts of flooding will worsen over time and have substantial impacts on public transit infrastructure and therefore, the communities that rely on it.

In addition to directly affecting properties, sea-level rise can also have a substantial impact on mobility due to delays in travel times and risks to transportation infrastructure such as electrical transfer stations and EV charging areas. El Niño events have the potential to exacerbate the effects of sea-level rise by increasing water levels by as much as one foot above normal, and, on average create 30 percent larger winter wave energy.

In 2018 the California Ocean Protection Council (OPC) released updated *Sea-Level Rise Guidance*, which uses "probabilistic-based"[a] projections and lays out an approach for developing adaptation strategies. The OPC recommends using the projections included in Figure 5, below. Low-risk projections should be used for short-lived infrastructure that is readily adaptable, such as trails. Medium-risk projections should be used for less adaptive, more vulnerable projects such as housing developments. Extreme risk projections should be used for larger and more complex infrastructure projects such as roads, wastewater treatment plants, and hazardous waste sites.

---

[a]Probabilistic-based projections "associate a likelihood of occurrence (or probability) with sea-level rise heights and rates and are directly tied to a range of emissions scenarios."[18]

Figure 5: San Francisco 2018 Probabilistic Sea-Level Rise Projections[28]
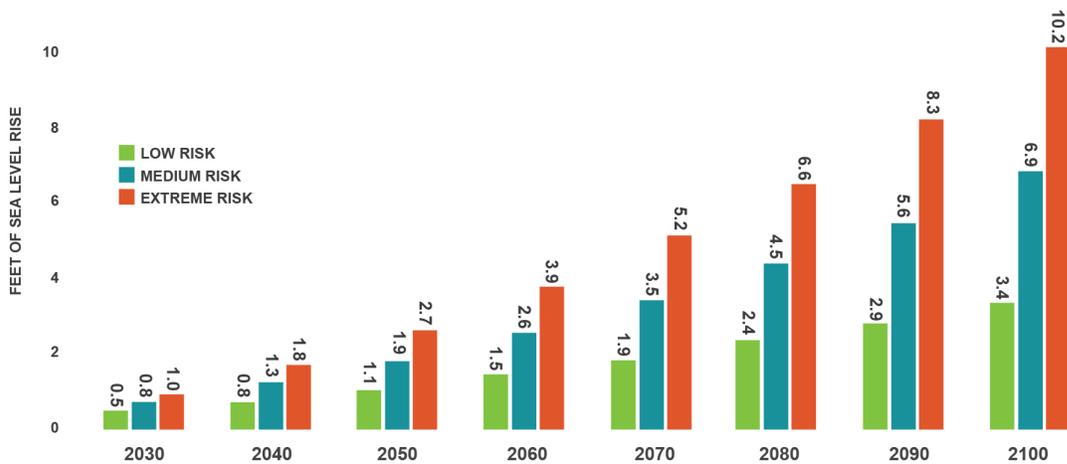
In 2019 the San Mateo County Board of Supervisors adopted a *Sea-Level Rise Policy for County-Owned Assets*, requiring all new and existing facilities to consider and plan for sea-level rise impacts. Sea-level rise impacts include higher permanent and flood water levels, erosion, and rising groundwater levels.

Increased Fire Risk

Fire risk reflects accumulation of wood or fuels in a forest combined with changes in the length and frequency of the fire season due to warmer climate, changing precipitation, lower humidity, higher winds, and soil drying from droughts. Fire suppression in the area has increased as fuel reserves have built up in unmanaged forests and woodlands. While wildfires in San Mateo County have not historically been extensive, recent models of wildfire risk and climate change show hotspots in the middle of the county.

Climate change is expected to increase the frequency, intensity, and duration of wildfire events impacting San Mateo County. Wildfires can claim lives, destroy property, force mass evacuations, and expose large populations to unhealthy levels of smoke for days to weeks at a time. Between 1995 and 2030, the model projects an increased risk of wildfire in San Mateo County from nine to 13.4 percent. In addition, by 2070, the projected burn area nearly doubles to 25 percent. Simulations of large wildfires using statistical models developed for the Fourth California State Climate Assessment[29] show that the probability of a large fire—which burns more than 1,000 acres – in San Mateo County increases rapidly with a warming climate, with an eight-fold increase in the probability of a large wildfire by 2070. By 2070, the chance that large wildfires or those over 1,000 acres will occur increases to 4 percent per year.

Figure 6 shows the areas that are most at risk of wildfire in the future. The "average percent burned area" is the percentage of a designated area that is projected to burn over two 30-year periods centered around 2030 and 2070.

Impact of Wildfires and Poor Air Quality on People

Most Californians are not aware of recent statistics that suggest that California is home to the worst air quality in the nation, with over 90 percent of Californians breathing unhealthy air. According to the California air resources board, unhealthy levels of ozone (smog) and particulate matter annually contribute to 19,000 premature deaths and 9,400 hospital admissions for respiratory and cardiovascular disease. Wildfires exacerbate the air quality problems, causing temporary large increases in outdoor airborne particles, and substantial increases in gaseous air pollutants such as carbon monoxide.

Socially vulnerable residents may be more affected by wildfires if they have existing health issues, less access to social services and internet, and fewer economic resources to respond.

Figure 6: Average Percent Burned Area in Atherton for 2070
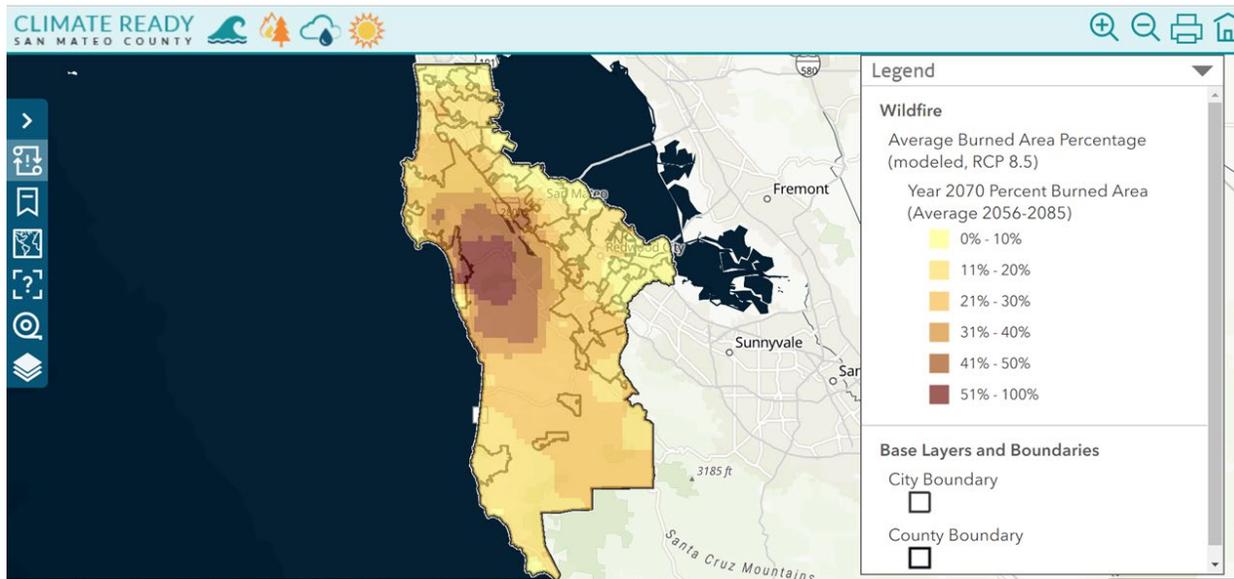
Increased Frequency and Intensity of Storms

The Bay Area's largest winter storms will likely become more intense, and potentially more damaging, in the coming decades. Flooding is a substantial threat in San Mateo County and is expected to increase as a result of climate change. According to flood modeling that integrates the impacts of sea-level rise and inland flooding throughout the County, a flood with a one percent chance of occurring in 2030 would increase to a two percent chance of occurring under 2070 climate conditions. The higher probability of extreme flooding means that creeks and municipal storm sewers are more likely to be overwhelmed, potentially resulting in damage to infrastructure and even loss of life. The largest individual storms are becoming more intense with climate change. In addition, more frequent "whiplash" events that swing from extremely dry to extremely wet conditions in California could become the new normal. These will heighten the need to expand and fortify the Town's storm water infrastructure, especially along the major arterial of El Camino Real.

Decreased Availability and Quality of Water

The 2012-2016 California drought led to the most severe moisture deficits in the last 1,200 years and a 1-in-500-year low in Sierra snowpack. The record low snowpack resulted in $2.1 billion in economic losses and exacerbated an ongoing trend of ground water overdraft.[30] While the total amount of precipitation in the Bay Area is not projected to change significantly (models project an additional 2 to 5 inches), the amount and timing of water available as drinking water may change. Under a high emissions scenario, average Sierra Nevada snowpack is projected to decline by nearly 20 percent in the next two to three decades, 30 percent to 60 percent in mid-century and by over 80 percent in late century.[31] Rising bay water and groundwater levels will also increase salinity intrusion and subsurface flooding

inland. Climate change will require improved storm water management in the Bay Area as extreme storm events increase in size and frequency.

Decreased Fog

Coastal fog, critical to the Bay Area climate, has decreased as much as 33 percent in some areas over the past 60 years.[32] Across the state of California, fog is expected to decline by an additional 12-20 percent by 2070.[33] In addition to being affected by changes in local and global atmospheric patterns due to climate change, fog is reduced in urban areas due to urban land use and pollution. Warmer nighttime temperatures, as a result of impervious surfaces and the urban heat island effect, can reduce fog, highlighting the importance of land use policies and urban tree canopies in maintaining fog cover, and thus lowering temperatures. Our plants and wildlife in San Mateo County depend on fog and redwood forests obtain as much as a third of their water from fog.

Increased Impact on Energy Systems

The Bay Area electrical grid is vulnerable to power outages during wind and wildfire events such as Public Safety Power Shutoffs (PSPS) – planned power outages to prevent occurrences of electrical equipment starting wildfires.[34] Many of our natural gas pipelines are located along waterways and will be impacted by flooding from sea-level rise and extreme storm events. California's transportation fuel sector, which distributes oil from refineries to end users, will be increasingly exposed to extreme weather events such as flooding and wildfire.

As severe weather has increased the instability of the electrical grid, Atherton residents have turned to energy alternatives, including installation of photovoltaic solar panels and battery backup systems that provide energy at the hyperlocal level. These infrastructure improvements both add clean, renewable energy capacity to the electrical grid while providing backup when the grid is strained or out.

Over the past four years, over nine percent of Atherton residents and institutions have installed photovoltaic solar systems, with over 350 backup battery panels that are clear indicators of a shift to an electrified economy through a decentralizing of the power grid's sources.

Shifting to Electric Power
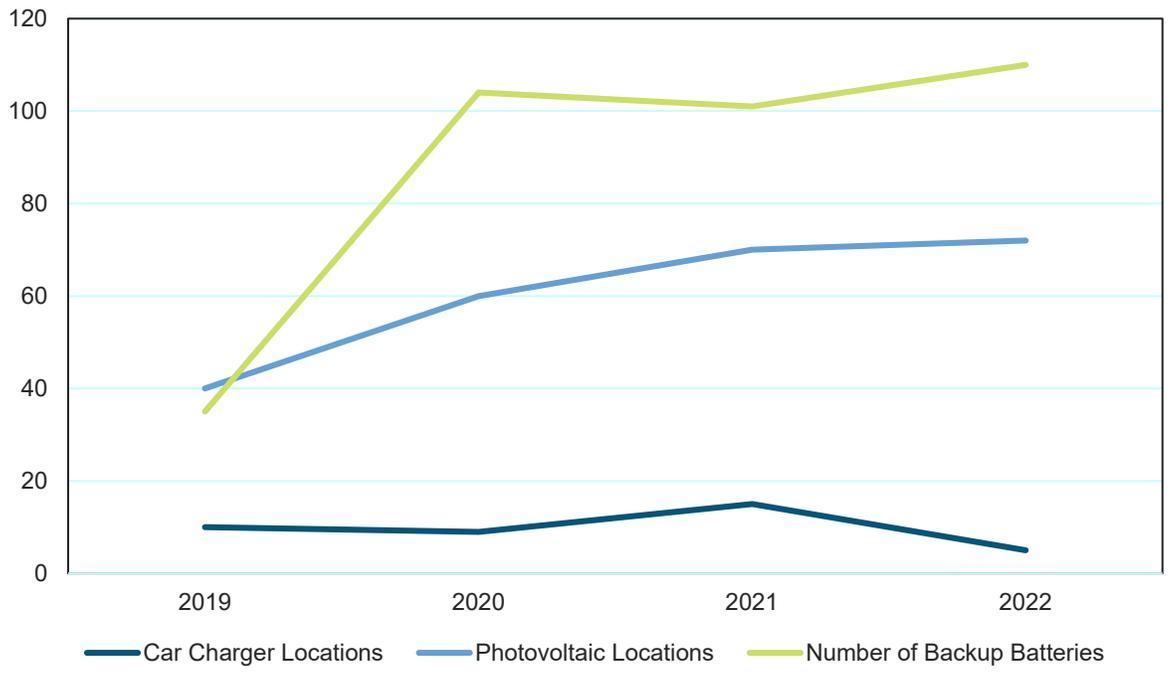
Financial Impact of Climate Change

As climate-related natural disasters become more frequent and intense, costs for disaster response and relief are anticipated to increase. With flooding, storms, droughts, wildfires, and other climate-related natural disasters becoming more common, flood insurance and flood prevention costs will grow.[35]

Working with the San Mateo County Health System

The San Mateo County Health System, in accordance with the Centers for Disease Control, serves a number of functions to reduce health risks related to climate change. These include informing cities about the risk to public health from climate change, creating tools that support decision-making and capacity building related to mitigating adverse health outcomes from climate change, and serving as a credible leader in planning for the public health impacts of climate change. Atherton intends to work with the San Mateo County Health System to mitigate public health dangers and maintain or improve long-term health by encouraging residents and workers to be part of the solution.

Research shows that individuals who live in mixed-use and walkable communities have a 35 percent lower risk of obesity.[36] Another study estimates that the walking associated with transit use saves an individual $5,500 over the course of their life by reducing obesity-related medical costs.[37] Atherton and the San Mateo County Health System will support programs that promote more walkable and bikeable cities, which not only promote healthier lifestyles, but also decrease reliance on vehicles that contribute to climate change.

Climate change is anticipated to impact public buildings, storm water infrastructure, transportation infrastructure, community services, and land-use planning and development. Climate damage to homes and businesses could negatively impact the economy and reduce Atherton's income from property and sales taxes, not to mention damage the quality of life for all community members.

If Atherton allocates resources and invests in climate-protecting strategies now, it will be insurance against some of the costliest effects of a hotter planet in the future.

4

**GOALS AND
TARGETS**

Goals and Targets

The Goal

To put California on the path to a low-carbon future, the California Air Resources Board (CARB) approved the *Climate Change Scoping Plan* in 2008. The plan directed the State to reach 1990 emissions levels by 2020. Municipal governments were asked to reduce their emissions by at least 15 percent by 2020 compared with current levels (2008 levels or earlier). This prompted many cities to adopt community-wide emissions reduction targets of at least 15 percent below 2005 levels. CARB adopted an update in December 2022 that calls for cutting carbon emissions 48 percent below 1990 levels by 2030 and reducing oil use by 94 percent from 2022 levels by 2045.

In 2015, Governor Brown issued Executive Order B-30-15 to set the 2030 emissions target (40 percent less than 1990 levels by 2030). It was codified by California Senate Bill 32 (SB 32). CARB followed up with an updated *California's 2017 Climate Change Scoping Plan.*[38] In response, Atherton is joining other municipalities in adopting community-wide emissions reduction targets of at least 50 percent below 2005 levels by 2030.

In September 2018, Governor Brown issued California Executive Order B-55-18, setting the goal of achieving carbon neutrality by 2045 at the latest, and maintaining net negative net emissions from that point forward. The following year, the San Mateo County Board of Supervisors committed to achieving carbon neutrality well before 2045.[39] With this CAP, Atherton commits to working with the County and other local governments in San Mateo County to reach the goal of carbon neutrality by 2045. In September 2022, the Governor signed AB 1279, which creates a legally binding goal to achieve carbon neutrality by 2045.

Carbon Neutrality

The basic definition of carbon neutrality is taking action to reduce greenhouse gas (GHG) emissions to zero – and then "offsetting" an equivalent amount of any remaining emissions. This carbon neutrality target is based on the Paris Agreement which calls for preventing average global temperature from rising more than 2°C (3.6°F) above pre-industrial levels and pursuing efforts to keep warming below 1.5°C (2.7°F). According to the Intergovernmental Panel on Climate Change (IPCC), holding temperature rise below 1.5°C will mean global emissions of CO_2 will need to decline 45 percent from 2010 levels by 2030 and reach net zero by 2050. U.S. cities that have adopted aggressive targets of reducing emissions by 80 to 100 percent by 2050 or sooner include Boulder, Minneapolis, New York City, Portland, San Francisco, and Washington D.C. Palo Alto's goal is an 80 percent reduction by 2030, and Menlo Park has committed to reaching carbon neutrality by 2030.

Governor Brown's 2018 executive order called on CARB to develop an implementation framework and accounting to track progress over time.[40] In particular, this framework needs to address how to account for the embodied emissions in the food, goods, and services we purchase that aren't covered by generation based GHG inventories (See Chapter 5: Greenhouse Gas (GHG) Emissions Inventories for more information). While Atherton will await State guidance on how to account for these emissions reductions, we will work to reduce consumption-based emissions in the meantime (See Chapter 6: Strategies & Actions, Food and Consumption section for specific strategies).

Meanwhile, AB 1279 created a legally binding goal that California achieve carbon neutrality by 2045. It also requires the State to reduce GHG emissions by 85 percent below 1990 levels by 2045.

5

GREENHOUSE GAS (GHG) EMISSIONS

Greenhouse Gas (GHG) Emissions Inventories

In this CAP, we used two types of GHG emissions inventories to inform the proposed climate action strategies:

1. **Generation-based GHG inventory** – This measurement method helps us understand the level of emissions based on energy use. It includes 1) direct consumption of energy by XXX, 2) consumption of energy via the electrical grid, and 3) emissions from the treatment/decomposition of waste. This is the industry-accepted methodology for quantifying community GHG emissions, with emissions reported by emission source category.

2. **Consumption-based GHG inventory** – This measurement method helps us understand the level of emissions based on consumption. It offers an alternative, more holistic, approach for quantifying emissions within a community, quantifying consumption of goods and services (including food, clothing, electronic equipment, etc.) by residents of a city, with emissions reported by consumption category.

This CAP discusses using both of these inventory methods, which are reviewed in the following sections.

Figure 7: Overlap Between Generation-based and Consumption-based GHG Inventories[41]
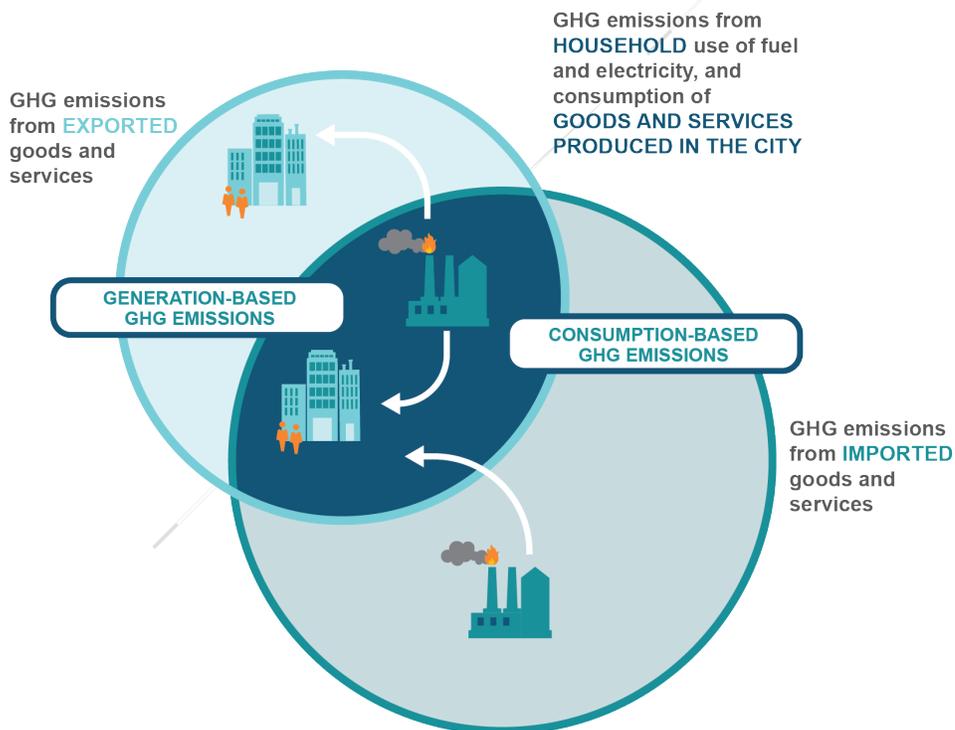
Generation-based GHG Inventory

Atherton's first generation-based inventory was completed for 2005 (the baseline year). Beginning in 2010, new community GHG inventories are completed annually, enabling Atherton to track progress over time.

In 2019, Atherton emitted an estimated 53,078 metric tons (MT) of carbon dioxide equivalent (CO_2e) from the residential, commercial, industrial, transportation, waste, and municipal sectors.[b] In comparison to the base year of 2005, that is a 27 percent decrease in total community emissions.

As shown in Figure 8 and Table 1, the two largest categories of emissions are transportation (including highway travel, local travel, and off-road equipment) and building energy use (including residential and commercial/industrial).

The residential and commercial/industrial sectors represent emissions that result from electricity generation and the burning of natural gas used in both private and public sector buildings and facilities. The transportation sector includes emissions from the burning of gasoline and diesel in private, commercial, and fleet vehicles driven within the City's geographical boundaries, as well as the emissions from public transit vehicles and the City-owned fleet. Off-road equipment includes lawn, garden, construction, industrial, and commercial equipment. Figure 8 shows the proportion of Atherton's total GHG emissions from all major sources for 2019.

FIGURE 8: COMMUNITY EMISSIONS BY SECTOR: 2019

Commercial/Industrial 8%
Other 1%
Transportation: Off-Road Equipment 4%
Transportation: State Highways 10%
Transportation: Local Roads 27%
Caltrain/Freight 1%
Wastewater Treatment 0%
Landfills 3%

---
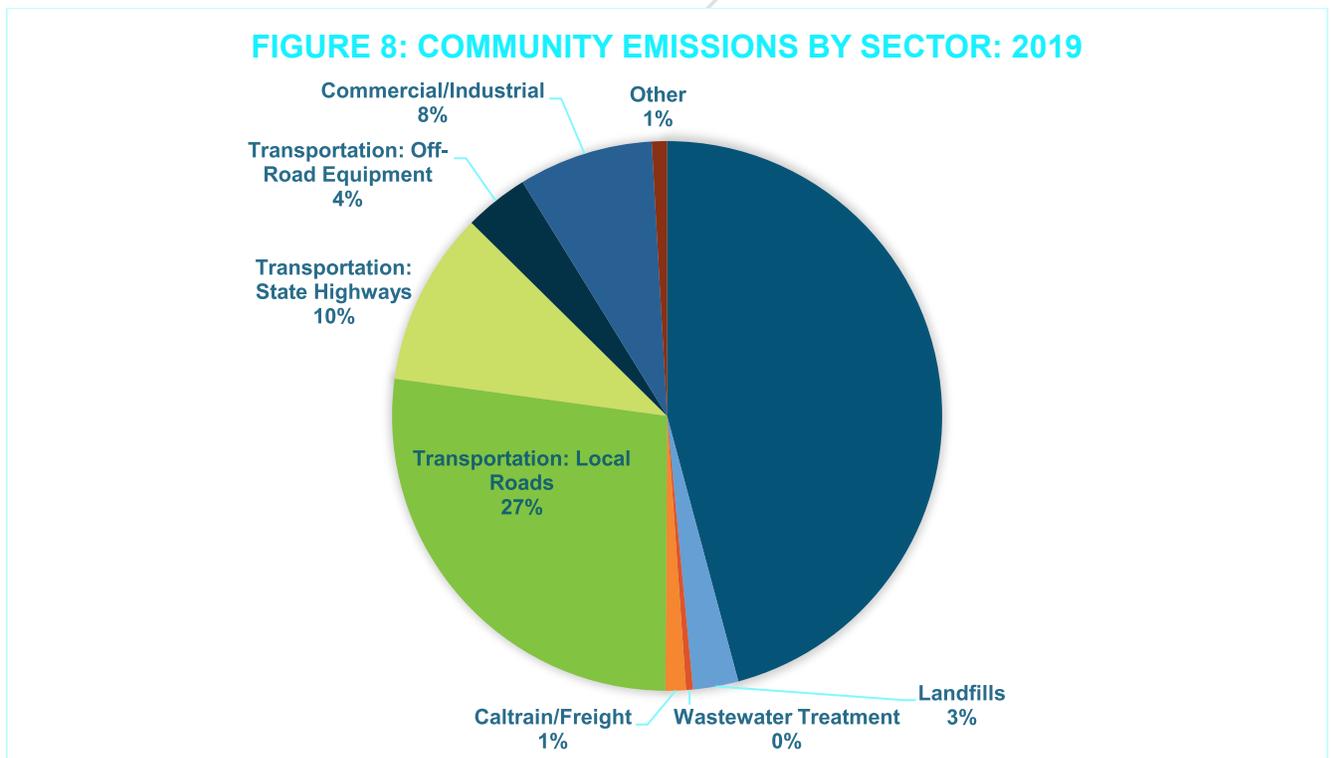
[b] Carbon dioxide equivalent is a unit of measure that normalizes the varying climate warming potencies of all six GHG emissions, which are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). For example, one metric ton of methane is equivalent to 21 metric tons of CO_2e. One metric ton of nitrous oxide is 210 metric tons of CO_2e.

Table 1: 2005 vs. 2019 Community Emissions by Sector

Sector	2005 GHG Emissions (MT CO2e)	2019 GHG Emissions (MT CO2e)	Percent Change in Emissions (%)
Residential	31,608	24,324	-23%
Commercial/Industrial	6,247	4,670	-25%
Transportation – Local Roads	24,256	14,367	-41%
Transportation – State Highways	6,569	5,434	-17%
Transportation – Off-road Equipment	2,057	2,012	-2%
Generated Waste	1,923	1.417	-26%
Other	72	854	
TOTAL	72,732	53,078	-27%

As shown in Table 1, Atherton's GHG emissions have declined over time—27 percent since 2005. Major contributors of this decline include a 41 percent reduction in emissions from the transportation sector (local roads) and the residential sector. This 27 percent reduction is a good start, but Atherton will have to greatly increase its emission reduction rate in order to achieve at least 50 percent by 2030 and carbon neutrality well before 2045 goals.

Emissions are described by category below.

Electricity and Natural Gas Emissions

In 2019, electricity and natural gas emissions accounted for 55 percent of total GHG emissions in Atherton. Atherton's total stationary energy consumption (electricity and natural gas consumed by residential, commercial, and industrial buildings) was 67,762,369 kilowatt-hours (kWh) of electricity and 4,556,691 therms of natural gas, including municipal operations and direct access electricity customers. Direct access is when an end-use customer buys electricity on the wholesale electricity market, rather than from Pacific Gas and Electric Company (PG&E) or Peninsula Clean Energy (PCE).

Of the total 28,994 MT CO_2e emitted due to energy use in buildings, natural gas accounts for a greater portion (94 percent) of total emissions than electricity (6 percent).

Figure 9: Building GHG Emissions by Sector and Fuel Type
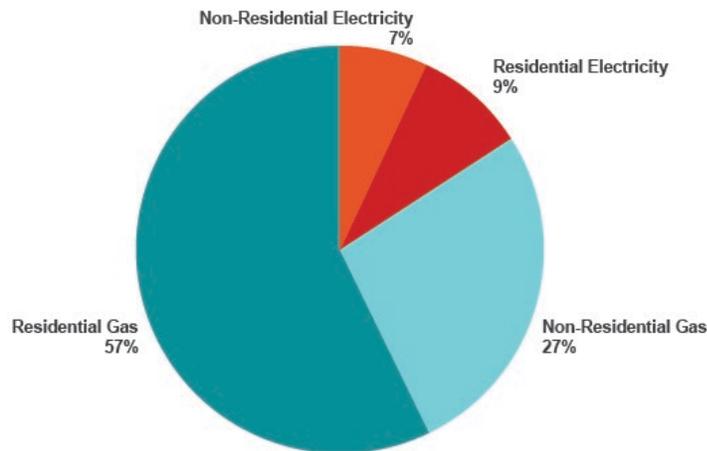
The emissions per kWh of electricity generated (the emission factor) can vary considerably from year to year and can depend on the provider of electricity (e.g., PCE, PG&E, and direct access providers). For example, in 2017, PG&E's emission factor was 210 lbs CO2/MWh, PCE's ECOplus (50 percent renewable) emission factor was 142 lbs CO2/MWh, and PCE's ECO100 (100 percent renewable) emission factor was 0 lbs CO2/MWh.

Over time, emissions associated with each kilowatt hour of electricity generation in California have continued to decline as the grid relies less on fossil fuel power generation sources, including coal and natural gas, and more on renewable power generation sources, including solar, wind, and hydropower.

In Atherton, natural gas accounted for 40 percent of building emissions in 2019, while electricity accounted for nine percent of building emissions. By 2019, energy emissions in Atherton had decreased 23 percent from 2005 levels.

Figure 10: Atherton 2010-2017 Building Emissions by Fuel Type
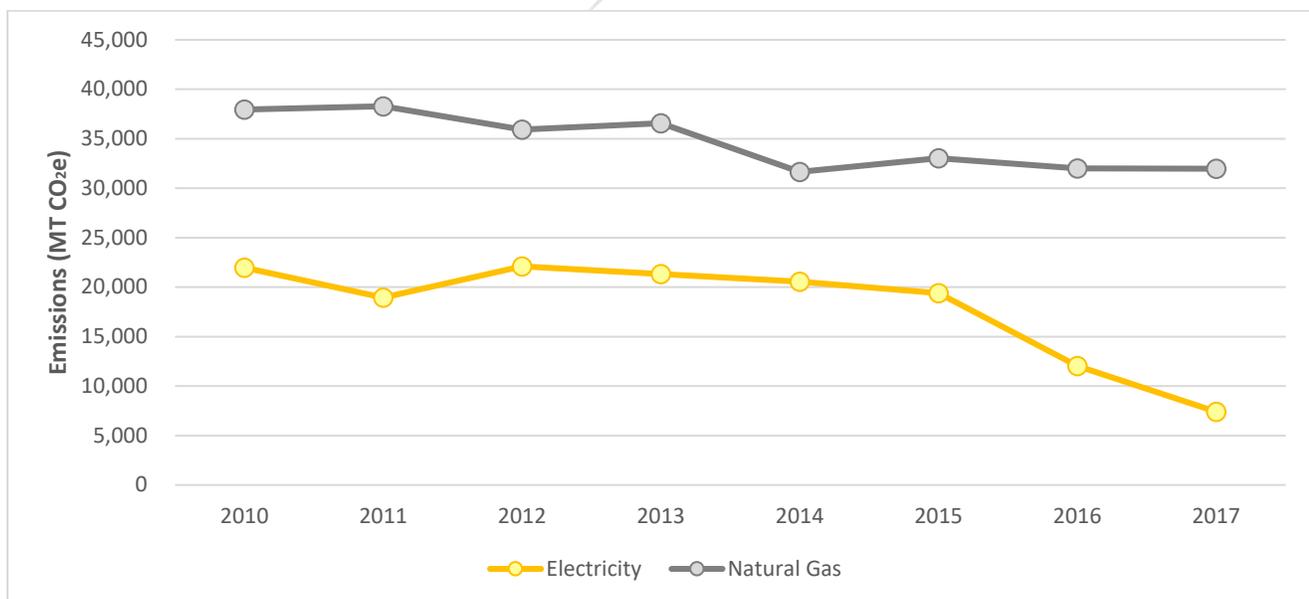
With the launch of Peninsula Clean Energy, which has a stated target of all electricity sales being 100 percent GHG-free by 2021, and the State's requirement through Senate Bill 100 (SB 100) that utilities procure 100 percent of electricity through renewable resources by 2045, the percent of building emissions associated with electricity will only continue to decline.

The State of California remains a leader in implementing policies aimed at reducing water consumption. Assembly Bill 1668 (AB 1668) and Senate Bill 606 (SB 606), adopted in 2018, require urban water providers to establish a target for water use by 2022 and threatens fines for agencies failing to meet their goals beginning in 2027. Standards will be based on an allowance of 55 gallons per person per day for indoor water use, a to-be-determined amount of residential outdoor use, and a standard for water loss due to leak rates in water system pipes.

Connection Between Energy and Water Use

Energy and water use are linked. Energy is needed to transport and to treat water, treat wastewater, and heat domestic hot water in homes and businesses across California. Approximately 20 percent of California's electricity and approximately 30 percent of natural gas used by homes and businesses across the state is dedicated to pumping, treating, and heating water. Figure 14 indicates the 10 percent of energy used to transport and treat water; energy used to heat water is distributed among the various customers.

Figure 11: Energy (Electricity and Natural Gas) Used by the Water Sector in California[42]
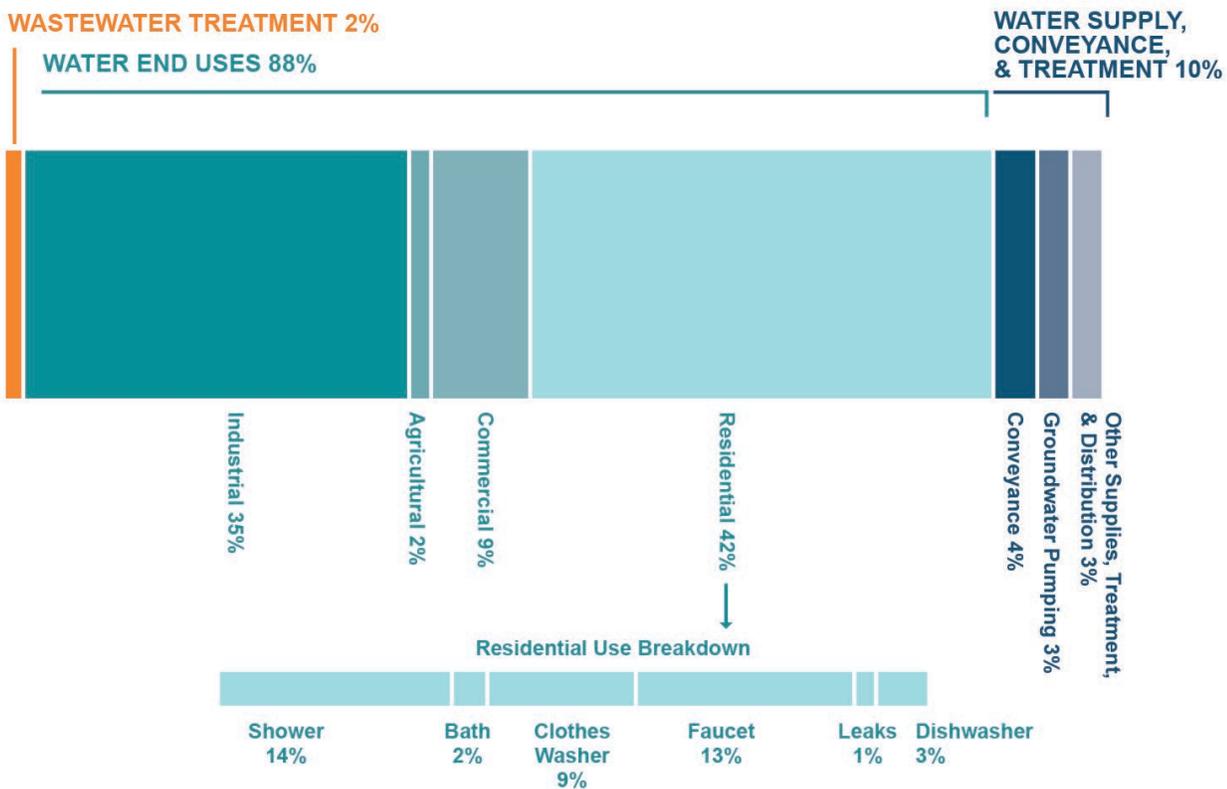
Transportation Emissions

In 2019, transportation emissions from burning gasoline and diesel accounted for 42 percent of total GHG emissions in Atherton. Gas and diesel-powered vehicles traveling on local roads accounted for 64 percent of transportation emissions; those traveling on state highways within city limits accounted for 24 percent; and gasoline and diesel emissions from off-road equipment, such as lawn, garden, and construction equipment, accounted for 12 percent.

Figure 11: On-road Transportation Emissions by Road Type
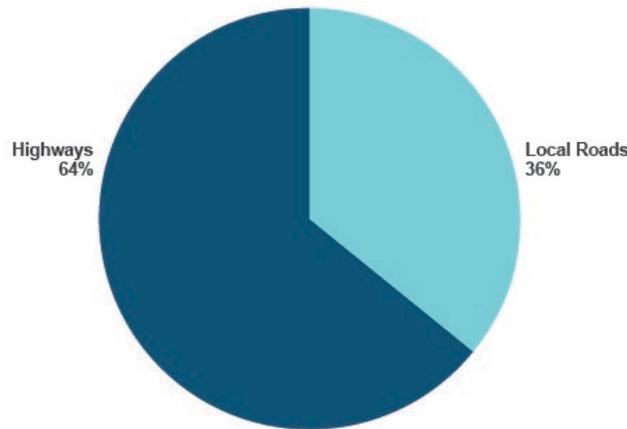
As of 2019, electric vehicles made up 7.8 percent of total new car sales in California.[43] There were 566,902 battery electric vehicles on the road as of that year – 1.06% of the total vehicles on the road in California.[44] Efficiency of gasoline and diesel vehicles, in terms of miles per gallon (MPG), continues to increase. For model year 2017, the average fuel economy of new vehicles sold in the United States reached 24.9 MPG – a record high.[45] However, addressing the third component, reducing VMT, is considerably more difficult than the previous two. Californians have driven more and more miles per year over the past five decades. Figure 16 demonstrates the growth in VMT within Atherton between 2005 and 2017. Figure 17 shows gasoline sales for cities in San Mateo County. (Data was accessed from https://www.coltura.org/gasoline-sales-volumes.Only cities with complete data are shown. Because of incomplete data for 2014, that year was eliminated from the graph.) We plan to monitor if efforts to reduce miles driven in gasoline vehicles results in a reduction of gasoline sales over time.

Figure 12: Atherton 2005-2017 Total VMT and Vehicle Efficiency

Gasoline Sales (MM gal) by Year

Legend: SOUTH SAN FRANCISCO, SAN MATEO, SAN CARLOS, SAN BRUNO, REDWOOD CITY, MILLBRAE, MENLO PARK, DALY CITY, BURLINGAME, BELMONT
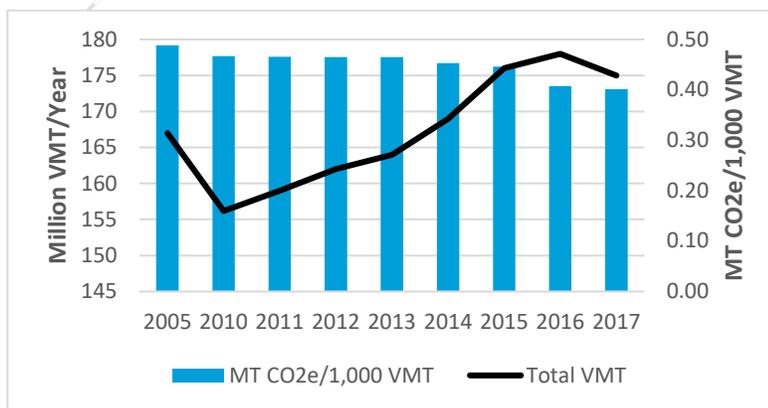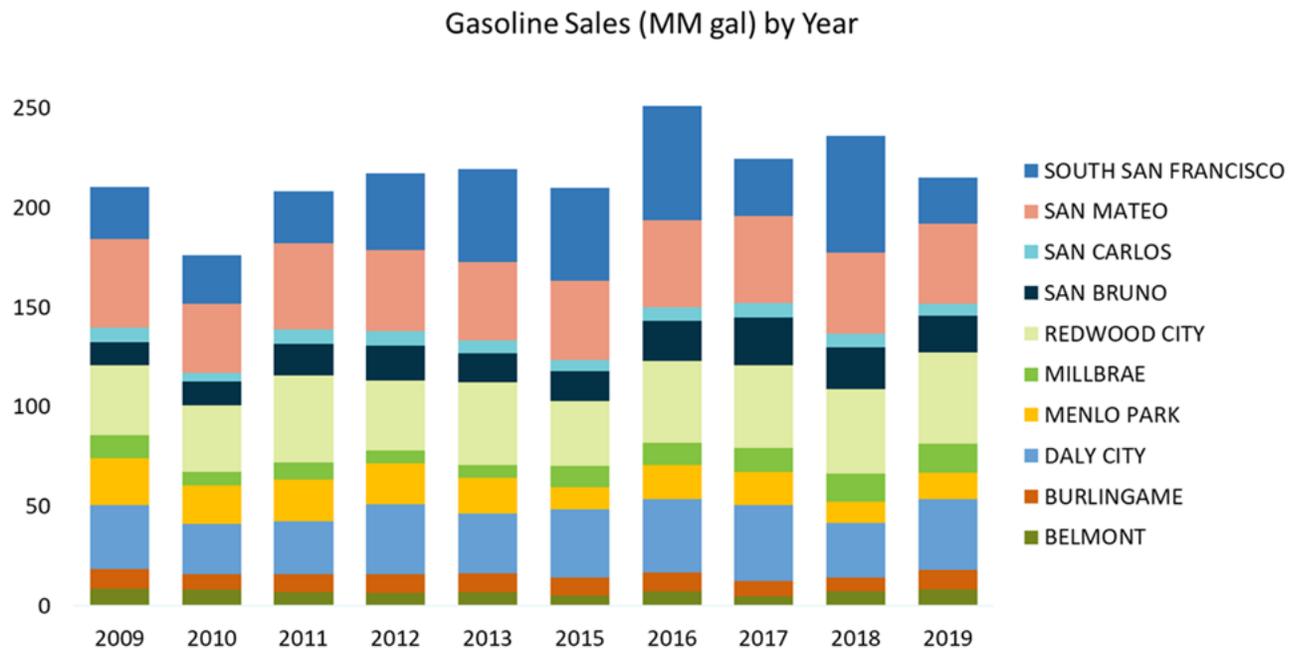
Solid Waste Emissions

In 2019, waste sector emissions accounted for three percent of total GHG emissions in Atherton. 1,417 tons of solid waste were sent to landfills.

Waste emissions result from organic material decomposing in the anaerobic conditions present in a landfill and releasing methane (CH_4) – a GHG 28 times more potent than CO_2. Organic materials (e.g., paper, plant debris, food waste) generate methane within the anaerobic environment of a landfill while non-organic materials (e.g., metal, glass, etc.) do not. Table 2 shows the approximate breakdown of the materials Atherton sent to landfills in 2019. Materials that do not release GHGs as they decompose are included in the "Non-organic Material" category.

Table 2: Estimated Waste Composition[46]

Waste Type	Waste Share
Non-organic Material	60.5%
Organic Material	39.5%
Corrugated Containers	6.4%
Newspaper	0.7%
Office Paper	0.4%
Mazagines/Third Class Mail	0.4%
Food Scraps	13.9%
Grass	1.2%
Leaves	1.2%
Branches	4.6%
Lumber/Wood/Pallets	10.8%

Carbon Sequestration

Our forests and oceans are natural carbon sinks, each absorbing 25 percent[47] of the carbon dioxide that is released into the atmosphere.[c] The process of capturing and storing this atmospheric carbon is known as carbon sequestration, and it is a strategy that – when combined with other efforts – can help combat climate change. A nonprofit organization called Project Drawdown specifically recommends 25 solutions based on using carbon sinks to reduce the impacts of climate change.[48]

It's not yet clear what role carbon sequestration will have in Atherton's climate action strategy, but it's something Atherton will evaluate and support moving forward in order to reduce any emissions that remain after implementing the 61 strategies included in the 2023 update.

There are several processes that can capture and store carbon:

- **Biological Sequestration:** The process of planting trees and other vegetation in forests, grasslands, and rangelands. Reforestation is one of the cheapest sequestration processes and helps support biodiversity. In our cities, encouraging residents, businesses, and parks to maintain or plant new trees can help to pull carbon dioxide from the atmosphere.

- **Biochar:** This process involves the burning of organic materials to create biochar, a compound that can hold carbon for long periods, rather than releasing it into the atmosphere as it degrades. Research shows that biochar will not break down for at least 100 years and possibly up to 1,000 years.[49] This type of carbon sequestration may be a solution for landfill and wastewater treatment applications.

---

[c] A healthy ocean has what is known as positive and negative "flux;" the former when CO_2 from the ocean is released into the atmosphere, and the latter when CO_2 is absorbed. Today, in large part due to human activity, the oceans absorb more CO_2 than they release. It is projected that by 2100, the oceans will be a CO_2 sink. The increase of CO_2 from fossil fuels is significantly impacting the acidity of the ocean, ultimately affecting not only the sea life, but also the air we breathe.

- **Biogas:** A methane and carbon dioxide gas produced from anaerobic digestion of agriculture waste products, landfills, and wastewater systems. Biogas can be used for heating, electricity, or transportation fuel; it is currently widely used in wastewater treatment plants in California.

- **Carbon Capture and Storage (CCS):** CCS is a three-part process that involves capturing carbon dioxide, transporting the carbon dioxide, and storing it underground typically through geologic sequestration.

- **Geologic Sequestration:** Carbon is captured and injected into underground rock formations for long-term or permanent storage.

- **Technological Sequestration:** Scientists are working to develop new and innovative ways to capture carbon. Some technologies are looking at capturing carbon directly from the air. Other potential technologies include repurposing carbon for use in other technologies.

- **Trees End of Life Sequestration:** A portion of the carbon dioxide trapped in trees during growth is released after they are cut down during the decomposition process. In order to avoid releasing this carbon dioxide, carbon can be stored for longer timeframes by locking carbon into wood products, such as lumber or furniture, or creating biochar. When urban trees fall down or are purposefully removed, residents and local municipalities should consider these end-of-life use cases to prevent the carbon dioxide from being re-emitted into the atmosphere.

Consumption-based GHG Inventory

In 2015, the Bay Area Air Quality Management District (BAAQMD) partnered with the Cool Climate Network at UC Berkeley to develop a consumption-based inventory of GHG emissions for cities and counties across the entire Bay Area. The inventory was developed through an economic model that estimates per-household consumption of goods and services based on economic indicators, such as household income. The consumption-based method results in about 35 percent higher emissions than a traditional generation-based approach for the region, largely due to higher emissions embedded in goods consumed within but produced outside of the county.[50] Figure 12 shows the consumption-based inventory for households in San Mateo County.

Figure 14: Consumption-based Inventory for Households in San Mateo County, 2015[51]

Breakdown of Average Household Carbon Footprint in San Mateo County
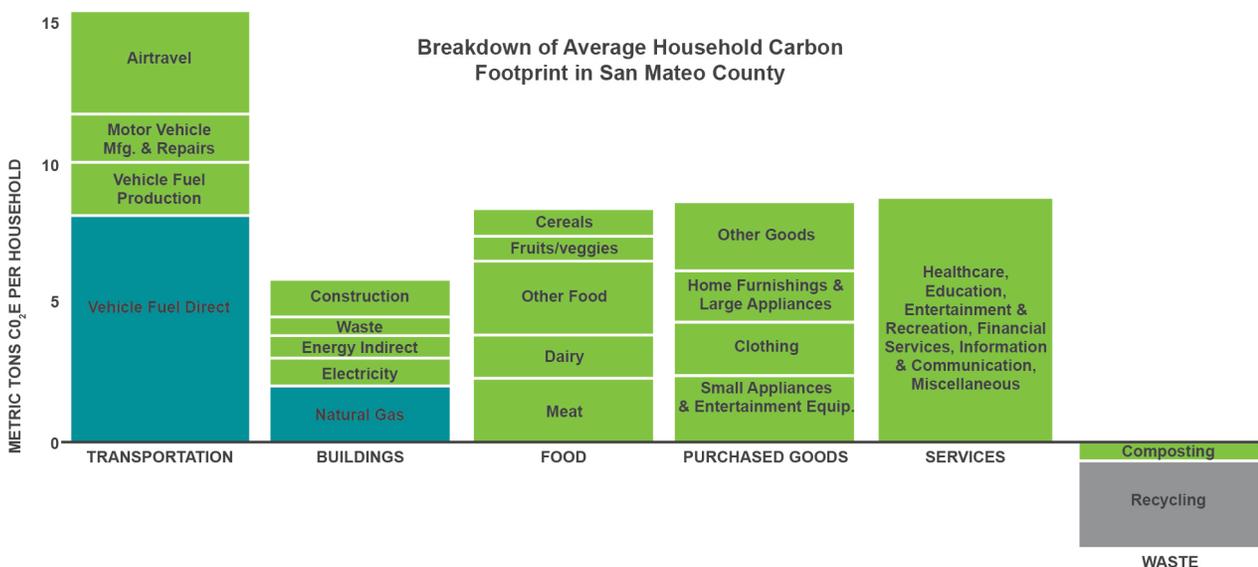
Because of a lack of data and the complexity and cost of the accounting required, consumption-based inventories are extremely difficult to accurately complete. Consequently, it isn't realistic to develop this type of lifecycle emissions accounting at regular intervals, as with standard GHG inventories. Even so, Atherton recognizes the importance of including measures and strategies to reduce consumption-based emissions in this CAP. Considering the impact of consumption-based emissions helps Atherton prioritize buying local and supporting community businesses and jobs.

In some cases, cities may be able to collect consumption-based data, which can be useful for tracking programmatic outcomes. For instance, transportation consumption data in the form of gasoline sales volumes is available at the city and zip code level from the California Energy Commission, and compiled and posted at https://www.coltura.org/gasoline-sales-volumes. However, this data is estimated to be underreported by around 12% a year, because not all gas stations report.

In the future, there may be the opportunity and need to quantify GHG emissions associated with the goods and products procured by the community and its residents at more regular intervals. More information on this regional consumption-based inventory effort can be found online at: https://www.baaqmd.gov/about-air-quality/research-and-data/emission-inventory/consumption-based-ghg-emissions-inventory

Future Emissions

Atherton developed a forecast of future emissions (Figure 13) to understand what reduction measures are needed to meet the 2030 and 2045 goals. The forecast starts from a projected 2020 base year community inventory for Atherton.

The forecast illustrates the following:

- **"Business-as-usual" (BAU) emissions** – This projection represents the emissions expected if 2020 patterns of travel, energy and water consumption, and waste generation/disposal were continued throughout time. This projection factors in the expected rate of county population and job growth (0.88 percent/year). The 0.88 percent growth rate is used a baseline in all BAU projections between 2016 and 2050, stemming from the Association of Bay Area Governments (ABAG) Plan Bay Area 2040 Final Preferred Scenario and Investment Strategy. This growth rate is an average of the projected population growth (0.7 percent per year) and the expected job growth (1.07 percent per year) to occur across San Mateo County. This projection is considered in the absence of any measures, policies, or actions that would reduce emissions over time, including state legislation and/or any other policies or procedures accepted after 2016. Under the BAU scenario, Atherton emissions are projected to increase by 4 percent in 2030 (2,244 MTCO2e) and 15 percent in 2050 (8,587 MTCO2e), relative to 2020.

- **Emission reduction from State measures and policy** – This projection incorporates the same factors as the BAU, but also includes key State policies such as clean car standards, renewable portfolio standard, zero net energy building, and organics recycling.

- **Emissions reduction from PCE measures and programs**. This projection includes the effect of Peninsula Clean Energy (PCE) operating in San Mateo County. Switching from PG&E to PCE in 2017 gave Atherton a 96 reduction in GHG emissions by providing a cleaner fuel mix for energy generation than the State provided. By 2045, the Renewable Portfolio Standard will have closed that gap by forcing all electricity providers to offer a similarly clean mix of energy. Emissions are projected to decrease 22 percent (31,272 MTCO2e) by 2030 and remain relatively constant through 2050.

- **Emissions reduction from Atherton CAP reduction measures** – This is the reduction necessary to reach the 2030 goal. In this CAP, Atherton is committing to take the actions need to meet this target. Those actions are described in the 2023 Climate Action Plan Update. Emissions are projected to decrease 50 percent (37,093 MTCO2e) by 2030.

Figure 15. Atherton GHG Reduction Target (50%] Below 2005 Levels by 2030)

City: Historical Emissions and Reduction Target

640,161

2020 Target: 15% Below 2005, 544,137

2030 Target: 49% Below 2005, 326,482

State Measures & Policy

PCE Measures & Programs

City Measures

MT CO2e

Emission Reduction from State Measures: 295,980

Emission Reduction from PCE Measures: 206,470

Emission Reduction from City Measures:

Projected 2050 Emissions: 32,445

- - - Historical Emissions   —— Business As Usual Projections   —— Projected Reduction Path   —— Emissions Reduction with State Measures

Reductions from State- and County-Level Actions

In addition to the actions outlined here, regulations aimed at reducing GHG emissions at the state and regional levels will also contribute to emissions reductions in Atherton. For example, the California Renewable Portfolio Standard (RPS) mandates that 100 percent of the electricity sold by the State's investor-owned utilities be generated from renewable resources by 2045, with an interim target of 60 percent by 2030. The impact of state-level actions on reducing local emissions is significant and is shown in relation to Atherton's emissions baseline, business-as-usual forecast, and reduction target in Figure 13.

A summary of the expected emission reductions from state and county programs is provided in Supplementary Findings C.3.

Table 4: Total Emission Reductions from State of California and San Mateo County Policies and Programs

State Initiative	Sector	% Emissions reduction from applicable sector in 2030	2030 reduction in Atherton's emissions (MT CO2e)
Advanced Clean Cars Program	On-road Transportation	11.9%	1,603
Low Carbon Fuel Standards	Off-road Transportation	20%	128
Caltrain Electrification	Trains	89.1%	495
Renewable Portfolio Standard	Electricity (Energy)	60%	2,754
100% Zero Net Energy New Residential 2020	Residential Energy	1.3%	731
50% Zero Net Energy Existing Commercial 2030	Commercial Energy	0.3%	197
Organic Waste Diversion SB 1383	Disposed Waste	2.1%	1,258
Total Emissions Reductions in Atherton from Statewide and Countywide Initiatives:			7,166 MTCO2e

Atherton's Contribution to the Goal

Atherton is committing to at least a 49 percent reduction in emissions below 2005 levels by 2030. Through this commitment, Atherton will be doing its part in helping California achieve the statewide target of a 49 percent reduction below 2005 levels by 2030 and will place Atherton on the path to achieving the statewide target of carbon neutrality well before 2045.

7

IMPLEMENTATION

Implementation

The preceding chapters describe the principal sources of Atherton's GHG emissions and related goals and actions for achieving the community's targets of reducing emissions at least 50 percent below 2005 levels by 2030. This section outlines the main components of the process for putting this CAP into action and identifies specific actions from earlier sections that are recommended for implementation.

Although significant GHG reduction policies and initiatives are already in place, the actions proposed in this CAP, by necessity, far surpass the scale of existing efforts. Implementing the CAP and ensuring that it results in real GHG emissions reductions will require increased coordination across sectors and institutionalized climate protection efforts across the community.

There are many measures and programs that Atherton may implement to reduce GHG emissions. A cost-benefit analysis and prioritization methodology is presented below to assist the City in developing a phased implementation plan.

Getting It Done: Managing the Strategy

Support will be needed to direct the implementation of the CAP measures. This section details how the city has organized itself to put this CAP into action.

- **Hire a Sustainability Coordinator** – The City has hired a Management Analyst with primary responsibility for implementation of this CAP and its sustainability programs.
- **Established an Environmental Programs Committee (EPC)** – A volunteer committee of citizens meets regularly to discuss issues relating to environmental planning, sustainability, and the implementation of the CAP.

Better Together

Climate change is an issue that crosses geographic and sector boundaries. Atherton recognizes the value of collaborating with other public agencies, businesses, and community-based organizations to accelerate climate action. Everyone has a part to play and Atherton cannot do it alone. Atherton plans to coordinate efforts with the sectors listed below. More potential partners are listed in Supplementary Findings E.

Public Agencies

Atherton leverages existing climate protection programs funded by public agencies such as the State of California, Peninsula Clean Energy, City/County Association of Governments of San Mateo County, Association of Bay Area Governments, County of San Mateo Office of Sustainability, South Bayside Waste Management Authority (RethinkWaste), and Bay Area Regional Energy Network (BayREN), among others. Collaboration with these organizations helps Atherton increase the sustainability of our own operations, as well as supports community efforts to improve energy efficiency, install renewable energy technologies, facilitate transit/biking/walking initiatives, and take other actions. A more extensive list of public agencies can be found in Supplementary Findings E.1.

Nonprofits

Atherton plans to work through existing networks of community-based and faith-based organizations that serve diverse cultural communities. Some organizations may not have the economic capacity to participate and may need to have their participation expenses defrayed. Many nonprofits already provide programming that is in alignment with the goals in this CAP. In addition, these collaborations will help Atherton engage community members who ordinarily aren't aware of climate action efforts. (See next section.) Some community members may not be able to afford childcare or other expenses to participate and may not have a car to drive to meeting locations not accessible by public transportation. A list of local nonprofits is in Supplementary Findings E.2.

Communities of Concern

Communities of color and low-income populations have been under-represented in policy-making and often are not consulted about programs and services intended to benefit them, frequently resulting in ineffective programs. A variety of factors, such as lack of trusted relationships with government, language barriers, and lack of inclusion in planning and policy-development processes have all served as barriers to involvement. Leadership and membership of mainstream environmental organizations have also tended to be white and well off, despite evidence that environmental concerns, including climate change, are broadly held by people of color and low-income populations.[52]

It's important for Atherton to invest in long-term, reciprocal relationships with socially vulnerable communities. Atherton understands the need to consider how individuals who have not had access to educational opportunities or who do not speak English can participate in the conversation. Atherton is committed to listening and responding to diverse concerns and assisting community partners in participatory planning processes.

In implementing this CAP, the City plans to foster relationships and deepen involvement with communities of color and low-income populations regarding the challenges of and solutions to climate change. Engagement strategies will take into account existing barriers and attempt to mitigate them. Ensuring that education and outreach are culturally and linguistically appropriate, as well as taking into account diverse educational attainment will be critical for success. This includes involvement of the North Fair Oaks Community and the Adelante Selby Immersion School community in the development of bicycle and pedestrian improvements for El Camino Real and Selby Lane, respectively.

Atherton and the County will seek to support community needs and priorities by working with community-based organizations to engage these traditionally under-represented and under-served populations and businesses. In addition, Atherton will look for opportunities to support diverse community organizations to implement actions outlined in this CAP, including grants such as the one that enabled community-based organizations in Half Moon Bay to engage socially vulnerable communities in participating in planning processes (see box).

Starting by Partnering with Community Organizations

The City of Half Moon Bay initiated their Climate Action and Adaptation Plan (CAAP) process by establishing partnerships with three organizations working with socially vulnerable communities – youth, seniors, the Latino community, and unhoused residents who had previously been underserved in planning processes. This effort generated innovative and tailored outreach strategies, strengthened relationships between the organizations and the City, generated a set of key priorities, and provided valuable insights that are being incorporated into the City's CAAP process. https://climatereadysmc.org/pilotprojects

Private Sector

For Atherton to succeed in achieving its CAP goals, we need support from the private sector. Markets need to shift. The goods and services available to our community should support our efforts to build a sustainable, resilient economy that doesn't threaten the stability of the climate.

Atherton's ongoing engagement in programs to decrease energy use and shift from natural gas to electricity use provided by private company, Pacific Gas and Electric Company, is crucial to our efforts to decarbonize our energy system and transportation system.

Some businesses already put resource conservation at the core of their business models. Several businesses are Certified B Corporations, which are legally required to consider the impact of their decisions on their workers, customers, suppliers, community, and the environment. More than 30 businesses in San Mateo County are certified as Green Businesses through the California Green Business Program. A complete list of these businesses is available at https://greenbusinessca.org/find-green-business/.

In addition, Atherton intends to partner with the County of San Mateo Office of Sustainability to help small and medium-sized businesses learn about programs and incentives that will help them save money while also being good environmental stewards.

In addition, San Mateo County is home to many multi-national corporations with global supply chains, and employees that live in Atherton. Moving forward, Atherton will look for opportunities to help residents, employees, and business leaders understand how they can bring climate action principles to their workplaces. (See "Four Levels of Action" box in Chapter 7: Implementation, Multi-Section and Regional Collaboration section.)

Internal Departments

Atherton's collaborative mindset extends to our internal management. Departments and teams across the City are responsible for leading and implementing the strategies outlined in this CAP, including Building, Public Works, Planning, Police Department, and the City's Manager's Office.

External Communication

Atherton plans to widely distribute information on programs and funding opportunities for residents and local businesses. This may include participating in a countywide or regional online engagement platform such as Climate Solutions Net or Sustainable Future, if possible. EACH city to summarize the plan for ongoing communication and education of residents and businesses; media strategy; meetings; social marketing.

Specific actions that community members are encouraged to take today are included in boxes throughout Chapter 6: Strategies and Actions, Strategies to Get Us There section. Funding opportunities are listed in Supplementary Findings F.

Atherton will also look for opportunities to partner with organizations listed in this CAP to bring workshops and trainings to the community. Overall, the goal is to increase community awareness about climate change to influence everyday consumer behavior and purchasing decisions. Atherton's messaging can encourage community members to take action not just at home, but also at work, and with community organizations of which they're members. (See "Four Levels of Action" box in Chapter 7: Implementation, Multi-Section and Regional Collaboration section.)

Multi-sector and Regional Collaboration

To ensure full implementation of the CAP and accelerate climate action efforts, an interdepartmental team of City staff, in collaboration with civic leaders from the public, nonprofit, and private sectors, must be assembled to ensure sustainability and accountability. In addition, Atherton will aim to participate in countywide and/or regional convenings that bring the three sectors together to identify shared goals and collaboration opportunities.

Two areas in particular are good candidates for regional collaboration:

1. Electrification of buildings
2. Electrification of transportation

In addition, multi-sector collaborations could address the need for financial products that enable more community members and businesses to upgrade their homes, businesses, and transportation.

Four Levels of Action

Strategic change expert Will Grant explains that there are four levels of action related to social change:

Level 1
Individual
Action

Level 2
Friends
and Family

Level 3
Community Organizations
Local Institutions
Workplaces

Level 4
The Economy
and Policy Change

Grant asserts that the environmental movement's message has been focused on Level 1 and Level 4: "Change individual actions or sign this petition, lobby this person. But I think our greatest impact is actually at Levels 2 and 3, and especially Level 3. Level 3 is institutions and groups where I'm still known as a person…where I can get in touch with a person who's in charge within about a week and get a meeting."

Grant gives the example of getting a local school to install solar panels. "I can figure out the economics of the project. I can organize and create a coalition to get it done. The conversation I generate at the school – with the principal, the students, the PTA – is a big piece of the change. It's as useful as the change itself. If I change a local institution or something that I'm involved in, I'm not just impacting my life, I'm impacting the lives of hundreds or maybe thousands of people. When the solar panels go up, other schools in the neighborhood wonder 'Why don't we have solar panels?' Then other institutions can take the model for that change."[53]

Workforce Development
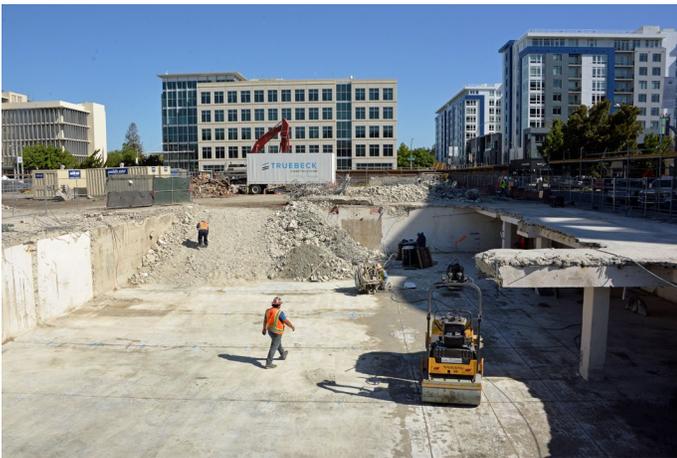
To meet our climate action goals, the workforce needs to be ready to implement projects that will result in less energy consumption, fewer vehicle miles traveled, less solid waste, and reduced municipal emissions. It's estimated that an increase of 64,000 to 100,000 local workers will be required to electrify California's building stock.[54]

Training workers to deliver the services required by this CAP is a critical step in the process. Organizations like BayREN and PG&E have already been training local contractors, designers, and architects in energy efficiency for over a decade through contractor trainings and specific workforce development programs. Local plumbing and electrical unions also provide extensive trainings for their members. Grid Alternatives has been offering training programs for solar installations in California and the rest of the United States by utilizing grant funds to install solar panels on low-income housing, and training workers on site in a style similar to the Habitat for Humanity model. Rising Sun Center for Opportunity runs Climate Careers, a summer youth employment and residential water and energy efficiency program in the Bay Area. It provides youth with opportunities for training and meaningful employment in the clean economy, educates about eco-literacy issues such as climate change, and offers continued professional development opportunities after employment.

Since 2019, Peninsula Clean Energy has started to offer similar programs to supplement BayREN and PG&E's existing work, and all three organizations have expanded to include contractor trainings on building electrification and EV charging station deployment. Since building electrification projects require contractors skilled in both plumbing and electricity trades, Atherton will collaborate with the County of San Mateo Office of Sustainability to provide opportunities for these contractors to connect with each other and potentially form implementation teams.

Supporting these workforce development programs and ensuring they help develop the expertise of our local workforce, will be critical to ensuring we meet our climate goals, and will help community members gain employment in the growing green jobs sector.

Timeline

The following timeline lists the major milestones in the CAP implementation process. Progress and updates to this schedule should be submitted to the City Council and the public as part of an annual Plan Implementation Report.

Table 7. Climate Action Plan Implementation

Milestone	Target Date
GHG Inventory Completed	04/2014
GHG Reduction Target Established	06/2016
Council Review	10/2016
CAP Adoption	11/2016
Sustainability Coordinator Begins Implementation	08/2021
1st Annual CAP Implementation Report	11/2021
2nd GHG Inventory Completed	10/2022
1st CAP Update	06/2023
2021 and 2022 GHG Inventories Completed	Fall 2023

Implementation Budget

Staff has evaluated the resource impacts across City departments and identified resources needed to implement this CAP over the coming years.

Some of the actions will be absorbed and integrated into existing departmental operating or projects budgets. Resources allocated to implementing the CAP will be refined and finalized as part of the annual process for budget development and approval by the City Council.

The City's strategy to finance implementation of current and future actions will evolve over time. Strategies the City may consider could include:

- Leveraging partnerships and collaborative projects, particularly through Peninsula Clean Energy and Office of Sustainability programs
- Developing a differential utility use tax (UUT) to incentivize electrification
- Charging carbon impact fees for development projects
- Implementing user fees for selected activities and services
- Implementing paid parking in selected locations
- Adding transportation impact fees to requirements for new construction projects

Monitoring and Improvement

Atherton envisions that the core strategies will remain constant as we move forward. As we live in an age and place of abundant technological innovation, more advanced technologies and creative innovations may be integrated into the CAP in the future.

To ensure that the emissions targets described in this CAP are met, ongoing monitoring is necessary. If it's determined that CAP efforts are falling short of the goals, the City will add additional voluntary and mandatory measures to the CAP. This process is necessary for this CAP to maintain its status as a "GHG Reduction Strategy" and for related projects to be automatically approved under the California Environmental Quality Act (CEQA).

Generation-based inventories provide a consistent way to track progress over time. But these inventories have two shortfalls:

1. **Annual GHG generation-based inventories lag about two years behind.** For instance, the 2018 inventory will be available in late 2020. This makes it difficult to get immediate feedback on changes to programs and policies.

2. **Generation-based inventories don't tell the whole story.** Our goal is to achieve at least 50 percent reduction of GHG emissions by 2030 on the way to carbon neutrality well before 2045. It will be difficult to meet the carbon neutrality goal without calculating and tracking emissions from the consumption of goods and services in addition to generation of emissions.

Atherton's monitoring and ongoing improvement program addresses these shortfalls:

- Atherton will establish and track key performance indicators (KPIs) for each action listed in Chapter 6: Strategies and Actions, Strategies to Get Us There section, including actions to reduce consumption-based emissions. Progress on KPIs will be posted on the City's website and updated quarterly, at minimum.

- Through the RICAPS program, Atherton will consider participating in a countywide goal for KPIs agreed to by all cities in the county. Those KPIs will be posted and tracked on the County's website. Examples of common KPIs are number of solar installations, number of EV charging stations installed, number of homes retrofitted, number of EVs purchased, number of heat pump water heaters and/or space heaters installed, etc.

- The City will issue an Annual Climate Action Update Report to update the City Council, residents, and other interested stakeholders on progress made implementing the CAP actions. The ACAPIR will detail lessons learned and make recommendations for changes to the implementation strategy or the CAP itself. Following the release of the update report, a 30-day public comment period will be open to allow for community input on the implementation of the CAP.

- The City will track the emissions, resource savings, equity and inclusion impact, and any other effects of each implemented action, as well as estimate costs to government, residents, and businesses. This will include enhancements to the databases that would help track progress on the variety of measures in the CAP, including those managed by other agencies or organizations. See "Measuring Success" section of Supplementary Findings D for details about how to track progress on equity and inclusion impact. Each action will be summarized in the ACAPIR and made available for public review.

- Every year, Atherton will review the newest community GHG inventory provided by the County of San Mateo Office of Sustainability through the San Mateo County Energy Watch program. Every five years, Atherton will conduct a municipal GHG generation-based inventory to track progress on reducing the Town's own emissions.

- This CAP may need to be updated based on the results of the GHG inventories. Atherton may modify and/or add new actions to ensure that the Town is on track to meet its GHG reduction goals.

- In partnership with the County Office of Sustainability, Atherton will explore a collaboration with a research institution to include questions about climate protection behaviors in an annual countywide survey of community members. Responses from the survey could be used to track progress on community actions related to consumption-based emissions.

document

.

8

CONCLUSION

Conclusion

The challenge of preparing for and mitigating the effects of climate change is unprecedented in its scale and potential disruption to our way of living. Recent climate disasters have given us a preview of what could become the "new abnormal." This includes severe weather that impacts inland jursidictions like Atherton.

We must act now. Climate change waits for no one. However, in the face of daunting headlines, we remain hopeful and resolved, and know what we need to do to move forward. We have the solutions to reduce emissions, increase efficiency, promote economic vitality, and improve our quality of life.

This CAP provides an overarching, strategic framework for Atherton to achieve the goal of reducing GHG emissions by at least 50 percent by 2030, on the way to carbon neutrality by 2045. While developing and publishing this CAP is an important step, it's even more critical that this CAP remain a living document, to be updated as technology and policies progress.

This CAP not only supports the Town's efforts to manage its own GHG emissions, it's a call-to-action to residents and community institutions to take an active part in our transition to a low-carbon future and clean economy. In this process, Atherton will foster a vibrant economy, increase its resiliency, and support a collective vision for a livable and sustainable community for generations to come.

9

SUPPLEMENTARY FINDINGS

SUPPLEMENTARY FINDINGS

A. Glossary of Abbreviations

AB 32	Assembly Bill 32, The California Global Warming Solutions Act of 2006
BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
CAP	Climate action plan
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CPUC	California Public Utilities Commission
EV	Electric vehicle
GHG	Greenhouse gas
ICLEI	Local Governments for Sustainability
IPCC	Intergovernmental Panel on Climate Change
KPI	Key performance indicator
kWh	kilowatt hour
MT	Metric ton
MMT	Million metric tons
PCE	Peninsula Clean Energy
PG&E	Pacific Gas and Electric Company
RPS	Renewable portfolio standard
TOD	Transit-oriented development
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled
WRI	World Resources Institute

B. Climate Change

B.1 Global Goal to Limit Warming to 1.5°C

The <u>Intergovernmental Panel on Climate Change</u> (IPCC), the leading international scientific body on climate change, released a report[55] in mid-2018 shifting the threshold at which significant and potentially irreversible climate change impacts occur from 2°C to 1.5°C of average global temperature increase above pre-industrial levels. The IPCC report promotes immediate actions to meet the 1.5°C threshold to prevent or slow these impacts. Many of the impacts of warming up to and beyond 1.5°C, and some potential impacts of mitigation actions required to limit warming to 1.5°C, fall disproportionately on low income and socially vulnerable people.

Substantial changes in regional climate occur between 1.5°C and 2°C of global average temperature increase. For example, the number of people exposed to severe heat waves triples. Keeping temperatures at 1.5°C as compared to a 2°C warming would result in global reductions in risk, including:

- **Sea level rise:** Decreasing global rate of rise by approximately 3.9 inches

- **Heat waves:** Decreasing the number of people being frequently exposed by 420 million worldwide

- **Heavy precipitation and drought:** Reducing intensity and frequency worldwide

- **Drinking water:** Lowering the number of people without access to drinking water by 50 percent

Limiting warming to 1.5°C will require changes by 2050, including:
- Eliminating GHG emissions in our cities

- Deep reductions in global emissions of non-CO2 climate pollutants, particularly methane

- Reducing oil use by 32-74 percent

- Reducing natural gas use by 13-60 percent

- Leveraging renewables to supply 36-97 percent of energy

- Making buildings and transportation energy efficient

- Implementing adaptation options, including coastal defense and hardening, efficient irrigation, green infrastructure, and disaster risk management

B.2 State and Local Goals and Targets

California has some of the most aggressive climate action goals in the United States. The State has set a goal of emissions reductions to 40 percent below 1990 levels by 2030 (or 49 percent below 2005 levels). To achieve this, California has created the following strategies:

- Increase renewable electricity production to 50 percent

- Reduce petroleum use by 50 percent in vehicles

- Double energy efficiency savings at existing buildings

- Reduce GHG emissions from natural and working lands

- Reduce short-lived climate pollutants such as black carbon, methane, tropospheric ozone, and fluorinated gases

- Make California more resilient to climate change in accordance with California's 2018 *Safeguarding California Plan*

B.3 Trends in National and State Emissions

National Emissions

According to the U.S. EPA, gross total U.S. GHG emissions in 2017 were 6,456.7 million metric tons (MMT) of CO2 equivalent (CO2e), representing a 12 percent decrease below 2005 levels.[56] Emissions have also decreased 4.5 percent since 2014, largely driven by transitioning power plants from using coal to natural gas, as well as warmer winter conditions. CO2, the largest component of man-made GHGs, made up 81.6 percent of total U.S. GHG emissions in 2017, followed by methane at 10.2 percent, nitrous oxide at 5.6 percent, and fluorinated gases at 2.6 percent.

Figure 18: Gross U.S. GHG Emissions by Gas: 1990-2018[57]
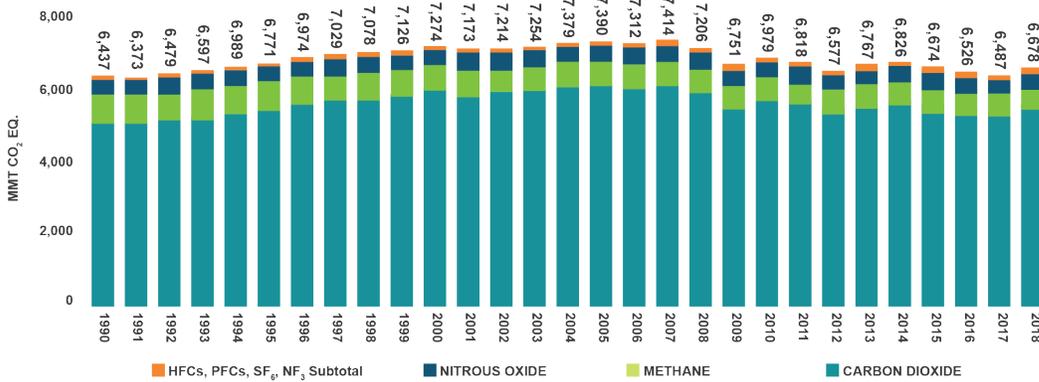
In 2018, the industrial sector contributed the largest share of GHG emissions (29.1 percent), followed by transportation (27.9 percent), commercial (16.2 percent), residential (15.6 percent), and agriculture (10.5 percent). Land use and forestry offset 11 percent of total gross emissions. Of the five main sectors, transportation has seen the largest increase in emissions since 1990 (22 percent increase), while industrial emissions have seen the largest decrease (15.5 percent decrease).

Figure 19: U.S. GHG Emissions by Economic Sector[58]
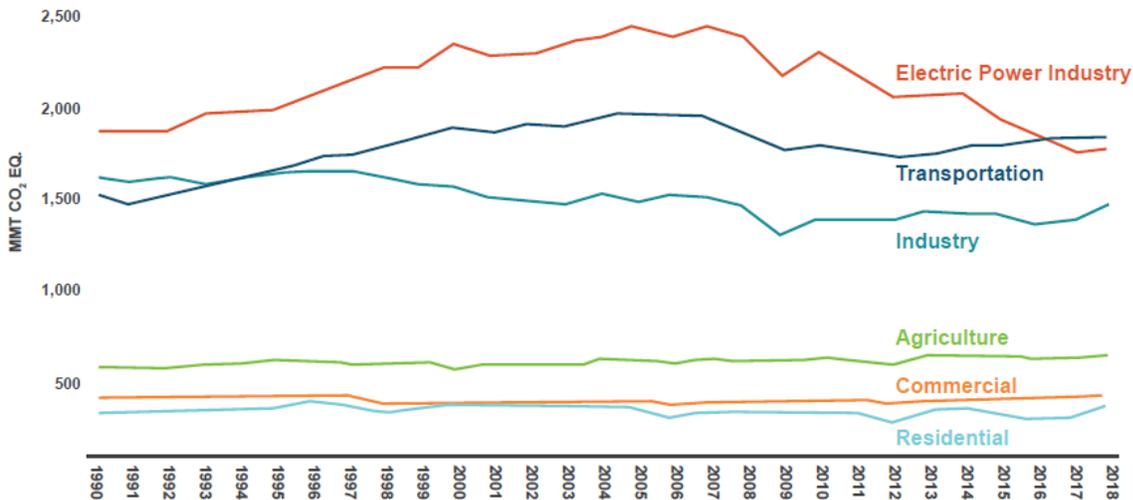
California Emissions

Similar to the national trend, total GHG emissions in California have decreased in recent years. According to the California Air Resources Board (CARB), total California GHG emissions in 2017 were 424 million metric tons (MMT) of CO2e, representing a 2 percent decrease below 1990 levels and a 13 percent decrease below 2005 levels.[59]

Figure 19: California GHG Emissions by Sector: 2000-20178
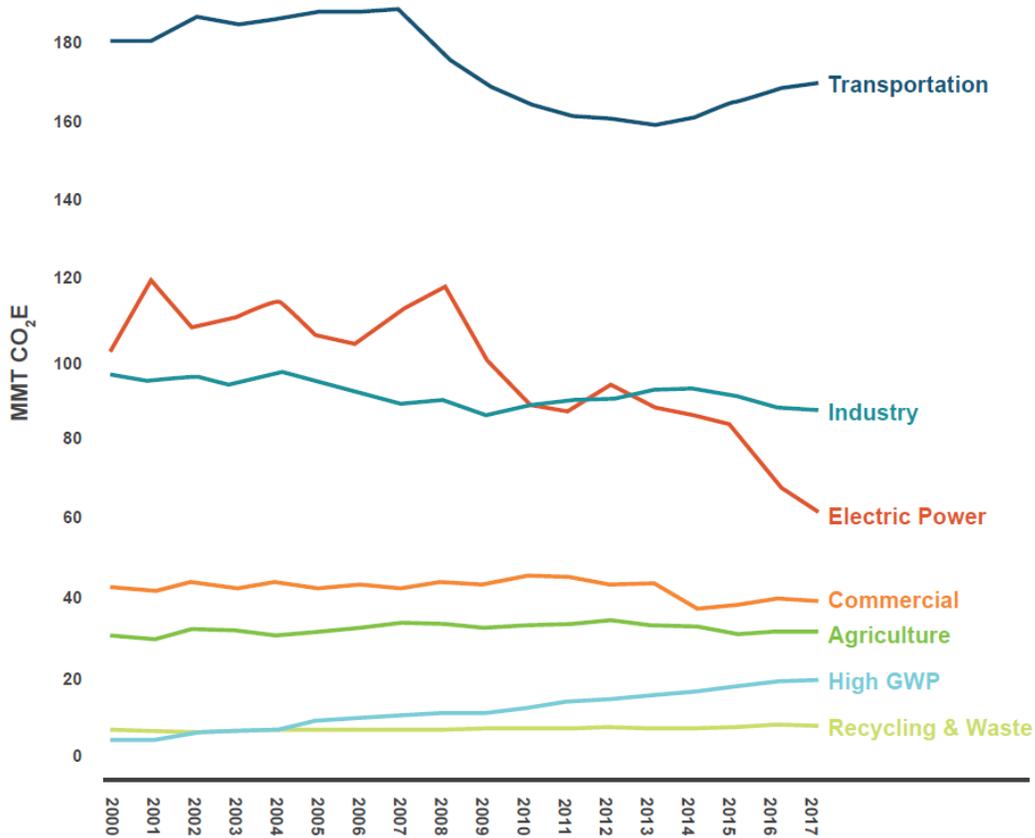
California has seen an overall decrease in carbon intensity of electricity generation, driven by a large increase in zero-GHG and renewable energy resources due in part to California's Renewable Portfolio Standard (RPS)[60] and Cap-and-Trade Program.[61] In 2017, the transportation sector contributed the largest share of GHG emissions (41 percent), followed by industrial (24 percent), in-state electricity (9 percent), agriculture and forestry (8 percent), residential (7 percent), imported electricity (6 percent), and commercial (5 percent).
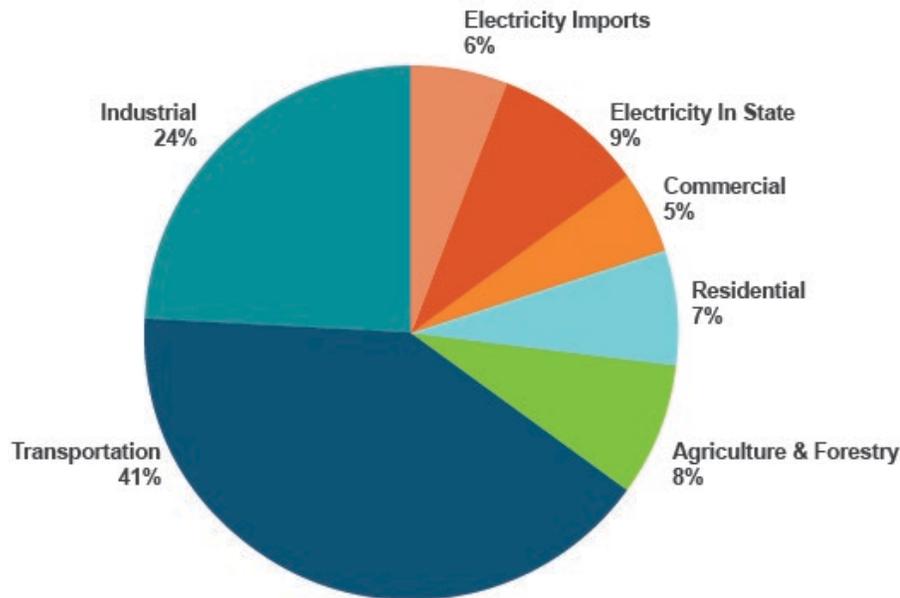
B.4 Four Scenarios Show What Climate Change Will Do To The Earth, From Pretty Bad To Disaster

The following is a reprint of an article that was published in Fast Company on August 26, 2014.[62] Despite the drops in emissions resulting from the downturn in economic activity during the COVID-19 pandemic, greenhouse gases are expected to continue to rise over the next decade,[63] [64] keeping us on course for the highest emissions pathway. Scientists are currently developing new emissions trajectories based on nine scenarios that will be used in the upcoming IPCC report.

Four Scenarios Show What Climate Change Will Do To The Earth, From Pretty Bad To Disaster

Climate change is going to do a lot of damage. How bad that damage will be is still under debate.

The most recent Intergovernmental Panel on Climate Change (IPCC) report left no doubt about the future of the world if we don't slow the rate at which we release heat-trapping gases into the atmosphere. In a word, it's going to get bad.

But exactly how bad is still an open question, and a lot depends not only on how we react, but how quickly. The rate at which humans cut down on greenhouse gas (GHG) emissions–if we do choose to cut them–will have a large bearing on how the world turns out by 2100, the forecasts reveal.

This graphic from the World Resources Institute gives a sense of the dynamics at play. It presents four "emissions pathways," ranging from the very optimistic to the highly pessimistic.

WE ACTUALLY DO SOMETHING ABOUT CLIMATE CHANGE

LOW EMISSIONS PATHWAY

Carbon dioxide emissions peak by 2020 and then drop 66% below 2010 levels by 2050. While the world will still experience some climate impacts under this pathway, they grow exponentially worse under higher emissions scenarios.

Global temperature increases by up to 2°C

24%

About 24% more of the projected global population will face reduced renewable groundwater resources by the 2080s compared to the 1980s.

In the 2080s, about 4 times as many people are expected to be annually exposed to the amount of water associated with a 100-year flood compared to the 1980s.

35%

Roughly one-third of the world's coral reefs, which provide habitat and resources to more than 500 million people, will experience long-term degradations over the next few decades.

Australasia provides more than 40% of global dairy products. With 1°C of warming by 2030, dairy production will likely decline throughout Australia.

This is the upper bound of the median temperature range of the low emissions pathway scenario, and does not include the full range of uncertainty. The same is true for the "medium," "high," and "highest" emissions pathways.

The first "Low Emissions" scenario is for a 66% drop in greenhouse emissions by 2050 compared to 2010 levels. It's what we might call a soft landing, because under those conditions scientists believe we'll be relatively safe. The world would have warmed only by 2 degrees C over pre-industrial levels (the level set by various international agreements). Still, almost of the quarter of the world would suffer depleted groundwater supplies by 2080, and many more people will face extreme flooding, the WRI says. So, life wouldn't be peachy.

WE KEEP DOING WHAT WE'RE DOING

MEDIUM EMISSIONS PATHWAY

Carbon dioxide emissions peak by 2040, but still rise 19% above 2010 levels by 2050.

2056
Year the carbon budget is exhausted, locking in 2°C of warming.

Global temperature increases by up to 2.9°C

(Y-axis: ANNUAL EMISSIONS (P$_g$ C), values: 35, 30, 25, 20, 15, 10, 5, 0, -5)

(X-axis: 2012, 2020, 2030, 2040, 2050, 2060, 2070, 2080, 2090, 2100)

26%

About 26% more of the projected global population will face reduced renewable groundwater resources by the 2080s compared to the 1980s.

In the 2080s, about 6 times as many people are expected to be annually exposed to the amount of water associated with a 100-year flood compared to the 1980s.

59%

Roughly two-thirds of the world's coral reefs will experience long-term degradations over the next few decades.

Climate change impacts like heat stress are expected to negatively impact workers and decrease global productivity by 20% by 2100.

The "Medium Emissions" scenario sees increases in emissions until 2040 and the world exceeding its "carbon budget"–the level at which it should stay within the 2 degrees limit–by 2056. By 2100, the planet has warmed by 2.9 degrees, and economic productivity has fallen by 20%. By the 2080s, six times as many people are experiencing catastrophic flooding as the 1980s.

WE REV THE ENGINES

HIGH EMISSIONS PATHWAY

Carbon dioxide emissions peak by 2080, but still rise 34% above 2010 levels by 2050.

2057
Year the carbon budget is exhausted, locking in 2°C of warming.

Global temperature increases by up to 3.7°C

ANNUAL EMISSIONS (PGC)

35 / 30 / 25 / 20 / 15 / 10 / 5 / 0 / -5

2012 2020 2030 2040 2050 2060 2070 2080 2090 2100

32%

About 32% more of the projected global population will face reduced renewable groundwater resources by the 2080s compared to the 1980s.

In the 2080s, about 7 times as many people are expected to be annually exposed to the amount of water associated with a 100-year flood compared to the 1980s.

Ranges of many of the world's plant and animal species will decrease by more than 50% by 2080s with 3.5°C of warming.

With temperature increases of 3-4°C, agricultural production and global food security could see negative impacts so large-scale they cannot be adapted to.

The "High Emissions" scenario doesn't see emissions peaking until 2080, while global temperatures jump 3.7 degrees C by 2100. The carbon budget is exhausted in 2057. The impact on agricultural production is so heinous that adaption is no longer viable, the WRI predicts.

WE DESTROY THE PLANET

HIGHEST EMISSIONS SCENARIO
Annual carbon dioxide emissions peak by 2100, rising 108% above 2010 levels by 2050.

2045
Year the carbon budget is exhausted, locking in 2°C of warming.

Global temperature increases by up to 4.8°C

38%
About 38% more of the projected global population will face reduced renewable groundwater resources by the 2080s compared to the 1980s.

In the 2080s, about 12 times as many people are expected to be annually exposed to the amount of water associated with a 100-year flood compared to the 1980s.

More than 4°C of temperature rise will likely bring decreased agricultural production, loss of critical ecosystem functions, and extinction of many animal and plant species.

Soybean yields in the Amazon would drop 44% by 2050. With higher amounts of warming, coffee farming could be virtually impossible in Southeastern Brazil in 2100.

As if that's not bad enough, there's one last "Highest Emissions" scenario (they should have called it the Doomsday Scenario, really). It sees the carbon budget obliterated in 2045 and global temperatures increasing a whopping 4.8 degrees by century's end. Many animals have become extinct and farming in some places, like southern Brazil, has become impossible.

But won't we adapt to the new conditions, you might ask? Well, maybe. The scenarios here assume flat technology development, not the leaps forward in innovation that we can hope for. We could have drought-resistant crops and new ways of recycling and desalinating water, for instance, that could make these predictions less forceful.

The easier course, though, is to cut emissions. To have a fighting chance of coping with climate disorder, we have to cut greenhouse gases quickly, not just wait until it's convenient.

ABOUT THE AUTHOR: Ben Schiller is a New York staff writer for Fast Company. Previously, he edited a European management magazine and was a reporter in San Francisco, Prague, and Brussels.

C. Policy

C.1 Global Policy

United Nations Sustainable Development Goal #13: Climate Action

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing – in a global partnership. Goal #13 is "Take urgent action to combat climate change and its impacts."[65]

C.2 State Policy and Regulatory Context

The State of California has been a leader in developing and implementing policies and regulations to directly address the risk of severe climate change. Below we summarize the key statewide legislation aimed at reducing greenhouse gas (GHG) emissions and adapt to climate impacts. There are many supporting pieces of legislation and other related initiatives that are sector specific.

Assembly Bill 32 (AB 32), California Global Solutions Act, 2006

In September 2006, the California legislature passed Assembly Bill 32 (AB 32), which set the goal of reducing GHG emissions back to 1990 levels by 2020. AB 32 finds and declares that "global warming poses a serious threat to economic well-being, public health, natural resources and the environment of California." The legislation granted authority to the Air Resources Board to establish multiple mechanisms (regulatory, reporting, voluntary, and market) to achieve quantifiable reductions in GHG emissions to meet the statewide goal.

Senate Bill 97, CEQA Guidelines for Addressing GHG Emissions, 2007

In August of 2007, Senate Bill (SB) 97 was signed into law, expressly recognizing the need to analyze GHG emissions as a part of the California Environmental Quality Act (CEQA) process. SB 97 required the Office of Planning and Research (OPR) to develop, and the California Natural Resources Agency to adopt, amendments to CEQA Guidelines addressing the analysis and mitigation of GHG emissions. Those amendments became effective in March of 2010. Proposed projects that must comply with CEQA regulations include General Plans, Specific Plans and specific types of development projects.

Senate Bill 350, Clean Energy and Pollution Reduction Act, 2015

In October of 2015, Senate Bill 350 (SB 350) was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. SB 350 codified Governor Jerry Brown's aggressive clean energy goals and established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 (legislation originally enacted in 2002) to 50 percent by 2030. Renewable resources include wind, solar, geothermal, wave, and small hydroelectric power. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

Senate Bill 100, The 100% Clean Energy Act, 2018

In September of 2018, Governor Brown signed Senate Bill 100 (SB 100), requiring the State's load serving entities (including energy utilities and community choice energy programs) to achieve 50 percent renewable resources target by December 31, 2026, to achieve a 60 percent target by December 31, 2030 and supply 100

percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. At the same time, Governor Brown also signed Executive Order B-55-18, requiring California to achieve carbon neutrality as soon as possible, and no later than 2045, and to maintain negative emissions thereafter.

Senate Bill 1477, Low Emissions Buildings and Sources of Heat Energy, 2018

In September 2018, Governor Brown signed Senate Bill 1477 (SB 1477), that requires the California Public Utilities Commission (CPUC) to oversee two new low-carbon heating programs, investigate potential pilot programs to build all-electric, zero-carbon buildings in areas damaged by wildfires, coordinate with the California Energy Commission on updates to the State's building (Title 24) and appliance (Title 20) energy efficiency standards, and establish a building decarbonization policy framework. The bill authorizes $200 million over four years to be invested in programs to advance low-carbon space and water heating technologies in both new and existing buildings. Funding for the programs is slated to come from natural gas utility carbon allowance proceeds from California's cap-and-trade program.

Bay Area Air Quality Management District CEQA Guidelines

The Bay Area Air Quality Management District (BAAQMD) encourages local governments to adopt a GHG Reduction Strategy that is consistent with AB 32 goals. The GHG Reduction Strategy may streamline environmental review of community development projects. According to the BAAQMD, if a project is consistent with a GHG Reduction Strategy, then it can be presumed that the project will not have significant GHG impacts. This approach is consistent with the following State CEQA Guidelines, Section 15183.5.a:

> *"Lead agencies may analyze and mitigate the significant impacts of greenhouse gas emissions at a programmatic level, such as…a plan to reduce greenhouse gas emissions. Later project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review. Project-specific environmental documents may rely on an [Environmental Impact Report] containing a programmatic analysis of greenhouse gas emissions."*

This CAP provides a foundation for future development efforts in the community. It is expected that environmental documents for future development projects will identify and incorporate all applicable voluntary and mandatory actions from CAP for projects undergoing CEQA review.

C.3 State-Level Programs

The Town isn't expected to make all the reductions on its own. The following programs help cities meet their climate goals.

California Advanced Clean Cars Program

In 2012, CARB adopted a set of regulations to control emissions from passenger vehicles, collectively called Advanced Clean Cars. The program was developed in coordination with the U.S. EPA and National Highway Traffic Safety Administration (NHTSA) and combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of regulations. ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program

California Low Carbon Fuel Standard Program

The Low Carbon Fuel Standard (LCFS) is designed to encourage the use of low-carbon fuels, encourage the production of those fuels, and therefore, reduce GHG emissions. Currently, the LCFS calls for a 20 percent decline in the carbon intensity of diesel fuels below 2010 levels by 2030. ww3.arb.ca.gov/fuels/lcfs/lcfs.htm

Caltrain Electrification

Caltrain Electrification is a key component of Caltrain Modernization Program (CalMod). The current project will electrify the corridor from San Francisco to San Jose, including all track in San Mateo County, and will replace 75 percent of Caltrain's diesel service with electric. The project will lower GHG emissions, improve regional air quality, and reduce noise. https://calmod.org

California Renewable Portfolio Standard

The Renewable Portfolio Standard (RPS), originally established in 2002, required 20 percent of electricity retail sales to be served by renewable sources by 2017. The program was accelerated in 2015 with SB 350, which mandated a 50 percent RPS by 2030. SB 100, enacted in 2018, accelerated the program further, establishing renewable energy targets of 50 percent by 2026, 60 percent by 2030, and 100 percent by 2045. www.cpuc.ca.gov/rps

California Long Term Energy Efficiency Strategic Plan

Published in 2008 and updated in 2011, the California Long Term Energy Efficiency Strategic Plan outlines goals and strategies for key market sectors (i.e., commercial, residential, industrial, and agricultural) and crosscutting initiatives (e.g., heating, ventilation and air conditioning, codes and standards, research, and technology). While the Plan has not been updated since 2011, it is still referenced in numerous State documents and reports. The Plan embraces four specific programmatic goals, known as the Big Bold Energy Efficiency Strategies. These goals are:

- All new residential construction in California will be zero net energy by 2020.

- All new commercial construction in California will be zero net energy by 2030.

- The Heating, Venting and Air Conditioning (HVAC) industry will be re-shaped to deliver maximum performance HVAC systems.

- All eligible low-income customers will have an opportunity to participate in the LIEE program and will be provided all cost- effective energy efficiency measures in their residences by 2020.

More information on California's zero net energy goals can be found online at: www.cpuc.ca.gov/ZNE

Organic/Food Waste Diversion

In 2016, Senate Bill 1383 (SB 1383) established methane emissions reduction targets in a statewide effort to reduce emissions of short-lived climate pollutants in various sectors of California's economy. SB 1383 establishes target to achieve at least a 50 percent reduction in the level of statewide disposal of organic waste from 2014 levels by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets. More information about SB 1383 can be found online at: https://www.calrecycle.ca.gov/climate/slcp

C.4 Local Policy

In September 2019, the San Mateo County Board of Supervisors adopted a resolution declaring a climate emergency in San Mateo County to highlight the increasingly urgent need for action to address the climate crisis. The County of San Mateo joined over 1,000 national, international, and local jurisdictions with similar declarations. The resolution calls for the County to create climate action plans (CAPs) for its government operations and unincorporated community that will achieve carbon neutrality in advance of the State of California's 2045 goal, and coordinate with the cities and other local partners in addressing the climate crisis.[66]

D. Best Practices for Community Collaboration and Sustainability Planning

Community engagement is an invaluable resource to climate action planning, building the social cohesion and resilience needed to adapt and mitigate to climate change impacts. San Mateo County Health Policy and Planning (HPP) supports meaningful, transparent, and inclusive public participation of residents that are most impacted by the decisions at stake in planning and policy processes. Community is central to the process to:

- Learn about the issues we are trying to address

- Share power and resources

- Build community ownership of the issues

- Do "with" versus doing "for"

- Honor community residents' knowledge and experience

- Inform solutions, implementation, and evaluation

- Meet the community where they are

The most effective plans are those that create a transparent process and collaborate with community from the beginning, thus providing residents with the opportunity to create ownership of and interest in the plans and issues at hand. There is a spectrum of community engagement processes with increasing levels of public influence on decision-making processes, beginning with informing the public of decisions and issues on one end of the spectrum and collaborating and empowering community members to co-design and decide for themselves at the other end.[67]

Some California cities have engaged in effective public collaboration and empowerment practices in their planning process by sharing their decision-making power. The table below highlights jurisdictions with model planning practices that went beyond informing the public and collaborated with and empowered the public. Building strong sustainability planning comes down to building strong narratives internally and externally, while establishing transformative collaboration processes.[68, 69]

D.1 Health Policy and Planning Recommended Best Practices for Community Engagement

The following recommendations incorporate best practices for inclusive and intentional engagement, transparency and clear communication, community empowerment, and program measurement.

Inclusive & Intentional Engagement

- Work through existing networks of community-based and faith-based organizations that serve and organize in diverse cultural communities to identify community leaders to work with.

- Host a "meet and greet" with community organizations and advocacy groups to build connections across sectors and develop partnerships.

- Engage community members with humility and by meeting people where they are: do not expect all community members to engage at the same level, acknowledge the many forms of community member knowledge, and use accessible and non-technical language (not planning jargon).

- Attend community meetings and cultural events as a participant. Listen to what issues are discussed and how they are talked about. Be sensitive to and aware of potential power dynamics due to race, ethnicity, citizenship, class, or gender differences.

- Develop awareness of the racial and economic disparities in the area and why those disparities exist; seek insights from experienced community leaders and organizations.

- Seek out relationships with leaders from non-English speaking communities. Work with them to identify barriers to engagement and ways to bridge the divide to work with their communities. Translate materials and provide interpretation at community meetings.

- Build incentives for engagement for each strategy that reduce barriers to participate.

- Hold meetings at times, such as on evenings and weekends, and places that are convenient and accessible to the public, including low-income residents; whenever possible, provide childcare, meals, and transit passes. Meeting locations should be well served by public transit that runs at night and on weekends.

- Establish an Equity Working Group as a way of creating an effective forum for bringing together the best thinking on equity issues through ongoing dialogue. At the same time, ensure that the recommendations of equity stakeholders do not live in a silo but are brought to other key decision-makers and advisory groups throughout the process. Ensure equity representation on technical advisory committees.[70]

Transparency

- Structure your engagement and planning process to include substantive representation by Black, Indigenous, and People of Color (BIPOC) and/or organizations that represent low-income communities in various decision-making capacities.

- Communicate all key decision points in the planning or policy process.[71]

- Demonstrate how public input will be considered by describing how public input from outreach strategies will be used in the development, evaluation, and selection of the plan alternatives at each key decision point.

- Establish regular communication mechanisms and communicate early and often to gauge progress, gain feedback on the process, share information, and gain new ideas for cultivating connections and maintaining relevance to community concerns.

- Use diverse communication techniques such as social media, pictures, video, and art to help people absorb information visually.[72]

Empowerment: Sharing Power & Capacity

- Empower community members to take an active role in neighborhood revitalization from the start of a process. This means:
  - Creating a participatory process for developing a shared vision for community change.
  - Engaging residents in documenting not only the disparities and conditions that merit change but also community assets to preserve and build from.[73,74,75]

- Share governance and decision-making by, for example, setting aside resources to be shaped and decided on by community members. Resources can include: grants for community engagement, land acquisition funds, the hiring of consultants, project selection, or participatory budgeting.

- Structure the planning process so community organizations and leaders can: 1) Shape agendas and issues, 2) organize and lead convenings, and 3) identify concrete and measurable benchmarks for success, as well as the parties who will be responsible for both procedural (community engagement) and substantive (program/policy) outcomes.

- Establish a system of neighborhood-level resident representation to empower/engage local neighborhoods in their own revitalization process.[76]

- Build capacity within disadvantaged/vulnerable/historically underserved communities to empower them to co-lead, navigate and participate in planning and policy processes. This can be achieved by:
    - Contracting with local, community-based organizations in low-income communities and communities of color to conduct engagement processes.
    - Partnering with and funding equity-focused community-based organizations to train participating residents from low-income communities and communities of color in the content and skills they will need to exercise informed leaderships.[77,78]
- Promote Community Based Participatory Research (CBPR) principles in data collection and mapping of neighborhood existing conditions.[79]

Measuring Success

Community planning for sustainability requires establishing measurable standards for diligent implementation. Defined assessment standards such as the Envision Rating System or STAR Community Rating System enhance the success, progress, and opportunities for any plan.

The current CAP acknowledges the value of continuously updating the implementation matrix and the monitoring tool: both are critical for implementation and transparency. Including more holistic measures like those used by the STAR Community Rating and Envision Rating may enhance the CAP's current evaluation metrics. Measure review should also include both quantitative and qualitative performance measures.

D.2 Health Policy and Planning Recommended Best Practices for Measure Review

- Identify SMART (Specific, Measurable, Agreed Upon, Realistic, Time-Bound) goals to accurately track and measure goals and deliverables.
    - Effectively communicate and share information with county/municipal agencies and stakeholders.
- Use tools (e.g., checklists, health impact assessments, etc.) to evaluate and identify challenges and potential solutions.
    - Identify implementation priority areas based on equitable vulnerability practices/assessments.
    - Routinely conduct pre/post evaluations.
- Practice accountability (in the form of regular progress reports and meetings with interested stakeholders), consulting with experts and community.
    - Produce annual progress reports and ensure reports are accessible to communities.
    - Clearly identify and communicate action plan methodologies, performance measures, timelines, and leads.
    - Assess changes and updates on a yearly basis, both for the plan and the relevant areas.
- Measure benefits and impacts in low-income and other vulnerable communities.
    - Ensure that updates and investments benefit existing and future residents.
    - Include displacement risk of existing residents in measure criteria.
    - Prioritize implementation of goals and actions in areas that are most affected.

Additional Resources

- Your Community Toolbox for Leading in a Changing Climate: Step-by-step guide to collaborate across sectors and provide climate change education and engagement (Climate Education Partners)

- Sustainability Best Practices Framework: Options for local action in 10 sustainability areas (Institute for Local Government)

- Planning for Equity Policy Guide: Guidelines to remove policy barriers to equity (American Planning Association)

- Assessing Sustainability: A Guide for Local Governments: Best practices for sustainability implementation (American Planning Association)

- Office of Planning and Research Clearinghouse: Tools and database, case studies, climate stories, equity resources, and more sustainability best practices (Governor's Office of Planning and Research)

- International Association for Public Participation: Resources for public participation and engagement at all levels (i.e., government, institution, individual, etc.)

Table X: Community Engagement Model Practices in suburban, urban, and rural jurisdictions[80,81,82]

Jurisdiction (type)	Leading Stakeholders	Outcome	Model Practice
City of Napa (urban/rural)	City staff, Task force, and Community residents	Sustainability Plan	Interviews with community leaders
East Palo Alto (urban)	City Council, City staff, Community stakeholders	Health and Equity Element	Policies for civic engagement and inclusivity in decision-making process
Jurupa Valley (suburban)	Consultants, Community-based organizations, and City staff	Environmental Justice Element	Meetings in affected neighborhoods
Los Angeles (urban)	City council, City staff, and Citywide coalition	Clean Up Green Up Ordinance	Community data ground-truthing
National City (suburban)	City council, City staff, and Community-based organizations	Environmental Justice Element	Meetings with decision-makers
Oakland (urban)	Planning Bureau and 12 Community-based organizations	EO Neighborhood Initiative	Year-long community engagement
Richmond (urban)	Advisory Committee and City staff	Community Health & Wellness Element	Council-appointed committee of resident leaders

E. Partners

In addition to the partners listed here, the newly launched Bay Area Climate Action Mapping Project (https://www.bayareaclimateactionmap.org/) lists additional organizations actively working on climate action.

E.1 Public Sector

Organization	Description
Bay Area Regional Energy Network (BayREN) BAYREN *Local Governments Empowering Our Communities*	Led by the Association of Bay Area Governments (ABAG), BayREN provides regional-scale energy efficiency programs, services, and resources for single-family and multi-family homes, and small and medium-size businesses. BayREN supports cities in developing reach codes, and local building departments in complying with the Energy Code through trainings, events, and compliance tools. A water bill savings program is launching in 2020. In San Mateo County, the program is administered by the County of San Mateo Office of Sustainability. www.bayren.org
City/County Association of Governments of San Mateo County (C/CAG) C/CAG *City/County Association of Governments of San Mateo County*	C/CAG is a council of governments consisting of the County of San Mateo and its 20 cities and towns. The organization deals with topics such as transportation, air quality, stormwater runoff, hazardous waste, solid waste and recycling, land use near airports, abandoned vehicle abatement, and issues that affect general quality of life. C/CAG supports several sustainability initiatives including: **San Mateo County Energy Watch.** A local government partnership between PG&E and C/CAG to promote energy efficiency in municipal and non-profit buildings. It is managed and staffed by the County of San Mateo Office of Sustainability. https://smcenergywatch.org/ **Congestion Management Agency.** C/CAG serves as the Congestion Management Agency for San Mateo County to identify strategies to respond to future transportation needs, develop procedures to alleviate and control congestion, and promote countywide solutions. https://ccag.ca.gov/programs/transportation-programs/congestion-management/ **Sustainable Communities Strategy/Regional Transportation Plan.** C/CAG is collaborating with local governments and regional agencies to develop a Sustainable Communities Strategy (SCS) in compliance with the requirements of SB 375. The SCS will facilitate more focused development in priority development areas near public transit stations. The aim of the San Mateo County SCS is to better integrate land use with public transportation in order to reduce GHG emissions. The San Mateo Countywide Transportation Plan was adopted by the C/CAG Board of Directors in February 2017. The Plan can be found online at: https://ccag.ca.gov/programs/countywide-transportation-plan/ **San Mateo County Energy and Water Strategy 2025.** This Plan provides a comprehensive roadmap for addressing challenges in the energy and water sectors in San Mateo County through 2025. It was developed by the County of San Mateo Office of Sustainability and the City/County Association of Governments of San Mateo County (C/CAG) with extensive input from expert local stakeholders from other public agencies, community-based organizations, and the private sector. **San Mateo Countywide Water Pollution Prevention Program (SMCWPPP).** The program is a partnership of C/CAG, each incorporated city and town in the County, and the County of San Mateo, which share a common National Pollutant Discharge Elimination System (NPDES) permit. The goal of the collaboration is to reduce the pollution carried by stormwater into local creeks, the San Francisco Bay, and the Pacific Ocean. Permittees developed Green Infrastructure Plans to prompt specific reductions in mercury and PCBs (polychlorinated biphenyls) from entering the Bay via stormwater by 2040.

County of San Mateo Office of Sustainability OFFICE OF SUSTAINABILITY COUNTY OF SAN MATEO	The Office of Sustainability (OOS) strives to improve the sustainability of the County's operations and the greater community by administering programs and developing policies in the areas of renewable energy and energy efficiency, water conservation, alternative transportation, affordable housing, waste reduction, and greenhouse gas (GHG) emission reductions. OOS also leads the following regional collaborations: **Climate Ready SMC.** Brings together leaders from across sectors and jurisdictions to foster collaboration and collectively find solutions to make San Mateo County climate ready. The Collaborative is facilitated by the County of San Mateo Office of Sustainability. The Collaborative seeks to help leaders from non-profit and community-based organizations local government, businesses, and other key partners. https://www.smcsustainability.org/climate-ready **Home for All Initiative.** Builds on the work and momentum of the Closing the Jobs/Housing Gap Task Force. Led by Supervisors Don Horsley and Warren Slocum, the Home for All Initiative is working to inspire community action and promote closure of the County's 16:1 jobs/housing gap. The Initiative's members include representatives from all sectors of the community and are focused on creating a future where everyone in San Mateo County has an affordable home. https://homeforallsmc.org/ **Regionally Integrated Climate Action Planning Suite (RICAPS).** A set of tools and a collaboration of all 20 incorporated cities and the County in climate action planning and implementation. https://smcenergywatch.org/local-governments/
Flood and Sea-Level Rise Resiliency District	The Flood and Sea Level Rise Resiliency District is a coordinated, cross-jurisdictional collaborative to face impending coastal erosion, sea-level rise, and flooding threats as we look toward 2100. Comprised of the 20 incorporated cities, City/County Association of Governments, and the County of San Mateo, the purpose of this entity is to create a unified voice, to cost-effectively implement resilient infrastructure to face these challenges. The District initiates new countywide efforts to address sea-level rise, flooding, coastal erosion, and large-scale stormwater infrastructure improvements through integrated regional planning, project implementation and long-term maintenance. https://resilientsanmateo.org
ICLEI - Local Governments for Sustainability ICLEI Local Governments for Sustainability	ICLEI is an international organization of local and regional governments that have made a commitment to sustainable development. They provide guides and frameworks that support climate action. https://icleiusa.org/
Local Government Commission (LGC) Local Government Commission Leaders for Livable Communities	LGC works to build livable communities and local leadership by connecting leaders via innovative programs and network opportunities, advancing policies through participation at the local and state level, and implementing solutions as a technical assistance provider and advisor to local jurisdictions. https://www.lgc.org/
Peninsula Clean Energy PENINSULA CLEAN ENERGY	Peninsula Clean Energy (PCE) was launched collaboratively by the County of San Mateo and all 20 of its cities and towns in 2016 to help the environment through cleaner energy, while helping customers save money through lower rates. PCE currently offers two electricity options to all residents, businesses, and municipalities in San Mateo County. Customers are automatically enrolled in the ECOplus rate that consists of 50 percent renewable and 95 percent greenhouse gas-free energy and can "opt up" to the ECO100 rate that consists of 100 percent renewable energy that is Green-e certified. PCE has a stated goal of sourcing 100 percent of electricity from California Renewable Portfolio Standard (RPS) eligible renewable energy by 2025. PCE is also supporting programs that reduce GHG emissions and deliver benefits to San Mateo County communities. www.peninsulacleanenergy.com

RethinkWaste 	Also known as the South Bayside Waste Management Authority (SBWMA), RethinkWaste is a joint powers authority formed by 12 local government jurisdictions: Town of Atherton, City of Belmont, City of Burlingame, City of East Palo Alto, City of Foster City, Town of Hillsborough, City of Menlo Park, City of Redwood City, City of San Carlos, City of San Mateo, the County of San Mateo and the West Bay Sanitary District. SBWMA owns and manages the Shoreway Environmental Center in San Carlos, California, which receives all the recyclables, green waste, and garbage collected from the Member Agencies. https://rethinkwaste.org/
San Mateo County Public Health, Policy and Planning (HPP) 	This County department protects the health of everyone who lives, works, learns, and plays in San Mateo County by preventing the spread of communicable diseases, delivering targeted health care services, providing public health laboratory testing, and building communities that make it easy to stay healthy. HPP is happy to partner with local governments working on climate action planning processes. https://www.smchealth.org/division-public-health-policy-and-planning
San Mateo County Transit District (SamTrans) 	SamTrans provides public transit and transportation programs in San Mateo County: SamTrans bus service, including Redi-Wheels & RediCoast paratransit service, Caltrain commuter rail, and the San Mateo County Transportation Authority. https://www.samtrans.com/
San Mateo County's Transportation Demand Management Agency (Commute.org) 	This public agency aims to reduce the number of drive-alone vehicles traveling to, from, or through San Mateo County. Its goal is to help residents and commuters find alternatives to driving alone that are less stressful, less costly, and better for the environment. The agency provides information and commute planning assistance to employees, offers employer programs, and supports city transportation demand management partnerships. https://commute.org/

E.2 Non-Profit Organizations

Organization	Description
Acterra 	Acterra builds alliances between community residents, local government programs, and community-based organizations in low-income areas in San Mateo County to create resilience against the coming impacts of climate change. https://www.acterra.org/
Building Decarbonization Coalition 	The Building Decarbonization Coalition unites building industry stakeholders with energy providers, environmental organizations, and local governments to help electrify California's homes and workspaces with clean energy. Through research, policy development, and consumer inspiration, the BDC is pursuing fast, fair action to accelerate the development of zero-emission homes and buildings that will help California cut one of its largest sources of climate pollution, while creating safe, healthy, and affordable communities. www.buildingdecarb.org/

Business Council on Climate Change (BC3) BUSINESS COUNCIL ON **CLIMATE CHANGE**	The Business Council on Climate Change (BC3) is a San Francisco-based multi-sector partnership dedicated to incubating, scaling, and sharing world-leading solutions to address climate change. It helps companies pool their buying power to move markets and improve the economics of sustainable purchasing decisions, share knowledge about sustainability programs that work, coordinate multi-company or multi-sector partnerships, and create opportunities for cross-sector dialogue to advance Bay Area climate policy. https://www.bc3sfbay.org/
GRID Alternatives GRID ALTERNATIVES	The nation's largest nonprofit solar installer, GRID develops and implements solar projects that serve low-income households and communities. The organization partners with affordable housing organizations, job training groups, government agencies, municipalities, utilities, tribes, and local communities to make solar a win for everyone. https://gridalternatives.org/
Joint Venture: Silicon Valley Network Joint Venture SILICON VALLEY	Established in 1993, Joint Venture provides analysis and action on issues affecting the Silicon Valley economy and quality of life. The organization brings together established and emerging leaders—from business, government, academia, labor, and the broader community—to spotlight issues, launch projects, and work toward innovative solutions. Joint Venture is actively involved in Silicon Valley's regional response to climate change. It is engaged with dozens of regional and local public and private agencies, municipalities, businesses, and other stakeholders in programs and activities designed to reduce greenhouse gas (GHG) emissions, promote sustainable energy, and improve the quality of life for all. www.jointventure.org
Peninsula Interfaith Climate Action	Peninsula Interfaith Climate Action (PICA) is a Regional Working Group of California Interfaith Power and Light. To carry forward this local interfaith approach, PICA was formed in 2014 with members from about a dozen congregations from the San Francisco Bay Peninsula area, including Trinity Episcopal in Menlo Park and the Unitarian-Universalist Fellowship of Redwood City. PICA members work to reduce the carbon footprint at their facilities by sharing information and best practices on energy, water, and resource conservation. https://www.interfaithpower.org/get-involved-3/pica/
Rising Sun Center for Opportunity RISING SUN CENTER FOR OPPORTUNITY	Rising Sun runs Climate Careers, a summer youth employment and residential water and energy efficiency program in the Bay Area. Climate Careers hires young people (ages 15 to 22) to become Energy Specialists, serving their communities with a free Green House Call. Energy Specialists perform audits, install free energy and water saving devices, and provide personalized recommendations and education for further savings in the home. Climate Careers was designed to serve hard-to-reach residents including renters, non-English speaking households, and low- to moderate-income households. https://risingsunopp.org/
San Mateo County Association of Realtors (SAMCAR) SAMCAR	SAMCAR is a trade association organized to ensure professionalism, protect property rights, promote the ownership of real property, and help members achieve success. https://www.samcar.org/

San Mateo County Economic Development Agency (SAMCEDA)	SAMCEDA was founded in 1953 to promote business issues that enhance and sustain the economic prosperity of our region and its local communities. https://www.samceda.org/
Sustainable San Mateo County (SSMC)	SSMC supports multiple programs to promote energy efficiency, alternative transportation, and education on sustainability concepts that focus on the intersections of the environment, economy, and social equity. SSMC's core programs include an Indicators Report that has been produced annually since 1997 and the Sustainable San Mateo County Awards Event, which has been held annually since 1999. The most recent Indicators Report can be found online at: https://sustainablesanmateo.org/home/indicators/
Sustainable Silicon Valley (SSV)	SSV is a collaboration of businesses, governments, and non-governmental organizations that are identifying and addressing environmental and resource pressures in Silicon Valley. As its first initiative, SSV engages Silicon Valley organizations to work towards a goal of reducing regional carbon dioxide emissions 20 percent below 1990 levels by 2010. SSV's Net Positive Bay Area 2050 goals are to: 1) produce more renewable energy than we consume, 2) sequester more carbon than we emit, and 3) optimize water resources to ensure water resilience. Their current strategy focuses on facilitating measure projects, education, events, and polices that deliver solutions by activating SSV's member network to reach the Net Positive Bay Area goals. www.sustainablesv.org
Thrive, The Alliance for Nonprofits of San Mateo County	A robust, trusted network of 200+ nonprofit organizations, government entities, foundations, businesses, and community leaders with a shared commitment to strengthening the nonprofit sector, thereby improving the quality of life in San Mateo County. Thrive unites the voice and influence of nonprofits, helps build their capacity, and enables effective cross-sector collaboration. https://www.thrivealliance.org/

F. Summary of Funding Sources

For implementation of the CAP, Atherton must evaluate strategies for financing climate protection actions and provide adequate, reliable, and consistent long-term program funding. This appendix provides an overview of available funding sources to help determine appropriate potential program funding sources and funding levels to support existing and new programs outlined in this plan. Other funding sources may be available that are not listed here.

F.1 Federal Funding

Better Utilizing Investments to Leverage Development (BUILD) Transportation Discretionary Grants program https://www.transportation.gov/BUILDgrants

Transportation Secretary Elaine L. Chao announced that in fiscal year 2020 over $1 billion will be available for transportation projects that "have significant local or regional impact." Cities can apply for a BUILD grant to fund road, rail, transit, and port projects. In the first two years of the BUILD Grants Program, other cities in California were awarded grants for zero-emission, battery-electric buses and chargers, as well as roadway improvements to enhance walkability and bikeability.

F.2 State Funding

Energy Conservation Assistance Act (ECAA) Program Loans

http://www.energy.ca.gov/efficiency/financing/index.html

Since 1979, more than $399 million has been allocated to more than 850 recipients through ECAA Program Loans. The program offers loans with a one percent interest rate to finance energy efficiency improvements. The maximum loan amount is $3 million per application. Eligible projects include lighting system upgrades, pumps and motors, streetlights and LED traffic signals, energy management systems and equipment controls, building insulation, energy generating infrastructure including renewable and combined heat and power projects, HVAC equipment, water and waste water treatment equipment, and load shifting projects.

F.3 Utility Programs

Pacific Gas and Electric Company (PG&E) offers a full suite of energy efficiency rebates to support its customers in saving energy and money.

Rebates

For households: https://www.pge.com/en_US/residential/save-energy-money/savings-solutions-and-rebates/rebates-by-product/rebates-by-product.page?

For small and medium businesses: https://www.pge.com/en_US/business/save-energy-money/business-solutions-and-rebates/product-rebates/product-rebates.page

For large businesses: https://www.pge.com/en_US/large-business/save-energy-and-money/business-solutions-and-rebates/product-rebates.page

0% interest Financing

For businesses: https://www.pge.com/en_US/small-medium-business/save-energy-and-money/energy-efficiency-financing.page

F.4 Other Funding Opportunities

American Forests Global ReLeaf Grant Program

http://www.americanforests.org/discover-american-forests/our-work/

American Forests is a non-profit organization founded in 1875 that promotes forest conservation. American Forest's Global ReLeaf Program provides grants to fund tree-planting projects in urban and natural areas.

Funding and Financing Climate Action Plans Report

https://www.usdn.org/uploads/cms/documents/usdn_funding_financing_climate_action_final_report.pdf

Urban Sustainability Directors Network (USDN) and HIP Investor developed comprehensive financing and funding analysis for six USDN member cities and created a guide to assist other cities in performing similar work in future Climate Action Plan updates. The report builds on the Financing Sustainable Cities Scan and Toolkit, an action-oriented "how-to toolkit" for Chief Sustainability Officers and Chief Financial Officers to catalog implementable and emerging funding mechanisms that can support cities striving towards bold climate action and sustainability goals. The toolkit includes a scan report, infographic of finance options, and conference agenda.

Large Landscape Audit

http://bawsca.org/conserve/programs/audits

BAWSCA and its participating member agencies offer this audit program to select large landscapes within the service area free of charge. This program includes the development and monthly distribution of landscape water budgets for selected accounts and actual large landscape surveys to assess landscape watering needs. A key component of the program is ongoing monitoring/tracking of actual water use and estimated water savings for the sites surveyed. For water conservation related questions, please call (650) 349-3000 or send an email to bawsca@bawsca.org. Also check with your local water company; some offer water audits for no charge.

Waste Audits by Recology

https://www.recology.com/index.php/commercial-beyond-the-cart/84-commercial

Recology offers a free waste audit to its business customers. A Waste Zero Specialist will come to your facility to advise you on the size/type of bins you could use and make other recommendations to help you reduce the amount of waste generated. To make an appointment, call (650) 595-3900.

G. Adaptation Planning for Climate Impacts

Effective adaptation planning and management entails dealing with uncertainty. It is a long-term process that should allow immediate action when necessary and adjust to changing conditions and new knowledge. Atherton plans to initiate an inclusive planning process that ensures the resulting actions are feasible and widely accepted. Adaptation will likely be an ongoing process of planning, prioritization, and specific project implementation.

Five important steps to effective adaptation planning are summarized below:

1. **Increase Public Awareness, Engage and Educate the Community**

   It is critical that the public understand the magnitude of the challenge and why action is needed. It is also important for the community to be aware of win-win opportunities that can improve quality of life, protect community members, and potentially generate more jobs. The planning process should be inclusive of all stakeholders. Local outreach campaigns are needed to promote awareness of the dangers of heat exposure, flooding, wildfires, and recommend low-cost and low-GHG adaptation strategies. These efforts should leverage similar efforts undertaken at the regional, state, and federal levels. The efforts should be inclusive of community organizations (especially those with socially vulnerable community members), and include community needs early on in the process.

2. **Assess Vulnerability**

   Understanding vulnerability to sea-level rise and other climate change impacts is critical to developing adaptation effective strategies. A detailed vulnerability analysis should be performed to assess potential climate change impacts to infrastructure and natural systems. Climate Ready SMC has developed an interactive map of climate impacts for all cities and unincorporated County. Assets and infrastructure can be overlaid with individual or multiple climate impacts to project their future vulnerability. The map includes critical infrastructure, socially vulnerable communities, and health facilities to allow for rapid vulnerability analysis. For example, cities can engage with city staff and community members to "ground-truth" data assumptions based on current observations. Often the people who live and work in the areas modeled can add valuable details, nuance, and missing information to assist Planners. Level of risk can be categorized in terms of likelihood of damage within the forecasting period and the severity of the damages. This allows planners to prioritize their response to climate change over time, known as the adaptation pathway approach. The vulnerability assessment can also provide a framework for agency and community education and participation, feed into other planning documents, and identify funding needs.

3. **Establish Goals, Criteria, and Planning Principles**

   Engage with stakeholders to establish planning priorities, determine decision criteria, and build community support for taking action. Include community-based organizations in this process to ensure that these priorities and criteria will reflect their needs as well. Rank physical and natural assets for preservation efforts. Where possible, look for situations where a mitigation action has adaptation co-benefits (e.g., planting trees to reduce urban heat islands while sequestering carbon and providing habitat).

4. **Develop Adaptation Plan**

   Identify specific strategies, develop actions and cost estimates, and prioritize actions to increase local resilience of Town infrastructure and critical assets, including community-identified and natural systems like wetlands and urban forests. Look for synergies between natural processes and engineering solutions. There is a continuum of strategies available to manage climate change impacts. An adaptation plan should include a prioritized list of actions (e.g., projects) with a timeline, capital expenditure plan, and framework for monitoring and adaptive management. Efforts should be made to integrate capital projects, existing infrastructure, emergency planning, and community services.

5. **Ongoing Monitoring and Adaptive Management**

   Reassess climate change vulnerabilities on a regular basis and modify actions accordingly. This includes monitoring the effectiveness of current policies, strategies and actions, and keeping up with changing science, funding opportunities, and regulatory actions. When reassessing, consider the most updated science available, and the timing of the impact.

Climate Ready SMC has developed a set of climate adaptation strategies and tools for use in planning. These tools will continue to be updated as new ones are available, including tools for developing climate adaptation plans, incorporating climate adaptation into General Plans, Local Hazard Mitigation Plans, Capital Improvement Plans, and community engagement and social equity. For the latest information on climate impacts and adaptation strategies, visit the Climate Ready SMC site: https://www.smcsustainability.org/climate-ready.
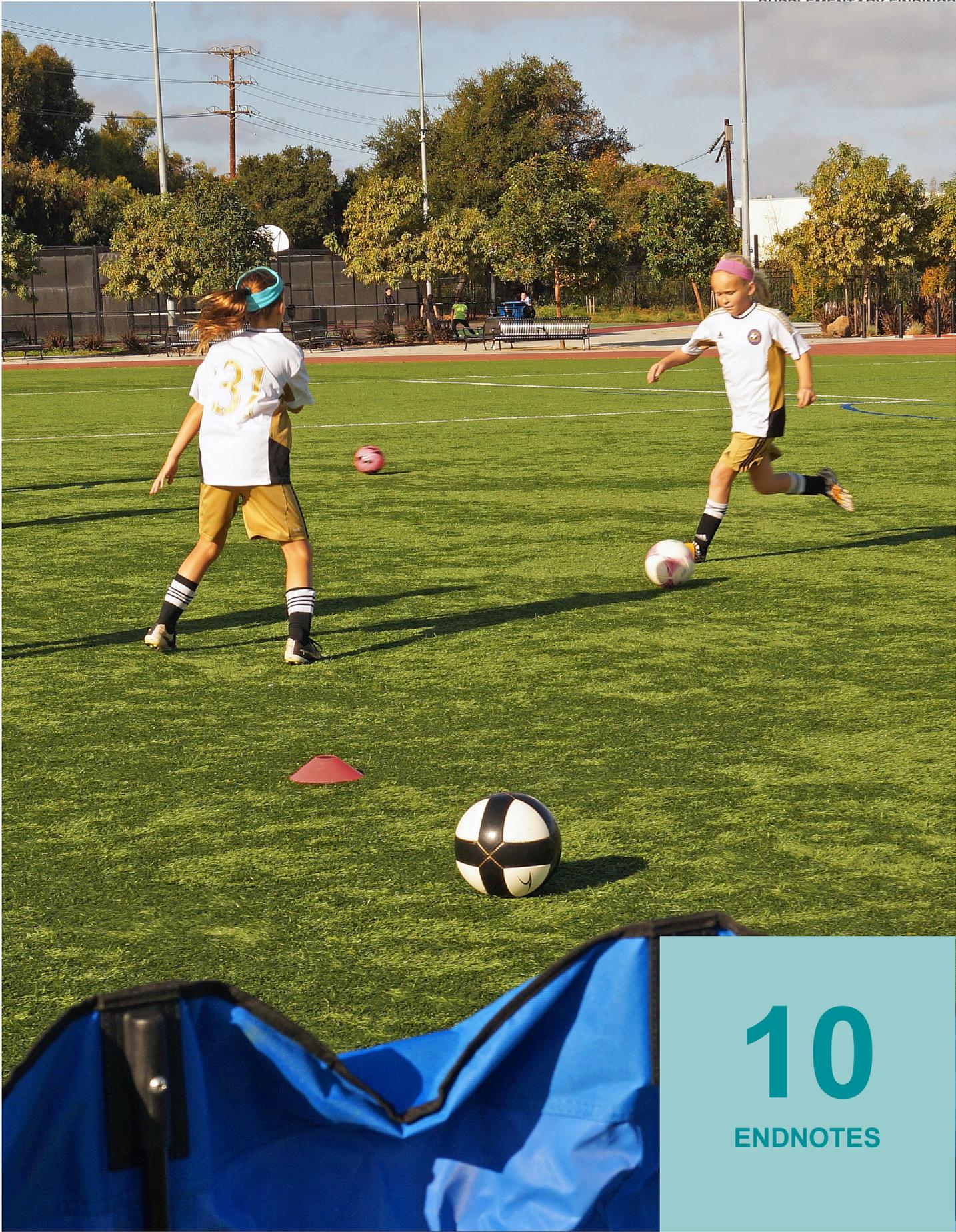
10
ENDNOTES

document.

Endnotes

[1] McConnell, R., et al. (2010). Childhood incident asthma and traffic-related air pollution at home and school. *Environ. Health Perspect.* 118, 1021–1026. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2920902/.

[2] Center for Neighborhood Technology. (2010). The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental, and Social Benefits. Retrieved from https://www.cnt.org/sites/default/files/publications/CNT_Value-of-Green-Infrastructure.pdf.

[3] Haines, A. *(2017).* Health co-benefits of climate action. *The Lancet Planetary Health.* Volume 1, Issue 1, Pages 4-e5, ISSN 2542-5196, Retrieved from https://doi.org/10.1016/S2542-5196(17)30003-7.

[4] Seattle.gov. (2020) Seattle City Light. Retrieved from https://www.seattle.gov/light/atwork/release.asp?RN=423

[5] Sullivan, W., Kuo, F. and Depooter, S. (2004). The Fruit of Urban Nature: Vital Neighborhood Spaces. *Environment and Behavior.* 36:678. Retrieved from https://journals.sagepub.com/doi/10.1177/0193841X04264945.

[6] Kuo, F.E. and Sullivan, W.C. (2001). Aggression and violence in the inner city: Impacts of environment via mental fatigue. *Environment & Behavior.* 33(4): 543-571.

[7] Leyden K. M. (2003). Social Capital and the Built Environment: The Importance of Walkable Neighborhoods. *Am. J. Public Health.* 93:1546–1551.

[8] CalTrans. (n.d.). SM 101 Express Lanes Project. Retrieved from https://dot.ca.gov/caltrans-near-me/district-4/d4-projects/d4-san-mateo-101-express-lane-project

[9] Government of the District of Columbia. (n.d.). Climate Ready DC: The District of Columbia's Plan to Adapt to a Changing Climate. Retrieved from https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/CRDC-Report-FINAL-Web.pdf.

[10] Peninsula Clean Energy. (2020). Used EV Incentives - Peninsula Clean Energy. Retrieved from https://www.peninsulacleanenergy.com/driveforwardelectric/.

[11] Environmental Defense Fund Climate Corps. (2017). The Growth of America's Clean Energy & Sustainability Jobs. Retrieved from http://edfclimatecorps.org/sites/edfclimatecorps.org/files/the_growth_of_americas_clean_energy_and_sustainability_jobs.pdf.

[12] Delucchi, M., Wang, Q. and Sperlin, D. (1989) Electric Vehicles: Performance, Life-Cycle Costs, Emissions, and Recharging Requirements. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.294.3080&rep=rep1&type=pdf.

[13] Wei D., Brugués A., Rose A., et al. (2017). Climate change and the economy in Baja California: Assessment of macroeconomic impacts of the State's Climate Action Plan.*Ecological Economics.* Volume 131, 2017, Pages 373-388, ISSN 0921-8009. Retrieved from http://www.sciencedirect.com/science/article/pii/S0921800915302482

[14] U.S. Department of Energy Energy Information Administration. (1998). Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings. Retrieved from https://www3.epa.gov/climatechange/Downloads/method-calculating-carbon-sequestration-trees-urban-and-suburban-settings.pdf

[15] County of San Mateo County Manager's Office. (2019, Sept 17). Board of Supervisors Declare Climate Emergency in San Mateo County. Retrieved from https://cmo.smcgov.org/blog/2019-09-17/board-supervisors-declare-climate-emergency-san-mateo-county

[16] ICLEI: Local Governments for Sustainability. (n.d.). Climate Equity. Retrieved from https://icleiusa.org/programs/climate-equity/

[17] Roberts, D. (2017). Wealthier people produce more carbon pollution — even the "green" ones. *Vox.* Retrieved from https://www.vox.com/energy-and-environment/2017/12/1/16718844/green-consumers-climate-change

[18] ICLEI: Local Governments for Sustainability. (n.d.). Five Milestones of Emissions Management. Retrieved from http://icleiusa.org/programs/emissions-management/5-milestones/http://icleiusa.org/programs/emissions-management/5-milestones/.

[19] Urban Sustainability Directors Network. (2017, May). Guide to Equitable, Community-Driven Climate Preparedness Planning. Retrieved from https://www.usdn.org/uploads/cms/documents/usdn_guide_to_equitable_community-driven_climate_preparedness-_high_res.pdf.

[20] UCLA Center for Climate Science. (2018). Climate Change in the Sierra Nevada. Retrieved from https://www.ioes.ucla.edu/wp-content/uploads/UCLA-CCS-Climate-Change-Sierra-Nevada.pdf

[21] Ibid.

[22] California's Fourth Climate Change Assessment: San Francisco Bay Area Region Report. 2019. Retrieved from https://climateassessment.ca.gov/regions/

[23] Peterson, M. (2018, Oct 22). Investigation Finds Home Can Be the Most Dangerous Place in a Heat Wave. *KQED.* Retrieved from https://www.kqed.org/science/1933237/investigation-finds-home-can-be-the-most-dangerous-place-in-a-heat-wave

[24] Climate Ready San Mateo County Coastal and Inland Flooding Factsheet (2020). https://climatereadysmc.org/

[25] California's Fourth Climate Change Assessment: San Francisco Bay Area Region Report. 2019. Retrieved from https://climateassessment.ca.gov/regions/

26 Sea Change San Mateo County. (n.d.). Sea Level Rise Vulnerability Assessment – Sea Change San Mateo County. Retrieved from http://seachangesmc.org/vulnerability-assessment/.

27 Ibid.

28 California Natural Resources Agency and California Ocean Protection Council. (2018). State of California Sea-Level Rise Guidance: 2018 Update. Retrieved from http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf

29 State of California. (2018). California's Fourth Climate Change Assessment. Retrieved from http://climateassessment.ca.gov/

30 Ibid.

31 Ibid.

32 Ibid.

33 Ibid.

34 Pacific Gas and Electric Company. (n.d.). *Public Safety Power Shutoff (PSPS)*. Retrieved from https://www.pge.com/en_US/safety/emergency-preparedness/natural-disaster/wildfires/public-safety-power-shutoff-faq.page.

35 American Meteorological Society. (2018). Explaining Extreme Events from a Climate Perspective. Retrieved from https://www.ametsoc.org/ams/index.cfm/publications/bulletin-of-the-american-meteorological-society-bams/explaining-extreme-events-from-a-climate-perspective/.

36 Lawrence, D.F., et al. (2004, Aug). Obesity relationships with community design, physical activity, and time spent in cars. *Am J Prev Med.27(2):87-96. Retrieved from https://pubmed.ncbi.nlm.nih.gov/15261894/.*

37 Sallis, J.F., Linton, L.S., Kraft M.K., et al. (2009, Feb 1). Active Living Research Program. *Am J Prev Med.* Retrieved from https://www.rwjf.org/en/library/research/2009/02/the-active-living-research-program.html.

38 California Air Resources Board. (2017). The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target. Retrieved from https://ww3.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

39 County of San Mateo. (2019). Board of Supervisors Declare Climate Emergency in San Mateo County. Retrieved from https://cmo.smcgov.org/blog/2019-09-17/board-supervisors-declare-climate-emergency-san-mateo-county.

40 Executive Department State of California. (2019). Executive Order B-55-18 to Achieve Carbon Neutrality. Retrieved from https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf.

41 C40 Cities Climate Leadership Group. (2020). Consumption-Based GHG Emissions of C40 Cities. Retrieved from https://www.c40.org/researches/consumption-based-emissions.

42 PPIC Water Policy Center. (2016). Energy and Water Use in California are Interconnected. Retrieved from https://www.ppic.org/content/pubs/report/R_1016AER.pdf

43 California Air Resources Board. (2019). Sales of electric cars breaking records in California. Retrieved from https://ww2.arb.ca.gov/news/sales-electric-cars-breaking-records-california

44 California Energy Commission. Zero Emission Vehicle and Infrastructure Statistics. Retrieved from https://www.energy.ca.gov/data-reports/energy-insights/zero-emission-vehicle-and-charger-statistics#

45 EPA. (2019). The 2019 Automotive Trends Report. Retrieved from https://www.epa.gov/automotive-trends/highlights-automotive-trends-report

46 California Integrated Waste Management Board (2009, Aug). California 2008 Statewide Waste Characterization Study. Retrieved from www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2009023/Summary.pdf.

47 NOAA. (n.d.). Ocean-Atmosphere Co2 Exchange. Retrieved from https://sos.noaa.gov/datasets/ocean-atmosphere-co2-exchange/.

48 Project Drawdown. (2020). Table of Solutions. Retrieved from https://drawdown.org/solutions/table-of-solutions.

49 Uhlenhuth K. (2015, Jan 27). How crop waste could become carbon-negative energy. *Energy News*. Retrieved from https://energynews.us/2015/01/27/midwest/how-crop-waste-could-become-carbon-negative-energy/

50 Jones C., & Kammen D. (2015). A Consumption-Based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties: Prioritizing Climate Action for Different Locations. Retrieved from https://escholarship.org/uc/item/2sn7m83z.

51 Ibid.

52 Bositis, D. A. (2010). Opinion of African Americans on Climate Change and 2010 Midterm Elections: The Results of a Multi-State Poll. The View from Arkansas, Indiana, Missouri, and South Carolina. Washington, DC: Joint Center for Political and Economic Studies. Retrieved from http://jcpes.files.wordpress.com/2010/03/pollfinal.pdf.

53 Pachamama Alliance. (2020 Jan 29). Four Levels of Action with Will Grant. Retrieved from https://www.facebook.com/PachamamaAlliance/videos/four-levels-of-action-with-will-grant/3650624068311455/?__so__=permalink&__rv__=related_videos.

54 UCLA Luskin Center for Innovation. (2019). California Building Decarbonization: Workforce Needs and Recommendations. Retrieved from https://innovation.luskin.ucla.edu/wp-content/uploads/2019/11/California_Building_Decarbonization.pdf.

Endnotes

Error! No text of specified style in
document.

[55] Intergovernmental Panel on Climate Change (IPCC).(n.d.). Intergovernmental Panel on Climate Change Special Report: Global Warming of 1.5ºC. Retrieved from https://www.ipcc.ch/sr15/.

[56] U.S. Environmental Protection Agency. (2018). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018. Retrieved from https://www.epa.gov/sites/production/files/2020-02/documents/us-ghg-inventory-2020-chapter-2-trends.pdf.

[57] Ibid.

[58] Ibid.

[59] California Air Resources Board. (2019). California Greenhouse Gas Emissions for 2000 to 2017. Retrieved from https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf.

[60] California Energy Commission. Renewables Portfolio Standard – RPS. (n.d.). Retrieved from https://www.energy.ca.gov/programs-and-topics/programs/renewables-portfolio-standard.

[61]" California Air Resources Board. (2020). Cap-and-Trade Program. Retrieved from https://ww3.arb.ca.gov/cc/capandtrade/capandtrade.htm.

[62] Schiller, B. (2014, August 26). 4 Scenarios Show What Climate Change Will Do To The Earth, From Pretty Bad to Disaster. Fast Company. Retrieved from: https://www.fastcompany.com/3034316/4-scenarios-show-what-climate-change-will-do-to-the-earth-from-pretty-bad-to-disaster

[63] Hausfather, Z. (2019, August 21). Explainer: The high-emissions 'RCP8.5' global warming scenario. CarbonBrief. Retrieved from: https://www.carbonbrief.org/explainer-the-high-emissions-rcp8-5-global-warming-scenario

[64] Climate Action Tracker (2020, December) Paris Agreement turning point. Retrieved from: https://climateactiontracker.org/documents/829/CAT_2020-12-01_Briefing_GlobalUpdate_Paris5Years_Dec2020.pdf

[65] United Nations Sustainable Development Goals. (n.d.). Sustainable Development Goal 13. Retrieved from https://sustainabledevelopment.un.org/sdg13.

[66] County of San Mateo. (2019). Retrieved from https://cmo.smcgov.org/blog/2019-09-17/board-supervisors-declare-climate-emergency-san-mateo-county.

[67] Stuart G. Sustaining Community. (2014, Feb 14). What is the Spectrum of Public Participation? Retrieved from https://sustainingcommunity.wordpress.com/2017/02/14/spectrum-of-public-participation/

[68] Feiden, W. (2018). Building Sustainability and Resilience into Local Planning Agencies.

[69] Climate Health Action. (2019). U.S. Call to Action on Climate, Health, and Equity: A Policy Action Agenda. Retrieved from https://climatehealthaction.org/media/cta_docs/US_Call_to_Action.pdf.

[70] Urban Habitat. (2015). Six Wins for Social Equity Network. (2015). Re: Public Participation Plan for Plan Bay Area 2017. Retrieved from https://www.urbanhabitat.org/campaigns/6-wins-social-equity-network

[71] Bergstrom D.

[72] Urban Habitat. (2015). Six Wins for Social Equity Network. (2015). Re: Public Participation Plan for Plan Bay Area 2017. Retrieved from https://www.urbanhabitat.org/campaigns/6-wins-social-equity-network

[73] PolicyLink. (2018). Community Engagement & Participation Checklist: Addressing Disparities for Healthier Places. Retrieved from http://www.policylink.org/sites/default/files/COMMUNITY%20ENGAGEMENT%20CHECKLIST.pdf

[74] City of Salinas. (2016). Economic Development Element (EDE). Retrieved from http://businessinsalinas.com/About-Us/Proposed-General-Plan-Economic-Development-Element.aspx.

[75] PolicyLink. (2018). Community Engagement & Participation Checklist: Addressing Disparities for Healthier Places. Retrieved from http://www.policylink.org/sites/default/files/COMMUNITY%20ENGAGEMENT%20CHECKLIST.pdf

[76] City of Salinas. (2016). Economic Development Element (EDE). Retrieved from http://businessinsalinas.com/About-Us/Proposed-General-Plan-Economic-Development-Element.aspx.

[77] Ibid.

[78] Bergstrom D.

[79] PolicyLink. (2018). Community Engagement & Participation Checklist: Addressing Disparities for Healthier Places. Retrieved from http://www.policylink.org/sites/default/files/COMMUNITY%20ENGAGEMENT%20CHECKLIST.pdf

[80] Vanderwarker A., Eng, T., Early, D., et al. (2018). SB 1000 Implementation Toolkit (p. 176). California Environmental Justice Alliance.

[81] Walker, C., et al. (2012). City of Napa Sustainability Plan. 103.

[82] City of Oakland. (2020). East Oakland Neighborhoods Initiative. Retrieved from https://www.oaklandca.gov/topics/east-oakland-neighborhoods-initiative.