Town of Colma

Climate Action Plan 2030

Acknowledgements

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Executive Summary

The Town of Colma has been a leader in sustainability and actively implementing greenhouse gas emissions (GHG) reduction programs since the Council approved the original Climate Action Plan in 2013. The GHG reduction programs have increased energy efficiency, reduced waste to landfills, conserved water, expanded renewable energy usage, reduced costs and increased operational efficiencies. Thanks to active program implementation, Colma has met and exceeded the 2020 GHG reduction target established in Colma's 2013 Climate Action Plan. According to the Town's 2017 GHG inventory, Colma has reduced GHG emissions by 27%[a] compared to their 2005 baseline.

Since Colma adopted the 2013 CAP, California Legislature passed new climate protection legislation, Senate Bill (SB) 32, which set a new GHG emissions reduction target of 40% below 1990 levels or 49% below 2005, (Colma's base year) by 2030. **In response to this new legislation, this Climate Action Plan 2030 Update (CAP 2030) is Colma's new plan to achieve new ambitious GHG reduction targets. This CAP 2030 provides the Town with new and expanded GHG reduction programs to implement and meet these aggressive targets**. The CAP 2030 outlines the necessary next steps to implement new and expanded programs to reduce GHGs and meet the 2030 target. This CAP 2030 also helps Colma look ahead to fight climate change at a local level and become a more resilient community.

Climate change is happening now. Countries all over the world are being impacted by climate change and are experiencing historic droughts, more extreme temperatures, heat waves, devastating wildfires, air quality issues which impact the elderly and young, and many other related impacts. Colma joins other jurisdictions throughout California and the United States in reducing GHG emissions through effective and efficient programs and policy implementation. Colma's CAP 2030 establishes the goal of reducing carbon emissions 49 percent below 2005 levels by 2030.

Colma has already made significant progress in its climate action efforts; between 2005 and 2017, annual emissions have been reduced by 9,088 metric tons of carbon dioxide equivalent ($MTCO_2e$) to achieve 27% percent below 2005 levels. In order to achieve the 49% reduction by 2030, Colma needs to reduce annual emissions by 7,386 $MTCO_2e$, at a rate of over 568 $MTCO_2e$ per year, which will significantly increase the scale and speed of GHG reductions. Even if all emissions were eliminated today, we would still see climate change impacts in the future, including sea-level rise, hotter temperatures, and increasing and more intense fires. However,

[a] 2017 Town of Colma GHG Inventory completed August 2020

this "bending of the carbon curve" for jurisdictions is essential to avoid the worst of climate change impacts.

To meet these ambitious GHG reduction targets this CAP 2030 provides a new and updated roadmap to reduce emissions in four sectors:

1) Energy and water
2) Transportation and land use
3) Solid waste
4) Food and consumption

Colma's 2030 Climate Action Plan Update provides the roadmap with updated GHG emissions reductions strategies to meet the 2030 target. The CAP 2030 identifies key GHG reductions measures that need to be accomplished to achieve the GHG emissions reduction goals.

Colma's goal is to fully implement the GHG reduction programs in the CAP 2030 and include the Town's businesses, City Council, staff, community groups and residents as partners in this critical work. Though municipal operations emit less than 1% of GHG, the Town has implemented energy efficiency programs that have further reduced our carbon footprint. Staff will coordinate with the Town's sustainability team to efficiently and cost effectively implement these CAP 2030 programs. Staff will actively reach out to businesses and residents to engage them in GHG reduction programs and continue to provide the annual CAP progress reports to City Council.

Colma's Climate Action Plan 2030 Update (CAP 2030):

- Establishes the new GHG reduction target for 2030 per new state legislation SB 32 which is 49% below 2005 baseline levels.
- Provides data, projections, and trends on GHG emissions with the GHG inventories.
- Provides strategic program measures to reduce GHG to meet the reduction 2030 targets and work toward carbon neutrality
- Summarizes the progress of the GHG programs identified in the prior 2013 CAP
- Addresses how our Colma community can be more resilient from climate change impacts (e.g. extreme heat events) and prepare for more frequent and intense climate change impacts. The Climate Preparedness Planning framework from the Urban Sustainability Directors Network and resources is included in Appendix D: "Best Practices for Community Collaboration and Sustainability Planning" as a guide.

Colma will continue to work collaboratively with our regional partners to cost effectively meet the new 2030 GHG reduction target. It is important to highlight that the CAP 2030 programs and policies are ambitious to enable the Town to meet this GHG reduction target; Additional staff hours and funding may be needed to fully implement these programs to meet the GHG reduction targets. Work will continue with San Mateo County's Office of Sustainability and other long-term partners to work on reducing GHG emissions and work toward carbon neutrality.

1. Introduction

1.1 Purpose of Climate Action Plan 2030 Update

Colma is updating the Climate Action Plan (CAP) to further expand programs and policies to reduce GHG emissions by 49% from our 2005 base year levels by 2030 to meet the new GHG reduction targets established in SB 32. This CAP documents how Colma will implement programs, policies and collaborate with our partners in county and state government, along with community organizations and local businesses to meet this ambitious GHG reduction goal.

Similar to the 2013 CAP, CAP 2030 is based on the ICLEI — Local Governments for Sustainability (ICLEI) 5-Milestone process.[1] Colma staff participated in regional meetings with the Office of Sustainability through the San Mateo County Energy Watch program and its Regionally Integrated Climate Action Planning Suite (RICAPS) initiative, and 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 May 2017).

1.2 Changes Since the 2013 Climate Action Plan

Since the Town's first CAP was adopted, the following changes have occurred:

- New state mandates for GHG reductions, local policies and climate targets, including carbon neutrality.
- Updated climate change impacts and adaptation strategies have been identified in San Mateo County.
- New regional partners have been identified to assist Colma residents, community groups, and businesses to get involved in climate action and help the most vulnerable members of our community.

Consequently, CAP 2030 includes the following updates and additions:

- Incorporates **new state and local policies** and climate targets, including **carbon neutrality**.
- Documents **climate change impacts in San Mateo County**
- Addresses **emissions from what we buy and consume** in addition to generation.
- Provides more ways for **community involvement**.
- Focuses on equity, or how to **make sure everyone benefits**, especially the most vulnerable members of our community.

1.3 Co-Benefits of Climate Action

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

Improved Public Health

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

Research shows that living within 160 to 650 feet of major roadways can trigger asthma symptoms among adults and children, and contribute to the development of asthma in children.[2] Consequently, actions that reduce traffic congestion, take vehicles off the road, and transition to an all-electric 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, improve mental health, and reduce the costs of public health services. Green infrastructure projects have been shown to increase recreational opportunities and physical fitness exercises such as dog walking or jogging.[3]

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.

Town of Colma's Green Infrastructure Plan
The Town adopted a Green infrastructure (GI) Plan to incorporate GI into new project. GI is a cost effective, resilient approach to managing stormwater. Traditional stormwater infrastructure such as curbs, gutters, and storm drains, directs runoff which includes stormwater and any pollutants it may have collected to receiving waters without any treatment. Green Infrastructure uses vegetation, soils, filter media, and/or natural processes to treat runoff before it infiltrates into the ground or enters receiving waters. GI provides multiple benefits in addition to improving water quality such as a traffic calming affect for drivers, creating habitat, and heat island effect mitigation.

Resilience for the Colma Community

Actions that address climate change can also bolster resilience to other hazards and improve social well-being. For example, increased heat increases demand for power from the grid and causes blackouts which can impact businesses and vulnerable populations. This section includes information on recent work and studies that may be beneficial to Colma.

A microgrid resiliency project at the Miller Community Center in Seattle is an example of what is expected to be many upcoming projects that leverage solar and battery storage to provide relief during emergencies. The local energy utility (Seattle City Light) partnered with Seattle Parks and Recreation to install battery energy storage systems, solar panels, and microgrid controls. The microgrid generates power and provides backup power storage for the community center when the grid is down.[4]

What is a microgrid?
Microgrids are local energy grids with control capability, which means it can disconnect from the traditional grid and operate autonomously.[5] A microgrid can be used to provide back up for the grid in case of emergencies but can also be used to cut costs or connect to a local resource that is too small or unreliable for traditional grid use. A microgrid allows communities to be more energy independent and, in some cases, more environmentally friendly. Microgrids can be used to power a single facility or an entire community. Examples of microgrid research around the nation can be found here: https://www.energy.gov/oe/services/technology-development/smart-grid/role-microgrids-helping-advance-nation-s-energy-syst-0

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.[6]
- Another study found that even small amounts of greenery increased the safety of urban areas.[7]
- Surveys 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.[8]

Reduced Traffic Congestion

The County Association of Governments of San Mateo County and the San Mateo County Transportation Authority are partnering to build 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 2022, the project is designed to reduce traffic congestion and encourage carpooling and transit use on U.S. 101 in San Mateo County.[9]

Equity and Inclusion

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 Colma. Many climate change impacts, such as health impacts, will disproportionately affect socially vulnerable populations. (See below 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.[10]

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 can include:

- 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
- 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

According to Local Governments for Sustainability (ICLEI), an international organization of local and regional governments, climate equity ensures that all people benefit equally from climate solutions, while not taking on an unequal burden of climate impacts.[11] Greenhouse gas emissions typically increases with income and CAP 2030 provides options to assist low-income community members in accessing energy efficiency and other resources. The goal is to provide all community members with options to reduce emissions which can result in a healthier and more resilient community. Colma recognizes the importance of proactively including socially vulnerable groups and CAP 2030 measures include actions for outreach and education to these more vulnerable groups.

A good example of equity and inclusion is Peninsula Clean Energy's partnership with Peninsula Family Service to offer increased incentives to enable low-income residents to cost effectively purchase used electric vehicles with low mileage through the DriveForward[12] program. Plug-in hybrid 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 provide businesses with opportunities for growth and 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. Jurisdictions 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.[13] Sustainable investments can also save Colma 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.[14]

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.[15]

Biodiversity and Conservation

Many actions that address climate action 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.[16]

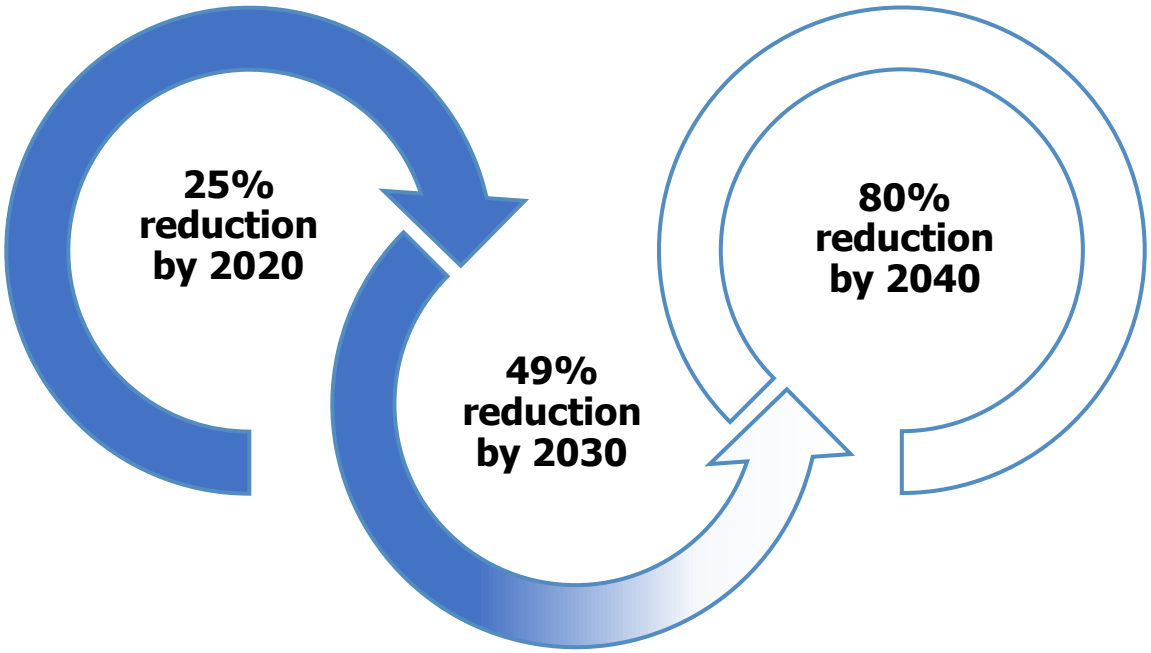
Actions to sequester carbon in trees, soils, and vegetation can minimize stormwater runoff and increase biodiversity of plants and animals. Biodiversity is critical to the health of Town parks and other open spaces. Natural area conservation protects natural resources and environmental features that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

Tree City USA

The Town of Colma is a Tree City USA Community. Tree City USA Communities are required to meet four core standards of sound urban forestry management: maintaining a tree board or department, having a community tree ordinance, spending at least $2 per capita on urban forestry, and celebrating Arbor Day. Each year, the Town celebrates Earth Day and Arbor Day in April and plants at least one new tree in the community.

2. Colma's GHG Reduction Targets and Progress

Colma met and exceeded the 2020 GHG reduction target of 25% reduction per AB 32 as established in Colma's 2013 Climate Action Plan. According to the Town's 2017 GHG inventory, Colma has reduced GHG emissions by 27%[b] compared to their 2005 baseline. Senate Bill (SB) 32, set a new GHG emissions reduction target of 40% below 1990 levels or 49% below 2005, (Colma's base year) by 2030. In 2040, the GHG target is 80% reduction.



Status of 2013 CAP GHG Reduction Programs

Colma's City Council adopted a Climate Action Plan (CAP) in May 2013 to meet the requirements of California's Global Warming Solutions Act of 2006 (AB 32). AB 32 set a greenhouse gas (GHG) emissions reduction target for the State to achieve 1990 GHG emissions levels by 2020 (or 15% below the baseline year, 2005).

The 2013 CAP includes the steps the Town had to take to ensure Colma would meet GHG emissions reduction targets. These steps include Sustainability and Planning staff monitoring and implementation progress, reporting on CAP program implementation through presentations

[b] 2017 Town of Colma GHG Inventory completed August 2020

to City Council and posting reports on the Town Website, and completing GHG inventories in accordance with ICLEI's Community Wide GHG Inventory Protocol.

By implementing the recommended GHG emissions reduction strategies in the CAP, Colma met and exceeded the AB 32 GHG reduction target. Colma reduced GHG emissions by 27% per Colma's 2017 Community GHG Inventory. This is a significant and commendable accomplishment and illustrates Colma's continued leadership in environmental protection.

Colma approved using 100% renewable energy sources for all Town Facilities and opted up to ECO-100 through Peninsula Clean Energy.

2013 CAP Program Implementation Highlights

- Reduced over 1,000,000 kWh of energy annually through Colma's new commercial energy efficiency program and partnership with Ecology Action and PG&E (estimated 345 tons of GHGs reduced annually)
- Colma "Opted up to ECO 100" where the Town procures 100% renewable energy to power all municipal facilities.
- Received Kaiser Permanente sustainability grant to purchase and install a bike repair station at the Colma Community Center.
- Added new organics diversion programs for commercial and residents to meet SB 1383 and AB 1826 and reduced organics to the landfill.
- Added new diversion requirements in the franchise agreement with performance incentives. Expanded household hazardous waste collection, added compost giveaways and security shredding and recycling, and significantly improved recycling technical assistance for businesses.

- Increased measured waste diversion rate to 38%
- Expanded commercial organics collection services to all food related businesses
- Met recycling and solid waste mandates: AB 939, AB 341, and AB 1826
- Converted all hauler collection vehicles from diesel vehicles to compressed natural gas (CNG) vehicles with new franchise agreement with Republic Services.
- Expanded new collection programs of e-waste for residents and added Security Shredding/Recycling and Compost Give Away events.
- Recognized by the Environmental Protection Agency (EPA) for efforts in reducing the negative health impacts of GHG emissions through our use of clean energy sources.
- Authorized $85,000 subsidy to increase participation in Water Conservation Incentive Program. Expanded water conservation incentive program for residents and multifamily for FY 18/19 and FY 19/20.
- Completed energy upgrades of Town facilities including the Police Station, Community Center, and Sterling Park.
- Awarded $50,000 grant to complete deep-dive energy upgrades for Town facilities.
- Approved $10,000 in grants for Resource Conservation District of San Mateo County (RCD) to continue water efficiency projects with cemeteries. Completed water irrigation evaluations for 5 of the largest cemeteries in collaboration with the RCD to provide technical assistance and recommendations for water and energy savings.
- Received Institute for Local Government Awards that include Beacon Awards for:
    - Platinum Level Award: 43% Agency Greenhouse Gas Reductions
    - Platinum Level Award: 29% Agency Energy Savings
    - Platinum Level Award: Sustainability Best Practices Implemented
    - Platinum Level Award: 43% Agency Greenhouse Gas Reduction
    - Gold Level Award: 18% Community GHG Reductions

The status of all 2013 CAP measures can be found in Appendix C.5.

Successful organics recycling and recycling program at Lucky Chances significantly reduced waste to landfill. The Town, Republic Services, and Lucky Chances management staff will continue to collaborate to make this program a success.

3. Climate Change Science and Impacts

Climate change is one of the most significant challenges of our time and as levels of 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 GHG are trapped inside the Earth's atmosphere, more of the sun's energy is trapped as heat and temperatures increase. The world has already become nearly 1°F warmer since 1880 and resulting consequences are more intense storms, greater, more frequent and more intense wildfires 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. 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 the Towns CAP are in alignment with the most optimistic pathway. For more information about the four pathways, see Appendix B.4.

Colma and San Mateo County's **annual maximum temperature** increased 1.7° F from 1950-2005. 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.

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

3.1 Climate Change Impacts on San Mateo County and Colma

The effects of climate change have already been experienced in San Mateo County and Colma. The discussion in this section includes a topical discussion on possible climate change impacts on Colma and San Mateo County based on current climate science. Topics include:

- Rising Temperatures
- Sea Level Rise

- Increased/More Intense Fires/Significant Air Quality Impacts
- Increased Frequency and Intensity of Storms
- Decreased Availability and Quality of Water
- Decreased Fog/Warmer Temperatures
- Increased Power Outages / Impact on Energy Systems
- Financial Impacts

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.10

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, and 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 Colma.

Impact of Heat on People

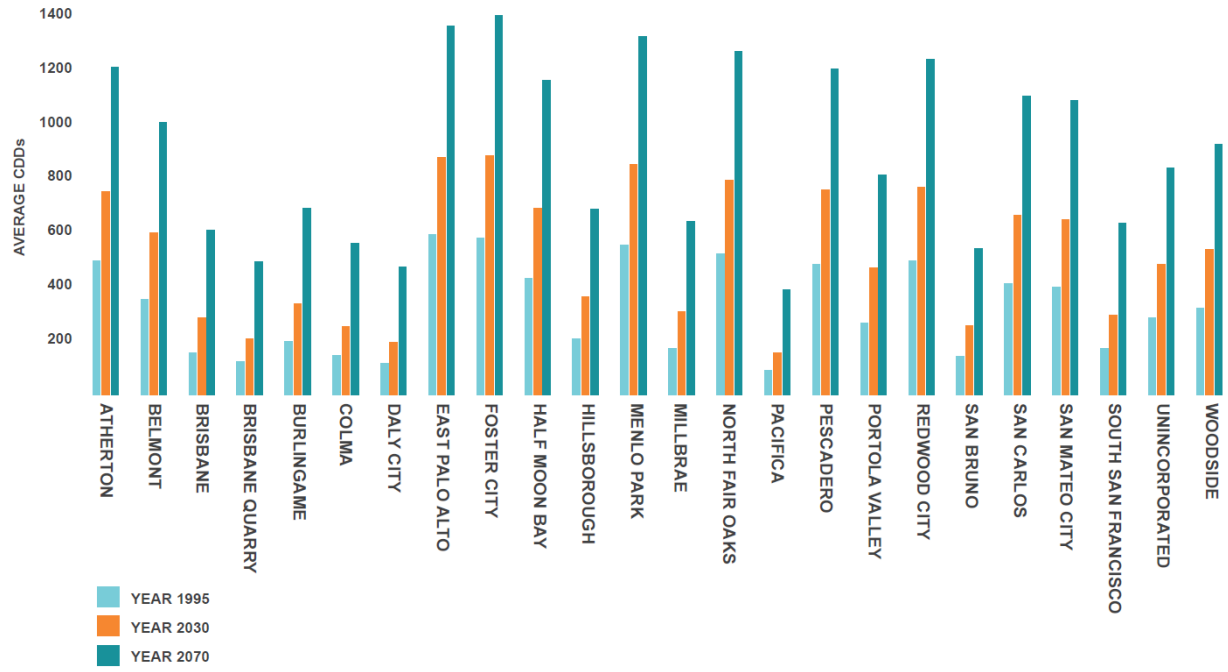
In a heat wave, the most dangerous places can be the ones where people spend the most time: inside houses and apartments. In poorly insulated buildings, heat can build up and not even dissipate at night. In 2018, a KQED investigation found that bay area homes without air conditioning were as much as 15 to 20 degrees hotter inside than outside overnight.[17]

These risks are compounded for low-income communities. A San Francisco 2017 bay area heat wave overwhelmed the protective and social infrastructure, 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).

Only 10 percent of homes in the Bay Area currently have air conditioning.[18] 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.

Figure 1. Average Cooling Degree Days Need for Air Conditioning by Jurisdiction



Sea-Level Rise Impacts Colma and San Mateo County

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. In 2018, the County of San Mateo finalized a *Sea-Level Rise Vulnerability Assessment*[20] 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.

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.[19]

While the Town of Colma is not located adjacent to the San Francisco Bay and is not directly impacted by sea level rise, it is impacted indirectly when regional transportation infrastructure and other communities are impacted. 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.

San Mateo County is one of the few counties in the nation where more than 100,000 people will be affected by three feet of sea-level rise.

Figure 2: Projected Sea-Level Rise (3.3 feet/1% Annual Chance Storm) and Erosion (4.5 feet/1% Annual Chance Storm) – San Mateo County Shoreline[21]

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"[c] projections and lays out an approach for developing adaptation strategies. 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

[c]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."

larger and more complex infrastructure projects such as roads, wastewater treatment plants, and hazardous waste sites.

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 permanent and higher flood water levels, erosion, and rising groundwater levels.

Increased/More Intense Fires/Significant Air Quality Impacts

The hotter climate, reduced precipitation, and soil drying from droughts are causing more fires and more intense fires. Models show increased wildfire risk and fire hotspots in the middle of San Mateo County. Climate change will 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. By 2070, the projected burn area nearly doubles to 25 percent.

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.

Increased Frequency and Intensity of Storms

With increased atmospheric and ocean temperatures, the Bay Area's largest storms will 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.

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.[22] 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.[23] 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/Warmer Temperatures

Coastal fog, critical to the Bay Area climate, has decreased as much as 33 percent in some areas over the past 60 years.[24] In addition to being affected by local and global atmospheric patterns, 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 Power Outages /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.[25] 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.

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. Colma 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.

Financial Impact of Climate Change

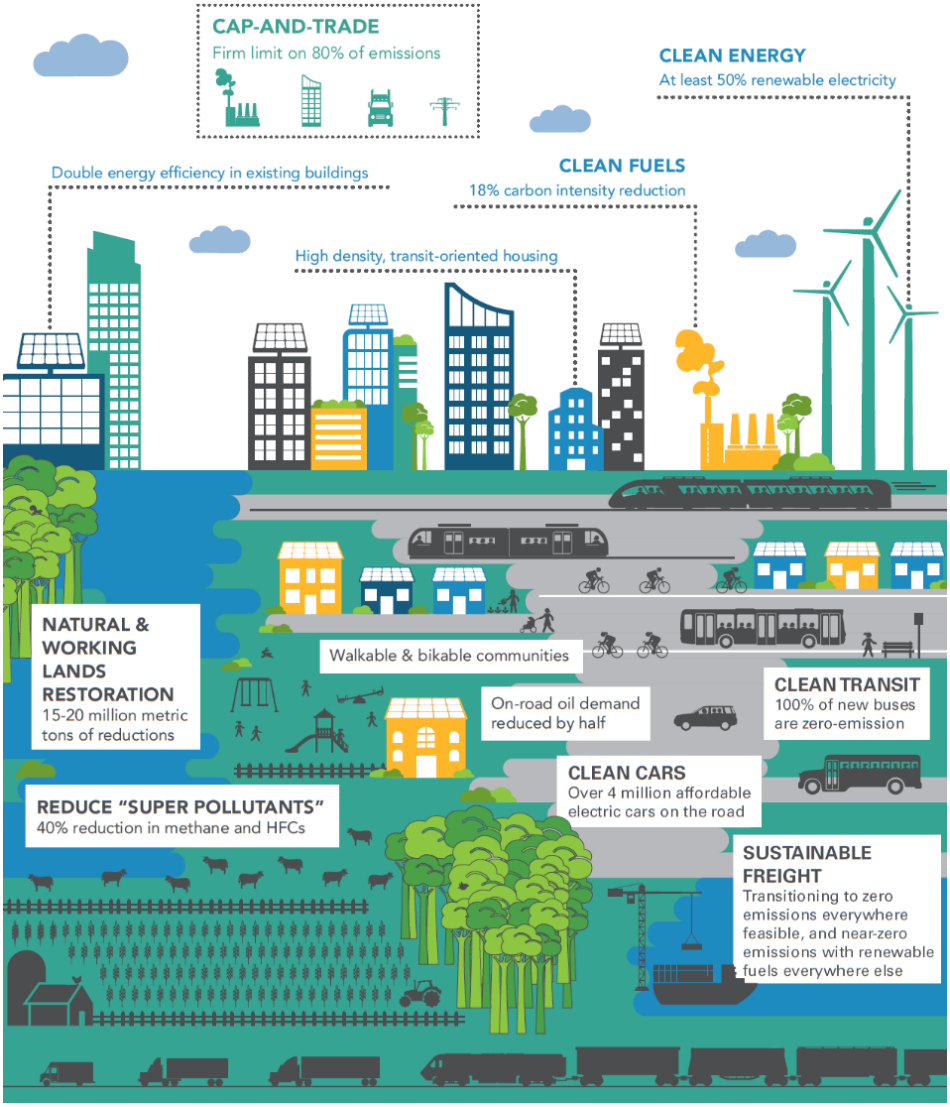
As climate-related natural disasters become more frequent and intense, costs for disaster response and relief are anticipated to increase. With flooding, storms, droughts, wildfires, and other climate-related natural disasters becoming more common, flood insurance and flood prevention costs will grow.[26] 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 Colma's income from property and sales taxes, not to mention damage the quality of life for all community members.

4. 2030 GHG Reduction Targets, Inventory and Forecast

4.1 GHG Emissions Reduction Targets

AB 32 and the subsequent California Air Resources Board (CARB) Climate Change Scoping Plan directed the State to reduce GHG by 15 percent by 2020 from its base year 2008 or earlier; Colma's base year is 2005. In 2015, Governor Brown issued Executive Order B-30-15 which was codified by California Senate Bill 32 (SB 32) and CARB updated *California's 2017 Climate Change Scoping Plan.*[27] Figure 3 below summarizes the strategies in the updated Climate Change Scoping Plan. In response, Colma is joining other municipalities in adopting community-wide emissions reduction targets of 49% below 2005 levels by 2030.

Figure 3. California's 2030 Vision



In September 2018, then Governor Brown issued California Executive Order B-55-18, setting the goal of achieving carbon neutrality as soon as possible (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 before 2045.[28] CAP 2030 will assist Colma in reaching the goal of carbon neutrality before 2045.

Governor Brown's 2018 executive order called on the CARB to develop an implementation framework and accounting to track progress over time.[29] 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 Section 5 for more information.) Colma will collaborate with San Mateo County to reduce consumption-based emissions while the Town awaits State guidance on how to account for the emissions reductions. (See Section 5.4 for specific strategies.)

4.2 Colma's GHG Emissions Inventories

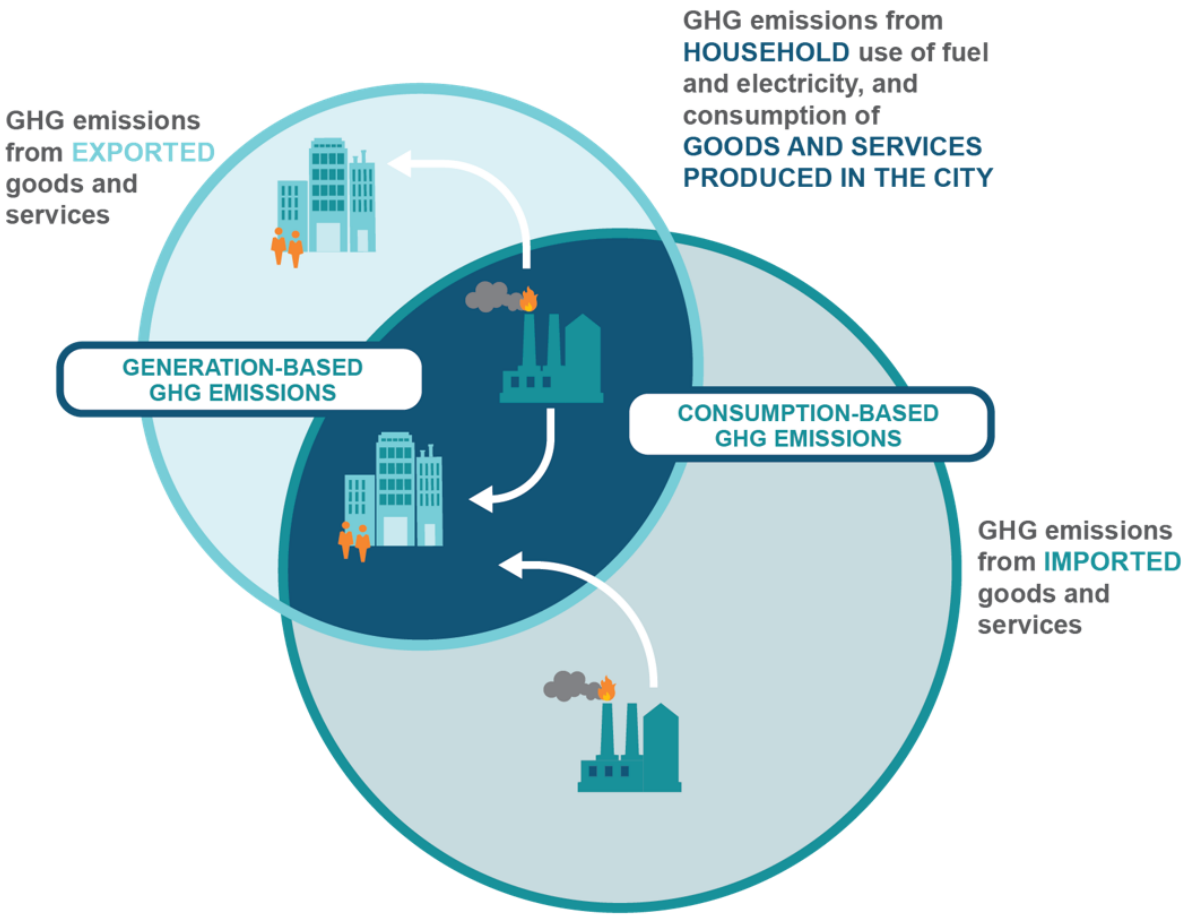
In this CAP, two types of inventories are used to identify the best programs for Colma to implement:

1. Generation-based GHG inventory – This type of inventory focuses primarily on emissions generated from energy use within the Town boundary, through direct consumption (scope 1) or the consumption of grid-supplied electricity (scope 2), as well as GHG emissions from the treatment of waste. This is the standard and industry-accepted methodology for quantifying community GHG emissions per ICLEI/Local Governments for Sustainability. This is the GHG inventory method we used for Colma's 2005 baseline inventory.

2. Consumption-based GHG inventory – This type of inventory offers an alternative, more holistic, approach for quantifying emissions within a community. It focuses on the consumption of goods and services (including food, clothing, electronic equipment, etc.) by residents of a jurisdiction, with emissions reported by consumption category rather than emission source category. 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 individual cities and counties across the entire Bay Area. The consumption-based method results in about 35% higher emissions than the traditional generation-based approach for the region, largely due to higher emission from imported food and goods.[d]

d Jones and Kammen, 2015. "A Consumption-based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties: Prioritizing Climate Action for Different Locations." https://escholarship.org/uc/item/2sn7m83z

Figure 4: Overlap Between Generation-based and Consumption-based GHG Inventories[30]



Colma's Generation-based GHG Inventory

The Town's first generation-based inventory was completed for 2005 and new community GHG inventories are completed regularly, enabling Colma staff to track progress over time.

In 2017, Colma emitted an estimated 24,532 metric tons of carbon dioxide equivalent (CO_2e) from the residential, commercial, industrial, transportation, waste, water and wastewater sectors.[e] In comparison to the base year of 2005 where Colma emitted 33,602 $MTCO_2e$, Colma has achieved a 27% decrease in total community emissions. This is a commendable

[e] 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.

achievement where Colma has met and exceeded the AB 32 GHG reduction target three years early[f].

As shown in Figure 5 and Table 1, Colma's two largest categories of emissions are related to transportation (including highway travel, local travel, and off-road equipment) at 74% and building energy use (including residential and commercial/industrial) at 25%. The residential and commercial/industrial sectors represent emissions that result from electricity and natural gas used in private- and public-sector buildings and facilities. The transportation sector includes emissions from 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 4 shows the proportion of the Town's total GHG emissions from all major sources for 2017.

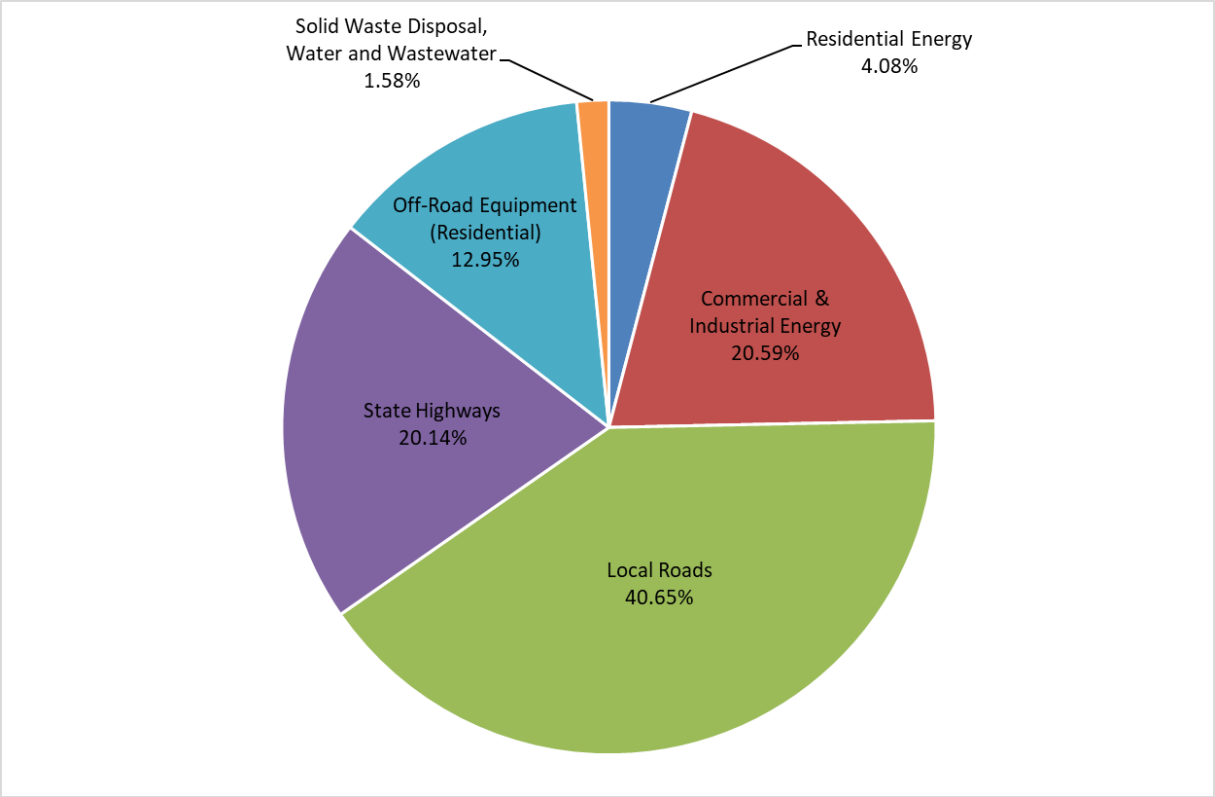
Table 1: 2005 Vs. 2017 Community Emissions by Sector

Sector	2005 GHG Emissions (MT CO_2e)	2017 GHG Emissions (MT CO_2e)	Percent Change in Emissions (%)
Energy Use – Residential	1,518	1,002	-34%
Energy Use – Non-Residential	10,210	5,052	-51%
Transportation – Local Roads	12,074	9,972	-17%
Transportation – State Highways	6,068	4,942	-19%
Transportation – Off-road Equipment	2,432	3,177	+31%
Solid Waste Disposal	1,318	388	-71%
Wastewater Treatment	N/A	25	N/A
Water	N/A	9	N/A
TOTAL*	**33,620**	**24,532**	**-27.0%**

* Total may not add up due to rounding.

[f] note, however GHG emissions could increase from 2017 through 2020 therefore, GHG reduction program implementation needs to continue

Figure 5: Colma's 2017 Community-wide Emissions by Sector



As shown in Table 1, Colma's GHG emissions have declined over time—27% since 2005. Major contributors of this decline include a 51% reduction in Commercial/Industrial Energy Use and 71% reduction in Solid Waste Disposal emissions. Colma staff focused on these two categories because they had significant GHG reduction potential and developed successful programs to achieve these GHG reductions, These programs included the Commercial Energy Efficiency Program and significant recycling and organics program improvements and requiring a minimal diversion percentage. Increases in emissions in the Off-road Equipment sector are due to increases in population, jobs, and the increased usage of gas and diesel equipment.

In 2005, emissions related to wastewater treatment and water conveyance were not included in the baseline inventory due to a lack of data. However, emissions from these sectors were included in the Town's GHG inventories since 2010 and are now included in the 2017 GHG inventory. The emissions are described by category below.

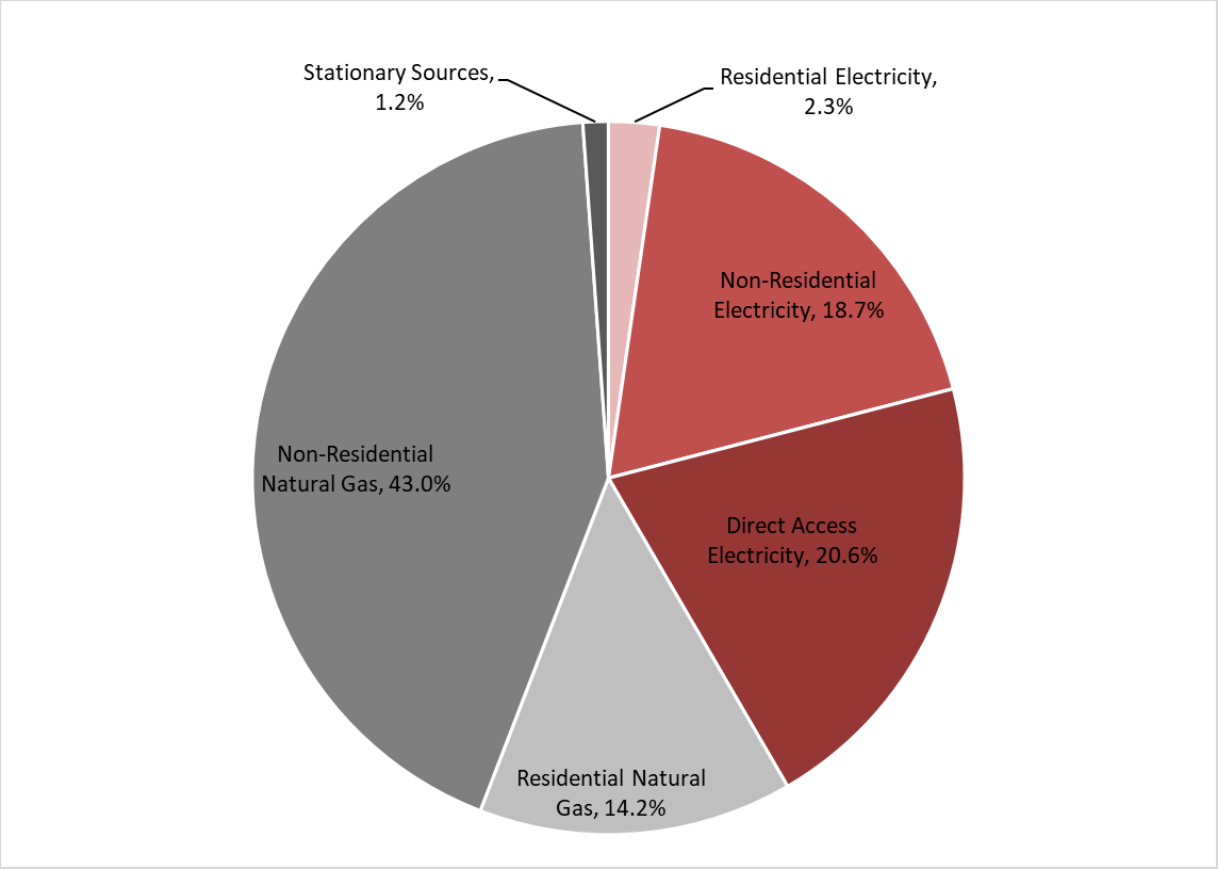
Colma's Energy Emissions

In 2017, electricity and natural gas emissions accounted for about 25% of total GHG emissions in Colma. The Town's total building energy consumption was 25,850,496 kilowatt-hours (kWh) of electricity and 651,775 therms of natural gas, including municipal operations and direct

access electricity customers. Direct access electricity includes end use customers that buy electricity on the wholesale electricity market, rather than from PG&E or PCE. Stationary source emissions were provided by BAAQMD and include emissions from facilities that use additional fuels within the Town's boundaries.

Of the total 6,054 MT CO_2e emitted due to energy use in buildings in Colma, natural gas and stationary sources accounts for a greater portion (58.4%) of total emissions than electricity (41.6%). For this reason, Colma's adoption of reach codes to increase electrification and reduce natural gas usage is an appropriate next step to take.

Figure 6: Building GHG Emissions by Sector and Fuel Type

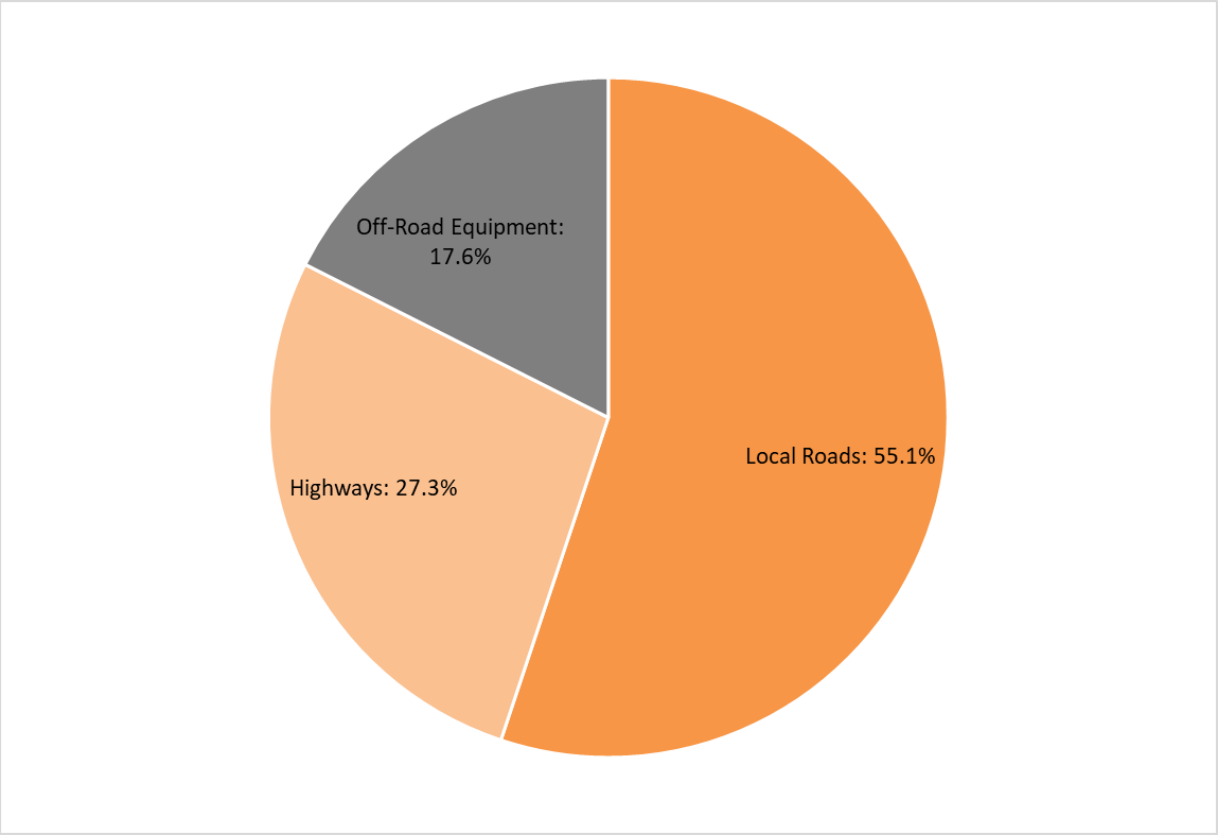


The emissions per kWh of electricity generated can vary considerably from year to year and based on the provider of electricity (e.g. PCE, PG&E, and direct access providers). For example, in 2017, PG&E's emission factor was 210 lbs CO_2/MWh, PCE's ECOplus (50% renewable) emission factor was 142 lbs CO_2/MWh, and PCE's ECO100 (100% renewable) emission factor was 0 lbs CO_2/MWh.

Colma's Transportation Emissions

In 2017, the Town's transportation emissions accounted for about 74% of total GHG emissions in Colma. Travel on local roads accounted for 55% of transportation emissions, travel on state highways that was attributed to the Town accounted for 27%, and emissions from off-road equipment, such as lawn, garden, and construction equipment, accounted for 18%. It is important to note that the off-road equipment sector which includes emissions from lawn, garden and construction equipment is Colma's only GHG sector that increased from 2005 to 2017. This 31% increase is significant and will be addressed in the GHG reduction strategies.

Figure 7: Colma's Transportation Emissions by Road Type



Colma's Solid Waste Emissions

Colma's waste sector emissions accounted for 1.4% of total 2017 GHG emissions and 2,004 tons of solid waste were sent to landfills. Emissions from waste sent to landfills accounted for 88% of waste emissions and emissions from the use of alternative daily cover (ADC) accounted for 12% of waste emissions. Two closed landfills are located within the Town's boundaries but

are not included in the GHG inventory[g]. 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, etc.) 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 that the Town sent to landfills in 2017. Materials that do not release GHGs as they decompose are included in the "Non-organic Material" category. Thanks to new organics recycling programs that have been implemented for Colma's businesses and residents, the organics diversion has increased significantly.

Table 2: 2017 Data for Colma's Estimated Waste Composition[h]

Waste Type	Waste Share
Non-organic Material	56.9%
Food Scraps	15.5%
Dimensional Lumber	14.5%
Corrugated Containers	4.8%
Officer Paper	1.9%
Grass	1.9%
Leaves	1.9%
Newspaper	1.3%
Magazines/Third Class Mail	0.7%
Branches	0.6%

Colma's Water and Wastewater Emissions

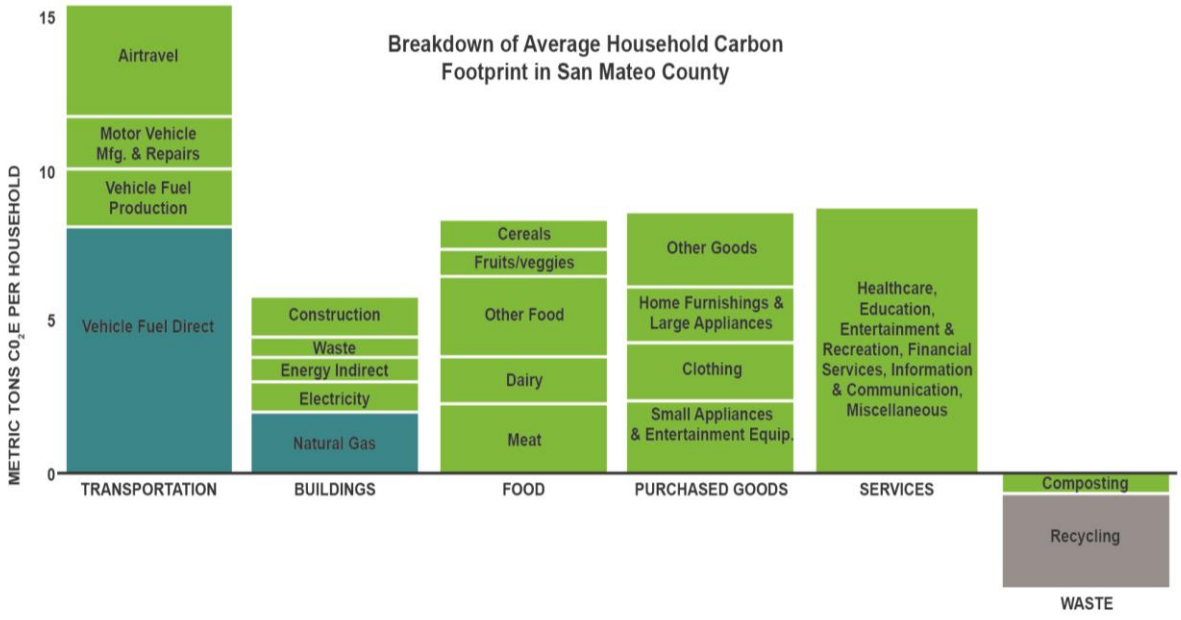
Water and Wastewater emissions accounted for less than 1% of total 2017 GHG emissions in Colma. Although water use does not account for a larger portion of the Town's overall GHG emissions, Colma recognizes the importance of water conservation and aims to continue education programs to decrease water use in all sectors. This is encompassed in the Town's 2030 CAP GHG Reduction measures. In 2017, the Town's total water consumption was 65,157,116 gallons of water[i]. The conveyance of water and treatment of wastewater accounted for 34 $MTCO_2e$.

[g] This is consistent with the 2005 baseline GHG inventory. Emissions from these landfills were excluded because they are out of the Town's control and the Town is unable to impact the emissions from the landfills.
[h] CalRecycle, "California 2008 Statewide Waste Characterization Study", Table ES-2. This state average waste characterization accounts for residential, commercial and self-haul waste. www2.calrecycle.ca.gov/WasteCharacterization/PubExtracts/2009023/Summary.pdf
[i] Town of Colma Public Works Department.

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 individual cities and counties across the entire Bay Area. The consumption-based method results in about 35% higher emissions than the traditional generation-based approach for the region, largely due to higher emission from imported food and goods.[j] Figure 8 shows the consumption-based inventory for households in San Mateo County.

Figure 8: Consumption-based Inventory for Households in San Mateo County, 2015[k]



This consumption-based inventory information is included to provide a wider and holistic illustration of GHG emissions in San Mateo County. However, due to a lack of data and the complexity of accounting required, consumption-based inventories are extremely difficult to complete accurately. Consequently, it is not realistic to develop this type of lifecycle emissions accounting at regular intervals. Even so, the Town recognizes the importance of including this information and including GHG reduction programs to reduce consumption-based emissions in CAP 2030.

[j] Jones and Kammen, 2015. "A Consumption-based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties: Prioritizing Climate Action for Different Locations." https://escholarship.org/uc/item/2sn7m83z
[k] https://escholarship.org/uc/item/2sn7m83z

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

Colma's Future Emissions

The Town developed a forecast of future emissions (Figure 9) to understand what GHG reduction measures are needed to meet the 2030 and 2040 goals. The forecast starts from 2017, the most current community wide GHG inventory developed for Colma.

The forecast illustrates the following:

"Business-as-usual" (BAU) emissions – This projection represents Colma's emissions expected if the 2017 patterns of travel, energy and water consumption, and waste generation/disposal were continued throughout time. This projection factors in the projected population estimates from Plan Bay Area until 2040; and projects population growth between 2040 and 2050 based on San Mateo County's projected population growth trends. 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 implemented after 2017. *Under the BAU scenario, emissions are projected to increase by 5.75% in 2030 (1,410 $MTCO_2e$) and 14.53% in 2050 (3,564 $MTCO_2e$) relative to 2017.*

BAU Emissions with State Measures – This projection incorporates the same factors as the BAU, but also includes emission reductions from key state policies such as clean car standards, renewable portfolio standards, zero net energy building, and organics recycling. By 2045, the Renewable Portfolio Standard will have closed that gap by requiring all electricity providers to offer a similarly clean mix of energy. *With state measures in place, emissions are projected to decrease by 6,577 $MTCO_2e$ by 2030 and gradually decrease at a slow rate through 2050.*

CAP 2030 Reduction Measures – This is the reduction necessary to reach the 2030 goal. In CAP 2030, Colma is committed to take the actions needed to meet this target. Those actions are described in Section 5. With CAP 2030 measures, e*missions are projected to decrease by an additional 3,079 $MTCO_2e$ by 2030 and continue to decrease through 2050.*

Figure 9. Colma GHG Reduction Targets

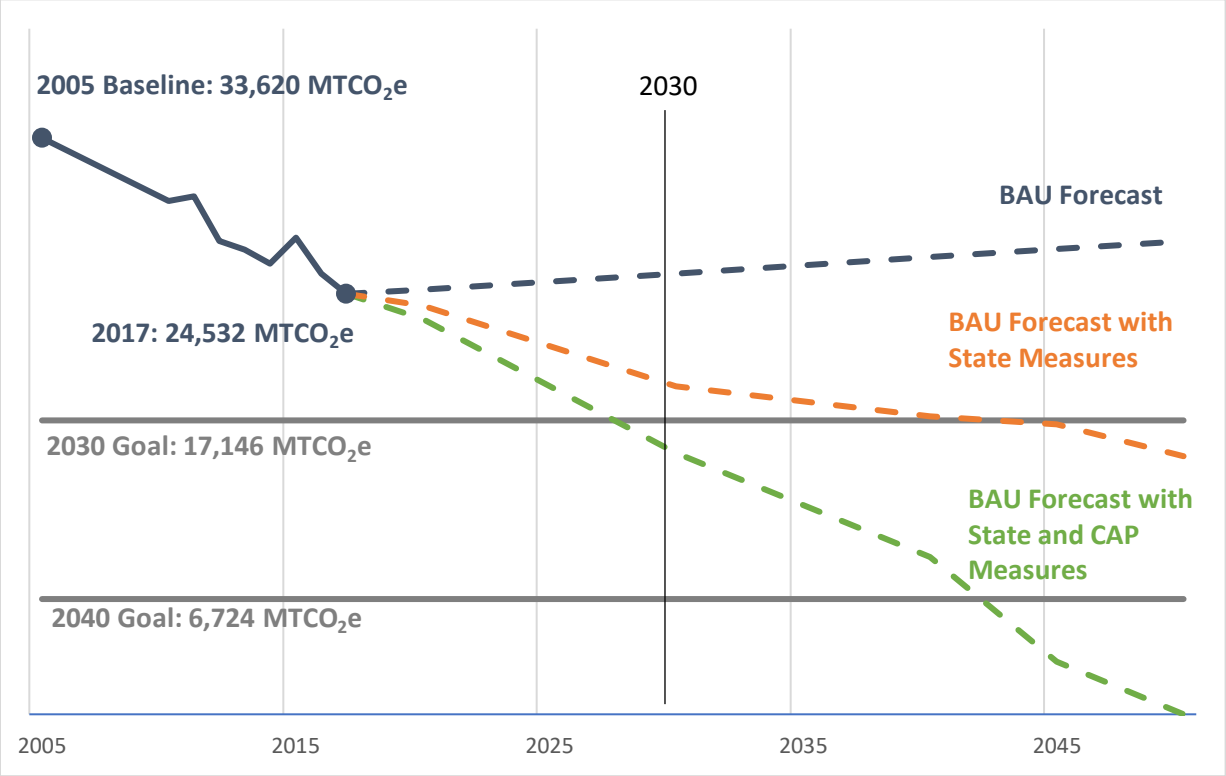


Figure 9 shows that Colma's GHG emissions in 2005 was 33,620 $MTCO_2e$ and that the Town's GHG emissions have been reduced to 24,532 $MTCO_2e$ as of 2017. To meet the 2030 goal of 49% below 2005 levels, Colma needs to reduce emissions to 17,146 $MTCO_2e$. The 2040 target is 6,724 $MTCO_2e$ which is 80% below 2005 levels. The 2045 target is for Colma to become carbon neutral.

Reductions from State-Level Actions

State-level and regional level actions have greatly contributed to GHG reductions and will continue to assist the Town in meeting future reduction targets. For example, the California Renewable Portfolio Standard (RPS) mandates that 100% of the electricity sold by the State's investor-owned utilities be generated from renewable resources by 2045, with an interim target of 60% by 2030. The impact of state-level actions on reducing local emissions is significant and is shown in relation to the Town's emissions baseline, business-as-usual forecast, and reduction target in Figure 9. A summary of the expected emission reductions from state programs are provided in Table 3 below.

Table 3: Colma's Total Emission Reductions from State-Level Actions

California State Initiative	Sector	% Emissions reduction from applicable sector in 2030	2030 reduction in Town's emissions (MTCO2e)
Advanced Clean Cars Program	On-road Transportation	-27.3%	-4,245
Low Carbon Fuel Standards	Off-road Transportation	-15.9%	-526
Renewable Portfolio Standard	Electricity (Energy)	-12.3%	-327
100% Zero Net Energy New Residential 2020	Residential Energy	-4.0%	-48
50% Zero Net Energy Existing Commercial 2030	Commercial Energy	-22.1%	-1,162
Organic Waste Diversion SB 1383	Disposed Waste	-79.4%	-269
Total Statewide Initiative Emissions Reductions:			**-6,577**

On September 23, 2020, Governor Gavin Newsom signed an executive order which set goals to have all in-state new passenger cars and trucks be zero-emission by 2035, all medium and heavy-duty vehicles in the state be zero emission by 2045 where feasible, and transition all off-road vehicles and equipment to zero-emission by 2035 where feasible. While this is not included as a state level action that reduces GHG emissions, it is expected to have a large GHG emissions reductions impact to transportation emissions.

CAP 2030 GHG Reductions Needed to Meet Goal

Colma's goal is aligned with SB 32 statewide target to reduce emissions to 49% below 2005 levels by 2030. Table 4 below outlines the amount of CO2e the Town is required to reduce to meet the 2030 goal. Colma's CAP 2030 strategies need to reduce emissions by 8,796 MT CO_2e by 2030 below the business-as-usual projected emissions, 8,796 MT CO_2e, is the equivalent of taking 1,900 passenger vehicles off the road for an entire year.

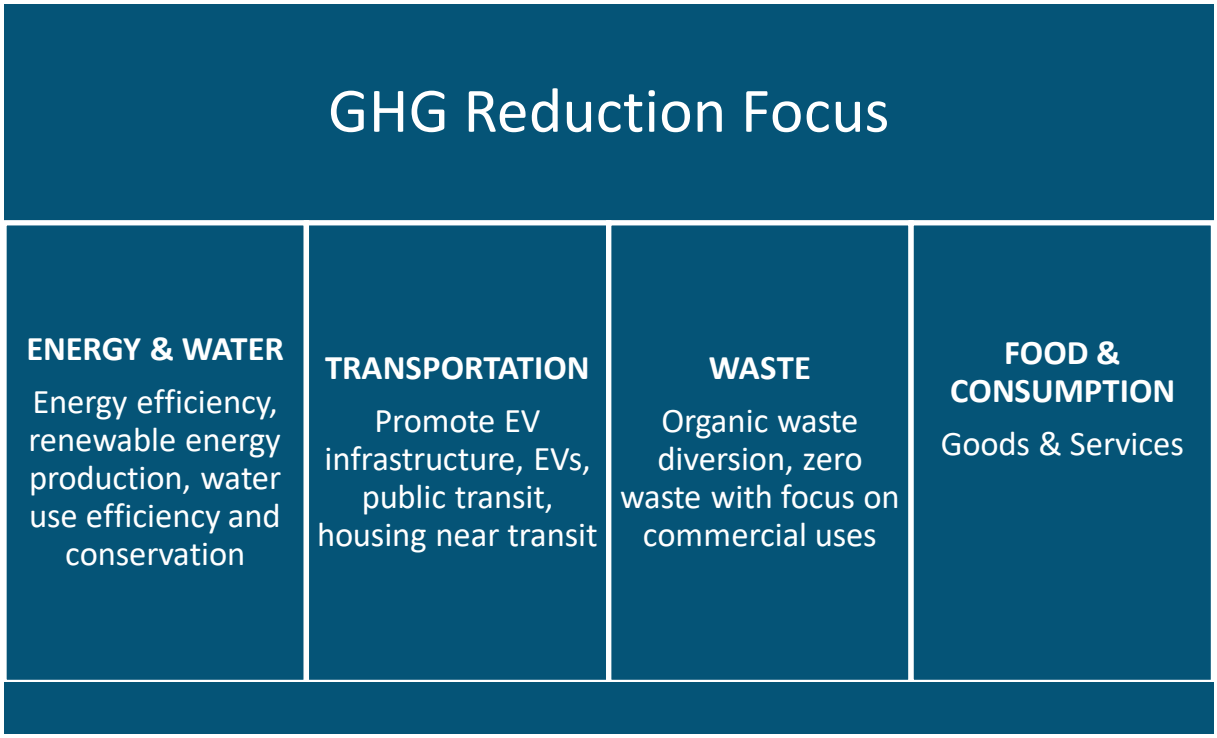
Table 4: GHG Emissions Projection and Reduction Target

2005 Baseline Emissions (MT CO2e)	Target Emissions by 2030 (MT CO2e)	2030 BAU Emissions (MT CO2e)	Emissions Reductions Required (MT CO2e)
33,620	17,146	31,372	14,226

Table 5: Meeting the 2030 Target

Sector	Emissions (MT CO2e)
2005 Baseline Emissions	33,620
2017 Emissions	24,532
2030 BAU Emissions	25,720
2030 State Measures Impact	-6,577
Colma's 2030 BAU Emissions with w/ State Measures	19,143
Colma's CAP 2030 Measures Impact	-3,079
Colma's BAU emissions w/ State + CAP Measures	16,064
Percent Emissions Below 2005 Target	49%
2030 Emissions Target	17,146
Colma Meets/Exceeds CAP Target?	**Yes**

5. CAP 2030 GHG Reduction Strategies



CAP 2030 GHG Reduction Strategies are described in this section and provide details on each sector: Energy and Water, Transportation and Solid Waste which include total GHG emissions from that sector, current GHG reduction status and other essential information.

5.1 Energy and Water

About 25% of the Town's GHG Emissions are from Energy Consumption.

58.4% of the emissions from the Energy Sector is from the use of Natural Gas.

Electricity is primarily used in buildings to provide lighting, refrigeration, ventilation, cooling and to power things like computers; Natural gas is primarily used in buildings to provide space heating, water heating, and cooking. In order to reach the Town's 2030 emissions reduction target, natural gas consumption will need to decline significantly through a combination of energy efficiency and electrification. Energy efficiency is simply using less energy to perform the same task such as replacing a low-efficiency gas furnace with a high-efficiency gas furnace. Electrification is the practice of replacing equipment in buildings that is powered by natural gas, including gas furnaces and gas water heaters, with electric equipment, such as air source heat pumps and heat pump water heaters. Colma has had good success in implementing commercial

energy efficiency programs, particularly for the auto dealerships and has reduced over 1,000,000 kWh for the auto dealerships. Staff will need to expand these types of outreach and education to build on this success to increase energy efficiency and reduce emissions.

Energy Efficiency

Improvements in energy efficiency in new construction and existing buildings will continue to be assisted through the Town's implementation of the California Green Building Standards Code (CALGreen). CALGreen helps reduce electricity, natural gas and water consumption, and promotes the use of environmentally sustainable building materials. CALGreen focused on the energy efficiency of newly constructed buildings and additions/alterations to existing buildings, with the most significant efficiency improvements to residential standards in improvements for attics, walls, water heating, and lighting. The 2019 CALGreen went into effect in January of 2020 and requires all new residential construction and major remodels to be built to a zero-net energy (ZNE) standard. A ZNE building is one that produces as much energy (generally through onsite renewable energy) as it consumes. In addition, the California Energy Commission voted to adopt a policy requiring all new homes in California to incorporate rooftop solar. This change will also be incorporated into the 2019 CALGreen code update.

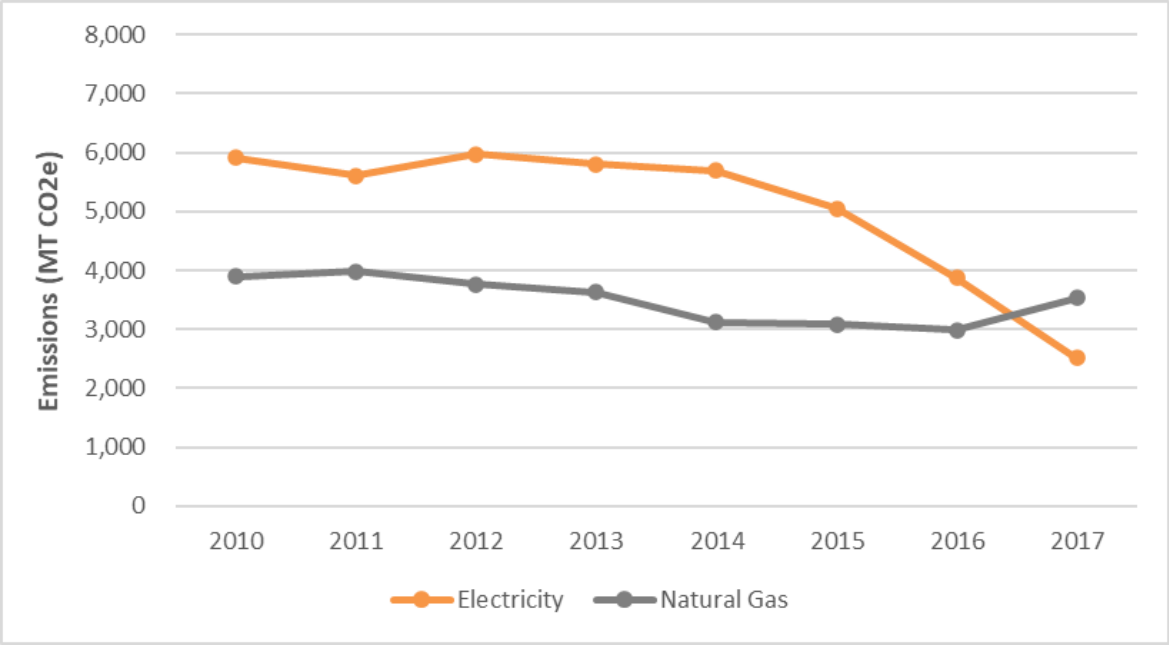
Colma will need to implement additional programs to increase energy efficiency and provide more direct outreach to businesses and residents about rebates, cost savings and options for financing energy efficiency upgrades. Rebates and incentives are available for purchasing energy efficient appliances, such as high-efficiency gas storage water heaters and electric heat pump storage water heaters, and increasing promotion of these rebates will lead to greater energy and water savings. Additionally, financing for energy efficiency projects e.g. Property Assessed Clean Energy (PACE) program is available to residents and is now available to nonresidential building owners. Town staff will continue to work with regional groups to collaborate on regional and cost-effective outreach and education.

Peninsula Clean Energy

Colma has significantly reduced GHG emissions from energy use by approving Peninsula Clean Energy (PCE), a community choice energy (CCE) alternative, as an electricity provider. A CCE is a locally-controlled electricity provider that provides communities a choice to purchase power that is generated from cleaner sources. PCE provides by default 50% clean renewable energy under ECO Plus with the choice to opt up to ECO100 with 100% renewable energy. The renewable electricity comes from sources such as geothermal, solar and wind, which reduces fossil fuel consumption and leads to lower GHG emissions. By relying less on fossil fuels,

electricity emissions in Colma have decreased 57 percent since 2010 while natural gas emissions have decreased 10 percent.

Figure 10: Town of Colma 2010-2017 Building Emissions by Fuel Type



PCE 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 energy emissions associated with electricity will continue to decline.

Want to Electrify Your Home? Plan Ahead
Converting to all-electric is more cost effective when appliances like your furnace and hot water heater are replaced with electric when they 'burnout'. Switch to an electric model and take advantage of electrification incentives from BayREN (http://www.bayrenresidential.org/).

Updates to the electric panel may be necessary. Additional rebates for panel upgrades will be available in November 2020.

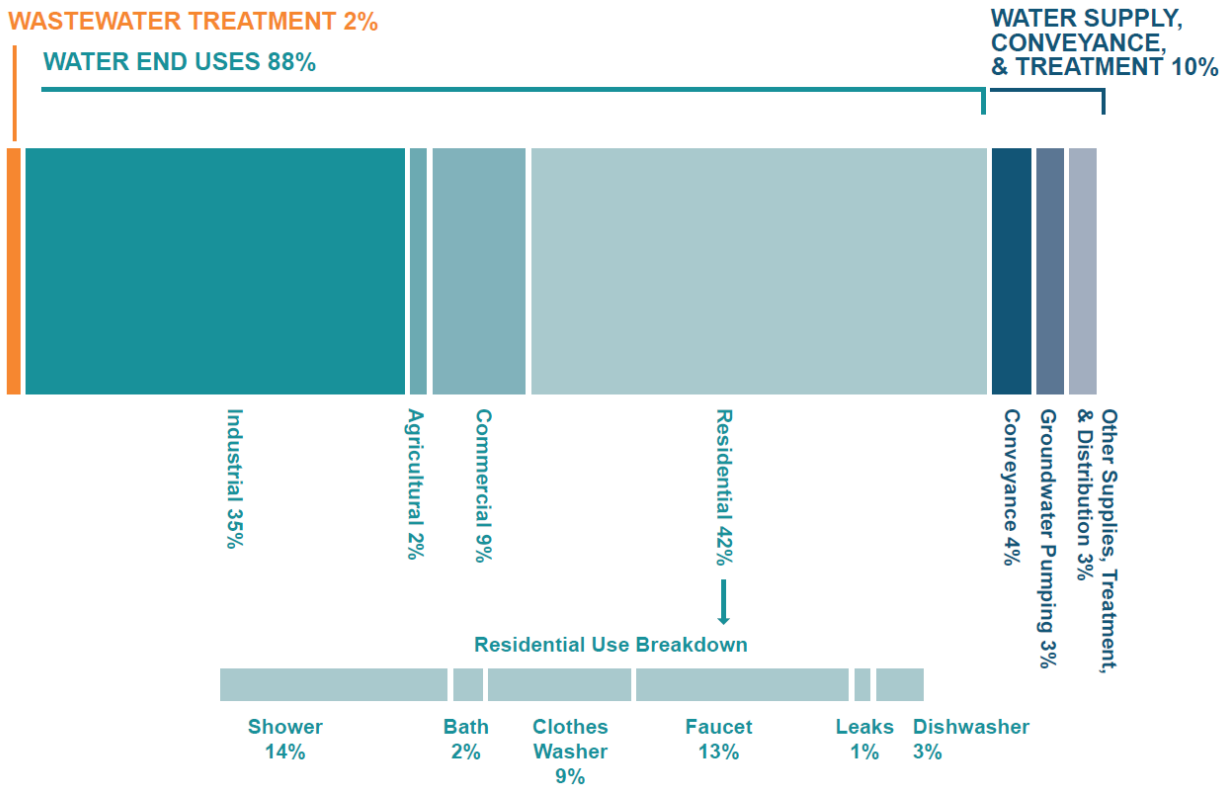
PCE also provides technical assistance and financial incentives to support the development of reach codes or building codes that are more stringent than those required by the state. In

2021, the Town will take steps to adopt reach codes to shift toward building electrification by requiring additional requirements for new construction and increased EV charging infrastructure requirements for residential and non-residential uses. For example, on non-residential properties, projects with 10 or more parking spaces are required to install a level 2 charger.

Connection Between Energy and Water Use

Energy and water use are linked because energy is needed to transport and to treat water, treat wastewater, and heat domestic hot water in homes and businesses. 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 11 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[31]



Colma recognizes the importance of reducing water use in landscaping and the fact that 75% of land use is large cemeteries with acres of landscaping. This in turn generates GHG emissions through pumping, conveying and treating water. Water conservation is vital to Colma's

sustainability and will continue to remain a key priority. Colma will continue to work with cemeteries to provide technical assistance, reduce water usage, seek grant opportunities, save energy and help them be more efficient which will reduce their operating costs.

California remains a leader in implementing water conservation legislation. 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 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.

Dry Up Household Water Waste

Did you know that the energy use related to water — transporting, cleaning, and heating it — consumes 19 percent of California's electricity and 30 percent of its natural gas every year? We've all learned the importance of taking shorter showers, and installing low-flow shower heads, low-flow aerators on faucets, and low-flush toilets to save water. But don't forget outside, too, since half of California's residential water use goes toward landscaping[32] and half of all water wasted in the United States is due to poorly managed and maintained irrigation systems.[33] ReScape California (https://rescapeca.org/) is a nonprofit that provides resources for selecting low-water plants, conserving water, and fostering soil health.

Energy and Water Goals

Goal	2030 Target
Reduce energy emissions from electricity and natural gas	50% reduction compared to 2005 usage
Increase commercial solar generation	Add 4 commercial solar projects on Town businesses by 2030
Reduce water consumption	25% reduction compared to 2005 usage

Energy and Water Strategies

Energy			
Strategies	**Description**	**Approach**	**2030 Emission Impact (MT CO2e/yr)**
Community Wide Measures			
Establish New Colma Sustainable Business Program with Technical Assistance	Initiate multi-approach campaign for Colma's businesses by providing on-site technical assistance to expand energy efficiency/water conservation/sustainable practices. Resources, rebate information, cost benefits will be highlighted. Program will provide: • Energy efficiency technical assistance, rebate information, best practices, checklist of options, outreach/education • Water conservation technical assistance, rebate information, resources • Benefits of opting up to ECO 100/ Participation in Peninsula Clean Energy • Resources for solar energy installation and solar storage rebates • Sustainability Policy/ Preferable Purchasing Policy technical assistance • Partner with regional partners to expand sustainable businesses participation	Outreach/ Education Campaign	Supporting Measure
Expand Participation in County Green Business Program	Expand participation in the San Mateo County Green Business program and set goals for participation. Voluntary program that allows businesses to brand themselves as green by completing a list of energy/water conservation, recycling, pollution prevention and buy recycled practices.	Town Program	-5
Expand participation in PCE's Opt Up to ECO 100	Through Peninsula Clean Energy, continue to provide greener renewable electricity to the community and promote residents and businesses "opting up" to PCE's ECO100 (100% renewable) service.	Government Policy & Promotion	-617
Campaign to promote benefits of solar energy installation/ solar storage using PCE grant	Educate residents about PCE rebates for installing solar and solar storage, and explore other options. PCE offers up to $1250 in rebates for solar/solar storage. Educate the financial incentives for solar PV and hot water system installation. Encourage bulk purchases such as the Peninsula SunShares Program. Provide free	Education, Promotion & Incentives	-69

Energy			
Strategies	**Description**	**Approach**	**2030 Emission Impact (MT CO2e/yr)**
	assistance for project developers through the PPA and interconnection process. *https://www.peninsulacleanenergy.com/pop-homeowner/*		
Expand Commercial energy efficiency programs for existing buildings including SMC Energy Watch and PG&E's commercial offerings	Through marketing and outreach, City promotes participation in commercial energy efficiency programs and demand response programs offered by SMC Energy Watch and PG&E – including PGE's appliance rebates, 0% energy efficiency financing and demand response programs. City provides or encourages commercial energy audits. City considers supplementing existing efficiency incentives and rebates. Research programs to provide businesses who use Direct Access energy with alternatives which reduce GHG emissions.	Promotion & Incentives	-37
Expand commercial energy conservation program	Colma will start a voluntary commercial energy conservation program and encourage minimum energy efficiency and water efficiency standards at the time of building sale. Consider transitioning to mandatory comprehensive energy assessments and benchmarking by registered energy assessors over time.	Town Program	-7
Encourage pairing battery storage systems with all solar PV systems	Provide education and outreach to stakeholders, including businesses, residents and contractors, on the benefits of pairing battery storage with solar PV systems. This education can be included in the Sustainable Green Business Campaign	Outreach and Promotion	-86
Update Building Code to disincentivize use of natural gas in new construction and major remodels	Require all new construction and major remodels to be electric ready for all large appliances. Stoves may be exempt.	Codes and Standards	-40

Energy			
Strategies	**Description**	**Approach**	**2030 Emission Impact (MT CO2e/yr)**
Promote residential energy efficiency programs for existing buildings	Promote residential energy efficiency programs, including BayREN's Home Upgrade program and PG&E's efficient appliance rebates. City provides or encourages residential energy audits. City considers supplementing existing efficiency incentives and rebates.	Promotion & Incentives	-15
Incentivize electric panel upgrades in commercial to accommodate all-electric technologies	Leverage incentives provided by PCE to encourage commercial and residential to upgrade electric panels in order to accommodate all-electric technologies including solar PV, battery storage, air source heat pumps, heat pump water heaters, electric dryers, electric stoves and EV chargers.	Incentives	-232
Promote opportunities for microgrid demonstration projects	Work with stakeholders to identify facilities for a potential site for a microgrid demonstration project. Provide education and outreach to these stakeholders on the multiple benefits of developing a microgrid including reliability, cleaner energy and cost savings. See Page 9 for an example of a microgrid.	Outreach	-36
Municipal Measures			
Continue to procure ECO100 electricity service for all municipal facilities.	Colma will continue to provide greener renewable electricity to municipal facilities with our ECO-100 service in all municipal facilities.	Town Policy	-23
Research options for solar energy on municipal facilities	Through feasibility studies, identify new or existing municipal facilities that are well suited to the installation of solar PV or solar hot water systems. Install systems where feasible. Use group purchasing power such as Bay Area SunShares or purchase power agreements (PPAs) to lower cost.	Capital Improvement	-1

Energy			
Strategies	**Description**	**Approach**	**2030 Emission Impact (MT CO2e/yr)**
Improve energy efficiency of municipal buildings	Continue to upgrade Town facilities to be energy efficient by reevaluating fixtures energy usage and cost every seven years.	Capital Improvement	-1
Update Sustain-ability Policy (environmentally preferred purchasing policy)	The Town will update the sustainable purchasing policy to expand energy efficiency e.g. purchase of ENERGY STAR certified equipment – appliances, electronics, etc.	Town Policy	-1

Colma businesses can save money with Energy Efficiency
Energy efficiency reduces fixed costs for businesses and helps them be more competitive. Business owners can save money on energy bills, increase profits, promote their businesses, and cut GHG emissions. B**ayREN's Pay-for-Performance program (https://www.bayren.org/commercial**) uses smart meter technology to help business owners find energy improvements that will pay for themselves over time – and provide incentives for long-term behavior and performance.

San Mateo County's Green Business Program (https://www.smcsustainability.org/climate-change/green-business/) helps businesses include sustainable practices and save money. Certified businesses get recognition and a marketing edge through promotional events, press coverage, and registry on the statewide Green Business directory.

Water			
Strategies	**Description**	**Approach**	**2030 Emissions Impact (MT CO_2e/yr)**
Promote water conservation rebates and services	Promote BAWSCA or CalWater residential water conservation rebate programs that offer rebates for items including high efficiency washing machines and toilets, rain barrels, sprinkler nozzles, irrigation controls and Lawn Be Gone (drought tolerant landscapes). Consider feasibility of supplementing existing rebates and services.	Outreach & Incentives	-6
Develop New Water Conservation Program for Cemeteries	Use technical expertise of Powers Engineering and or other technical experts to provide water conservation improvements advise to cemeteries. Examples include upgrading old inefficient water pumps which conserve energy and reduce water waste. Identify grants and other options for water conservation.	Outreach/ Education	Supporting Measure

5.2 Transportation and Land Use

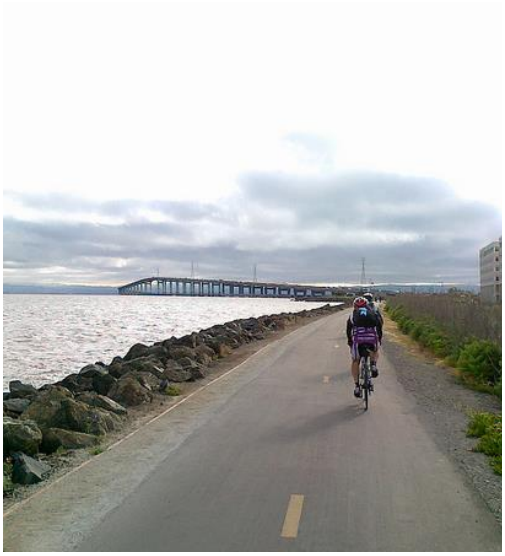
74% of Colma's GHG Emissions are from transportation/related land use

Off-road equipment (lawn, garden, construction equipment, etc.) emissions increased 31% between 2005 and 2017

Colma's transportation and land use is 74% of total emissions and will need to be a focus of GHG reduction strategies where Colma has policy control. Policy control for transportation includes adding policies to increase electric vehicle infrastructure with new actions to increase EV charging stations. Additional programs include providing incentives and resources to replace off-road equipment with cleaner alternatives and researching options to provide exchange programs, rebates and incentives to cleaner equipment and providing resources to businesses about commute alternatives through the new Colma Sustainable Business Program. Statewide, 41% of emissions are from on-road vehicles. In Colma, travel on local roads represent 55% of total transportation emissions and travel on state highways make up 27%. The remaining 18% comes from off-road mobile sources.

Reducing Transportation Emissions

Reducing emissions from the transportation sector requires: 1) expanding zero emission vehicle infrastructure and increasing zero emissions vehicles versus fossil fuel vehicles which have high carbon intensity 2) increasing vehicle efficiency, and 3) reducing vehicle miles travelled (VMT). Gasoline and diesel have a very high carbon intensity and transitioning to lower carbon intensity fuels, especially EV is critical to reducing emissions in the transportation sector. Similar to implementing reach codes to increase electricity over more carbon intensive natural gas in buildings, adding EV infrastructure is critical to reducing emissions since jurisdictions have policy control in this important sector.



What Would It Be Like?

Many of us drive our cars for short trips. We drive three blocks to work out at the local gym, we drop off our teenager at a friend's house in the neighborhood, or we move our car to park near the entrance of the next store on our list of errands. Some short car trips are necessary; for example, health and mobility issues might limit our ability to walk. Other times, driving is convenient: when we're in a hurry, if it's cold or raining, or if we have a lot of groceries to carry. However, some short car trips might be easily made by foot or bike.

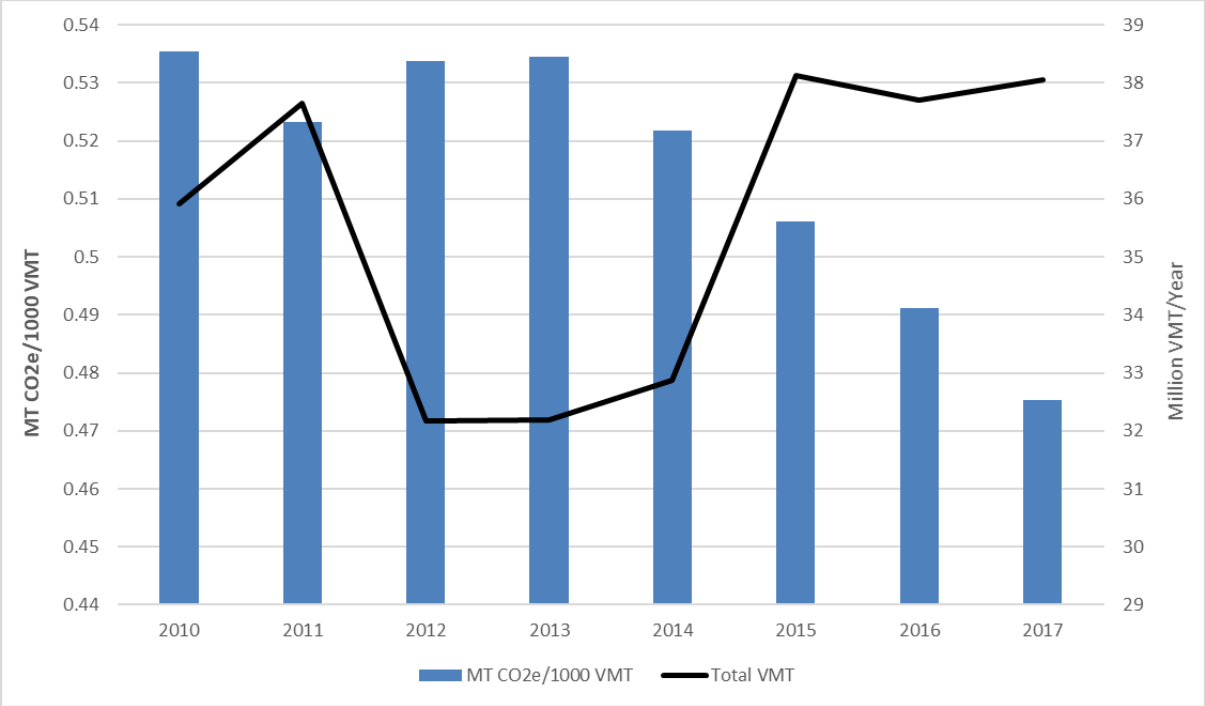
If we all chose to power half of these short trips with our feet instead of petroleum, assuming an average fuel economy of 22 mpg and an average fuel price of $2.50/gallon, we would save about $575 million in fuel costs and about 2 million metric tons of CO2 emissions per year. That's like taking approximately 400,000 cars off the road each year. The total financial savings are even bigger — almost $900 million dollars — when you include savings on maintenance and tire replacement.[34]

Reducing VMT can be challenging because of convenience and issues related to viable public transportation options, cheap gasoline, low fuel efficiency in many vehicles and streets that discourage pedestrian or bicycle access.

How is Colma Doing in Reducing Transportation Emissions?

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.[35] 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 12 demonstrates the growth in VMT within the Town between 2010 and 2017.

Figure 12: Town of Colma 2010-2017 Total VMT and Vehicle Efficiency



In addition, SB 375 sets regional emissions targets and tasks regional planning organizations to recalibrate land use and transportation planning to meet emissions targets. San Francisco Bay Area targets are 7% below 2005 levels by 2020 and 15% below 2005 levels by 2035.

Transportation Goals

Goal	2030 Target
Expand EV Infrastructure to decarbonize transportation.	Add a minimum of 10 new charging stations in Town by 2030.
Increase number of bike lanes and the walkability of the streets and roadways in Town.	Incorporate green infrastructure and complete streets features in the design of all projects where feasible.

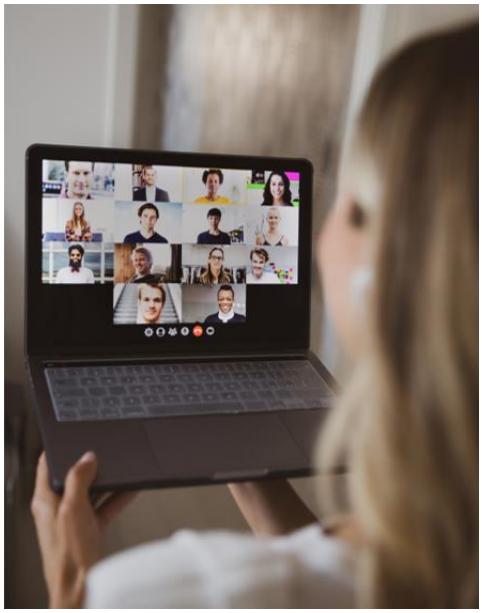
Transportation Strategies

Transportation			
Strategy	**Description**	**Approach**	**2030 Emissions Impact (MT CO2e/ year)**
Establish smart growth policy	Establish a smart growth policy that prioritizes infill, higher density, transportation-oriented development and mixed-use development	Development Policy	-79
Expand walkable and bikeable street landscape and green infrastructure	Modify landscape to make walking and biking more desirable. Install bike lanes, bike parking, traffic calming measures, beautification, etc.	Development Policy	-211
Encourage and incentivize bike and car sharing companies to operate in the Town	Develop policies and incentives that attract bike and car sharing companies to establish or expand service.	Town Policy, Incentives	-42
Support Safe Routes to School Program	Support Safe Route to Schools program by collaborating with neighboring jurisdictions to enhance pedestrian routes to local schools.	Town Program	-2
Develop low emission, off-road equipment program	Research and develop program to reduce off-road emissions from lawn, garden, and construction equipment. Program may include identifying products and resources for cemeteries and others and researching bulk purchasing or rebate options	Town Program	Supporting Measure
Support local farmers' markets	Encourage participation and promotion of community farmers' markets with locally-grown food to encourage local shopping and reduce VMT associated with acquiring produce.	Outreach	-1
Promote & educate benefits of electric vehicle ownership	Promote/ educate the benefits of EV ownership and promote rebates from PCE for purchase of EV purchases. Add resources about other state/federal rebates. Participate and promote "EV drive events" with neighboring jurisdictions for Colma residents.	Outreach/ Education	-590

Transportation			
Strategy	**Description**	**Approach**	**2030 Emissions Impact (MT CO2e/ year)**
Expand EV charging infrastructure through incentives and partnerships	Leverage incentives from PCE's EV Ready Program, a $28 million EV READY PROGRAM To expand charging infrastructure in public properties, multi-unit dwellings and workplaces. Program includes: • Free technical assistance to help design/guide project • Access to negotiated EV charging station pricing • Network o vetted contractors to install charging ports • Available to businesses, public facilities/public parking, multi-family locations	Outreach/ Education & Incentives	-669
Establish commercial and residential green building policy: EV charging	Update residential and commercial building code to increase the mandated percentage of parking spaces designed to accommodate electric vehicle charging equipment and require the installation of a Level 2 charger in new commercial developments.	Codes and Standards	-142
Enhance infrastructure to promote shared electric bikes and scooters	Modify existing Town infrastructure to accommodate shared electric bikes and scooters that provide last-mile solutions to residents and commuters. Infrastructure enhancements including dedicated off-street parking spaces and on-street corrals to accommodate shared electric bike and scooter parking and prevent conflicts with pedestrians.	Policy	-61
Update vehicle procurement policy to require municipal vehicles to be ZEV.	Expand the existing vehicle procurement policy to require zero emissions vehicles (ZEVs) except when a ZEV is not able to meet the performance requirement needed.	Town Policy	-20
Establish flexible schedules policy for public employees	Establish policy enabling alternative work schedules and remote working to reduce VMT associated with employee commuting for positions that allow for this flexibility.	Policy	-16

Transportation			
Strategy	**Description**	**Approach**	**2030 Emissions Impact (MT CO2e/ year)**
Promote commute alternatives program to businesses	Develop policy to support and promote commute alternatives program including pre-tax commuter benefits, transit subsidies, and a carpool program to promote and incentivize public transportation, carpooling, biking, etc. to business community.	Outreach/ Education	-2*

*Emissions reductions impact may be higher than calculated.



GHG Emissions and Increase of Teleworking

Before March 2020, just 29 percent of college graduates worked from home at least some of the time.[36] The coronavirus pandemic was the catalyst for workplaces to institutionalize more teleworking for full-time employees once the economy reopened. In April 2020, a survey showed that nearly 43 percent of full-time employees said they'd like to work remotely more often, and 20 percent said their workplace was actively discussing the option.[37] Telework policies that previously allowed employees to work one or two days a week from home may get flipped around. Work groups may start discussing which one or two days everyone should come to the office for in-person meetings and activities, leaving the remainder of the week for teleworking. Since the majority of San Mateo County's GHG emissions come from transportation, the climate benefit from this shift will be sizable.

Unfortunately, many jobs can't be performed at home – think security guards, delivery personnel, and grocery store clerks. In addition, low-income households may not have access to computers or internet access at home.

5.3 Solid Waste

1% of Colma's GHG Emissions are from solid waste to landfill

Colma has done an excellent job reducing waste due to high participation rates in the new diversion programs, particularly the organics diversion programs for businesses and residents which were developed in 2015. Emissions from waste is a small portion of the Town's total GHG emissions but there are benefits from waste reduction such as composting and keeping organics out of the landfill, reducing litter and pollution, and source reduction. With the approvals of SB 1383 and AB 341 more organics are now composted than ever before. There are additional programs that include a County-wide plastic bag and polystyrene (Styrofoam) ban. Colma is bringing the sustainable foodware ordinance for Council consideration and staff has already met with businesses to discuss the sustainable foodware options. The feedback has been favorable, particularly due to the availability of sustainable options and rebates.

New programs will include consideration of a new zero waste policy and additional resources for businesses to reduce waste and reduce costs. In California, 2 percent of total GHG emissions are generated from the disposal of waste. When organic material, including food and wood products, are sent to landfills they release methane as they slowly decay over time. While some landfills capture as much methane as possible and combust it for electricity generation, many landfills leak methane, a potent GHG, directly into the atmosphere.

Be a Better Consumer
Did you know that the average American generates about 4.4 lbs of trash each day? To reduce the amount of trash you generate, follow these few easy steps. Use reusable coffee mugs and shopping bags. If you forget your mug or bag at the store, buy a new reusable one and keep the extra one in your purse or car for use the next time you are out. Alternatively, set aside $1 each time you forget your mug or bag; depending on your memory, you will have enough funds to purchase a reusable item sooner or later. Also, reuse as many things as possible and recycle at home, work, and school. Compost pick-up is now available in most parts of San Mateo County.

Stop Unwanted Services
Did you know that junk mail production in the United States consumes as much energy as 2.8 million cars? Stop your junk mail at www.directmail.com/junk_mail. Stop unwanted catalogs at www.catalogchoice.org.

How is Colma Doing to Reduce Waste?

Although composting programs have begun to decrease the amount of organic material sent to landfills, organic material still accounts for 37.4 percent of all materials sent to landfills in California. Because organic materials sent to landfills release methane directly into the atmosphere, increasing the percentage of organic materials that are sent to dedicated composting facilities is critical to reducing emissions in the waste sector.

Solid Waste Goals

Goal	2030 Target
Implement zero waste policy: Focus on commercial organics and recycling diversion to meet and exceed SB 1383 and AB 1826, AB 341	20% reduction compared to 2005
Increase organic waste diversion in commercial uses	75% of businesses who generate waste to have organics diversion program

Solid Waste Strategies

Waste			
Strategy	**Description**	**Approach**	**2030 Emissions Impact (MT CO2e/year)**
Community Wide Measures			
Establish a zero waste policy and develop a zero waste program	Develop a zero-waste policy and develop a program to meet the zero-waste target of 90% diversion through a combination of efforts including promotion of traditional recycling and organics recycling programs and local enforcement of recycling requirements.	Town Policy/ Education	-68
Adopt the regional Sustainable Food ware ordinance	Adopt the regional Sustainable Food Ware ordinance and work in collaboration with San Mateo County Office of Sustainability to provide resources and on-site assistance to Colma businesses to transition from single-use food ware.	Mandatory Requirements	Supporting Measure
Develop vendor policy for public events	Establish policy requiring traditional and organics recycling at public events. Require compostable or recyclable cutlery and packaging to be used. Supports measure WC-1.	Mandatory Requirements	Supporting Measure
Municipal Measures			
Establish a municipal zero waste policy	Establish a policy to achieve 95% waste diversion rate in city operations. Provide appropriate bins and signage, organics recycling and education to public employees to make goal achievable.	Town Policy	-2
Expand environmentally preferred purchasing policy: Recycled materials	Expand our sustainable purchasing policy that emphasizes the purchase of materials with high recycled content – paper, furniture, etc.	Procurement	Supporting Measure

5.4 Food and Consumption

The strategies in this section address consumption-based emissions related to goods, food, and services. The consumption-based inventory for San Mateo County includes emissions from the

six categories in the chart below. Actions designed to reduce consumption-based emissions are intended to supplement actions already included in CAP 2030 measures, not replace them.

Category	Included in Generation-based Inventory	Not Included in Generation-based Inventory
Transportation	Vehicle fuel	Vehicle fuel production Motor vehicle manufacturing and repairs Air travel
Buildings	Electricity Natural gas	n Construction Waste
Food	Grown and distributed within San Mateo County	Cereals Fruits/vegetables Dairy Meat Other food
Purchased goods	Manufactured in San Mateo County	Small appliances and entertainment equipment Clothing Home furnishings and large appliances Other goods
Services	Services accessed in San Mateo County	Healthcare Education Entertainment and Recreation Financial Services Information and Communication Miscellaneous
Waste	Composting Recycling	N/A

Addressing consumption-based emissions is a new effort for the Town of Colma. The Town has not determined how to quantify emissions from these actions but know that these actions will ultimately reduce GHG emissions. The Town will use resources such as the Urban Sustainability Directors Network (USDN) Sustainable Consumption Toolkit[38] as a resource to educate the community about consumption-based emissions and how to reduce them.

Goal	Action
Buildings: Improve more sustainable building products	Educate and promote the benefits of more sustainable building materials (through Colma's Sustainability webpage) and other outreach to provide resources for builders in Colma who have new construction and renovation projects.
Food: Minimize food waste through education	Support campaigns like StopFoodWaste.org and "Food Too Good To Waste" to educate residents and businesses about how to minimize waste through shopping, storing and cooking.
	Support food rescue programs in the community that deliver surplus food to hungry people. This action supports components of SB 1383 which requires edible food waste recovery.
	Education and support food waste prevention efforts and food sharing tables by educating the community with easy ways to reduce waste.
Food: Buy local and in season and reduce the emissions intensity of food consumed	Working in collaboration with the Office of Sustainability educate the benefits of purchasing local seasonal vegetables, plant-based proteins, and less processed foods. These ideas can be shared via Live Wire and or future farmers markets in Colma.
	Provide information and encourage healthy school lunches
	Provide information and support legislation or advocacy for carbon footprint labeling of food products
Purchased goods: Educate about the benefits of durable long-lasting products and encourage reduction of purchase of single use products use.	Promote "buy durable" or "buy repairable" ideas and add to Colma's Sustainability webpage to educate and provide resources. Considering partnering to support fix-it clinics and adult classes on how-to-repair. Support legislation such as Right to Repair.[39]
	Support the addition of repair businesses where feasible and classes and job training for repair, reuse and repurpose.
	Promote resale, reuse, repurpose and salvage businesses where feasible.
Purchased goods: Reduce emissions intensity of consumer goods	Encourage businesses to "opt up" to purchasing 100% renewable energy through PCE.
	Promote "buy clean – made with renewables," campaign for Bay Area and California producers that use renewable energy.
	Promote products made with other "low-carbon" attributes such as refurbished products, or those made with bio-based materials or recycled content. Promote to producers and consumers. Support legislation or advocacy for carbon footprint labeling of goods.

Shop Locally Grown and Produced
The shorter the distance your food travels to your plate or a product travels to your home, the fewer greenhouse gases are produced. Declare one day a week to be a "buy local day" and eat foods produced within 50 miles of your house. Participate in community-supported agriculture and community-supported fishery programs and shop at farmers markets.

To find certified green businesses in your area, download the "Shop Green" app or visit https://greenbusinessca.org/. To find other locally owned businesses, contact your local chamber of commerce.

Buy produce and fish labeled "As Fresh As It Gets," signifying that it was grown or harvested in San Mateo County. Support restaurants and businesses accredited by the "As Fresh As It Gets" campaign, signifying that they use county-grown produce, fish, and other products. For a list of in-season produce and fish, farmers market locations, and accredited businesses and restaurants, visit www.asfreshasitgets.com.

5.5 Carbon Sequestration

Our forests and oceans are natural carbon sinks, each absorbing 25 percent[40] of the carbon dioxide that is released into the atmosphere.[l] The process of capturing and storing atmospheric carbon is known as carbon sequestration, and it is a strategy that – when combined with other efforts – can help combat climate change. Nonprofit Project Drawdown specifically recommends 25 solutions based on using carbon sinks to reduce the impacts of climate change.[41]

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 Colma we can encourage residents, businesses, and cemeteries to maintain or plant new trees to reduce GHG.
- **Biochar**: This process involves 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.[42] This type of carbon sequestration may be a

[l] 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.

solution for landfill and wastewater treatment applications and new processes are being introduced to the Bay Area.

- **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.

Town staff has been researching options for carbon sequestration and will provide alternatives in coming months and years to reduce GHG emissions.

5.6 Climate Adaptation

According to the National Oceanic and Atmospheric Administration (NOAA): The globally averaged temperature departure from average over land and ocean surfaces for 2019 was the second highest since record keeping began in 1880, according to NOAA scientists. December's combined global land and ocean surface temperature departure from average for 2019 was also the second highest in the 140-year record. In a separate analysis of global temperature data, WMO, NASA and Copernicus scientists determined 2019 to also be the second warmest year on record. Analyses from the United Kingdom Met Office ranked 2019 as one of the top three warmest years on record.

For 2019, the average temperature across global land and ocean surfaces was 1.71°F (0.95°C) above the 20th century average. This was the second highest among all years in the 1880–2019 record and just 0.07°F (0.04°C) less than the record value set in 2016. The five warmest years have occurred since 2015; nine of the 10 warmest years have occurred since 2005. The year 1998 is the only 20th century year among the 10 warmest years on record."[43]

Even if we stopped emitting greenhouse gasses tomorrow, the climate would continue to change due to the length of the carbon cycle — the ability of the Earth to absorb excess carbon in the ocean and plants. Therefore, climate change is inevitable, and our communities must plan to adapt to it.

Adaptation planning is most effective at the local level. To develop its adaptation strategy, Colma will refer to the following integrated set of policies and tools:

- California Adaptation Planning Guide from the California Office of Emergency Services (still in draft form: https://www.caloes.ca.gov/HazardMitigationSite/Documents/APG2-FINAL-PR-DRAFTAccessible.pdf)
- Safeguarding California Plan: California's Climate Adaptation Strategy (2018 Update)
- Cal-Adapt 2.0 (released October 2017 and updated regularly, most recently in January 2020)
- California's Climate Change Assessment (most recently updated in 2018)
- State of California General Plan Guidelines (updated periodically, most recently updated in 2017)
- Adaptation Clearinghouse
- State Hazard Mitigation (2018 Update)

In addition, the County of San Mateo has embarked on a multi-sector adaptation strategy, Climate Ready SMC, to plan, assess, and implement strategies to address sea-level rise and flooding, changes in precipitation, extreme heat, and wildfires in San Mateo County.[44] Colma plans to coordinate closely with the County on adaptation planning efforts.

For more information on adaptation planning, see Appendix D or visit the Climate Ready SMC website: https://www.smcsustainability.org/climate-ready.

6. CAP 2030 Implementation

This section outlines Colma's implementation process for reducing emissions 49% below 2005 levels by 2030. Colma has implemented many of the previous GHG reduction strategies from the 2013 CAP, however, the CAP 2030 GHG strategies will require more resources, new policies, more staff time and a commitment to meet the new GHG reduction targets by 2030. Staff is aware of the funding restraints that have been placed on the Town due to COVID-19 and will research funding sources and grant opportunities. Staff will also continue to prioritize GHG reduction strategies that are most cost effective for businesses and residents.

CAP 2030 implementation will be managed and monitored by Sustainability and Planning staff. The General Plan and other planning and building documents will be updated to incorporate the CAP 2030 measures. Staff will hold periodic meetings to discuss CAP 2030 strategies and their implementation and will collaborate with regional groups such as the San Mateo County Office of Sustainability, C/CAG and others to cost effectively implement the strategies. Staff has been successful in achieving grants such as the energy efficiency grants awarded in 2019 and will continue to research additional funding sources for CAP 2030 implementation. One additional funding source for CAP 2030 is to consider a small increase in the franchise fee already collected in the franchise agreement with Republic Services. Staff will present additional information and alternatives for consideration of a very moderate franchise fee increase for CAP 2030 funding.

For CAP 2030 implementation, the following is recommended:

- Expand our efforts for Colma businesses and residents, and the Town to leverage programs and resources funded by PG&E, PCE and others to improve energy efficiency and install solar and or other renewable energy
- Expand policies, including the adoption of reach codes, to support electric vehicle infrastructure and increase electrification to reduce GHG emissions due to the significant natural gas consumption in Colma.
- Expand water conservation and energy efficiency programs to our cemeteries by providing technical assistance and resources and seek grants to assist in funding upgrades.
- Hold a kickoff CAP 2030 meeting with staff to discuss CAP 2030 strategies, potential funding sources and new resources/programs that are available to the Town. Discuss the staff hours that will be available to devote to CAP 2030 strategy implementation.
- Hold periodic staff meetings to discuss CAP 2030 implementation and methods to incorporate sustainability into Town projects as early as feasible (e.g. CIP projects). At

these meetings also discuss the recommended methods to incorporate the new strategies into Town procedures and policies. Continue to meet one on one with staff members to ensure there are sufficient resources and compliance with the policies and procedures (e.g. the Town Sustainability Policy and environmentally preferable purchasing is consistently done). Ensure new Town hires are aware of the CAP 2030 and provide them with resources.

- A significant focus will be on the new Colma Sustainable Business Program to provide resources to businesses to increase energy efficiency, conserve water, consider solar/renewable energy, consider opting up to ECO 100 and be a Certified Green Business.
- Consider updating "CAP 2030 Impact" section or similar language in City Council staff reports to detail how the recommended action is consistent with the CAP 2030.
- Ensure that a GHG Inventory is completed every year to monitor progress toward the 2030 GHG reduction target.
- Expand resources on Colma's Sustainability webpage, increase outreach to community groups and businesses, post additional education materials at Town Hall, Community Center, and banners in front of the Police Department, etc. Participate in the regional online engagement platform such as Climate Solutions Net.
- Expand outreach by adding sustainability discussions to ongoing meetings with Colma businesses (e.g. cemeteries) to promote new resources and technical assistance.
- Provide annual progress report to the City Council and post progress on the Town website. Highlight the areas of success and challenges. Monitoring CAP 2030 implementation progress is a critical component to ensure that the GHG reduction targets are met.

6.1 Leveraging Partnerships

Colma staff has been active in leveraging our partnerships with Republic Services, Peninsula Clean Energy, C/CAG (City/County Association of Governments), Association of Bay Area Governments, the Office of Sustainability, San Mateo County Energy Watch, the Resource Conservation District, Ecology Action and the Bay Area Regional Energy Network (BayREN). We will continue to actively engage with these groups to cost effectively implement the CAP 2030 strategies that include improving energy efficiency, rebates to promote installing solar, grants for water conservation and other programs. Colma will expand efforts to reach out to vulnerable groups which include seniors and low income to ensure they are aware of the resources that are available to them.

BayREN and PG&E have been training local contractors, designers, and architects in energy efficiency for over a decade through contractor trainings and workforce development programs. Plumbing and electrical unions also provide extensive trainings for their members. Grid Alternatives has been offering training programs for solar installations in California by using grants 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. In implementing the CAP 2030 strategies, Colma staff will be reaching out to these organizations.

Since 2019, Peninsula Clean Energy has offered programs to supplement BayREN and PG&E's work mentioned above; 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 electrical trades, Colma will promote the Office of Sustainability information about these available trainings to expand the workforce.

Four Levels of Action Related to Change

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

Grant asserts that the message to increase sustainability has been focused on Level 1 and Level 4: (e.g. "Change individual actions or sign this petition) but says greater impact is 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."

An example is getting a local school to install solar panels. In this example, Grant says "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."[45]

Colma staff will also work closely with the California Green Business Certification Program to expand resources and technical assistance to Colma businesses. (the current list of these businesses is available at https://greenbusinessca.org/find-green-business/.) Additionally, Colma will consider participating in the regional collaboration for education and outreach regarding electrification of buildings (e.g. reach code implementation) and the electrification of transportation (e.g. adding EV infrastructure). Collaborations can help Colma provide cost-effective education and resources for businesses and residents to upgrade their homes and businesses. As part of our outreach and education, Colma will use the levels of action detailed in the box below.

6.2 Timeline

The following timeline lists the major milestones in the CAP 2030 implementation process. Progress and updates will be provided to the Council and Colma's Sustainability webpage as part of the annual CAP 2030 Progress Report.

Table 6. Climate Action Plan Implementation

Milestone	Target Date
2005 GHG Baseline and 2010 GHG Inventory Completed	Jan 2013
2013 CAP and AB 32 2020 GHG Reduction Target Draft Established	February 2103
Draft 2013 CAP Published	April 2013
Community Comment Period	May 2013
Council Review	May 2013
2013 CAP Adoption	May 2013
Sustainability staff begins implementation	May 2013 - Present
Annual CAP Implementation Progress Report to Council	2014-2019
2017 GHG Inventory Completed	January 2020
2030 CAP Update	September 2020 - Present

6.3 Implementation Budget

Some of the CAP 2030 strategies will be integrated into existing staff workplans and departmental operating or projects budgets. There will be additional resources needed over the

ten-year implementation timeline to meet the GHG reduction targets of 49% below 2005 levels. Additional staff resources will be needed over this timeline. It is the intent of Colma staff to develop a CAP 2030 implementation budget for implementing the strategies, however, staff is cognizant that financial challenges and assigning of budget priorities are a part of municipal operations which will vary from year to year. CAP 2030 funding will be refined and evaluated as part of the annual budget process and approval by the City Council.

To fund some of the CAP 2030 strategies, Colma could consider some of the following as funding sources:

- Consider a moderate increase in the franchise fee in the franchise agreement with Republic Services since Colma's franchise fee is below the median franchise fee in the Bay Area.
- Consider charging carbon impact fees for development projects
- Adding transportation impact fees to requirements for new construction projects

6.4 Monitoring

Colma staff will monitor the progress toward the 2030 GHG reduction target and if it's determined that the CAP 2030 strategies are not meeting the targets, Colma staff will increase additional voluntary and mandatory measures. This monitoring process is necessary for this CAP to maintain its status as a "GHG Reduction Strategy" under the California Environmental Quality Act (CEQA). As part of the annual monitoring of Colma's CAP 2030 and GHG inventories, staff will evaluate additional significant advances in technologies and creative innovations used in other jurisdictions which could be integrated into Colma's strategies in the coming years.

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.** The goal is to achieve 49% reduction of GHG emissions by 2030 and toward carbon neutrality by 2045 and 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. Technology to monitor and track this information will improve over time.

Additionally, Colma can continue to participate in the County's RICAPS program which will post participating jurisdictions' success in meeting established goals such as the number of solar installations, number of EV charging stations installed, number of homes retrofitted etc. Though Colma is a small jurisdiction, this participation is a good way for Colma's effort to get recognition. As part of this monitoring Colma staff can not only monitor GHG emissions, but also resource (energy and or water) savings and cost savings (if available)

Annually, Colma staff will review the new GHG inventory provided by the County of San Mateo Office of Sustainability through the San Mateo County Energy Watch program. Every five years, Colma will conduct a municipal GHG generation-based inventory to track progress on reducing the Town of Colma's own emissions. Colma's municipal emissions are less than 1% of Colma's total emissions. CAP 2030 strategies may need to be updated based on the results of the GHG inventories. The Town may modify and/or add new actions to ensure that Colma is on track to meet its GHG reduction goals.

7. Appendix

A. Glossary of Abbreviations

AB	Assembly Bill
BAAQMD	Bay Area Air Quality Management District
BAU	Business-As-Usual
CARB	California Air Resources Board
CAP	Climate action plan
CCE	Community Choice Energy
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CPUC	California Public Utilities Commission
EV	Electric vehicle
GI	Green Infrastructure
GHG	Greenhouse gas
HFCs	Hydrofluorocarbons
ICLEI	Local Governments for Sustainability
IPCC	Intergovernmental Panel on Climate Change
kWh	kilowatt hour
MT	Metric ton
MMT	Million metric tons
N_2O	Nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
PCE	Peninsula Clean Energy
PFCs	Perfluorocarbons
PG&E	Pacific Gas and Electric Company
RICAPS	Regionally Integrated Climate Action Planning Suite
RPS	Renewable portfolio standard
SB	Senate Bill
SF_6	Sulfur hexafluoride
TOD	Transit-oriented development
U.S. EPA	United States Environmental Protection Agency
VMT	Vehicle miles traveled
WRI	World Resources Institute
ZEV	Zero Emission Vehicle

B. Climate Change Information

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

The Intergovernmental Panel on Climate Change (IPCC), the leading international scientific body on climate change, released a report[46] 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:

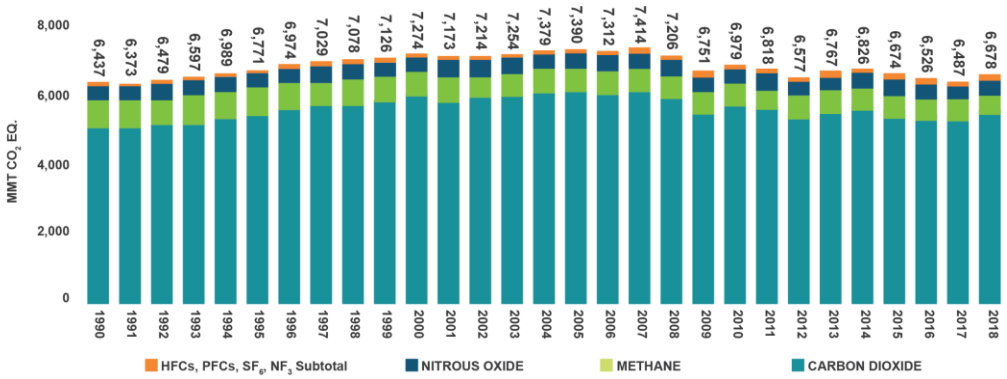
- Increase renewable electricity production to 50 percent
- Reduce petroleum use by 50 percent in vehicles
- Double energy efficiency savings at existing buildings
- Reduce GHG emissions from natural and working lands
- Reduce short-lived climate pollutants such as black carbon, methane, tropospheric ozone, and fluorinated gases
- Make California more resilient to climate change in accordance with California's 2018 *Safeguarding California Plan*
- Phase out sale of gasoline vehicles by 2035
- 100% medium and heavy-duty vehicles in state be zero-emission by 2045
- Transition to 100% zero-emission off-road vehicles and equipment where feasible

B.3 Trends in National and State Emissions

National Emissions

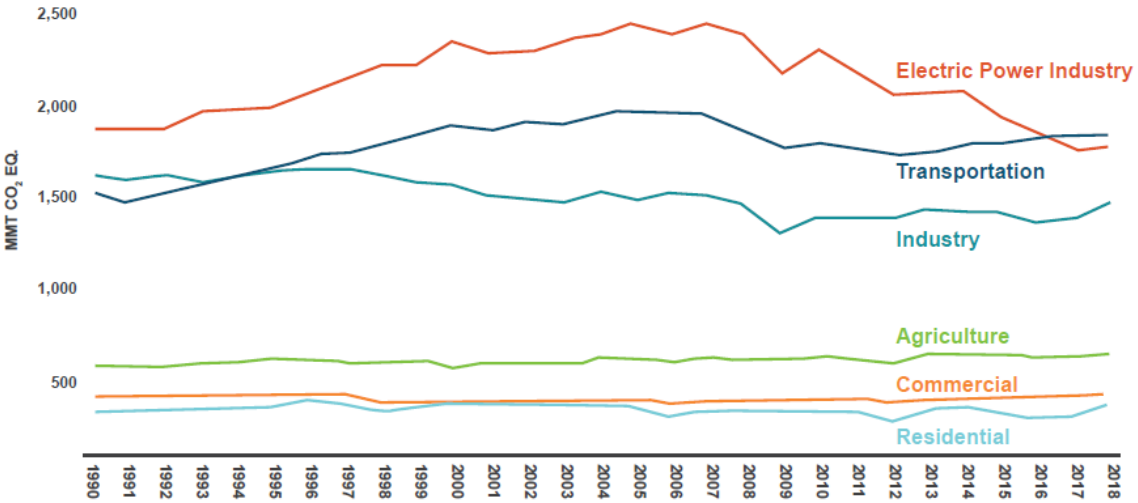
According to the U.S. EPA, gross total U.S. GHG emissions in 2017 were 6,456.7 million metric tons (MMT) of CO2 equivalent (CO2e), representing a 12 percent decrease below 2005 levels.[47] Emissions have also decreased 4.5 percent since 2014, largely driven by transitioning power plants from using coal 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 13: Gross U.S. GHG Emissions by GHG Gas Type: 1990-2018[48]



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).

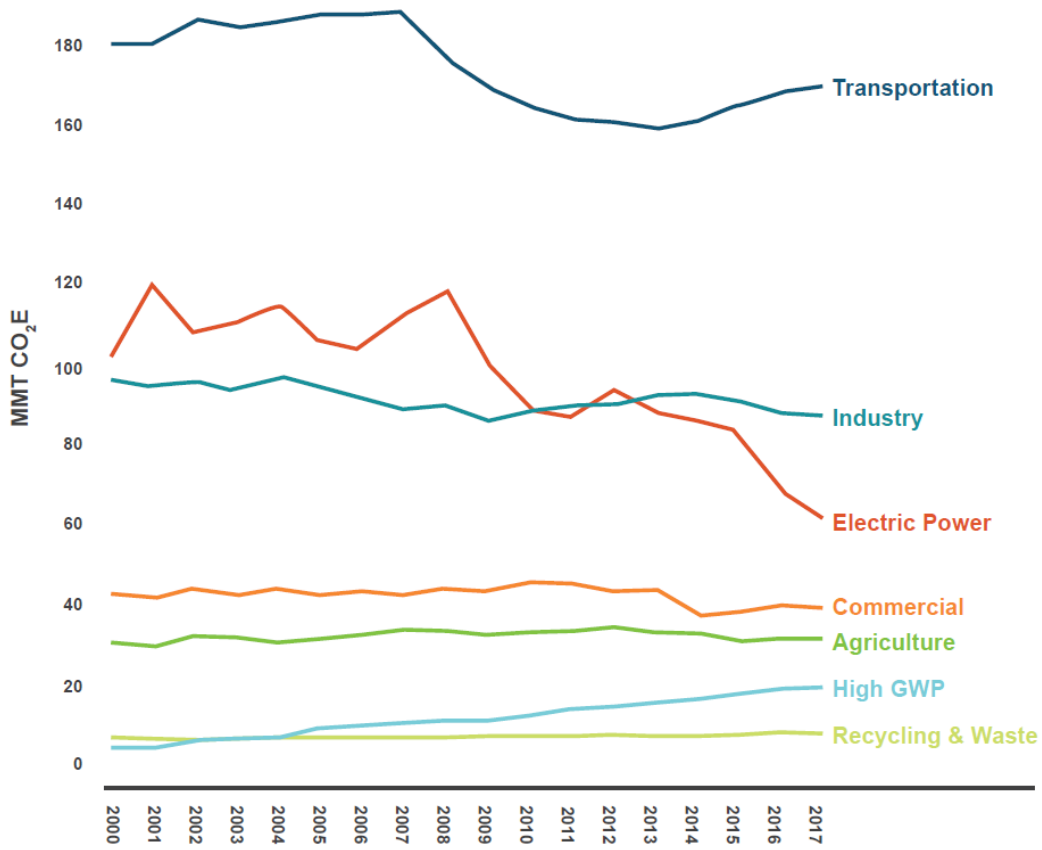
Figure 14: U.S. GHG Emissions by Economic Sector[49]



California Emissions

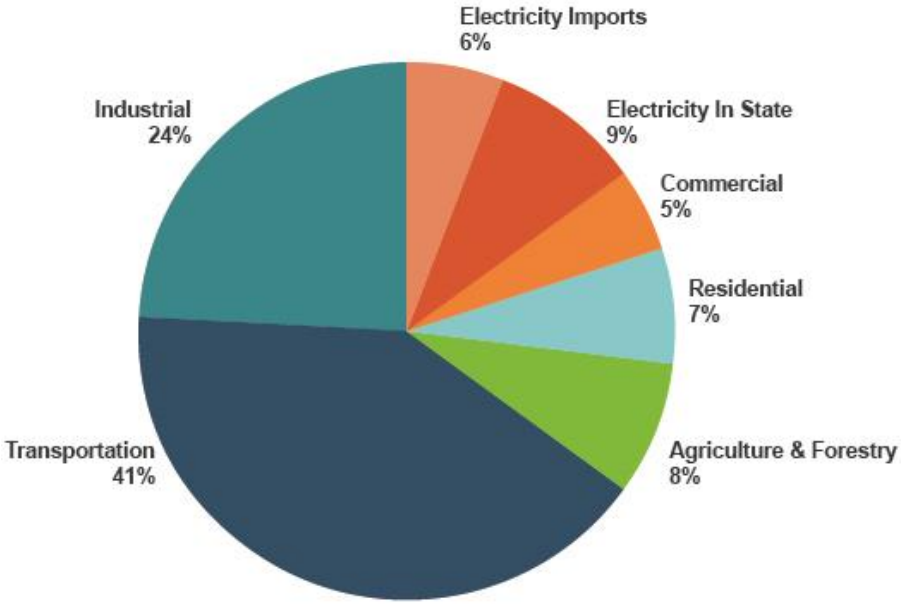
Similar to the national trend, total GHG emissions in California have decreased in recent years. According to the California Air Resources Board (CARB), total California GHG emissions in 2017 were 424 million metric tons (MMT) of CO2e, representing a 2 percent decrease below 1990 levels and a 13 percent decrease below 2005 levels.[50]

Figure 15: California GHG Emissions by Sector: 2000-2017



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)[51] and Cap-and-Trade Program.[52] 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).

Figure 16: California 2017 GHG Emissions by Sector



B.4 Four Climate Change Scenarios

The following is a reprint of an article that was published in Fast Company on August 26, 2014.[53]

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

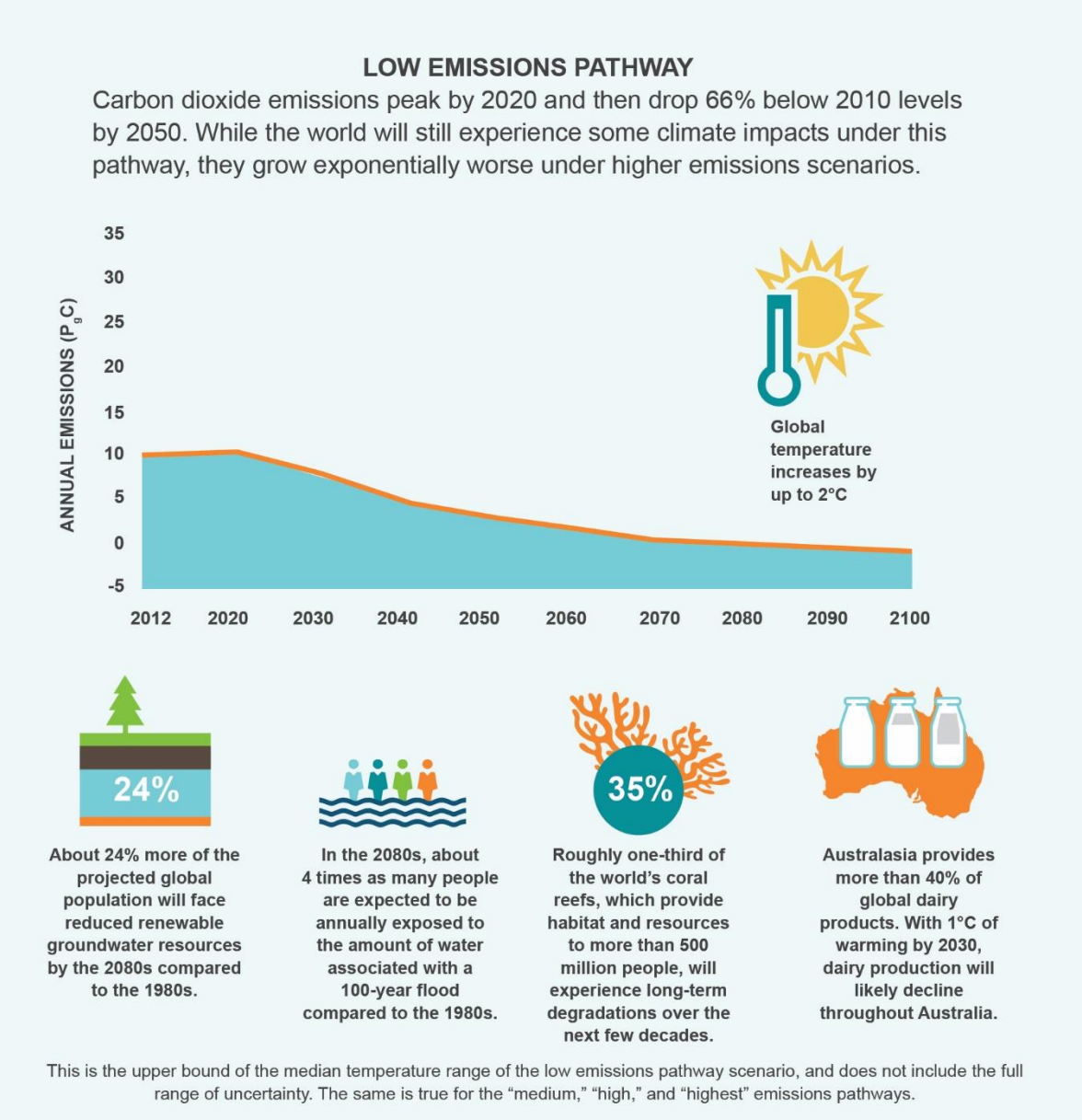
Climate change is going to do a lot of damage. How bad that damage will be is still under debate.

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.

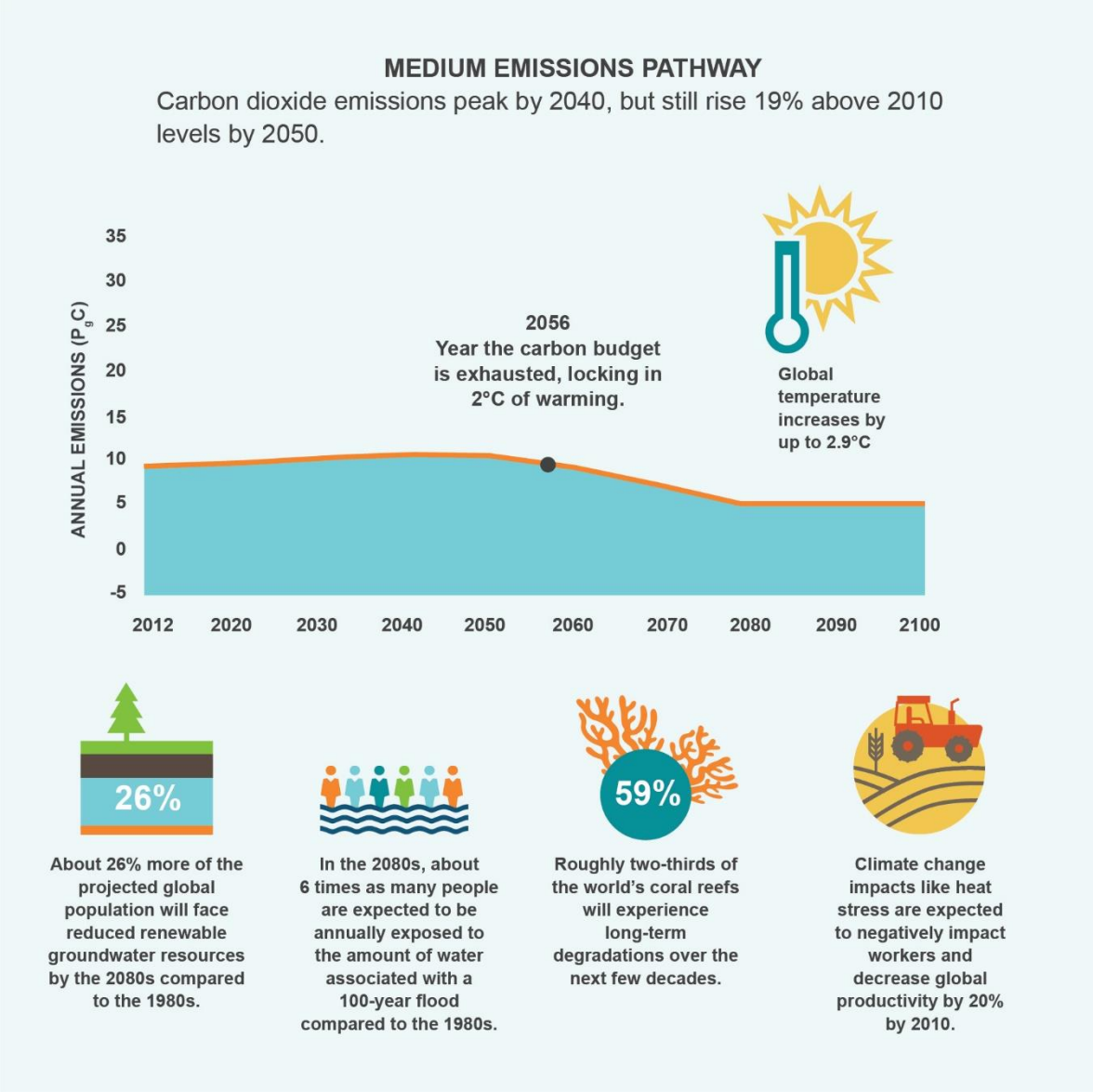
This graphic from the World Resources Institute gives a sense of the dynamics at play. It presents four "emissions pathways," ranging from the very optimistic to the highly pessimistic.

WE ACTUALLY DO SOMETHING ABOUT CLIMATE CHANGE



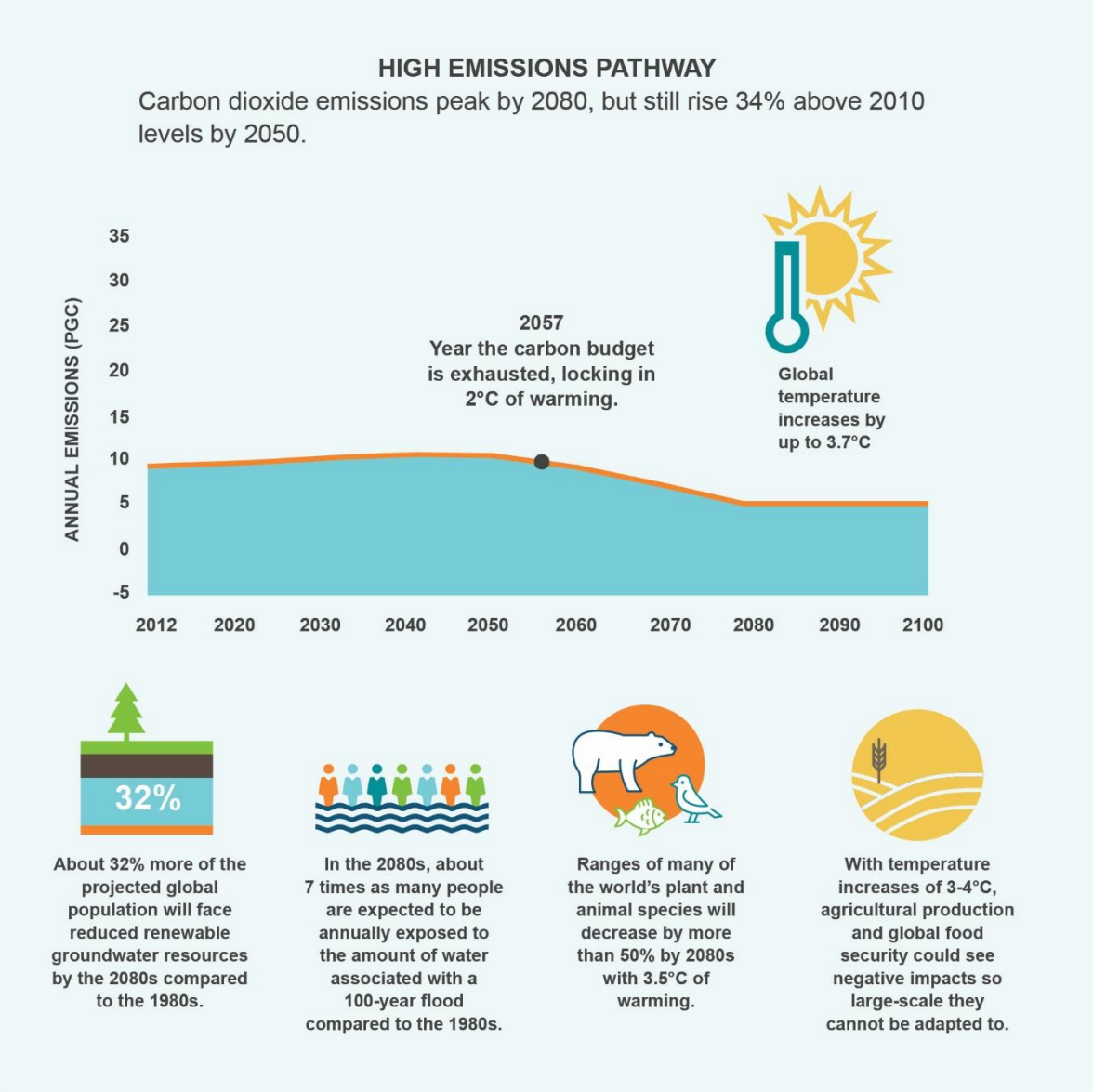
The first "Low Emissions" scenario is for a 66% drop in greenhouse emissions by 2050 compared to 2010 levels. It's what we might call a soft landing, because under those, scientists believe we'll be relatively safe. The world would have warmed only by 2 degrees C over pre-industrial levels (the level 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



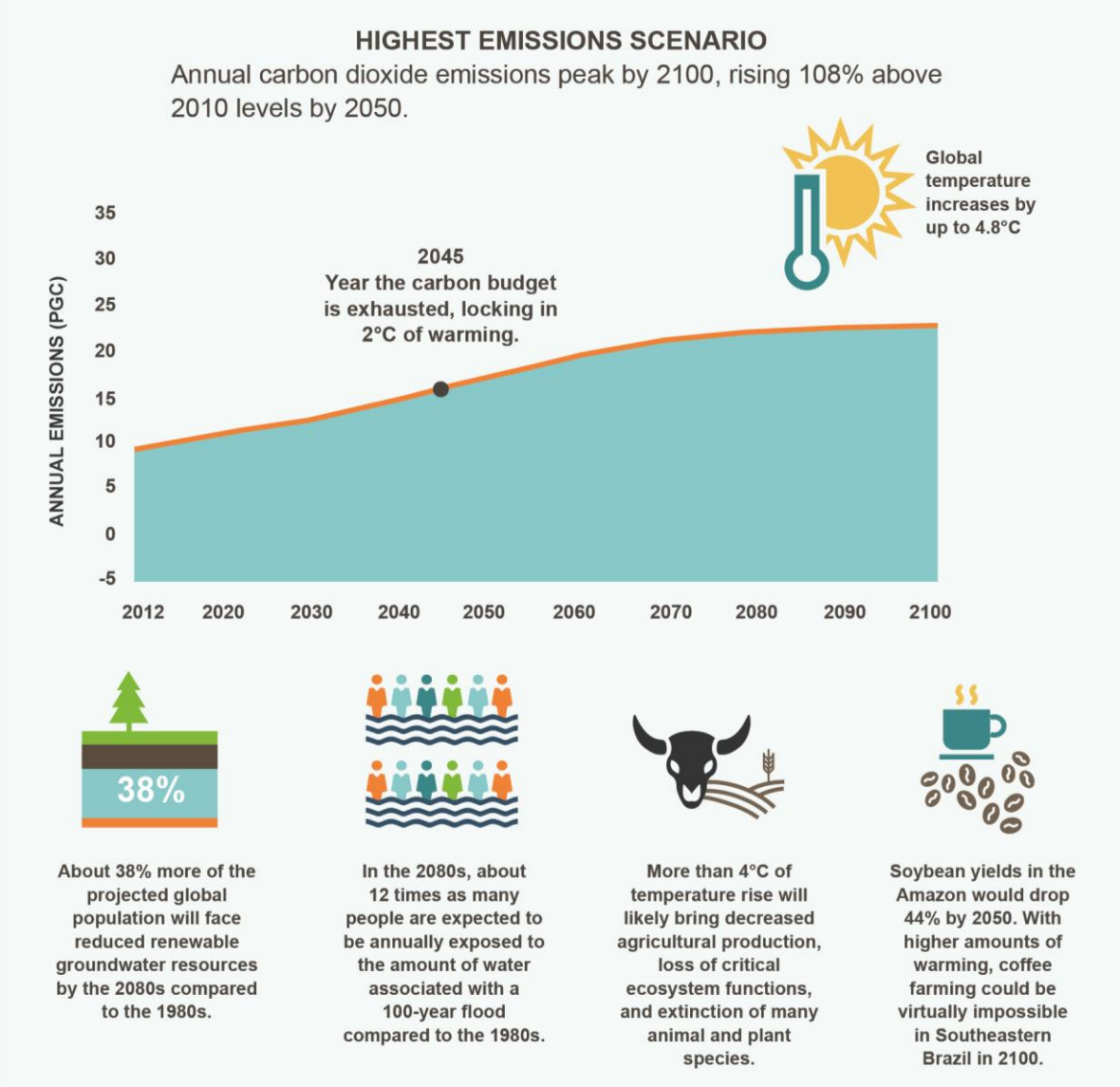
The "Medium Emissions" scenario sees increases in emissions until 2040 and the world exceeding its "carbon budget"–the level at which it should stay within the 2 degrees limit–by 2056. By 2100, the planet has warmed by 2.9 degrees, and economic productivity has fallen by 20%. By the 2080s, six times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

WE REV THE ENGINES



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



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.

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C. Policy Resources

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."[54]

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 32, California Global Warming Solutions Act of 2006: emissions limit, 2016

In September of 2016, Senate Bill 32(SB 32) was signed into law, amending AB32 goals to reducing GHG emissions 40 percent below 1990 levels by 2030. SB 32 declares that the reduction of ghg emissions is "critical for the protection of all areas of the state, but especially for the state's most disadvantaged communities." The legislation expands and extends the statewide GHG emissions reduction goals to reduce dependency on fossil fuels and fight climate change.

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."*

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

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 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.[55]

C.5 2013 Climate Action Plan Measures

Table 7: 2013 CAP Measures

Cap Measure	Status
Implement Residential Energy and Water Efficiency Program	Implemented
Implement Commercial Energy and Water Efficiency Program	Implemented
Replace 80% of commercial parking lot lighting with energy efficient lighting	Implemented
Participate in Bay Area Green Business Certification Program	Implemented
Develop and implement a Green Building Ordinance	Implemented
Implement mandatory Smart Growth development policies	Implemented
Increase bicycle lanes and implement mandatory policies to include walkability and bicycling in new projects and renovations	Implemented
Implement policies from *San Mateo County Sustainable Green Streets and Parking Lot Design Guidebook*	Ongoing
Promote mandatory Transportation Demand Management (TDM) strategies to new businesses with more than 50 employees	Ongoing
Promote Transportation Demand Management TDM strategies to existing businesses with more than 50 employees	Ongoing
Implement parking policies for new developments and renovation projects that require prioritized parking for low carbon fuel vehicles and bicycle parking and unbundle parking from property costs	Ongoing
Update the General Plan to be consistent with the CAP	Underway
Implement new planning review requirement for new and redeveloped commercial projects to include preferred parking	Ongoing
Increase recycling and waste diversion to meet 80% diversion rate	underway
Implement single use bag ban and polystyrene ban	Implemented
Develop and implement a Town Sustainability Policy	Implemented
Promote commute alternatives for Town employees and the public	Implemented
Replace 100% street, signal, park, and parking lot lighting with energy efficient lighting	Implemented
Adopt Green Building Ordinance for new Town-sponsored projects and major renovations	Implemented
Complete a solar installation feasibility study of Town properties and consider participating in regional joint purchase program for solar where feasible and cost-effective	In progress
Expand tree planting on public properties and use native and drought tolerant trees/plantings	Implemented
Establish method to integrate CAP measures into Town projects and day-to-day decisions	Implemented/TBD
Research methods to reduce methane released from closed landfills and collaborate with landfill owners where feasible	Not Started
Promote solar/renewable energy installations for commercial and residential	Ongoing
Longer-Term Implementation: Next 4-8 years	
Adopt a Commercial Energy Efficiency Ordinance	TBD

D. Community Collaboration and Sustainability Planning Best Practices

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.[56]

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.[57, 58]

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.[59]

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.[60]

- 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.[61]

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.[62,63,64]
- 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.[65]
- 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.[66,67]
- Promote Community Based Participatory Research (CBPR) principles in data collection and mapping of neighborhood existing conditions.[68]

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 8: Community Engagement Model Practices in suburban, urban, and rural jurisdictions[69,70,71]

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)	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 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 Sustainabilityof OFFICE OF SUSTAINABILITY COUNTY OF SAN MATEO Sustainability	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 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)	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 (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)	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	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	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 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 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

F. Funding Sources

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.

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. Colma 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 City 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:

Endnotes

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