



City of San Carlos

Climate Mitigation and Adaptation Plan

September 27, 2021





San Carlos Sustainability



City of San Carlos

Climate Mitigation and Adaptation Plan

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LIST OF ABBREVIATIONS

Acronym/Abbreviation	Meaning
AB	Assembly Bill
ABAG	Association of Bay Area Governments
BAAQMD	Bay Area Air Quality Management District
BayREN	Bay Area Regional Energy Network
BCDC	San Francisco Bay Conservation and Development Commission
Caltrans	California Department of Transportation
Cal Water	California Water Service
CAP	Climate Action Plan
CARB	California Air Resources Board
C/CAG	City/County Association of Governments of San Mateo County
CEQA	California Environmental Quality Act
CH ₄	Methane
CMAP	Climate Mitigation and Adaptation Plan
CO ₂	Carbon dioxide
CO _{2e}	Carbon dioxide equivalent
EIR	Environmental impact report
GHG	Greenhouse gas
GWP	Global warming potential
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt-hour
LGOP	Local Government Operations Protocol
MTC	Metropolitan Transportation Commission
MTCO _{2e}	Metric tons carbon dioxide equivalent
N ₂ O	Nitrous oxide
PCE	Peninsula Clean Energy
PG&E	Pacific Gas and Electric Company
PSPS	Public Safety Power Shutoff
RethinkWaste	RethinkWaste is the South Bayside Waste Management Authority
RICAPS	Regional Climate Action Planning Suites
SB	Senate Bill



Acronym/Abbreviation

Meaning

SCS	Sustainable communities strategy
VMT	Vehicle miles traveled
ZNE	Zero-net energy



EXECUTIVE SUMMARY

The 2021 Climate Mitigation and Adaptation Plan (CMAP) is San Carlos' strategic plan to reduce greenhouse gas (GHG) emissions and to adapt to changing climate conditions. The CMAP allows City of San Carlos (City) decision-makers, staff, and the community to understand the sources and magnitude of local GHG emissions and the impacts of climate change on the community, reduce GHG emissions, prioritize steps to achieve GHG emission-reduction targets, and increase resilience.

The CMAP is an update of the 2009 Climate Action Plan (2009 CAP), providing updated information, an expanded set of GHG reduction strategies, climate adaptation strategies, and a planning horizon out to 2050. The CMAP contains an inventory of the community's GHG emissions from the transportation, energy, off-road equipment, waste, and water and wastewater sectors, as well as from Caltrain operations; an assessment of the populations and assets most vulnerable to climate change; and goals, strategies, and actions to address climate change adaptation and GHG emissions. The CMAP also presents a work plan and monitoring program for the City to track progress over time.

San Carlos has an extensive history of achievement on GHG reduction and other environmental sustainability actions. The CMAP allows community members, City staff and officials, and other stakeholders to understand San Carlos' existing planning efforts and strategies to achieve its GHG reduction goals. It builds on several earlier efforts, including the Envision 2030 General Plan, the 2009 CAP, and several other local accomplishments to date.

Greenhouse Gas Inventory and Forecast

A GHG inventory is a summary of the GHG emissions generated by activities that take place within a community. The GHG emissions inventories and the GHG forecast lay the groundwork for the CMAP, which seeks to align the City's GHG reduction efforts with state-recommended targets. The City is committed to reducing emissions 40 percent below 1990 levels (equal to 49 percent below 2005 levels) by 2030 and 80 percent below 1990 levels (or 83 percent below 2005 levels) by 2050.

The CMAP contains GHG inventories for both community-wide and City operations. The community-wide GHG inventories include the years 2005 and 2010 through 2018 while the City operations inventories include the years 2015, 2017, and 2018. The City updated the 2005 community-wide GHG inventory that was included in the 2009 CAP to take into account the latest science in GHG accounting, new best practices, and updated emissions factors. These inventories assess emissions produced by the transportation, energy, waste, off-road, and water and wastewater sectors, as well as emissions associated with Caltrain operations and emissions reductions attributable to biomass sequestration.

As shown in Table ES-1, GHG emissions have declined steadily from 2005 levels. In the base year of 2005, the community of San Carlos emitted approximately 212,600 MTCO₂e. Transportation was the largest contributor to community emissions, emitting approximately 41 percent of the city’s total GHG emissions. In 2018, GHG emissions totaled 160,250 MTCO₂e, a decrease of 25 percent from 2005. Transportation remained the largest source of GHG emissions, accounting for approximately 47 percent of the community’s total.

**Table ES-1. San Carlos Community-wide GHG Emissions
Percentage Change Between 2005 and 2018 by Sector**

Sector	2005 (MTCO ₂ e)	2018 (MTCO ₂ e)	Percentage Change 2005 to 2018
Residential Energy	49,030	33,220	-32%
Non-residential Energy	51,800	25,310	-51%
Transportation	87,420	75,120	-14%
Off-road Equipment	11,180	12,540	12%
Rail	—	1,150	-4%
Stationary Sources	—	—	0%
Solid Waste	13,530	12,290	-9%
Water and Wastewater	—	980	-17%
Land Use and Sequestration	-360	-360	0%
Total Annual MTCO₂e	212,600	160,250	-25%

Table Notes: Due to limited data availability, 2005 GHG emissions for rail, stationary sources, and water and wastewater were not available. Stationary source GHG emissions for 2018 were also not available. All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

A GHG emissions forecast uses estimates of future community population and job growth to predict how emissions would grow over time if no action is taken at the federal, state, or local or regional level to reduce them. The CMAP includes a GHG forecast for the calendar years 2030 and 2050, relying on growth assumptions from the California Department of Finance and Association of Bay Area Governments (ABAG). As shown in Table ES-2, San Carlos’ GHG emissions are expected to increase by approximately 13 percent between 2005 and 2050 if no action is taken to reduce emissions.



Table ES-2. San Carlos Community-wide GHG Emissions Forecast, 2005 to 2050

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Residential electricity	16,190	4,050	4,100	4,680	5,130	-68%
Residential natural gas	32,840	29,170	29,520	33,760	36,970	13%
Non-residential electricity	34,550	8,640	9,860	10,510	11,490	-67%
Non-residential natural gas	17,260	16,660	20,050	31,940	34,670	101%
Transportation	87,420	75,120	80,960	101,220	112,620	29%
Off-road equipment	11,170	12,540	11,500	21,340	17,370	56%
Rail*	—	1,140	1,230	1,540	1,710	50%
Stationary sources*	—	—	70	70	70	0%
Solid waste	13,520	12,290	13,250	16,560	18,430	36%
Water and wastewater*	—	980	1,060	1,320	1,460	49%
Sequestration†	-360	-360	-360	-360	-360	0%
Total	212,590	160,230	171,240	222,580	239,560	13%

Table Notes:

* Due to limited data availability in 2005, emissions for rail and water and wastewater are not available and therefore the percentage reduction is calculated between 2018 and 2050. Data for stationary sources was not available for the years 2005 or 2018 and therefore the percentage change was calculated between 2020 and 2050.

† Informational item. These emissions are negative due to carbon being sequestered in soil and biomass from forested land and street trees. Any changes to the City’s Protected Tree Ordinance may impact these numbers. The effect on the climate from the removal of larger trees should be considered in any updates and permit issuance.

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Climate Change Vulnerability Assessment

A vulnerability assessment is an analysis of how climate change is likely to affect a community. The vulnerability assessment in this CMAP looks at the anticipated hazards and other public safety concerns that may be created or exacerbated by climate change and how these conditions have the potential to harm people, buildings and infrastructure, ecosystems, and other assets in San Carlos.

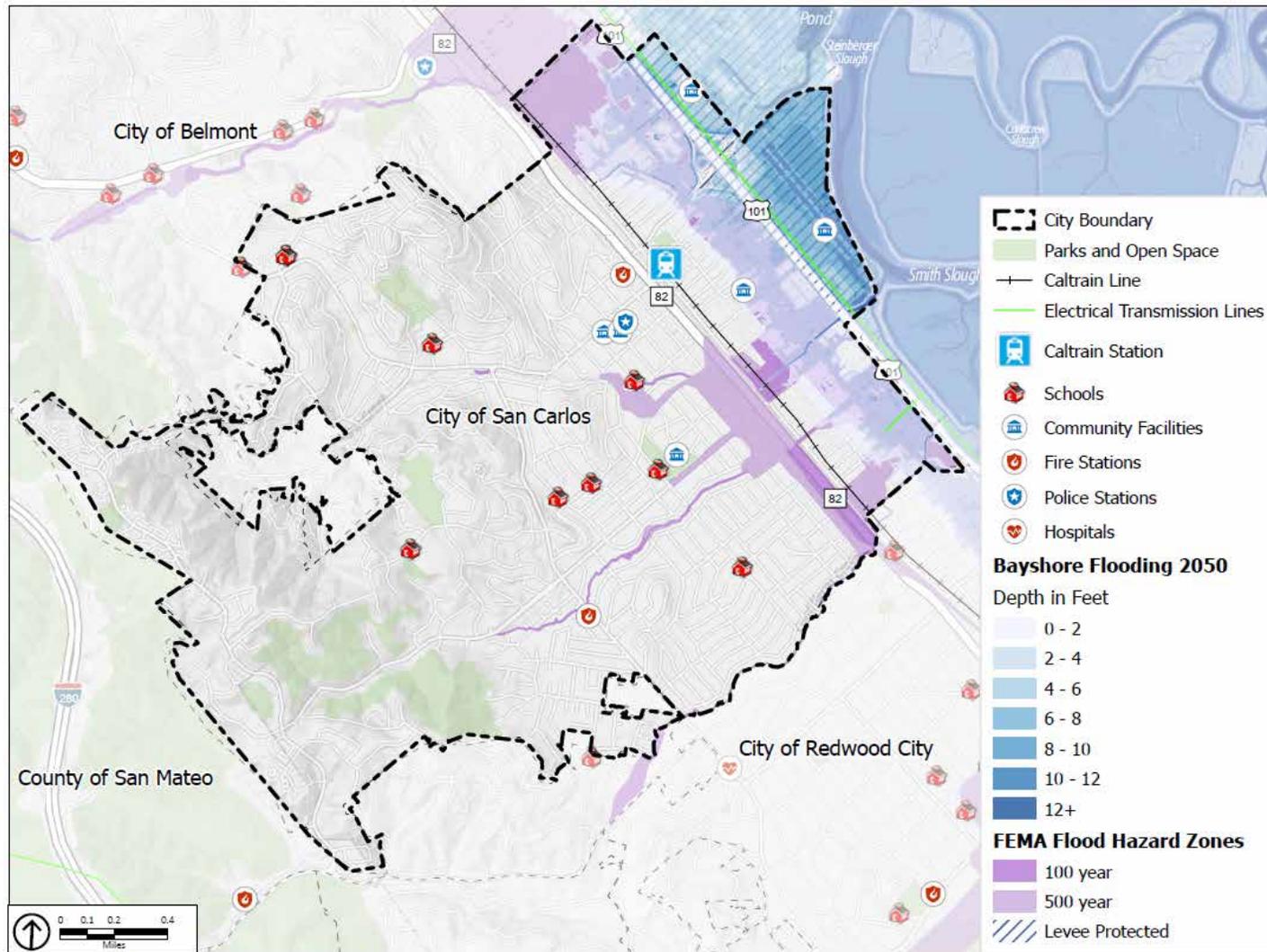
San Carlos, like most communities in California, is expected to experience multiple direct impacts due to climate change, including bayshore flooding, drought, extreme heat, inland flooding, landslide and debris flow, sea level rise (SLR), severe storms, and wildfire. These climate change effects are projected to have myriad intersecting and compounding impacts on San Carlos' communities, ecosystems, infrastructures, and services. Potentially vulnerable communities include those with low incomes; those with unstable or deficient housing; those unfamiliar with or unable to access community and government services and resources; those with limited mobility; and those who are physiologically more sensitive to changing climate conditions, such as children, the elderly, and people with certain medical conditions.

Locations within San Carlos that are particularly vulnerable to the effects of climate change include steep slopes and adjacent areas on the west side, riparian habitats, and low-lying parts of the city, particularly those located near the water on the eastern shore. Steep slopes are susceptible to landslides, riparian habitats are vulnerable to drought and water quality degradation, and both riparian habitats and low-lying areas are vulnerable to flooding and sea level rise. Figure ES-1 illustrates locations of bayshore and inland flooding by 2050.

Components of the built environment and associated services that are especially susceptible to climate change include electrical infrastructure and services, transportation infrastructure, and low-lying sewer lift stations and sewer infrastructure.



Figure ES-1. 2050 Bayshore Flooding and Inland Flooding



Source: San Francisco Bay Conservation and Development Commission, 2017; Federal Emergency Management Agency, 2018.

Greenhouse Gas Reduction and Climate Adaptation Strategies

To evaluate the City’s current progress toward meeting its emissions reductions targets, this CMAP acknowledges the City’s existing climate policies and programs, planned future actions, and actions already and soon-to-be implemented at the state level and estimates GHG emissions reductions associated with the implementation of these actions. As shown in Table ES-3, with the implementation of existing state and local programs, the community’s GHG emissions are projected to be at 177,380 MTCO_{2e} by 2030 and 168,500 MTCO_{2e} by 2050. This is below 2005 levels despite continued job and population growth.

Table ES-3. San Carlos Community-wide GHG Emission Reductions from State, Regional, and Local Activities, 2005 to 2050

	2005 MTCO _{2e}	2018 MTCO _{2e}	2020 MTCO _{2e}	2030 MTCO _{2e}	2050 MTCO _{2e}	Percentage Change 2005 to 2050
Forecasted emissions without state actions	212,590	160,230	171,240	222,580	239,560	13%
Reductions from RPS	-	-	-120	-1,730	-19,650	-
Reductions from Clean Car standards	-	-	-3,240	-25,380	-46,160	-
Reductions from Title 24	-	-	-130	-2,130	-2,240	-
Reductions from LCFS (off-road only)	-	-	-860	-1,580	-1,270	-
Reductions from Innovative Clean Transit Regulations	-	-	-0	-150	-50	-
Reductions from all state actions	-	-	-4,350	-30,970	-69,370	-
Emissions with state actions	212,590	160,230	166,890	191,610	170,190	-20%



	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Peninsula Clean Energy	—	—	-6,970	-12,930	0	—
New solar capacity	—	—	-60	Less than 10	0	—
All-electric and ZNE buildings	—	—	10	10	10	—
Public EV charging stations	—	—	-150	-130	-110	—
Increased composting	—	—	-210	-210	-210	—
Energy efficiency retrofits (California First, BayREN, and HERO)	—	—	-10	Less than 10	Less than 10	—
Caltrain electrification			0	-950	-1,360	
Peninsula Clean Energy ECO 100 *			-130	-130	0	
Streetlight LED retrofits			0	0	0	
Reductions from all local and regional actions	—	—	-7,540	-14,360	-1,690	—
Forecasted emissions with all existing and planned actions	212,590	160,230	159,500	177,380	168,500	-32%

* To avoid double-counting with the Peninsula Clean Energy item, these emissions are not counted as part of the total

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

While implementation of existing state and local actions will help the city meet its GHG reduction targets, these actions are insufficient on their own. Thus, the CMAP identifies future strategies that, if implemented, will allow the community to achieve its emissions-reductions targets. Refer to Table ES-4 for a list of the CMAP strategies, explained in more detail in Chapter 4.



Table ES-4. List of CMAP GHG Reduction Strategies

CMAP GHG Reduction Strategies
Strategy 1: Regional Energy Conservation and Efficiency Programs. Promote available energy efficiency and conservation opportunities, incentives, and technical assistance for businesses and residents.
Strategy 2: K-12 Energy Conservation and Efficiency Education. Support San Mateo County’s Environmental Literacy and Sustainability Initiative and Peninsula Clean Energy’s K-12 energy educational resources in the San Carlos School District and county-wide.
Strategy 3: City Facilities. Ensure energy conservation and efficiency in City buildings and facilities.
Strategy 4: Electrification. Transition to electricity as the primary energy source citywide.
Strategy 5: Building Codes. Advance electrification through local amendments to the California Building Code.
Strategy 6: Rooftop Solar. Continue to support and increase participation in rooftop and onsite solar energy systems in the community and at City facilities.
Strategy 7: Peninsula Clean Energy. Continue to support and promote PCE as the community’s official electricity provider with a goal to provide 100 percent carbon-free, renewable energy by 2025.
Strategy 8: Battery Storage. Promote installation of small-scale onsite battery energy storage systems for existing and new development, including City facilities.
Strategy 9: Grid Reliability. Explore opportunities to partner with PG&E and PCE to improve electrical grid reliability during PSPS events and other emergencies.
Strategy 10: PSPS Response. Ensure the community is prepared during times of PSPS events and other emergencies.
Strategy 11: Transit-Oriented Development. Encourage development of mixed-use projects, higher-density housing, and job growth within the General Plan’s recognized Transit-Oriented Development (TOD) corridor (Planning Areas 1, 2, and 3) while being mindful of surrounding uses.
Strategy 12: Active Transportation. Prioritize bicycling and walking as safe, practical, and attractive travel options citywide, as directed by the Bicycle and Pedestrian Master Plan.



CMAP GHG Reduction Strategies

Strategy 13: Neighborhood Hubs. Encourage the establishment of Neighborhood Hubs (as defined by the General Plan) within existing residential neighborhoods to support neighborhood-serving small-scale retail and service uses, including small stores selling fresh and locally grown produce and basic daily goods.

Strategy 14: Public Curbs. Assess opportunities in the downtown, mixed-use, office, and commercial areas to designate public curbs for passenger pick-up/drop-off in support of ridesharing.

Strategy 15: Public Transportation. Support improvements to public transit routes, services, and facilities to facilitate longer distance travel.

Strategy 16: Public Spaces. Create and maintain accessible public spaces, including the full spectrum of the public realm—sidewalks, alleys, pedestrian paseos, pedestrian and bicycle paths, plazas, squares, and public gathering spaces.

Strategy 17: Vehicle Miles Traveled. Reduce community-wide transportation-related emissions per resident and employee, with an emphasis on reductions from existing and new development in the city’s core commercial, office, and industrial areas, including development on the east side.

Strategy 18: Electric Vehicles. Support residents and business owners to transition to electric and plug-in hybrid vehicles.

Strategy 19: Safe Routes to School. Continue to support the Safe Routes to Schools Program and reduction of GHG emissions from school-related trips.

Strategy 20: City Fleet. Transition the City fleet to zero-emissions vehicles or low-carbon fuels, as feasible.

Strategy 21: Car Sharing. Promote electric vehicle and low-carbon fuel car-sharing programs.

Strategy 22: Micromobility. Facilitate micromobility options, including low-speed individually owned or shared, human-powered and electric bicycles, scooters, and skateboards, for short trips and last mile commutes.

Strategy 23: Clean-fuel Construction and Landscaping. Encourage hybrid and clean-fuel construction and landscaping equipment citywide.

Strategy 24: Zero-Waste City. Promote zero-waste initiatives in City operations and public events.

Strategy 25: Material Reuse and Repair. Support community-led initiatives to create a material reuse and repair program and continue to educate community members about ways to make unwanted items available for reuse.

Strategy 26: Compostable Food Service Ware. Require food facilities to use non-plastic, compostable food service ware, including straws, utensils, plates, bowls, cups, food trays, clamshells, and other containers when distributing prepared food.



CMAQ GHG Reduction Strategies

Strategy 27: Construction and Demolition Waste. Increase the amount of waste recycled during construction and demolition of buildings.

Strategy 28: Composting and Recycling. Partner with RethinkWaste to expand commercial and multi-family residential recycling and composting programs.

Strategy 29: Recycling Contamination. Work with waste haulers to reduce contamination of recyclables.

Strategy 30: Sustainable Food Consumption. Promote awareness of carbon-free and sustainable food consumption, materials, and consumer products.

Strategy 31: Water-efficient Retrofits. Encourage water-efficient retrofits of existing buildings by working with water providers and regional agencies.

Strategy 32: Water-wise Landscaping. Promote drought-tolerant and firewise landscaping.

Strategy 33: Graywater and Recycled Water. Promote graywater and recycled water systems.



Each GHG reduction strategy falls into one of the following eight goals:

- § Reduce energy use.
- § Transition to carbon-free energy sources.
- § Promote energy resilience.
- § Promote sustainable development that reduces VMT.
- § Transition to low-carbon transportation.
- § Support pollution-free outdoor equipment.
- § Become a zero-waste community.
- § Reduce community-wide water use.

In conjunction with existing local and state programs, these strategies provide a flexible path to reduce the community’s GHG emissions to 107,920 MTCO₂e by 2030 (49 percent below 2005 levels) and 36,060 MTCO₂e by 2050 (83 percent below 2005 levels) as shown in Table ES-5. The City’s GHG reduction targets are to reduce emissions to 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050, at a minimum. Refer to Chapter 4 for additional detail on GHG reductions from state, regional, and local actions, in conjunction with GHG reductions anticipated from implementation from strategies and actions outlined in this CMAP.

Table ES-5. GHG Reduction Progress with CMAP Implementation (MTCO₂e)

	2030	2050
2005 Baseline emissions	212,590	212,590
Emissions with existing and planned actions	177,380	168,500
Emissions with CMAP implementation	107,920	36,060
Percent below 2005 baseline with existing actions and CMAP implementation	-49%	-83%
Percent below 1990 levels with existing actions and CMAP implementation	-40%	-80%

This CMAP also provides a suite of climate change adaptation strategies. These strategies aspire to foster climate change adaptation by reducing the severity of the climate change impacts on the community and by supporting the community’s ability to respond to and recover from climate change–related disruption. Climate change adaptation strategies are organized into two overarching goals, including become a low-carbon, resilient community and prepare for, reduce vulnerability to, and adapt to changing climate conditions. The CMAP’s adaptation strategies are listed in Table ES-6.





Table ES-6. List of Adaptation Strategies

CMAP Adaptation Strategies
Strategy 34: Low-Carbon Economy. Encourage a low-carbon, sustainable economy that moves away from industries reliant on fossil fuels and supports low- to no-carbon industries, products, and services.
Strategy 35: Carbon Offsets. Explore local and regional opportunities to offset local carbon emissions that cannot be reduced to zero.
Strategy 36: Open Space Preservation. Preserve existing open space by supporting urban infill.
Strategy 37: Heat Island Effect. Minimize the urban heat island effect.
Strategy 38: Community Resilience Hubs. Establish a Community Resilience Hub network that includes a virtual resilience hub and a network of equitably located Community Resilience Hubs at existing or new community facilities.
Strategy 39: Sea Level Rise. Develop regionally coordinated sea level rise adaptation measures and programs in collaboration with San Mateo County Flood and Sea Level Rise Resiliency District, ABAG, San Francisco Bay Conservation and Development Commission (BCDC), BayAdapt, and other regional entities.
Strategy 40: Disaster Preparedness Information. Provide disaster preparedness information to all residents and businesses in English, Spanish, Chinese, and other relevant languages.
Strategy 41: Community Wildfire Protection Plan. Develop a Community Wildfire Protection Plan, in coordination with San Mateo County Fire Department and CAL FIRE.
Strategy 42: Vegetation Management. Promote vegetation management and fire-resistant landscape design on residential properties and businesses within the wildland-urban interface and very high fire severity zone.
Strategy 43: Fire Risk Reduction Assessment. Develop a fire risk reduction assessment that can be used by project applicants and City staff in the development review process to identify and reduce or avoid potential harm through site design or other mitigation techniques within the very high or high fire severity zones.
Strategy 44: Medical and Emergency Services. Coordinate with local medical providers to ensure that low-cost medical and emergency medical services are available to all City residents.
Strategy 45: Flooding and Pond Water. Reduce flooding and ponded water in the city by collaborating with local and regional flood-protection agencies.



Plan Implementation

Implementing the CMAP will require City leadership to put the strategies identified in the CMAP into effect and report progress. To ensure that the implementation process is efficient and transparent, this CMAP includes a work plan that identifies responsible departments, partners, time frames, and relative costs associated with each strategy. Implementation strategies are shown in Table ES-7.

Table ES-7. List of Implementation Strategies

CMAP Implementation Strategies
Implementation Strategy 1. Monitor and report progress toward CMAP target achievement on an annual basis.
Implementation Strategy 2. Continue collaborative partnerships with agencies and community groups that support implementation of the CMAP.
Implementation Strategy 3. Secure necessary funding to implement the CMAP.
Implementation Strategy 4. Continue to update the community-wide and City Operations GHG emissions inventories and evaluate the effectiveness and applicability of the CMAP every five years.
Implementation Strategy 5. Maintain and update CMAP to allow for greater resilience.





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1. INTRODUCTION

Purpose of the Climate Mitigation and Adaptation Plan

The San Carlos Climate Mitigation and Adaptation Plan (CMAP) will serve as the blueprint for how San Carlos will address climate change and foster a sustainable community through the next several decades. The CMAP is responsive to current State of California regulations and guidance, along with changing conditions in the state and across the globe. This CMAP includes the following:

- § Long-term greenhouse gas (GHG) reduction goals for 2030 and 2050.
- § Past and current GHG inventories and forecast.
- § GHG reduction strategies to achieve 2030 and 2050 reduction goals.
- § Identification of climate impacts and vulnerabilities.
- § Climate adaptation and resilience strategies.
- § An implementation and monitoring program.

Many jurisdictions across the globe prioritize climate action, which includes participating in climate mitigation activities to reduce the impact that humans are having on the Earth's climate system, ultimately slowing the effects of climate change. However, because the effects of climate change are already prevalent, and because there is no known reversal for the effects of climate change, jurisdictions across the world are also engaging in climate adaptation activities, which include increasing human resilience to the hazards posed by the changing climate, such as sea level rise, wildfires, extreme weather, and drought.

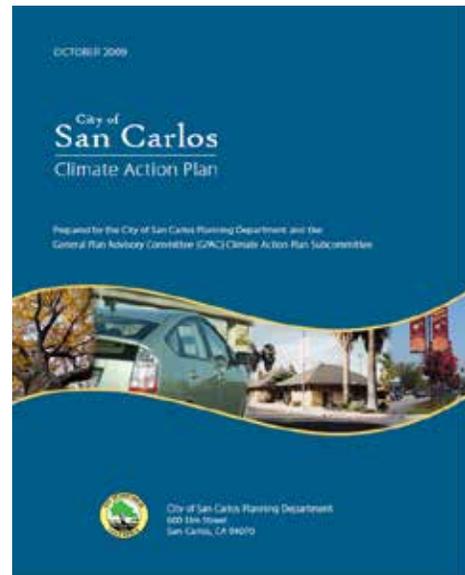
This CMAP is a community plan and a unique opportunity for the City of San Carlos and its community to work towards achieving its strategic goal of addressing climate change and supporting sustainability. Climate action is not only about reducing GHG emissions, but also contributing towards the City's mission of providing high-quality services and facilities to its residents in an equitable, sustainable, transparent, responsive, and friendly manner to foster an inclusive, safe, and healthy community now and in the future.

2009 Climate Action Plan

The City of San Carlos has been a long-time leader in addressing the challenges that climate change poses to the community. In May 2008, the City Council approved the San Carlos Climate Protection letter, making a formal commitment to calculating the community's GHG emissions and incorporating climate action into the City's General Plan. On October 12, 2009, the City Council adopted the City's first Climate Action Plan (2009 CAP), which assembled the City's existing climate action efforts into one centralized plan informed by technical analyses. The 2009

CAP was the beginning of an ongoing evaluation and reassessment of the community's response to climate change through 2020 and beyond.

A key component of the 2009 CAP was to establish a baseline of community GHG emissions to measure future changes against and to inform actions the community could take in the coming years to reduce such emissions by 2020. In order to track the future progress of strategies included in the 2009 CAP, San Carlos developed the 2005 Community-Wide Baseline Greenhouse Gas Emissions Inventory in August 2008 with the help of the Local Governments for Sustainability (ICLEI, which stands for International Council for Local Environmental Initiatives) for data collection, analysis, and management. That baseline report, included as Appendix C in the 2009 CAP, revealed the major sources of emissions caused from community activities and have a basis of comparison for the 2009 CAP and future assessment reports.



In response to the findings of the Inventory, the City adopted a GHG reduction target of 15 percent below the baseline 2005 GHG emission levels by 2020. The City chose this reduction target to affirm the City's commitment to developing and measuring GHG reduction measures and to remain consistent with the state-recommended reduction target of 15 percent below present levels by 2020, which is the local equivalent of the state's own adopted reduction target of reducing emissions to 1990 levels. A reduction target of 35 percent below 2005 levels by 2030 uses the 15-percent reduction target by 2020 as an interim target.

The 2009 CAP included 21 measures to reduce the negative impact that the community has on the climate, adapted through work with the CAP subcommittee, City staff, community meetings, a community workshop, and City Council guidance. Measures in the 2009 CAP addressed energy, solid waste management, transportation, and land use, guiding efforts to reduce GHGs and reach the adopted targets. The 2009 CAP also included adaptation strategies that created steps the City could take to prepare for the potential effects of climate change. These measures were implemented through inter-departmental City projects and programs and in conjunction with City partner agencies and community organizations. Action included steps taken by both the community at large and by the San Carlos City government. Progress towards achieving the goals in the 2009 CAP were documented through a 2015 5-Year CAP Assessment and through annual GHG inventories.



Climate Mitigation and Adaptation Plan

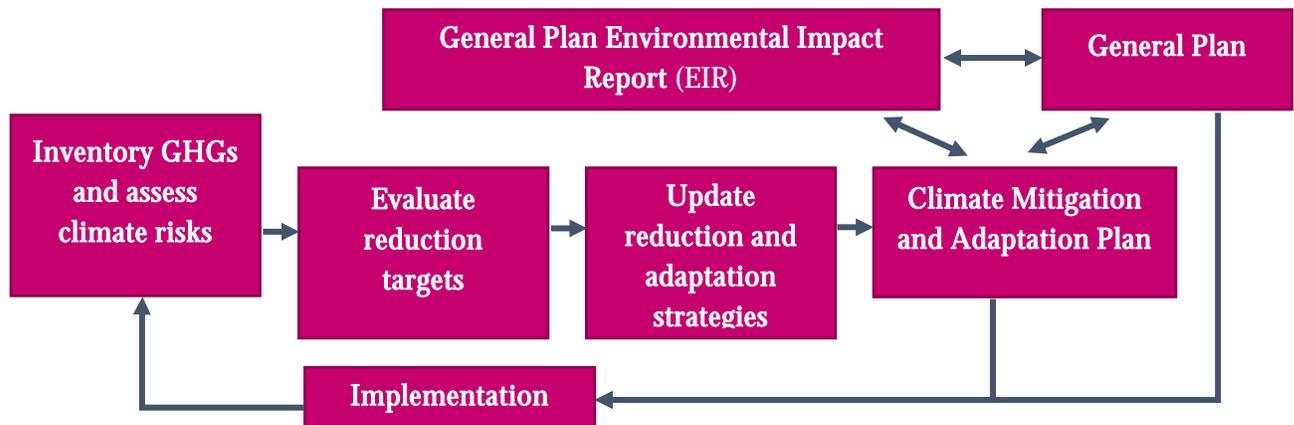
As a continuing leader in climate action and adaptation planning, the City of San Carlos prepared the CMAP, to update the community's strategic path to reducing GHG emissions and adapting to the changing climate. Specifically, this CMAP does the following:

- § Identifies sources of GHG emissions within the City of San Carlos' municipal boundary and estimates how these emissions may change over time, as presented in Chapter 2.
- § Identifies changes to climate change-related hazards in San Carlos and the threat that these hazards pose to community members and assets, as described in Chapter 3.
- § Provides strategies (see Chapter 4) in various sectors to meet or exceed the state targets of reducing emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050 consistent with the direction of the State of California via Assembly Bill (AB) 32 and Governor's Executive Order S-03-05 and California Public Resources Code Section 21083.3.
- § Provides substantial evidence that the emission reductions estimated in the CMAP are feasible (see Chapter 4 and supporting technical appendix included in this document as Appendix A).
- § Serves as the programmatic tiering document for the purposes of the California Environmental Quality Act (CEQA) for use by projects for review of climate change impacts. If a proposed development within the City of San Carlos is consistent with the emission reduction and adaptation strategies included in the CMAP and the programs are developed as a result of the CMAP, the project would have a less-than-significant impact on climate change and emissions consistent with the direction of the California Attorney General (Climate Change, CEQA, and General Plans, Revised March 6, 2009) and Public Resources Code Section 21083.3. The CEQA Guidelines encourage the adoption of policies or programs as a means of addressing comprehensively the cumulative impacts of projects (See CEQA Guidelines, Section 15064, subd. (h)(3), 15130, subd. (c)). The City conducted an environmental review of this CMAP and prepared an Addendum to the City's General Plan Environmental Impact Report summarizing the results of the environmental review.
- § Outlines ways in which the City can prepare for and adapt to the consequences of climate change, as described in Chapter 5.
- § Discusses the various outcomes of reduction efforts and how these reduction efforts can be implemented.
- § Provides an implementation program in Chapter 6, including a direction to update the community's GHG inventory and CMAP every five years or more frequently as needed to respond to changes in science; effectiveness of emission-reduction strategies; and federal, state, regional, or local policies to further strengthen the City's response to the challenges of climate change.

The General Plan references the 2009 CAP and the City's subsequent CAPs, like this CMAP, recognizing the City's climate action planning efforts must be updated on a more regular basis

than the General Plan to be responsive to changing regulations, guidance, technology, best practices, and science. The CMAP update process and its relation to the General Plan are depicted in Figure 1, as depicted in the 2009 CAP.

Figure 1. Five-Year Climate Mitigation and Adaptation Plan Update Process and Relation to the General Plan



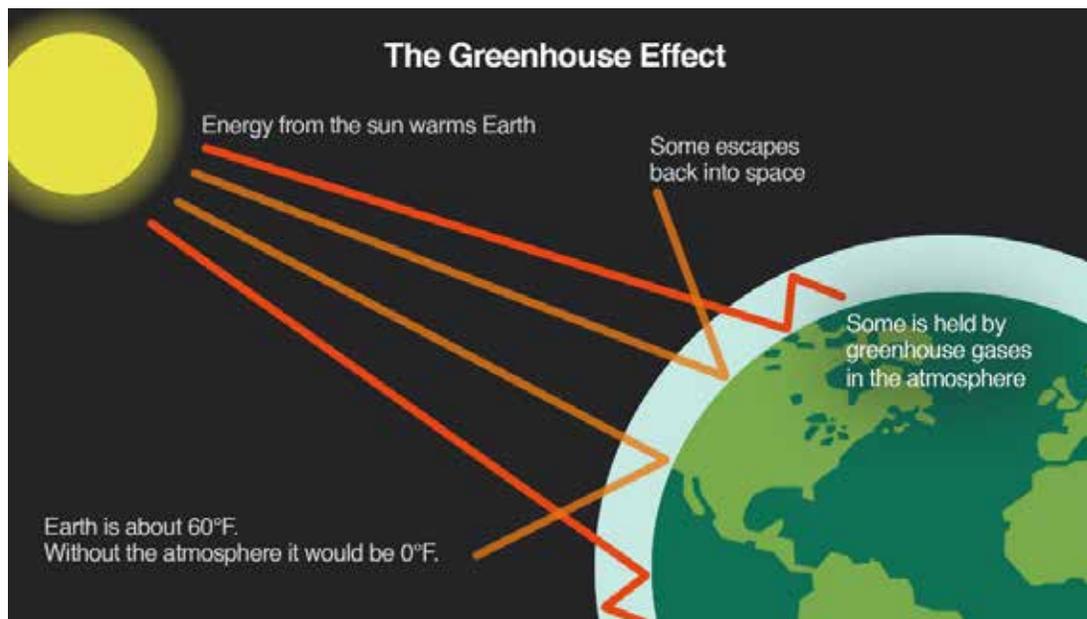
Climate Change – Global Issue and Local Problem

Climate is the long-term average of weather conditions, such as temperature and precipitation. While it is normal for Earth’s climate system to experience long-term shifts in these average conditions, human activity is causing global climate change at a much more rapid pace than has occurred in the past. These activities, predominately the burning of fossil fuels, emit heat-trapping gases called GHGs that build up in the atmosphere. As GHG levels increase, Earth’s atmosphere traps more heat, triggering changes in the global climate system that may have serious and potentially catastrophic impacts on people, physical assets, and natural systems.

To fully understand global climate change, it is important to recognize the naturally occurring “greenhouse effect” and to define GHGs that contribute to this phenomenon. The temperature on Earth is regulated by this greenhouse effect, which is so named because the Earth’s atmosphere acts like a greenhouse, warming the planet in much the same way that an ordinary greenhouse warms the air inside its glass walls. Like glass, the gases in the atmosphere let in light yet prevent heat from escaping. This process is shown on Figure 2.



Figure 2. The Greenhouse Effect



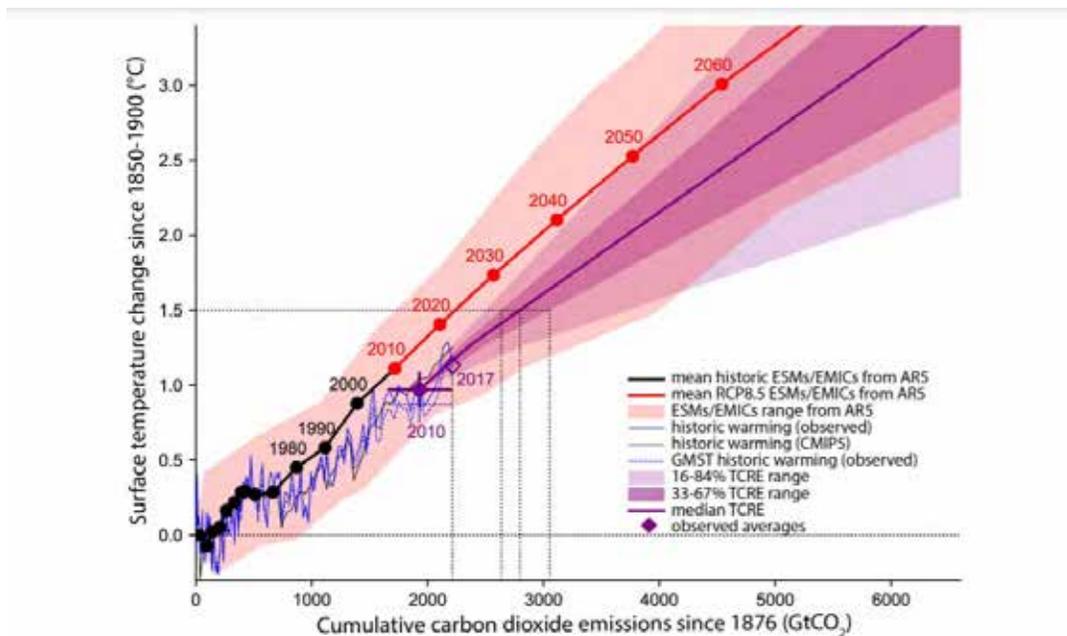
Source: Climate Central.

GHGs are naturally occurring gases, such as water vapor, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that absorb heat radiated from the Earth's surface. GHGs are transparent to certain wavelengths of the sun's radiant energy, including visible light, allowing sunlight to penetrate deep into the atmosphere or all the way to Earth's surface. Clouds, ice caps, and particles in the air reflect about 30 percent of this radiation, but oceans and land masses absorb the rest (70 percent of the radiation received from the sun) before releasing it back toward space as infrared radiation. GHGs and clouds effectively prevent some of the infrared radiation from escaping; they trap the heat near Earth's surface where it warms the lower atmosphere. If this natural barrier of atmospheric gases was not present, the heat would escape into space, and Earth's average global temperatures could be as much as 61 degrees Fahrenheit (°F) cooler.

In addition to natural sources, human activities are exerting a major and growing influence on the climate by changing the composition of the atmosphere and by modifying the land surface. Particularly, the increased consumption of fossil fuels (e.g., natural gas, coal, gasoline) has substantially increased atmospheric levels of GHGs. The Intergovernmental Panel on Climate Change's (IPCC's) Fifth Assessment Report summarizes the most recent scientific understanding of global climate change and projects future conditions using the most comprehensive set of recognized global climate models. The report, released in 2013, considers all impacts that human activities have on global temperature, and states that there is at least a 95-percent probability that "human influence has been the dominant cause of the observed warming since the mid-20th century." The Fifth Assessment Report projects four different temperature scenarios, all of which project 2016–2035 temperatures 0.54 to 1.26°F warmer than the 1986–2005 average temperature, and potentially over 7.2°F by 2100 under the most aggressive scenario.

As noted in the IPCC Fifth Assessment Report, if trends remain unchanged, continued GHG emissions above current rates will induce further warming changes in the global climate system and pose even greater risks than those currently witnessed. Figure 3 shows the effects of additional warming on global temperatures. Given the scientific basis of climate change and expected trends, the challenge remains to prepare for and mitigate climate change through deliberate global and local action.

Figure 3. Global Temperature Increase



Historic and potential future global temperatures, depending on different levels of future GHG emissions. The red line shows the expected temperature trend without significant worldwide action to reduce GHG emissions

Source: Intergovernmental Panel on Climate Change, 2019.

In California and western North America, observations of the climate have shown: (1) a trend toward warmer temperatures with an increase in extremely hot days and nights; (2) an increase in the area burned by wildfires; (3) a smaller fraction of precipitation falling as snow; (4) an increase in frequency of drought and an increase in consecutive dry years; and (5) sea level rise is expected to continue to increase erosion on beaches, bluffs, and cliffs.¹ Overall, California has become drier over time, with five of the eight years of severe to extreme drought occurring between 2007 and 2016, and unprecedented dry years in 2014 and 2015. Statewide precipitation has become increasingly variable from year to year, with the driest consecutive four years occurring from 2012 to 2015.² Research suggests that California will continue to experience hotter and drier conditions, reductions in winter snow and increases in winter rains, sea level rise, significant changes to the water cycle, and an increased occurrence of extreme weather events.



Such compounded impacts will affect economic systems throughout California, with likely ramifications to the community of San Carlos. To refrain from action is costly and risky; the California Fourth Climate Change Assessment estimates that no action to address the potential impacts of climate change will lead to economic losses of “tens of billions of dollars per year in direct costs” and “expose trillions of dollars of assets to collateral risk.” Table 1 summarizes potential impacts in California due to climate change.

Table 1. California Climate Change Impacts

Climate Impact	Historical Trends	Future Direction of Change	Confidence for Future Change
Temperature	Warming	Warming	Very high
Sea Level Rise	Rising	Rising	Very high
Snowpack	Declining	Declining	Very high
Annual Precipitation	No significant trends	Unknown	Low
Intensity of Heavy Precipitation Events	No significant trends	Increasing	Medium-high
Frequency of Droughts	No significant trends	Increasing	Medium-high
Frequency and Intensity of Santa Ana Winds	No significant trends	Unknown	Low
Marine Layer Clouds	Some downward trends	Unknown	Low
Acres Burned by Wildfire	Increasing	Increasing	Medium-high

Source: Louise Bedsworth, Dan Cayan, Guido Franco, Leah Fisher, Sonya Ziaja. (California Governor’s Office of Planning and Research, Scripps Institution of Oceanography, California Energy Commission, California Public Utilities Commission). 2018. Statewide Summary Report. *California’s Fourth Climate Change Assessment*. Publication number: SUMCCCA4-2018-013.

Although much of the attention to the topic of climate change is global in scale, it is important to realize that climate change affects every community at the local level. Potential consequences of climate change for the community include the following, which are described in Chapter 3:

- § Drought
- § Extreme heat
- § Inland flooding
- § Human health hazards
- § Landslides and debris flow
- § Sea level rise and bayshore flooding
- § Severe weather
- § Wildfire

It is important to realize that despite their relatively small size in comparison to the global issue of climate change, cities and counties collectively have the ability to reduce GHG emissions and make an impact on the larger, global climate condition. Individual cities, such as San Carlos, can act as leaders on this issue and inspire other communities to take action. Making these goals of reduction and adaptation a reality requires a collective effort on the part of the community. No single sector, resident, or entity can achieve these reductions alone. Residents, City officials, and businesses must all be involved in the ongoing implementation of these strategies to achieve the community's emission-reduction goals.

Regulatory Framework

State of California Regulations

California law first directly addressed climate change in 1988, when AB 4420 directed state agencies to prepare a GHG inventory and study the impacts of climate change. Since then, California has adopted several laws to assess climate change, analyze GHG emissions and their effects, reduce emissions, and prepare for the impacts of climate change. Many of these laws and associated regulations affect local governments, although only some create specific requirements for individual communities. These laws and associated regulations are briefly summarized here.

Executive Order S-03-05 and Assembly Bill 32 - California Global Warming Solutions Act of 2006

In 2005, Governor Arnold Schwarzenegger issued Executive Order S-03-05, which established the first statewide GHG reduction goals for California: reduce emissions to 2000 levels by 2010, reduce emissions to 1990 levels by 2020, and reduce emissions 80 percent below 1990 levels by 2050.

AB 32, the California Global Warming Solutions Act, was approved by the legislature and signed by Governor Schwarzenegger in 2006. The landmark legislation required the California Air Resources Board (CARB) to develop regulatory and market mechanisms to reduce GHG emissions to 1990 levels by 2020, codified in Executive Order S-03-05. AB 32 also directed CARB to identify early action items that could be quickly implemented, to develop a scoping plan to identify the most technologically feasible and cost-effective strategies to achieve the 2020 target, and to create and adopt regulations requiring major emitters to report and verify their emissions.

The Climate Change Scoping Plan (Scoping Plan), adopted in 2008 and updated in 2014 and 2017, employs a variety of GHG reduction strategies that include direct regulations, alternative compliance mechanisms, incentives, voluntary actions, and market-based approaches like a cap-and-trade program. The plan identifies local governments as strategic partners to achieving the state goal and translates the reduction goal to a 15-percent reduction of "existing" emissions by 2020. Although "existing emission levels" is not formally defined by the Scoping Plan, state, regional, and local agencies interpreted it as referring to emissions occurring between 2005 and



2008. San Carlos' GHG reduction strategies have used 2005 emissions as the “existing” or baseline level to inform the targets.

Senate Bill 375 - Sustainable Communities and Climate Protection Act of 2008

Senate Bill (SB) 375 builds off AB 32 and aims to reduce GHG emissions by linking transportation funding to land use planning. It requires metropolitan planning organizations to create a sustainable communities strategy (SCS) in regional transportation plans for reducing urban sprawl. In 2013, the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) adopted Plan Bay Area, consisting of both the region's first SCS and the 2040 Regional Transportation Plan. In 2017, MTC and ABAG adopted an updated version of Plan Bay Area. A second update is in progress and is scheduled for adoption in 2021.

Senate Bill 379

In 2015, the State adopted SB 379, establishing Section 65302(g)(4) of the California Government Code to require the Safety Element of the General Plan to include more information about wildfire hazards, flooding risks, and other short-term and long-term threats posed by climate change. SB 379 is the foundation for adaptation and resiliency in general plan safety elements, as it requires local governments to conduct vulnerability assessments as part of their long-range public safety planning efforts and to prepare policies that will protect against harm caused by climate change.

The State of California prepared a guidance document, the California Adaptation Planning Guide, to assist communities in addressing climate adaptation and resilience, and complying with Section 65302(g)(4) of the California Government Code. This guide presents a step-by-step process for gathering the best available climate change science, completing a climate change vulnerability assessment, creating adaptation strategies, and integrating those strategies into general plans and other policy documents. This process is outlined in further detail in Chapter 3 of the CMAP.

Executive Order B-30-15 and Senate Bill 32

In 2015, Governor Jerry Brown signed Executive Order B-30-15, which directed state agencies to take several steps to reduce statewide GHG emissions and adapt to changing climate conditions. One section of this executive order set a GHG reduction goal for the state of 40 percent below 1990 levels by 2030. In 2016, the state legislature adopted SB 32 and the governor signed it, codifying this GHG reduction goal into law as an official statewide target.

Executive Order B-55-18

In 2018, Governor Brown issued Executive Order B-55-18, which established an additional statewide goal of achieving carbon neutrality (no net GHG emissions) by 2045. Under this goal, any GHGs that are emitted by California must be fully offset by other activities by 2045. While this

goal does not yet have the force of law, it does indicate the direction that the state is moving in and may be a reference point for future legislative action.

Other state-level climate action measures include Title 24 energy-efficiency standards for new and significantly renovated buildings, the Renewable Portfolio Standards, Clean Car Standards, Low Carbon Fuel Standard, and Innovative Clean Transit Regulations.

Executive Order N-79-20

In 2020, Governor Gavin Newsom issued Executive Order N-79-20, which set new statewide goals for the phasing out of gasoline-powered vehicles in California. This Executive Order sets the following zero emissions goals and directs the CARB to develop regulations and strategies to achieve these goals.

1. 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035.
2. 100 percent of medium- and heavy-duty vehicles in the state be zero-emission by 2045 for all operations where feasible.
3. The state will transition to 100 percent zero-emission off-road vehicles and equipment by 2035 where feasible.

California Environmental Quality Act

CEQA requires that many proposed development projects conduct an environmental review to identify how the project may impact the environment. SB 97 directed the Governor's Office of Planning and Research to amend the CEQA Guidelines to address GHG emissions, requiring proposed projects to analyze their GHG emissions and contribution to climate change. The Office of Planning and Research adopted the CEQA Guidelines in December 2009, and they went into effect March 18, 2010. The guidelines include provisions for local governments to use adopted plans for the reduction of GHG emissions to address the cumulative impacts of individual future projects on GHG emissions (see CEQA Guidelines Section 15183.5(b)(1)).

Consistent with the CEQA Guidelines, lead agencies may use adopted GHG reduction plans to assess the cumulative impacts of discretionary projects on climate change. In addition, the guidelines provide a mechanism to streamline development review of future projects.

Specifically, lead agencies may use adopted plans consistent with CEQA Guidelines Section 15183.5 to analyze and mitigate the significant effects of GHGs under CEQA at a programmatic level by adopting a plan for the reduction of GHG emissions. Later, as individual projects are proposed, project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review in their cumulative impact analysis. Project-specific environmental documents prepared for projects consistent with the General Plan and the CMAP may rely on the programmatic analysis of GHGs in this document.



A project-specific environmental document that relies on this CMAP for its cumulative impact analysis must identify specific GHG reduction strategies applicable to the project and demonstrate the project's incorporation of the strategies. Project applicants and City staff will identify specific strategies applicable to each project during project review. If applicable strategies are not otherwise binding and enforceable, they must be incorporated as mitigation strategies for the project. If substantial evidence indicates that the GHG emissions of a proposed project may be cumulatively considerable, notwithstanding the project's compliance with specific strategies in this CMAP, an environmental impact report (EIR) must be prepared for the project.

The CMAP meets the requirements of the CEQA Guidelines and commitments through the following:

- § Quantifies emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.
- § Establishes a level, based on substantial evidence, below which the contribution of emissions from activities covered by the CMAP would not be cumulatively considerable. This document identifies three targets, consistent with state guidance:
 - Reduce emissions to 15 percent below 2005 levels by 2020.
 - Reduce emissions to 40 percent below 1990 levels by 2030.
 - Reduce emissions to 80 percent below 1990 levels by 2050.
- § Identifies and analyzes the emissions resulting from specific actions or categories of actions anticipated within the geographic area.
- § Specifies strategies or a group of strategies, including performance standards that, if implemented on a project-by-project basis, substantial evidence demonstrates they would collectively achieve the specified emissions level.
- § Establishes a mechanism to monitor the CMAP's progress toward achieving specific levels and to require amendments if the CMAP is not achieving those levels.
- § Includes an environmental review of the CMAP in the form of an Addendum to the General Plan EIR.

Bay Area Air Quality Management District

The Bay Area Air Quality Management District (BAAQMD) is responsible for planning air quality management within the Bay Area.

Released in 2017, the latest update to the BAAQMD's Clean Air Plan provides a regional strategy to protect public health and the climate via continued progress toward all state and federal air quality standards, and to eliminate health risk disparities from exposure to air pollution among Bay Area communities. The plan defines a vision for transitioning the region to the post-carbon economy needed to achieve ambitious GHG reduction targets for 2030 and 2050 and provides a

regional climate protection strategy that will put the Bay Area on a pathway to achieve those GHG reduction targets.

The 2017 Clean Air Plan includes a wide range of control measures designed to decrease emissions of the air pollutants that are most harmful to Bay Area residents, such as particulate matter, ozone, and toxic air contaminants; to reduce emissions of methane and other GHGs that are potent climate pollutants in the near-term; and to decrease emissions of carbon dioxide by reducing fossil fuel combustion.

Climate Mitigation and Adaptation Plan Preparation

At the direction of City Council and the 2009 CAP, City staff initiated preparation of the CMAP in 2019. The City hired climate action planning consultant PlaceWorks to collaborate with staff and the community to prepare the CMAP. City staff and PlaceWorks represented the CMAP project team. The preparation process followed best practice guidance and included three key phases, as shown in Figure 4, with community and stakeholder engagement integrated into each phase and throughout the project. The CMAP project team created opportunities for ongoing input and guidance from City staff, the public, community stakeholders, advisory bodies, and the City Council. These outreach efforts resulted in a process of vetting and recommending appropriate strategies that are reflective of the priorities and concerns of the community and responds to community leadership in climate action planning. The strategies in this CMAP reflect the community priorities and recommendations expressed through the community outreach process. This process was also used as a tool by City staff to build new and maintain existing relationships with community partner agencies and organizations needed to help implement the CMAP.

Figure 4. Three Phases of CMAP Preparation



Community and Stakeholder Engagement

The CMAP project team welcomed community engagement throughout the entire planning process with key activities occurring during each of the project's three phases. This section summarizes the CMAP's community and stakeholder process. See Appendix B for more detailed information on community engagement. Figure 4 shows the general phases of CMAP implementation and timing.

Phase 1 Community and Stakeholder Engagement

Phase 1 of community and stakeholder engagement focused on raising awareness and informing community members of the CMAP and sharing initial results of the technical analyses (including the GHG inventories, assessment of existing programs, and the vulnerability assessment), and to begin brainstorming on GHG reduction and adaptation strategies. The project team invited the community to participate in the CMAP project through a sustainability focused Spotlight Newsletter and presentations to City Commissions and a local high school environmental group. The City hosted two separate, but identical, online workshops on August 26, 2020, and October 1, 2020, using Zoom software due to the COVID-19 pandemic Shelter-In-Place order. During each workshop, the CMAP team gave a presentation that was followed by small group discussions, which allowed for an interactive and in-depth exploration of specific topics. Questions asked of workshop participants included the following:

- § **Energy Sector.** What actions do you do or would like to do at home or your business to increase energy efficiency and energy resilience? Are there challenges or barriers to those actions? When thinking about those actions, should the City consider mandatory requirements for energy efficiency and renewable energy beyond the state's building and energy code requirements (also called reach codes)?
- § **Transportation Sector.** What actions do you do or would like to do at home or your business to reduce transportation-related emissions? Should the City replace existing City cars/fleet with electric cars and install more electric vehicle charging stations? Are there challenges or barriers to those actions?
- § **Waste Sector.** What actions do you do or would like to do at home or your business to reduce GHG emissions and increase resilience related to garbage and recyclable or reusable materials? Are there challenges or barriers to those actions?
- § **Extreme Events.** What climate hazards are of most concern to you? What areas of the city have experienced climate hazards? How can we be prepared and reduce the impacts of these events?
- § **Implementation.** Where does climate change fit into the City's goals and budget? In support of this question, facilitators shared the City Council Vision Statement, which read as follows:
The City of San Carlos will continue to move with confidence into the future as a desirable,

vibrant, inclusive, and business-friendly community, admired by all as a great place to live, learn, work, and play.

After the two workshops, the City posted an online Shape San Carlos Survey consisting of the same questions to the City's website, which allowed for feedback from those who were unable to join a workshop or had additional feedback. The majority of workshop participants chose to provide suggestions to the City regarding steps to move towards a more sustainable community. Most of the participants expressed support for the City's CMAP and existing sustainability and climate action efforts while providing constructive feedback to increase success in reducing GHGs and improving community resilience in the future. Common feedback by workshop participants included mentioning the severity of financial barriers to taking individual climate action, lack of individual and community education, and desires to be proactive and ensure San Carlos is a leader in climate action and sustainability.

"It's less costly to implement policies and actions now than manage climate change effects later." – Input from Phase 1 Community Workshop

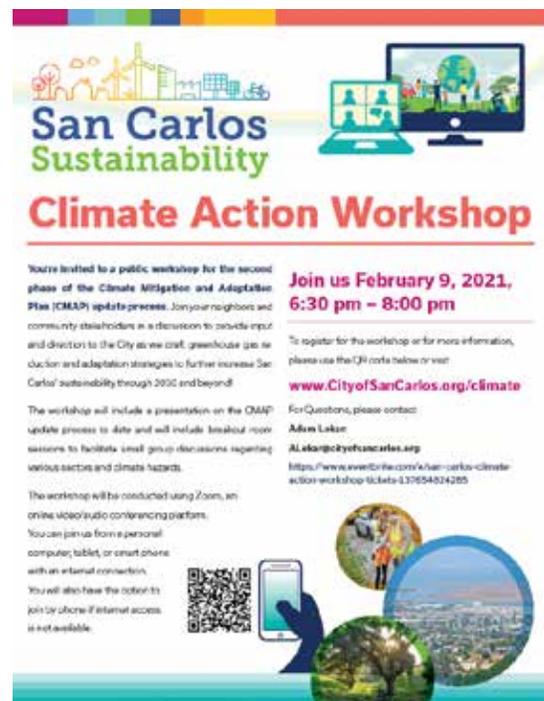
Phase 2 Community and Stakeholder Engagement

Phase 2 of community and stakeholder engagement was focused on sharing updates on the CMAP process and providing an opportunity for community feedback on revisions to, and creation of, proposed climate action strategies. Outreach was conducted through one online community workshop on February 9, 2021, an online Shape San Carlos survey that included the same content as the community workshop and stakeholder meetings.

Phase 2 Virtual Workshop

The CMAP project team created a list of preliminary draft strategies based on the adopted 2009 CAP and informed by community feedback, regional efforts, new and emerging opportunities, and discussions with City staff, among others.

The CMAP team gave a presentation that was followed by small group discussions, which allowed for an interactive and in-depth discussion of draft strategies. Each small group was given the same list of draft strategies, which focused on four primary sectors: (1) climate adaptation and resilience; (2) energy use, supply, and resilience; (3)



transportation and land use; and (4) waste, water, and wastewater. Each sector included two to three goals, each with example strategies and/or example actions to spark a discussion. Participants were asked to share their thoughts on what the San Carlos community can do to support the strategies, what barriers they may face, or any important considerations or implementation ideas the City should consider while creating draft strategies. Participants were also encouraged to share additional strategies or ideas. Feedback for each goal was categorized under one of three headings: (1) suggestion; (2) barrier; and (3) considerations and/or implementation. The results of the feedback include the following:

- § **Community Adaptation and Resilience.** Participants focused on the use of vegetation and open space as both suggestions and barriers when given example strategies for the climate adaptation and resilience sector. Several participants stated that encouraging native and drought-resistant landscaping can help protect against wildfire and increased planting could sequester carbon. However, some participants noted that the planting of more vegetation could potentially increase the risk of wildfire in the community due to more vegetation fuel. Participants also suggested focusing on improving emergency evacuation routes and signage in the community.
- § **Energy Use, Supply, and Resilience.** Suggestions regarding the energy use, supply, and resilience sector include a more aggressive switch from gas to electric appliances and cars. Several participants noted that the cost of switching appliances can be too high for some community members. Implementation considerations included incentives for making these appliances less expensive so that all members of the community could have the option to electrify their homes and cars.
- § **Transportation and Land Use.** Land use suggestions included ensuring a balance of jobs and housing units. Most feedback on the transportation and land use sector was focused on transportation. Suggestions included looking into micromobility programs, expanding infrastructure for electric vehicles, and encouraging residents to switch to electric landscaping equipment. Barriers included the terrain with the hills making it more challenging to use active forms of transportation in some areas of the community. Considerations included expanding information for residents, including location of electric vehicle charging facilities, and providing rebates for older cars to increase the incentive to go electric.
- § **Waste, Water, and Wastewater.** Feedback received on the waste, water, and wastewater sector was limited due to time. Suggestions included rewarding residents for water conservation and providing compost tumblers.

“Focus on making sure that the CMAP focuses on items the City has the ability to do”. – Representative of San Carlos Green

Stakeholder Engagement

During Phase 2, the City hosted stakeholder meetings to share information on the CMAP process and to provide an opportunity for community stakeholders to provide strategy input specific to their work in the city and larger region. These meetings included discussions and presentations with various community organizations and partners, including representatives from the business community, Peninsula Clean Energy, San Mateo County, OneShoreline, and environmental groups. The CMAP project team asked stakeholders what their businesses or organizations are already doing to help combat climate change, what they would like to do to combat climate change, what barriers they may face when taking action, and how their business or organization can support the City in implementation of the CMAP. This stakeholder engagement resulted in refined strategies and actions related to renewable energy, electrification, electricity conservation and efficiency, enhancements to the active transportation system, retrofitting of existing buildings, and changing the behaviors of the community through education campaigns.

Advisory Bodies

The CMAP project staff met several times with the Transportation and Circulation Commission, the Economic Development Advisory Commission, the Parks Recreation and Culture Commission, the Youth Advisory Council, the Planning Commission, and the City Council. The CMAP project team shared project status updates and sought input on draft strategy ideas. The advisory bodies helped inform final modifications to the CMAP strategies.

Phase 3 Community Engagement

Phase 3 of the CMAP process included preparation of the draft CMAP and public review of the draft. The City released the Public Review Draft CMAP in June 2021 with a presentation and preliminary review by the City Council during a publicly noticed Study Session on June 28, 2021. The City accepted public comment throughout June, July, and August 2021 leading up to the Planning Commission's review. The Planning Commission reviewed the Public Hearing Draft CMAP and its Addendum to the General Plan Environmental Impact Report during a public hearing on August 16, 2021, received public comment, and voted unanimously to recommend approval and adoption by the City Council during its review in September 2021. The City Council unanimously adopted the Public Hearing Draft CMAP and its Addendum to the General Plan Environmental Impact Report during a public hearing on September 27, 2021 following Council discussion and receipt of public comment.



City Staff Engagement

Engagement with City staff is integral to the process of developing and vetting climate action strategies because the City is the ultimate implementing party of the CMAP. Interdepartmental engagement was necessary to ensure that the strategies included in this CMAP are attainable and that the City departments responsible for implementing each strategy are able to do so. Members of the CMAP project team consulted with staff from multiple City departments, including the City Manager's Office, Community Development, Public Works, and the Fire Department. The expertise of staff from these departments helped confirm appropriate and feasible strategies and actions.

Wrap-up

The following chapters of the CMAP provide details of the community's GHG emissions, climate vulnerabilities, and strategies to increase resilience and reduce emissions. Chapter 2 of this CMAP describes the results of the GHG inventories conducted for San Carlos, as well as estimates for the city's GHG emissions in 2030 and 2050. This work provides a foundation that allows the community to see how its emissions have changed over time and chart progress toward state and local emissions reduction targets, informing emissions reduction strategies.



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2. SAN CARLOS' GREENHOUSE GAS EMISSIONS

Background and Methodology

GHG emissions are generated by various activities that are largely commonplace in daily life. Some daily activities release GHG emissions in the location of the activity, such as gases released anytime a car is driven. On the other hand, some activities cause GHG emissions to be released elsewhere, such as someone using electricity to power their home from the grid, which generates GHG emissions in the location of the power plant that supplies the power, and not in the home itself. San Carlos must consider the GHG emissions caused by activities attributed to the community, including GHG emissions generated both inside and outside its jurisdictional boundaries. Knowing the sources and amounts of GHGs attributed to San Carlos is essential to the process of identifying how to reduce community and City operations GHG emissions, what strategies to adopt in the CMAP, and what targets to set for future reduction efforts.

The City has two types of GHG inventories: community-wide inventories and City operations inventories.

- § A community-wide GHG inventory identifies GHG emissions that result from activities of residents, employees, and other community members occurring within the community. Examples include residents driving cars, homes using water, and businesses using electricity.
- § A City operations GHG inventory summarizes emissions that are a direct result of San Carlos' government operations. Examples include electricity and water used in City buildings or the fuel used for City vehicles.

The inventories are conducted using a series of guidance documents, called protocols, which provide recommendations on how to adequately assess GHG emissions. The CMAP project team prepared new GHG inventories and conducted updates to past GHG inventories consistent with the guidance in widely adopted, standard protocol documents. These protocols provide guidance on what activities will be evaluated in the GHG inventories and how emissions from those activities will be measured. Using standard methods also allows for an easy comparison of GHG emission levels across multiple years and communities. GHG inventories are estimates of GHG emissions based on these standard methods and verified datasets. While they are not direct measurements of GHG emissions, the use of the standard methods identified in the protocol, in combination with accurate data from appropriate sources, allows GHG inventories to provide reliable estimates of local emission levels.

San Carlos' City operations GHG inventory relies on the Local Government Operations Protocol (LGOP), which was first developed in 2008 and was updated in 2010. The LGOP is a tool for accounting and reporting GHG emissions of local government (municipal) operations and is used

throughout California and the United States. The LGOP includes guidance from several existing programs as well as the state's mandatory GHG reporting regulations.

The community-wide GHG inventory uses the United States Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), which was first developed in 2012 and updated in 2019. The California Governor's Office of Planning and Research encourages cities and counties to follow the U.S. Community Protocol for community-wide GHG emissions.

These GHG inventories assess emissions in a unit called carbon dioxide equivalent (CO_2e), which is a combined unit of all GHGs analyzed in the inventory. As different GHGs have different effects on the processes that drive climate change, CO_2e is a weighted unit that reflects the relative potency of the different GHGs. These inventories report amounts of GHGs in metric tons of CO_2e (MTCO_2e), equal to 1,000 kilograms or approximately 2,205 pounds. These emissions are calculated by using data on GHG generating activities in combination with emission factors. An emissions factor describes how many MTCO_2e are released per unit of an activity. For instance, an emissions factor for electricity describes the MTCO_2e produced per kilowatt-hour (kWh) of electricity used, or an emission factor for on-road transportation describes the MTCO_2e produced per mile of driving.

How much is a Metric Ton of Carbon Dioxide (CO_2)?

1 metric ton = 2,205 pounds



One pound of CO_2 can fill 120 party balloons. That means that one metric ton of CO_2 (MTCO_2e) could fill more than 260,000 party balloons!



Did you know that many human activities generate GHG emissions?

Many common daily activities contribute to global emissions. But how much?



Producing half a pound of hamburger meat releases as much GHG emissions into the atmosphere as driving an average 3,000-pound vehicle for 10 miles.

Source: United Nations Food and Agriculture Organization

2021 Nissan Leaf	2021 Toyota Prius	2021 Honda Accord
Driving an electric 2021 Nissan Leaf produces 0 grams of GHG emissions per mile.	Driving a gasoline-only 2021 Toyota Prius produces 170 grams (0.37 pounds) of GHG emissions per mile.	Driving a 2021 Honda Accord produces 268 grams (0.59 pounds) of GHG emissions per mile.

Driving different cars releases different levels of emissions depending on each car's engine and fuel type.

Source: United States Department of Energy

GHG Inventories

Updates to Existing Inventories

Prior to the CMAP project, San Carlos and its regional partners prepared community-wide GHG inventories for the calendar years 2005 and 2010 through 2017. The City prepared the 2005 inventory with ICLEI.³ The 2010 to 2017 community-wide GHG inventories were prepared through the Regional Climate Action Planning Suites (RICAPS) program.

The CMAP team revised the existing community-wide (2005 and 2010 to 2017) and City operations (2015, 2017, and 2018) GHG inventories to use consistent and current methods and data sources and prepared a new 2018 community-wide GHG inventory. One major edit to the existing GHG inventories was to revise the global warming potentials (GWPs) used in all inventories to account for the relative difference in potencies of different GHGs. These numbers have changed as the science of GHGs has advanced. San Carlos' existing inventories used GWPs from the IPCC's 1995 Second Assessment Report. These values were updated to use the GWPs

from the most recent IPCC report, the 2013 Fifth Assessment Report.⁴ Table 2 shows the differences in GWPs, by gas, in the two reports.

Table 2. Change in GWPs by GHG

Gas	Second Assessment Report GWP (1995)	Fifth Assessment Report GWP (2013)
Carbon dioxide (CO ₂)	1	1
Methane (CH ₄)	21	28
Nitrous oxide (N ₂ O)	310	265

Because of these changes, the inventory results presented in this CMAP will be different than results that were published in the 2009 CAP. Apart from the transportation sector, these changes are relatively minor. The large change in transportation-related emissions is due to a change in the source of the activity data, which has been prepared using a different method than the original 2005 inventory. The original 2005 GHG inventory includes “pass-through” trips, which are those that do not begin or end in San Carlos, but pass through the community, primarily on Highway 101. The removing of “pass-through” trips follows industry best practices for assessing GHG emissions related to transportation. Since local jurisdictions lack control over these emissions, as the trips do not begin or end in the community, best practice recommends removing them to avoid attributing emissions to San Carlos that are the responsibility of other communities. These trips have been removed in the updated GHG inventory, hence the substantial drop in transportation GHG emissions. Table 3 shows how the baseline 2005 inventory has been updated.



Table 3. Updates to the 2005 Baseline Inventory

Sector	Original Inventory Results (MTCO ₂ e)	Updated Inventory Results (MTCO ₂ e)	Percentage Change
Residential Energy	49,180	49,030	Less than -1%
Non-residential Energy	54,620	51,800	-5%
Transportation	150,660	87,420	-42%
Off-road Equipment	—	11,180	—
Rail	—	0	—
Stationary Source	—	0	—
Solid Waste	12,780	13,530	6%
Water and Wastewater	—	0	—
Land Use and Sequestration	—	-360	—
Total Annual MTCO₂e	267,240	212,600	-20%

Table note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

In addition to these universal edits, the CMAP project team made the following changes to the existing inventories:

- § Adjusted the source of activity data for vehicle use in the community-wide GHG inventory to now use activity data from the BAAQMD, which more accurately reflects the community's contributions to traffic in the region compared to the previously used data from the California Department of Transportation (Caltrans).
- § Adjusted the emissions associated with Caltrain in the community-wide GHG inventory to be based on passenger ridership to and from San Carlos rather than miles of railway in the community.
- § Replaced estimates for electricity use at selected major non-residential facilities in the community-wide GHG inventory with measured electricity use numbers, as available.
- § Revised the emissions associated with off-road equipment in the community-wide GHG inventory to reflect San Carlos' share of these emissions more accurately as a proportion of county-wide emissions.



Community-wide GHG Inventory

A community-wide GHG inventory identifies GHG emissions that result from activities of residents, employees, and other community members occurring within the community. The CMAP includes the community-wide GHG inventory results for calendar years 2005, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, and 2018. The community-wide GHG inventory assessed GHG emissions from the following nine categories of activities, known as sectors.

- § **Residential Energy** GHG emissions are those that residential units generate from the use of electricity and natural gas.
- § **Non-residential Energy** includes GHG emissions from electricity and natural gas use in non-residential properties.
- § **Transportation** GHG emissions are those created by on-road transportation, such as driving a car, in terms of vehicle miles traveled (VMT).
- § **Off-road Equipment** includes GHG emissions from equipment with motors that are not driven on roads, such as tractors for construction or equipment used for landscape maintenance.
- § **Rail** includes GHG emissions from both the Caltrain and freight trains.
- § **Stationary Sources** are those GHG emissions from large industrial sites, commercial businesses, warehouses, or power plants.
- § **Solid Waste** includes the GHG emissions released from trash collected in the community and transported to a landfill elsewhere.
- § **Water and Wastewater** accounts for the electricity used to transport every gallon of water or wastewater.
- § **Land Use and Sequestration** includes GHG emissions absorbed and stored in trees and soils.

The proportion of each sector's contribution to annual GHG emissions is largely consistent between the years 2005 and 2018, as shown in Table 4. The transportation sector has remained the largest source of GHG emissions in San Carlos, hovering around 41 percent from 2005 to 2015, rising to 46 percent in 2016 and to 47 percent by 2018.



The transportation sector is followed by the residential and non-residential energy sectors as the second and third dominant emitters, respectively. Residential energy hovers between 23 and 25 percent from 2005 to 2014, declining slightly in more recent years to between 20 and 21 percent. Non-residential energy was quite similar with average proportions of total GHG emissions between 22 and 24 percent between 2005 and 2015, until the share of non-residential GHG emissions dropped to 18 percent in 2016. The share of non-residential energy GHG emissions decreased 1 percent per year between 2016 and 2018, resulting in a total of 16 percent of community-wide GHG emissions in 2018.

Off-road equipment and solid waste are the next-largest source of GHG emissions in San Carlos, each providing approximately 5 to 8 percent of community-wide emissions. Both the rail and water and wastewater sectors remain at approximately 1 percent between 2005 and 2018. Finally, stationary sources, the lowest emitter of GHG emissions in San Carlos, represented less than 1 percent of emissions for all years except for 2017, when stationary sources were responsible for approximately 3 percent of emissions.

Table 4. Proportions of Annual GHG Emissions by Sector

Sector	2005	2010	2015	2018
Residential Energy	23%	25%	21%	21%
Non-residential Energy	24%	22%	23%	16%
Transportation	41%	41%	41%	47%
Off-road Equipment	5%	6%	7%	8%
Rail	—	1%	1%	1%
Stationary Sources	—	Less than 1%	Less than 1%	—
Solid Waste	6%	5%	6%	8%
Water and Wastewater	Less than 1%	1%	1%	1%
Land Use and Sequestration *	Less than -1%	Less than -1%	Less than -1%	Less than -1%
Total Annual MTCO₂e	100%	100%	100%	100%

* GHG emissions from land use and sequestration activities are negative, as these activities reduce the amount of GHG emissions in the atmosphere. Any changes to the City's Protected Tree Ordinance may impact these numbers. The effect on the climate from the removal of larger trees should be considered in any updates and permit issuance.

Table Note: Blank cells indicate the year in which specific sector data is not available.



As shown in Table 5, San Carlos' community-wide GHG emissions decreased by approximately 25 percent between the years 2005 and 2018. The sectors that experienced the largest decrease in annual GHG emissions are residential and non-residential energy, which reduced by 32 and 51 percent, respectively. This is primarily due to the introduction of Peninsula Clean Energy (PCE) service in November 2016. PCE supplies electricity to most customers in San Carlos and uses sources of electricity that emit fewer GHGs than electricity supplied from Pacific Gas and Electric Company (PG&E). As a result of PCE beginning operations, GHG emissions associated with electricity use have declined substantially. Improvements in energy efficiency have reduced the amount of electricity and natural gas use in San Carlos despite a growing population, which has also contributed to a reduction in energy-related GHG emissions.

The second sector to experience the largest decrease was water and wastewater at a decrease of 17 percent, also from cleaner sources of energy used to process and treat water and wastewater. The transportation, solid waste, and rail sector GHG emissions declined as well. The transportation sector saw a GHG emission decrease of 14 percent, primarily because of the increase of fuel-efficient and electric vehicles. Solid waste and rail experienced decreases of 9 and 4 percent, respectively.

The only sector to experience an increase in GHG emissions is off-road equipment. GHG emissions from this sector rose by 12 percent. Off-road equipment GHG emissions increased due at least in part to an increase in construction activity and a growing population.

GHG emissions associated with land use and sequestration remained constant, as there are no records of undeveloped natural land being developed in San Carlos during this period. Any changes to the City's Protected Tree Ordinance may impact these numbers. The effect on the climate from the removal of larger trees should be considered in any updates and permit issuance.

Since Peninsula Clean Energy's default ECOplus program became 100% carbon free on January 1, 2021, no GHG emissions are released from customers of PCE.

In 2021, 97% of eligible accounts in San Carlos are enrolled in PCE. Of those, 1.5% are enrolled in the ECO100 program.



Table 5. Community-wide GHG Emissions
Percentage Change Between 2005 and 2018 by Sector

Sector	2005 (MTCO _{2e})	2018 (MTCO _{2e})	Percentage Change 2005 to 2018
Residential Energy	49,030	33,220	-32%
Non-residential Energy	51,800	25,310	-51%
Transportation	87,420	75,120	-14%
Off-road Equipment	11,180	12,540	12%
Rail	—	1,150	-4%
Stationary Sources	—	—	0%
Solid Waste	13,530	12,290	-9%
Water and Wastewater	—	980	-17%
Land Use and Sequestration	-360	-360	0%
Total Annual MTCO_{2e}	212,600	160,250	-25%

Table Notes: Due to limited data availability, 2005 GHG emissions for rail, stationary sources, and water and wastewater were not available. Stationary source GHG emissions for 2018 were also not available. All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

City Operations GHG Inventory

The City prepared City operations GHG inventories for the calendar years 2015, 2017, and 2018. As described previously, the CMAP team revised the existing City operations (2015, 2017, and 2018) GHG inventories to use consistent and current methods and data sources. The primary adjustment to the existing City operations GHG inventory was to revise the GWPs used in the analysis to account for the relative difference in potencies of different GHGs.

A City operations GHG inventory summarizes emissions that are a direct result of San Carlos' municipal government operations. The City's operations GHG inventory assessed six sectors:

- § **Energy** includes the GHG emissions of electricity, natural gas, and propane used to power City buildings, facilities, and operations.
- § **Commute** covers GHG emissions from the total annual miles that City staff drive to and from work.
- § **Fleet** includes the GHG emissions released by City vehicles based on the total gallons of fuel used.
- § **Solid Waste** accounts for the GHG emissions released from the collection of trash at City buildings and facilities, which are transported to a landfill elsewhere.

- § **Water and Wastewater** accounts for the energy used to transport every gallon of water and wastewater to and from City buildings and facilities.
- § **Refrigerant** includes the amount of refrigerants used to refill air conditioners in City buildings and vehicles.

The proportion of each sector’s contribution to annual City operations GHG emissions fluctuated between the years 2015 and 2018. As Table 6 illustrates, the highest emitter of GHG emissions by City operations was the energy sector in 2015 and 2017, but overall energy GHG emissions decreased while the fleet sector increased, resulting in the fleet sector becoming the largest emitter, by proportion, in 2018. In 2015, energy GHG emissions accounted for 49 percent of annual GHG emissions, which reduced to 26 percent by 2018. Conversely, fleet accounted for only 27 percent of annual GHG emissions in 2015, which grew to 45 percent of annual GHG emissions by 2018. Other sectors indicate varying results. The commute sector started at 20 percent of annual GHG emissions in 2015, increasing to 28 percent in 2017, and decreasing to 21 percent in 2018. Solid waste GHG emissions grew from 3 percent in 2015 to 5 percent in 2018. The water and wastewater sectors did not have data for 2015; however, 2017 and 2018 data indicate that water and wastewater only accounted for 1 percent of annual GHG emissions. Lastly, refrigerants accounted for 1 percent of annual City operations GHG emissions in 2015, rising to 3 percent in 2018.

Table 6. Proportions of Annual GHG Emissions by Sector

Sector	2015	2017	2018
Energy	49%	37%	26%
Commute	20%	28%	21%
Fleet	27%	26%	45%
Solid Waste	3%	6%	5%
Water and Wastewater	—	1%	1%
Refrigerants	1%	2%	3%

Table Note: All numbers are rounded to the nearest whole number. Totals may not equal the sum of individual rows.

As shown in Table 7, City operations GHG emissions fluctuated between each inventory year. Annual GHG emissions decreased by 48 percent between 2015 and 2017, then increased by 43 percent between 2017 and 2018. Overall, GHG emissions between the years 2015 and 2018 decreased by only 26 percent. This fluctuation is likely due to many factors. First, the energy sector saw a 60 percent decline in GHG emissions between 2015 and 2018 from the introduction of PCE renewable energy service in 2016 and the City opting into PCE’s ECO100 option. The commute sector additionally experienced a decline of 22 percent between 2015 and 2018, which was a result of less VMT by City employees and increasing efficiency of cars. The refrigerant sector increased by 150 percent between 2015 and 2018, largely because of the infrequent need of recharging



vehicle and building air conditioning units. The fleet sector saw an increase of 21 percent of GHG emissions between 2015 and 2018, which is due to increased VMT by City staff. Solid waste and water and wastewater GHG emissions increased by 9 and 4 percent, respectively.

Table 7. Percentage Change Between 2015 and 2018 by Sector

Sector	2015	2017	2018	Percentage Change 2015 to 2018
Energy	710	280	280	-60%
Commute	290	210	230	-22%
Fleet	400	200	490	21%
Solid Waste	50	50	50	9%
Water and Wastewater	—	Less than 10	Less than 10	4%
Refrigerants	10	10	30	150%
Total	1,470	760	1,090	-26%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Consumption-Based Inventory Emissions

The community-wide and City operations inventories for San Carlos are protocol-compliant, production-based inventories meaning that they assess the GHG emissions produced by activities occurring within the community.¹ However, these inventories largely do not account for GHG emissions created through the manufacture and transportation of goods purchased for use in the community, air travel by San Carlos residents and employees, food grown and processed outside of San Carlos, or disposal of certain materials and products.

For example, if a San Carlos community member purchases food at a local grocery store, the production-based inventory will include vehicle emissions for the trip to and from the store, energy use at the store and home, and wastewater and any landfilled waste generated. However, it does not include emissions associated with growing, processing, and transporting the food, nor does it include any emissions from composting or reprocessing of waste materials that do not end up in a landfill or wastewater, unless such activities occur within the San Carlos city limits.

In contrast to a production-based inventory, a consumption-based inventory looks at a wider array of GHG emissions created by the goods and services used by San Carlos community members, employees, and businesses. This includes emissions associated with the manufacture,

¹ Technically, the inventories in the CMAP are a hybrid of the production-based and activity-based inventory methods, but for simplicity's sake they are referred to here as "production-based".

transportation, and disposal of products used in San Carlos, regardless of where those activities occur. Consumption-based inventories can therefore show a more complete picture of the GHG emissions associated with San Carlos.

Consumption-based inventories are more complex to calculate than production-based inventories and do not have established protocols and methods the way that a production-based inventory does. California does not have a statewide consumption-based inventory or guidance for preparing such an inventory. As a result, a consumption-based inventory was not prepared as part of the CMAP. In 2015 the BAAQMD worked with the Cool Climate Network at the University of California, Berkeley to prepare a consumption-based inventory for all Bay Area jurisdictions.⁵ This inventory includes the following emission sources:

- § **Travel.** Emissions from fuel use by on-road vehicles, vehicle manufacturing and repairs, air travel, and public transportation.
- § **Housing.** Emissions from electricity and natural gas use in homes, as well as use of other fuels used for home heating such as fuel oil and kerosene, electricity emissions associated with water and wastewater, and emissions from waste. This also includes emissions from the manufacture, transportation, and construction and demolition of materials used to build houses.
- § **Food.** Emissions associated with the growth, process, and transportation of food.
- § **Goods.** Emissions from the manufacture of consumer products, including clothing, home furnishings, appliances and electronics, and healthcare and personal care items.
- § **Services.** Emissions generated by personal and business services, including education, healthcare, entertainment and recreation, maintenance and repair services, and communication.

Some of these emission sources are included in the production-based inventories in the CMAP, while others are only covered by one of the inventories. Table 8 compares the sources of GHG emissions between the CMAP production-based inventory and the BAAQMD/Cool Climate Network consumption-based inventory. Figure 5 shows San Carlos' 2015 consumption-based GHG emissions.



Table 8. Comparison of Sources in Production- and Consumption-Based Emission Inventories

Source of Emissions	Production-based CMAP inventory	BAAQMD/ Cool Climate Network Consumption-Based Inventory
Generation of electricity used	Included	Included
Combustion of natural gas used	Included	Included
Combustion of fuel oil used	Not included	Included
Fuel use from on-road vehicles	Included	Included
Fuel use from public transit	Included	Included
Vehicle manufacturing and repairs	Partially included *	Included
Air travel	Not included	Included
Fuel use from off-road equipment, including construction and landscaping	Included	Not included
Generation of electricity used for water processing and transportation	Included	Included
Generation of electricity used for wastewater processing and transportation	Included	Not directly included †
Direct wastewater process emissions	Included	Not included
Landfilling of solid waste	Included	Included
Reprocessing of recyclables	Partially included *	Included
Compost processing	Partially included *	Included
Manufacturing of home construction materials	Partially included *	Included
Food production, processing, and transportation	Partially included *	Included
Sequestration in forests and street trees	Included	Not included
Embedded emissions in other goods and services	Not included	Included

Table Notes:

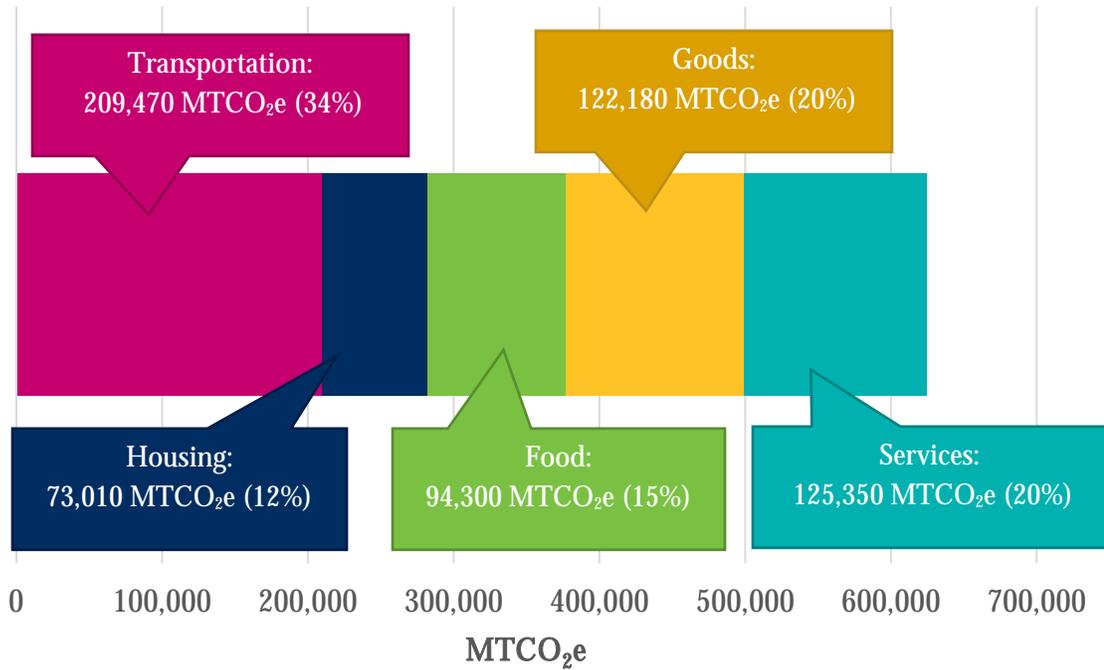
* To the extent that these activities occur in San Carlos, energy use, water use, and waste generation at these facilities is included in the CMAP inventory. Emissions occurring from these activities outside of San Carlos, or emissions in San Carlos beyond those associated with energy/water use and waste generation, are not included in the CMAP inventory.

† These emissions are not called out separately in the BAAQMD/Cool Climate Network inventory, but they may be included in the total electricity use category.

Due to differences in data sources and analytical methods, there may be different results between the two inventories for the same source of emissions.



Figure 5. San Carlos Consumption-Based GHG Emissions (2015)



According to the 2015 consumption-based inventory, San Carlos’ consumption-based emissions totaled approximately 619,710 MTCO₂e. Similar to the production-based GHG inventory prepared for the CMAP, transportation accounted for the largest source of these emissions, equaling approximately 34 percent of the total. Services and goods are the second- and third-largest sources of consumption-based GHG emissions, respectively, each accounting for approximately 20 percent of San Carlos’ emissions. Food is the fourth-largest source of consumption-based GHG emissions (15 percent), and housing is the smallest (12 percent). San Carlos’ consumption-based GHG emissions are more than three times higher than the community’s production-based GHG emissions, which totaled 185,770 MTCO₂e in 2015. More details about the consumption-based inventory, including methods and details results for all Bay Area jurisdictions, are available at: <https://coolclimate.berkeley.edu/inventory>.

The CMAP does not forecast changes in consumption-based GHG emissions or identify the reduction in consumption-based GHG emissions from strategies. However, since the consumption-based inventory includes production-based emissions, the GHG reduction strategies will reduce consumption-based as well as production-based emissions. Additionally, some strategies that are identified as supportive in the CMAP will likely achieve reductions in consumption-based GHG emissions.



GHG Forecasts

The CMAP includes projections of future community-wide and City-operations GHG emissions. These projections include a forecast of future GHG emissions if no actions were taken to reduce GHG emissions (a “business-as-usual” forecast). A projection of future GHG emissions with the benefits of existing and planned efforts at the state, regional, and local levels is presented in Chapter 4. Projections were completed for the calendar years 2020, 2030, and 2050 using the demographic projections in Table 9. These projections include a significant increase in jobs between 2020 and 2030 as a result of commercial development anticipated on the east side and other economic growth, resulting in a near-doubling of jobs from 2018 levels by 2050. The analysis serves as a foundation for identifying GHG emission targets and strategies in the CMAP to achieve the necessary reductions for the community and the City.

Table 9. San Carlos Demographic Projections, 2018 to 2050

	2018	2020	2030	2050	Percentage Change 2018 to 2050
Population	29,860	30,150	33,600	37,930	27%
Households	11,560	11,700	13,380	14,650	27%
Jobs	16,190	19,480	28,450	31,110	92%
Service population	46,050	49,630	62,050	69,040	50%
City employees	98	99	104	114	16%

Community-wide GHG Forecast

The forecast of community-wide GHG emissions is based on the results of the 2018 community-wide GHG emissions inventory, combined with San Carlos’ 2018 and future demographic projections (population, households, and jobs) shown in Table 9. Service population is the sum of population and jobs.

The GHG forecast assumes that each person in San Carlos will continue to contribute the same amount of GHG emissions to the community total, so that the amount of GHG emissions increases proportional to the projected increase in community demographics. There is one exception, which is that emissions associated with land use changes and biomass sequestration assume that the City does not develop open space land and that the number of street trees in the community remains constant. The 2020 projections in the forecast are intended to show a “typical” year of GHG emissions given the results of the 2018 inventory and San Carlos’ projected demographic growth. The 2020 numbers are not an assessment of actual GHG emissions in that year. They do not reflect changes in behavior and activity associated with the COVID-19 pandemic.

San Carlos' community-wide GHG emissions are expected to increase 13 percent by 2050 relative to 2005 levels, and increase 50 percent by 2050 relative to 2018 levels, if no action is taken at any level, including by state, regional, and local agencies. Although emissions decreased substantially from 2005 to 2018, significant demographic growth, especially increases in job projections, are expected to override these decreases. Table 10 shows San Carlos' forecasted community-wide GHG emissions.

San Carlos is expected to see a notable increase in jobs resulting from the development of new commercial, office, and light industrial development in the eastern portions of the city (generally east of El Camino Real). This development includes anticipated growth in the area identified as the East Side Innovation District, including housing and commercial land uses to support biotechnology, life science, and high-tech office industries. Therefore, there is a potential that an increase in transportation emissions may occur due to an increase in employees commuting to work. Growth in community-wide GHG emissions shown in Table 10 reflect the increased job growth anticipated as part of commercial development on the east side.

San Carlos' 2009 CAP establishes a community-wide GHG emissions-reduction target of 15 percent below 2005 levels by 2020, which is comparable to reducing emissions to 1990 levels by 2020, according to the Scoping Plan. For more information on the Scoping Plan, refer to the Regulatory Framework in Chapter 1. According to the updated GHG emissions inventory, San Carlos' 2005 GHG emissions totaled 212,590 MTCO_{2e}. A target of 15 percent below this level is equal to 180,700 MTCO_{2e}.

As of 2018, San Carlos' GHG emissions were 160,230 MTCO_{2e}, 25 percent below 2005 levels. With existing and planned activities (discussed in more detail in Chapter 4), San Carlos' 2020 GHG emissions are projected to be 161,920 MTCO_{2e}, which is 24 percent below 2005 levels and well below the City's adopted target. The decrease is due to several factors, including significantly cleaner sources of electricity for buildings, more fuel efficient and electric vehicles, and an increase in composting and other landfill reduction activities. Without existing and planned efforts, San Carlos' 2020 GHG emissions are projected to be 171,240 MTCO_{2e}, or 19 percent below 2005 levels.



Table 10. San Carlos Community-wide GHG Emissions Forecast, 2005 to 2050

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Residential electricity	16,190	4,050	4,100	4,680	5,130	-68%
Residential natural gas	32,840	29,170	29,520	33,760	36,970	13%
Non-residential electricity	34,550	8,640	9,860	10,510	11,490	-67%
Non-residential natural gas	17,260	16,660	20,050	31,940	34,670	101%
Transportation	87,420	75,120	80,960	101,220	112,620	29%
Off-road equipment	11,170	12,540	11,500	21,340	17,370	56%
Rail*	—	1,140	1,230	1,540	1,710	50%
Stationary sources*	—	—	70	70	70	0%
Solid waste	13,520	12,290	13,250	16,560	18,430	36%
Water and wastewater*	—	980	1,060	1,320	1,460	49%
Sequestration†	-360	-360	-360	-360	-360	0%
Total	212,590	160,230	171,240	222,580	239,560	13%

Table Notes:

* Due to limited data availability in 2005, emissions for rail and water and wastewater are not available and therefore the percentage reduction is calculated between 2018 and 2050. Data for stationary sources was not available for the years 2005 or 2018 and therefore the percentage change was calculated between 2020 and 2050.

† Informational item. These emissions are negative due to carbon being sequestered in soil and biomass from forested land and street trees. Any changes to the City's Protected Tree Ordinance may impact these numbers. The effect on the climate from the removal of larger trees should be considered in any updates and permit issuance.

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

City Operations GHG Forecast

The forecast of San Carlos' City operations GHG emissions is based on the results of the 2018 City operations GHG emissions inventory, combined with the City's future employment projections shown in Table 9.

San Carlos' City operations GHG emissions are expected to decrease 16 percent by 2050, relative to 2015 levels, if no action is taken at any level, including by state, regional, and local agencies. The draft forecast assumes that each City employee will continue to contribute the same amount of GHG emissions to the City's total, so that the amount of GHG emissions increases proportional to the projected increase in employees. San Carlos' City operations GHG emissions are projected to remain below 2015 levels, as emissions decreased enough between 2015 and 2018 that the rise in emissions from employment growth is not expected to be enough to erase this earlier decline. However, a 14 percent increase in City emissions is forecasted between 2018 and 2050 if nothing were to be done during that time on the state, regional, or local level. Table 11 shows San Carlos' forecasted City operations GHG emissions.

Table 11. San Carlos City Operations GHG Emissions Forecast, 2005 to 2050

Sector	2015 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2015 to 2050
Energy	720	280	280	300	310	-57%
Commute	290	230	230	240	270	-7%
Fleet	400	490	490	520	560	40%
Solid waste	50	50	50	50	60	20%
Water and wastewater	—	Less than 10	Less than 10	Less than 10	Less than 10	—
Refrigerants	10	30	30	30	30	200%
Total	1,470	1,080	1,080	1,140	1,230	-16%

Table Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

San Carlos' 2009 CAP establishes a City operations GHG emissions-reduction target of 15 percent below 2005 levels by 2020, in accordance with state recommendations. According to the updated GHG emissions inventory, San Carlos' 2015 City operations GHG emissions totaled 1,470 MTCO₂e. A target of 15 percent below this level is equal to 1,250 MTCO₂e. As of 2018, these GHG emissions were 1,080 MTCO₂e, 27 percent below 2015 levels. With existing and planned activities, San Carlos' 2020 City operations GHG emissions are forecasted to be 920 MTCO₂e, which is 37 percent below 2015 levels and well below the City's adopted target.



GHG Reduction Targets

The 2009 CAP adopted GHG reduction targets of 15 percent below 2005 levels by 2020 and 35 percent below 2005 levels by 2030. San Carlos' 2009 CAP establishes a community-wide GHG emissions-reduction target of 15 percent below 2005 levels by 2020, which is comparable to reducing emissions to 1990 levels by 2020, according to the Scoping Plan. (For more information on the Scoping Plan, refer to the Regulatory Framework in Chapter 1.) According to the updated GHG emissions inventory, San Carlos' 2005 GHG emissions totaled 212,590 MTCO_{2e}. A target of 15 percent below this level is equal to 180,700 MTCO_{2e}.

As shown previously, the community saw a decrease of 25 percent in community-wide GHG emissions between 2005 and 2018 to 160,230 MTCO_{2e}, while City operations GHG emissions decreased by 26 percent between 2015 and 2018. Therefore, the community is well on the way to reaching the GHG reduction target of 15 percent below 2005 levels by 2020 in the 2009 CAP.

With existing and planned activities (discussed in more detail in Chapter 4), San Carlos' 2020 GHG emissions are projected to be 161,920 MTCO_{2e}, which is 24 percent below 2005 levels and well below the City's adopted target. The decrease is due to several factors, including significantly cleaner sources of electricity for buildings, more fuel efficient and electric vehicles, and an increase in composting and other landfill reduction activities. Even without existing and planned efforts, San Carlos' 2020 GHG emissions are projected to be 171,240 MTCO_{2e}, or 19 percent below 2005 levels.

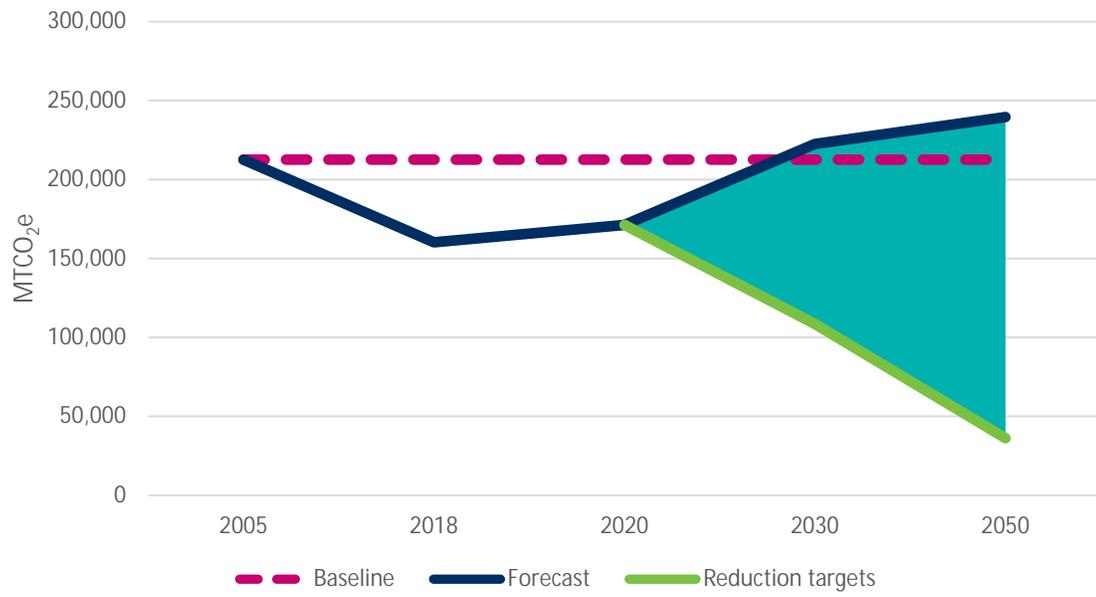
As shown in the GHG forecast section, and Figure 6, GHG emissions from both community-wide and City operations activities are anticipated to increase over time and, under a "business-as-usual" scenario, would not meet the 2030 target set in the 2009 CAP. This CMAP establishes higher GHG reduction targets than the 2009 CAP. **This CMAP seeks to reduce GHG emissions 40 percent below 1990 levels (equal to 49 percent below 2005 levels) by 2030 and 80 percent below 1990 levels (or 83 percent below 2005 levels) by 2050.**

It is important to note that the City of San Carlos and its community can work to exceed these GHG reduction targets and that these targets serve as a foundation for emission reductions as mandated by state regulations. The City of San Carlos is committed to pursuing more aggressive GHG emission reductions as feasible and actively seeks new programs, projects, or funding that would allow for a more rapid decrease in community-wide GHG emissions.

The GHG inventory and forecast provided in this chapter provide an understanding of how San Carlos' emissions are expected to change in the absence of any reduction efforts. Chapter 3 describes San Carlos' vulnerability to climate change. Chapter 4 of this CMAP describes how the City intends to reduce future emissions to meet or exceed its GHG reduction targets.



Figure 6. Gap Between Forecasted Emissions and Reduction Targets



3. SAN CARLOS' VULNERABILITY TO CLIMATE CHANGE

Background

A vulnerability assessment is an analysis of how climate change is likely to affect a community. The vulnerability assessment in this CMAP looks at the anticipated hazards and other public safety concerns that may be created or exacerbated by climate change and how these conditions have the potential to harm people, buildings and infrastructure, ecosystems, and other assets in San Carlos. Just as the GHG inventory and forecast provide a foundation for identifying future GHG emission reductions, the vulnerability assessment helps support future efforts to improve community resilience and adapt to changing climate conditions.

Vulnerability Assessment Process

The vulnerability assessment primarily follows the recommended process in the *California Adaptation Planning Guide*,⁶ published in 2020 by the California Governor's Office of Emergency Services. This includes a four-step process: (1) characterizing the City's exposure to current and projected climate hazards; (2) identifying potential sensitivities and potential impacts to community populations and assets; (3) evaluating the current ability of the populations and assets to cope with climate impacts, also referred to as its adaptive capacity; and (4) identifying priority vulnerabilities based on systematic scoring. Figure 7 presents these steps, described in further detail in Appendix C.

Figure 7. California Adaptation Planning Guide Recommended Model



Vulnerable Populations and Assets

The CMAP vulnerability assessment includes the evaluation of community populations and assets and how those populations and assets may be impacted by climate change. The vulnerability assessment includes a comprehensive list of populations and assets to understand how susceptible different people, places, ecosystems, and services within the community are affected by climate change hazards. This list includes 16 populations, 16 infrastructure types, 10 building types, 6 important economic assets, 6 ecosystems and natural resources, and 8 key community services, as shown in Table 12. These populations and assets allowed City staff to build resiliency for the most susceptible people and assets in the city. Some assets, such as the Silicon Valley Clean Water Wastewater Treatment Plant, are in neighboring cities but serve San Carlos, and therefore were

included in the assessment. Following confirmation of this list, City staff developed an applicability matrix, which looked at which hazards are likely to affect which populations and assets. For example, human health hazards are likely to impact most populations, but it would not physically affect buildings. Many of these populations and asset groups include sub-categories that are not listed separately.

Table 12. List of Populations and Assets

Category	Populations or Assets		
Populations	§ Children (under 10)	§ Outdoor workers	§ Renters
	§ Cost-burdened households	§ Persons experiencing homelessness	§ Seniors (65+)
	§ Households in poverty	§ Persons living on single-access roads	§ Seniors living alone
	§ Immigrants and refugees	§ Persons with chronic illnesses	§ Undocumented persons
	§ Linguistically isolated populations		§ Persons with disabilities
	§ Low-income households		§ Persons without access to lifelines
Infrastructure	§ Airports	§ Evacuation routes	§ Single-access roads
	§ Bridges	§ Flood-control infrastructure	§ Solid waste facilities and closed landfills
	§ Caltrain station and line	§ Hazardous materials sites	§ Transit stops
	§ Communication facilities	§ Major roads and highways	§ Water and wastewater infrastructure
	§ Electrical substations and transmission lines	§ Natural gas pipelines	
	§ Electrical vehicle charging stations	§ Parks and open space	



Category	Populations or Assets		
Buildings	§ Community centers	§ Homes and residential structures	§ Public safety buildings
	§ Commercial centers	§ Libraries	§ Schools
	§ Emergency shelters	§ Medical and care facilities	§ Transit centers
	§ Government buildings		
Important economic assets	§ Aviation museum	§ Industrial/manufacturing centers	§ Outdoor recreation
	§ Biotechnology	§ Major employers	§ Regional parks
Ecosystems and natural resources	§ Annual grassland	§ Oak woodland	§ Scrub
	§ Aquatic habitat	§ Riparian habitats	§ Wetlands
Key community services	§ Communication services	§ Energy delivery	§ Public transit access
	§ Emergency medical response	§ Government administration and community services	§ Solid waste removal
		§ Public safety response	§ Water and wastewater

Hazards in San Carlos

The vulnerability assessment assigns vulnerability scores to 375 different pairing of hazards and populations or assets. This section summarizes the climate change hazards at the local level and discusses the significant vulnerabilities created by those hazards. For a complete list of vulnerability scores, see Appendix C.

Drought

A drought occurs when conditions are drier than normal for an extended period, making less water available for people and ecosystems. Droughts are a regular occurrence in California; however, scientists expect that climate change will lead to more frequent and more intense droughts statewide. Overall, annual average precipitation levels are expected to remain similar, with more years of extreme precipitation events and droughts that last longer and are more intense. California Water Service (Cal Water) and other water providers in San Carlos purchase

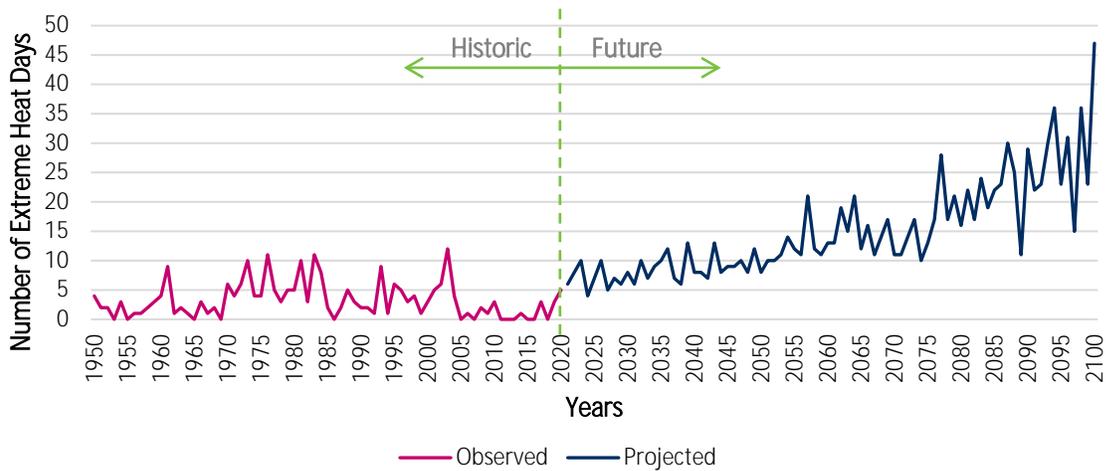
water from the City and County of San Francisco, derived from the Hetch Hetchy Regional Water System in the Sierra Nevada along the Tuolumne River.⁷ During drought conditions, water stored in the Hetch Hetchy system's primary reservoir could decrease from lack of rainfall and reduction in snowpack from higher temperatures, causing water shortages during extended drought conditions or price hikes that could increase economic instability of low-income residents. The watershed feeding Hetch Hetchy Reservoir could experience a reduction in baseflow of 2.7 inches, or 24 percent, during an extended drought period.⁸ This reservoir is also fed by slowly melting snowpack that provides water throughout the year. Snow water equivalence, or the amount of water stored in the snowpack, is projected to decrease by an average of 1,230 inches, or 45 percent, during an early-century drought (2023 to 2042) and an average of 1,710 inches, or 62 percent, during a late-century drought (2051 to 2070).⁹

At the local level, the aquatic habitat, wetlands, and riparian habitats that depend on water from the Pulgas, Brittan, Belmont, and Cordilleras Creeks are most vulnerable. In an early-century drought (2023 to 2042), the community could experience a drop in average precipitation from an average of 19.9 inches per year to an average of 17.4 inches per year, which would subsequently lower baseflows in streams from an average of 5.6 to 4.1 inches per day.¹⁰ In a late-century drought (2051 to 2070), precipitation could also drop to an average of 17.4 inches per year and cause baseflows in streams to drop to 4.0 inches per day.¹¹ This could lower water quality and raise water temperatures, causing lower dissolved oxygen levels and algae growth that can harm a variety of fish species.¹² Wetlands and riparian habitats can experience increased soil erosion, degradation of landscape quality, and loss of biological productivity.¹³ Since wetlands act as a buffer between developed areas and San Francisco Bay, helping to protect the community from sea level rise and bayshore flooding, degradation of wetlands could decrease the amount of water that the ecosystem can absorb and reduce the protection that the wetlands provide. Drought conditions can also dry out vegetation and increase wildfire conditions, which could strain firefighting equipment and personnel.

Extreme Heat

Extreme heat occurs when temperatures rise significantly above normal levels. In San Carlos, an extreme heat day is when temperatures reach above 94.7°F. As shown in Figure 8, the number of extreme heat days in San Carlos is projected to increase from 4 days historically,¹⁴ to an average of 11 extreme heat days per year during mid-century (2040 to 2060) and an average of 22 extreme heat days per year during the late-century (2070 to 2099).

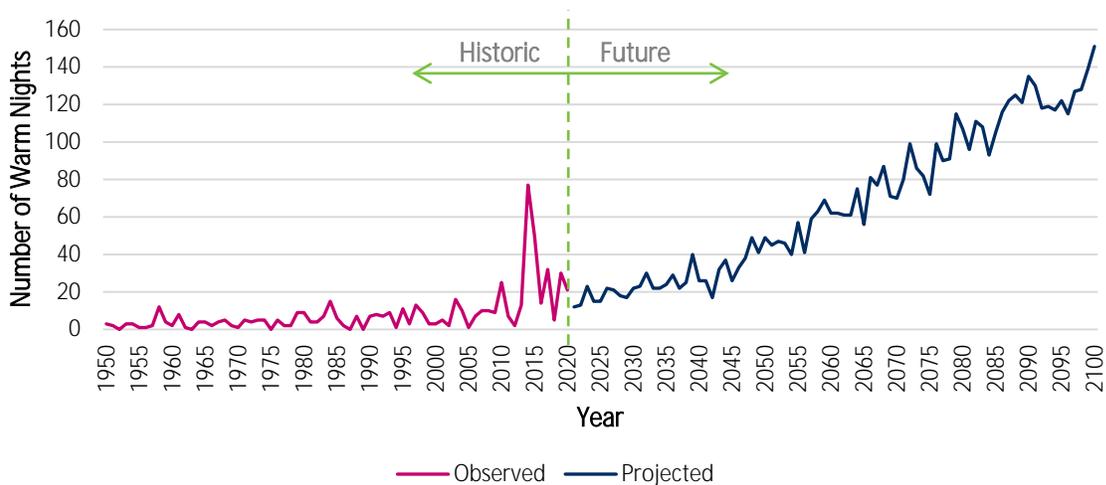
Figure 8. Projected Extreme Heat Days in San Carlos



Sources: Cal-Adapt, 2020, and National Oceanic and Atmospheric Administration, 2020.

Extreme heat can also occur in the form of warmer nights, as temperatures do not cool down overnight and provide relief from the heat. In San Carlos, a warm night occurs when the temperature stays above 59.5°F. As shown in Figure 9, the number of warm nights in San Carlos is projected to increase from an average of 5 historically,¹⁵ to an average of 45 warm nights per year during mid-century (2040 to 2060), and an average of 109 warm nights per year during the late-century (2070 to 2099).

Figure 9. Projected Warm Nights in San Carlos



Sources: Cal-Adapt and National Oceanic and Atmospheric Administration, 2020.

Extreme heat can cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, in addition to worsening respiratory and cardiovascular conditions. The most vulnerable populations are those that spend a disproportionately high amount of time outside, such as children, outdoor workers, and persons experiencing homelessness, as well as those with sensitive or compromised immune systems, persons with chronic illnesses, and seniors.

Households in poverty are also highly vulnerable due to a lack of financial resources to prepare for or respond to extreme heat conditions. According to the comments from community engagement efforts, many homes in San Carlos may lack air conditioning, and as a result, people living in these homes may be more susceptible to harm from extreme heat events. Community members also voiced concerns about a lack of cooling centers and the inability to cool homes or keep medications cooled if extreme heat events cause Public Safety Power Shutoffs (PSPS).

Energy delivery services and associated infrastructure are highly vulnerable to extreme heat, as high temperatures can stress and overload the grid, causing power outages and damage to the transmission lines. Additional vulnerabilities include outdoor recreation, as people may be deterred from recreating outdoors in high temperatures, and aquatic and wetland habitats, which can experience decreases in water quality as temperatures increase.

Inland Flooding

Inland flooding can cause significant harm to buildings, people, and infrastructure. Floodwater can be deep enough to drown people and may move fast enough to carry people or heavy objects (such as cars) away. Flooding can be caused by heavy rainfall, long periods of moderate rainfall, or clogged drains during periods of rainfall. In rare instances, a break in a water pipe or water tank can also cause flooding. Storm drainage systems throughout the city collect stormwater runoff and convey water to prevent flooding, although these systems are typically designed based on winter storms recorded in the past and may not be designed to accommodate more intense storms.

According to the *2016 San Mateo County Multijurisdictional Hazard Mitigation Plan¹⁶*, what is currently considered a 100-year flood, or a flood that has a 1-percent chance of occurring annually, may occur more often due to climate change. Figure 10 and Figure 11 show that the inland flood hazard areas are primarily located along the bayshore, Pulgas Creek, Cordilleras Creek, and Belmont Creek.

Several populations and assets face particularly high risks from flooding events. Persons experiencing homelessness, households in poverty, and linguistically isolated persons are severely vulnerable to flooding, as they may live in or near flood hazard areas, lack financial resources to protect their homes, or have difficulty receiving adequate evacuation notices because of language barriers. Persons with limited mobility and those without access to lifelines (persons without access to a car, transit, or communication systems) may have difficulty evacuating prior to a flooding event, and therefore are also highly vulnerable.



Transportation infrastructure, such as the San Carlos Airport, Caltrain station and line, electric vehicle charging stations, evacuation routes, and major roads and highways, which are essential for public transit access, solid waste removal, and other services, can be inundated, blocked, and damaged by floodwaters along the creeks.

Buildings and facilities on the east side of Highway 101, such as hazardous materials sites, commercial centers, and residential areas, are also highly vulnerable to flood events that can cause hazardous material release or cause mold and mildew to grow in buildings. Several major employers are on the east side of the city, and those who work or own businesses in the aviation museum, industrial or manufacturing, and other commercial centers may be negatively impacted by flood events. The wastewater treatment plants also lie within the 100-year flood zone, and therefore could be inundated and provide limited services during a flood event.

Human Health Hazards

Human health hazards are bacteria, viruses, parasites, and other organisms that can cause diseases and illness in people. Some of these diseases may only cause mild inconvenience, but others are potentially life threatening. These diseases can be and often are carried by animals such as mice and rats, ticks, and mosquitos. Warmer temperatures and high levels of precipitation can lead to increased populations of disease-carrying animals, creating a greater risk of disease and increased rates of infection. Other human health hazards can include poor air quality, including smoke from wildfires, which can affect respiratory systems of those exposed for prolonged periods.

Populations most vulnerable to human health hazards are those who spend a disproportionate amount of time outdoors (such as outdoor workers or persons experiencing homelessness), those with fragile immune systems or existing illnesses (which may include persons with chronic illnesses and seniors), and those who may live in sub-standard housing or not have access to health insurance and medical care (households in poverty, low-income households, undocumented persons). These persons may be living in conditions that increase their chances of catching vector-borne illnesses or lack the ability to fight off infections that may occur. Many populations may also not have access to air purification systems that can filter out harmful particulate matter.¹⁷

Emergency medical response services are also highly vulnerable to human health hazards, as they may not be able to provide adequate services if there is an influx of health-related emergencies.

Landslides and Debris Flows

Landslides occur when a hillside becomes unstable, causing soil and rocks to slide downslope. Landslides can include rock falls, deep failures of slopes, and shallow debris flows.¹⁸ Landslides are most common on steep slopes and hillsides made up of loose soil or other material where excavation and grading, drainage alterations, or changes in vegetation have occurred.¹⁹ The vulnerability assessment looks at landslides that are caused by precipitation, although earthquakes can also trigger landslides. Hillsides commonly absorb water, which increases instability of the

slope and may increase the risk of slope failure. Steep slopes made up of loose or fractured material are more likely to slide. In some cases, the hillsides can become so saturated that slope failures can result in a mudslide (a mixture of soil and water moving downslope). As shown in Figure 12, steeper slopes in the western part of the city are in high landslide susceptibility areas.

Landslides and mudslides can move fast enough to damage or destroy homes or other structures in their path, block roadways (including evacuation routes), and injure or kill people caught in them. The most vulnerable populations are those that may be unable to evacuate due to limited mobility, lack of access to a vehicle, or language barriers that may prevent awareness of emergency notifications. Those living on single-access roadways in the hilly western portion of the city or those living in less resilient housing may lose access to their homes if roadways or the structures are damaged or destroyed by a landslide. Infrastructure, such as natural gas pipelines and water or wastewater infrastructure, can break or malfunction if the soil supporting them fails. This can lead to disruptions in energy delivery and water or wastewater services.

Sea Level Rise and Bayshore Flooding

As global temperatures heat up, glaciers and other land ice near the north and south poles melt. The water flows into the ocean, increasing sea levels across the globe. Higher temperatures also cause water to expand in oceans, causing further rising of sea levels. Sea level rise is a gradual process, taking place over years or decades. In California, guidance²⁰ suggests that sea levels will increase in most places by 6 to 10 inches by 2030, 13 to 23 inches by 2050, and 41 to 83 inches by 2100.²¹ However, it is possible that sea levels could rise faster than these projections.²² Along the San Carlos bay shoreline, sea levels are projected²³ to rise approximately 24 inches by 2050 and 84 inches by 2100.²⁴

Eventually, sea level may increase enough to permanently flood low-lying areas in the eastern part of San Carlos along the bayshore. Sea level rise threatens important buildings and key pieces of infrastructure that support the main economic drivers in San Carlos, such as Highway 101, the San Carlos Airport, and the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City.²⁵ Homes and structures built above the increased sea level can still be harmed if the higher levels of water erode the rock or soil supporting the structures, potentially making them unsafe and at risk of collapse. This can cause bridges and roadways to become impassable, flood control infrastructure to not work effectively, and hazardous material facilities to increase the risk of accidentally releasing harmful substances. Natural systems, such as wetlands and tidal marshes, will be disrupted by higher tide levels. Many of the tidal marshes in eastern San Carlos are expected to convert to another habitat type, a process called “downshifting,” which will lead to different plant and animal species, and some features of wetlands may be altered or lost.^{26, 27}

Rising sea levels can also cause the bay shoreline to flood more frequently and severely. Because ocean levels are higher during normal conditions due to sea level rise, shoreline floods, such as king tides and storm surge, can reach further onto land. For example, a storm that has a 1 in 10 chance of occurring in a given year (known as a 10-year storm), can create a temporary increase in



sea levels of approximately 28 to 30 inches. This means that if sea levels rise by 24 inches during normal conditions, a 10-year storm event would create a temporary sea level rise of around 52 inches.²⁸ Bayshore flooding in 2050 is shown in Figure 10 and bayshore flooding in 2100 is shown in Figure 11. Higher sea levels can also give a “boost” to smaller floods that would not have been large enough to flood dry land during normal conditions, making shoreline flooding more frequent.

During strong storms and king tides, bay shoreline flooding may damage or destroy homes and commercial buildings in low-lying areas in eastern San Carlos; disrupt transportation routes, such as Highway 101, Industrial Road, Holly Street, Old County Road, and Brittan Avenue; and harm important economic assets, such as the Aviation Museum, industrial and manufacturing centers, biotechnology companies, and major employers. Essential infrastructure, such as the San Carlos Airport, bridges, electric vehicle charging stations, solid waste facilities, and water and wastewater infrastructure, may be frequently temporarily inundated, causing them and the community services they support to not function as needed.²⁹

Persons experiencing homelessness, without access to lifelines, or with limited income or access to resources, may be more likely to live in low-lying areas or less-resilient structures, and therefore are highly vulnerable to bayshore flooding.

Severe Weather

Severe storms include windstorms, hail, lightning, thunderstorms, and heavy rainfall. Severe weather is usually caused by intense storm systems, although types of strong winds can occur without a storm. The connection between climate change and severe storms is not as well established as other exposures, but new evidence suggests that severe storms may occur more often and become more intense than in the past.³⁰ Severe winds, which are winds over 50 to 60 miles per hour, but can reach up to 100 miles per hour in some areas, can damage or destroy buildings and infrastructure.³¹ Hail can damage buildings and plants (and in extreme cases injure people), and lightning can spark fires, injure people, or cause fatalities. Heavy rainfall, which is characterized by rainfall amounts that exceed normal levels, can lead to flooding in both the eastern and western portion of the city.³² Strong winds and heavy rainfall are the most common types of severe weather in the city.

The most vulnerable to severe weather are persons experiencing homelessness; those who may live in less structurally resilient buildings, such as households in poverty and undocumented persons; and those who may have difficulty preparing or responding to severe weather due to mobility or language barriers. These populations include linguistically isolated populations, persons living on single-access roads, persons with chronic illnesses, and seniors living alone.

The energy delivery system is especially vulnerable to windstorms, which can damage transmission lines or cause PSPSs. Windstorms can also damage warehouses that hold harmful materials and prevent people from traveling to work, which can harm important economic drivers within the city.

Wildfire

Wildfires are a regular feature of the landscape in much of California. They can be sparked by lightning, malfunctioning equipment, vehicle crashes, or many other causes. Warmer temperatures, an increase in drought conditions, and extreme wind events, are likely to create more fuel for fires in natural and rural areas, leading to a greater chance that a spark will grow into a potentially dangerous blaze. Climate change is also expected to extend the fire season throughout much (or even all) of the year. Figure 13 shows the fire hazard severity zones in San Carlos, which include very high fire hazard severity zones in the western part of the city. Because wildfires burn the trees and other vegetation that help stabilize a hillside and absorb water, more areas burned by fire may also lead to an increase in landslides and debris flows.

Wildfires expose people and property to flames, increasing the risk of injury, death, and property damage or destruction. Homes and schools are especially vulnerable, as many are located within the very high fire hazard severity zone, as shown on Figure 13.

The smoke from wildfires increases air pollution levels and creates a significant health risk in the region, particularly under weather conditions that prevent smoke from clearing, such as those during the lightning complex fires in 2020. Most of the populations within San Carlos are highly or severely vulnerable to wildfire and heavy smoke conditions. Planned PSPSs to prevent wildfires have already impacted persons who depend on electricity for air conditioning or their medically necessary equipment.

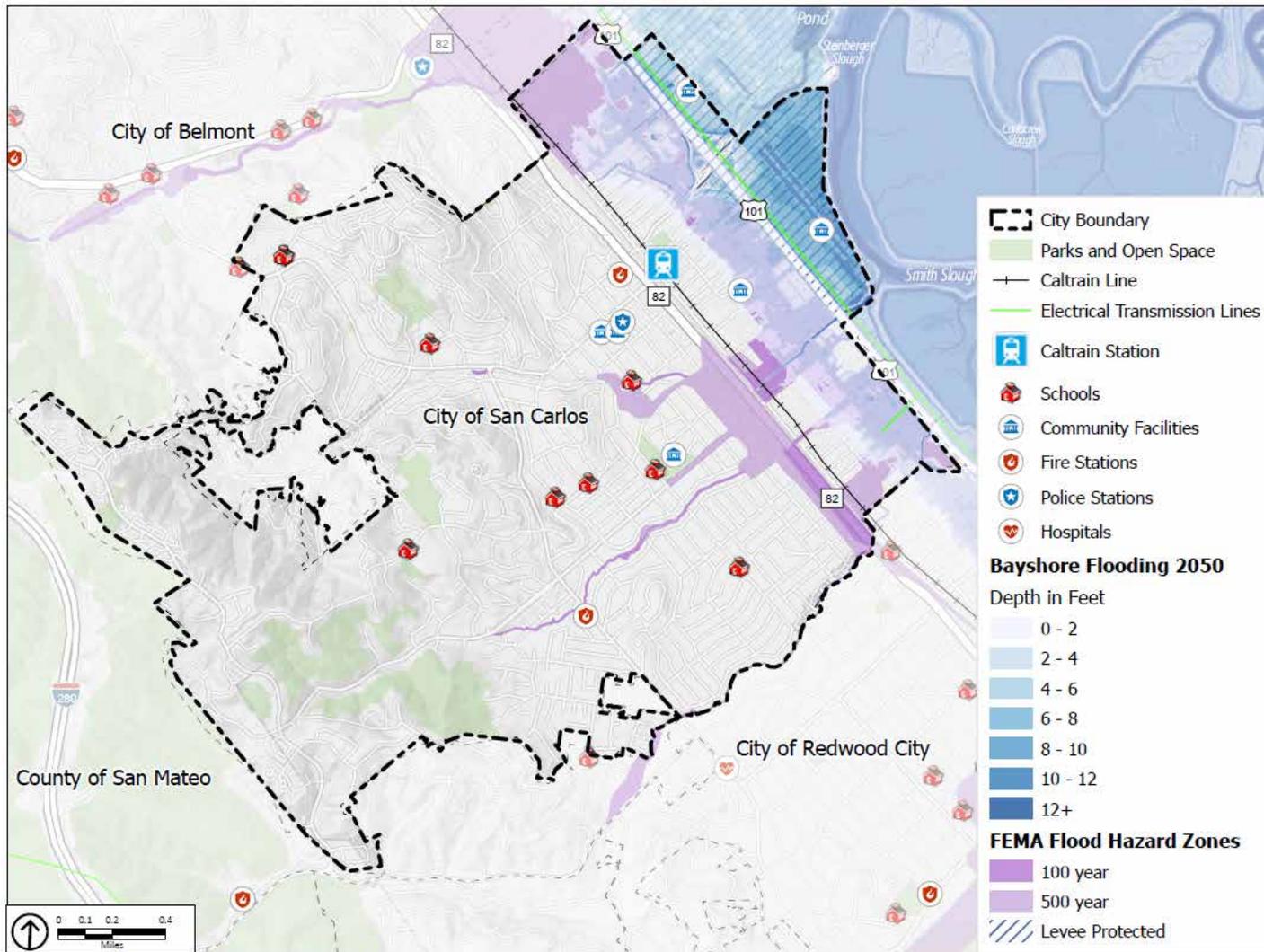
Essential roadways, such as evacuation routes and single-access roads, can be blocked by wildfire flames or debris, making it difficult for residents to evacuate and emergency personnel to reach certain areas of the city. The entire energy delivery system, including electric transmission lines and natural gas pipelines, can be damaged by wildfires.

Coastal scrub and oak woodlands, although somewhat adapted to wildfires, can be substantially harmed by more frequent and severe fires that do not let the ecosystems recover.

This chapter highlights the effects that failure to effectively reduce GHG emissions may have on the San Carlos community. Chapter 4 describes the efforts the City plans to make to mitigate these effects by reducing its own GHG emissions and Chapter 5 discusses strategies the City can use to adapt to changing climate conditions.



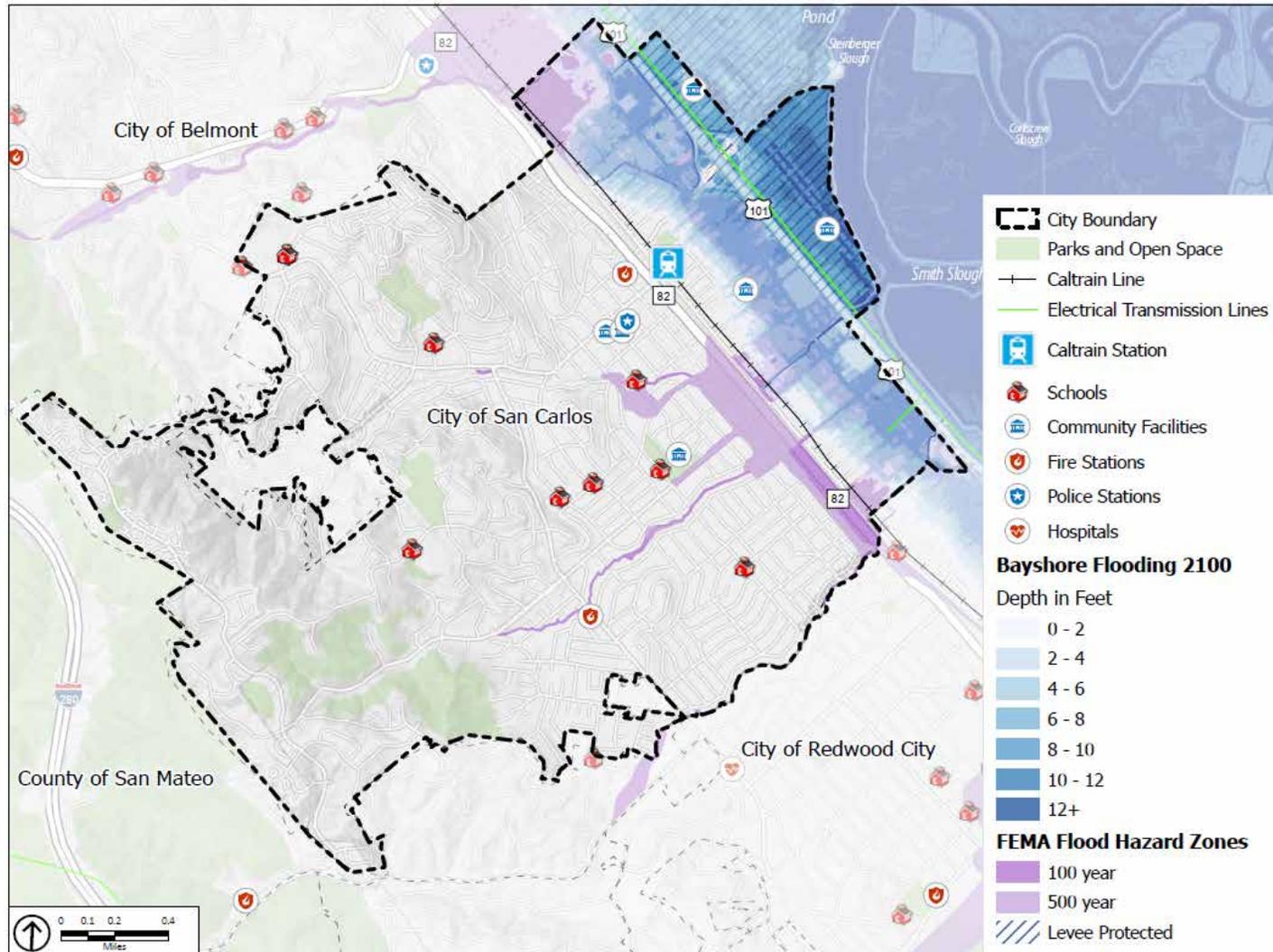
Figure 10. 2050 Bayshore Flooding and Inland Flooding



Source: San Francisco Bay Conservation and Development Commission, 2017; Federal Emergency Management Agency, 2018.



Figure 11. 2100 Sea Level Rise, Bayshore Flooding, and Inland Flooding



Source: San Francisco Bay Conservation and Development Commission, 2017; Federal Emergency Management Agency, 2018.



Figure 12. Landslide Susceptibility Areas

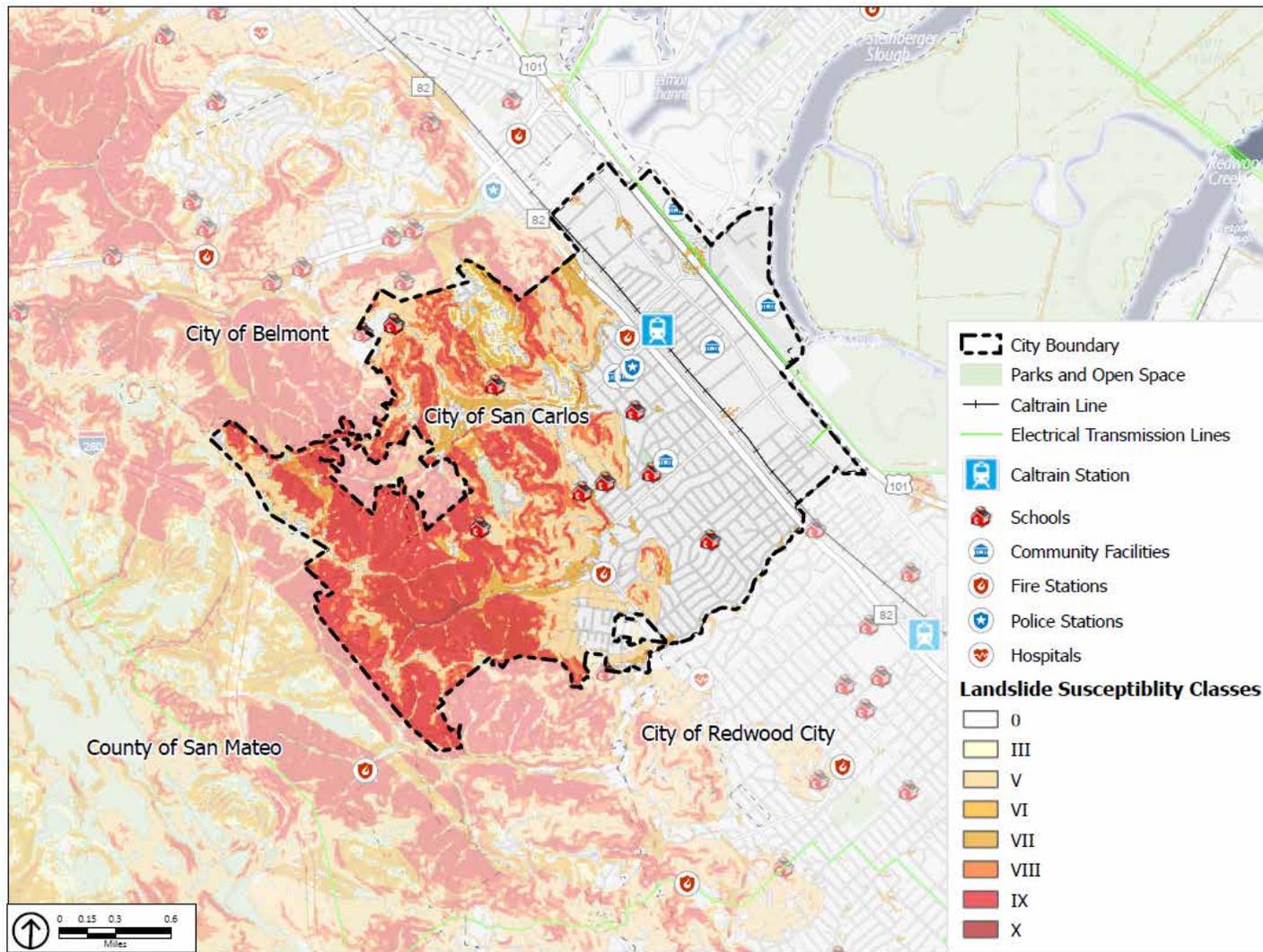
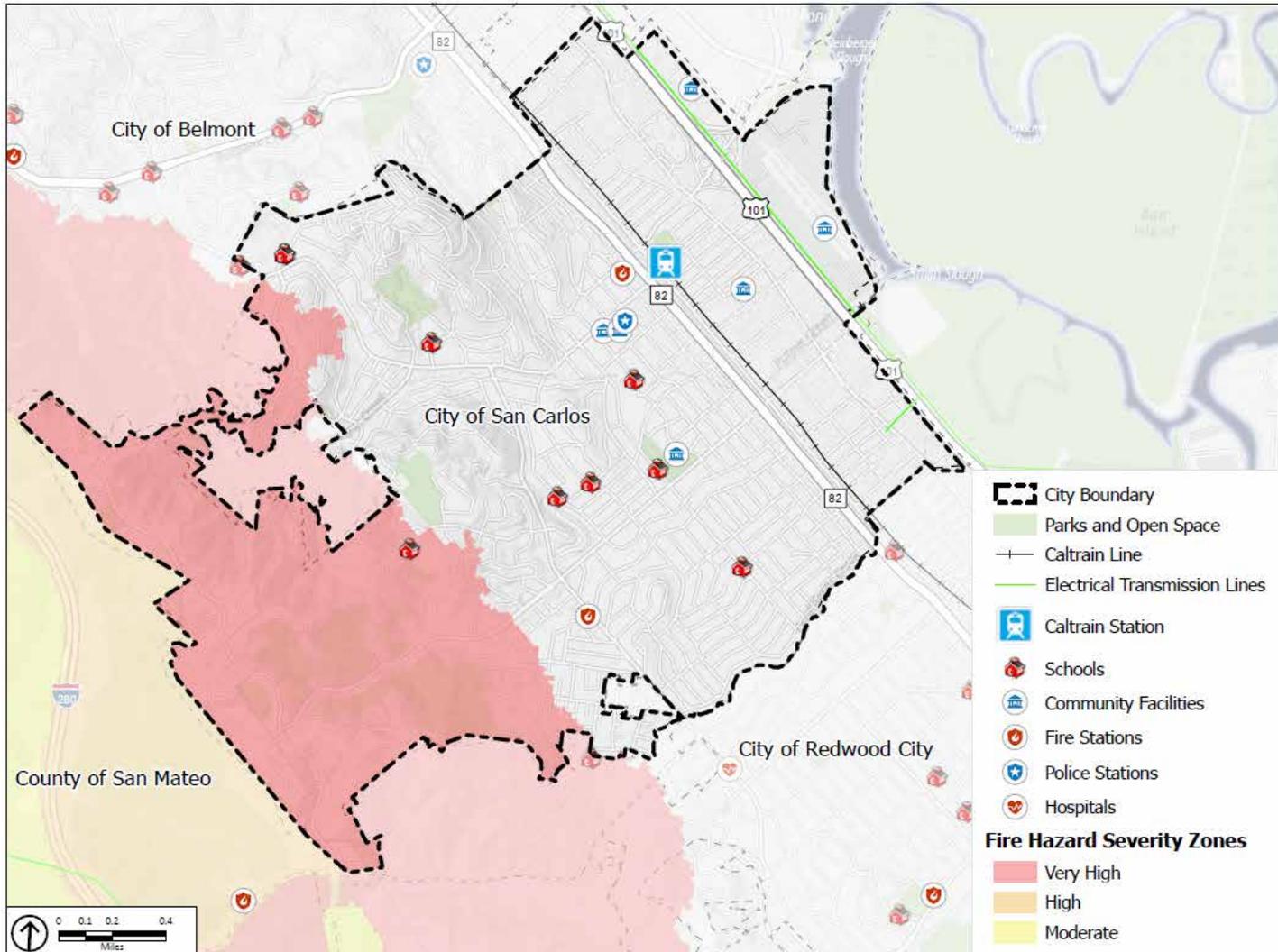




Figure 13. Fire Hazard Severity Zones



4. SAN CARLOS' GHG EMISSION REDUCTION PATHWAY

Background

To understand the level of action necessary to achieve the City's reduction targets, the CMAP analyzes existing, planned, and future actions. By first looking at past accomplishments, the City can understand progress achieved and outstanding opportunities while looking at state initiatives, which may result in further GHG reductions on a local level. Existing and current efforts provide a foundation for this CMAP. The GHG reductions from past and current activities help inform the creation of new GHG reduction strategies to reduce GHG emissions even further. These new strategies can further close the gap between projected GHG emission levels and the reduction targets, and guide development and implementation of future programs. Together, these efforts serve as the City's multipronged strategy to achieve reduction targets.

State Initiatives to Reduce GHG Emissions

California has adopted and committed to implementing policies to decrease GHG emissions statewide, including from several of the major GHG emission sectors present in San Carlos. Many of these policies are identified in California's Climate Change Scoping Plan, which was originally adopted in 2008 in response to the California Global Warming Solutions Act. As mentioned in the Regulatory Framework section in Chapter 1, the Scoping Plan outlines several regulatory and market-based solutions to achieving California's GHG emission-reduction goals. Successive updates to the Scoping Plan in 2014 and 2017 revised these state actions and identified additional opportunities for GHG emission reductions, as applicable.³³

While the Scoping Plan and related documents lay out several policies to reduce GHG emissions, the CMAP focuses on the strategies that have most direct and apparent benefits to San Carlos. This CMAP includes an assessment of San Carlos' community-wide local GHG emission-reduction benefits from these efforts, allowing the community to receive "credit" for the state's efforts. These efforts are:

- § The Renewables Portfolio Standard (RPS) that requires increases in renewable electricity supplies.
- § The Clean Car Standards that require increased fuel efficiency of on-road vehicles and decreased carbon intensity of vehicle fuels.
- § The updated Title 24 building energy-efficiency standards that require new buildings to achieve increased energy-efficiency targets.
- § The Low Carbon Fuel Standard (LCFS) that mandates reduced carbon intensity of fuels used in off-road equipment.
- § The Innovative Clean Transit Regulations, or zero-emission bus mandates, requiring public transit buses to reduce and ultimately eliminate tailpipe emissions.



Local and Regional Initiatives to Reduce GHG Emissions

The San Francisco Bay Area, and more specifically, the City of San Carlos, have been a long-term leader in GHG emission reductions. The City's 2009 CAP identifies early GHG emission-reduction activities, such as increasing housing density near transit, increasing overall waste diversion by at least 1 percent per year, and adopting a green building standard for new development and major remodels. Since the CAP was adopted, the City has continued to take action as a community and in partnership with regional agencies. Implementation of CAP and related climate action strategies between 2009 and 2018 is accounted for in the 2018 community GHG inventory. All existing and planned activities that have been implemented since 2018, or have increased participation since 2018, can be credited for additional GHG emissions reductions. This CMAP includes an assessment of San Carlos' local GHG emission-reduction benefits from these efforts, allowing the community to receive "credit" for its efforts. These efforts include:

- § Joining the PCE network to introduce renewable electricity supply to the community (including the ECO100 program).
- § Increasing solar capacity.
- § Promoting all-electric and zero-net energy (ZNE) buildings.
- § Adding additional public electric-vehicle charging stations.
- § Increased composting.
- § Completion of energy efficiency retrofits through the California First, BayREN, and HERO programs.
- § Electrification of Caltrain.
- § Retrofitting streetlights with LED bulbs.

Peninsula Clean Energy

A public agency created by San Carlos and other San Mateo County jurisdictions. It is the primary electricity supplier for the community. It provides energy from renewable sources at low rates. The default ECOplus program is 100% carbon free while the ECO100 program is both 100% carbon free and 100% renewable. Peninsula Clean Energy also provides programs to the communities it serves, targeting residences and businesses. These programs include financial incentives, such as rebates or reduced rates for electric vehicle purchases or energy retrofits.



Community-wide Existing and Planned Reduction Strategies

San Carlos' community-wide GHG emissions are partially reduced through a combination of state, regional, and local initiatives. Overall, state activities are projected to cause San Carlos' 2050 community-wide GHG emissions to be 6 percent above 2018 levels and 20 percent below 2005 levels. Table 13 shows the community-wide GHG emission reductions from state actions.





Table 13. San Carlos Community-wide GHG Emission Reductions from State Actions

	Related Sector	2005 MTCO _{2e}	2018 MTCO _{2e}	2020 MTCO _{2e}	2030 MTCO _{2e}	2050 MTCO _{2e}	Percentage Change 2005 to 2050
Forecasted emissions without state actions		212,590	160,230	171,240	222,580	239,560	13%
Reductions from RPS	Transportation	-	-	-120	-1,730	-19,650	-
Reductions from Clean Car standards	Transportation	-	-	-3,240	-25,380	-46,160	-
Reductions from Title 24	Transportation	-	-	-130	-2,130	-2,240	-
Reductions from LCFS (off-road only)	Off-road Equipment	-	-	-860	-1,580	-1,270	-
Reductions from Innovative Clean Transit Regulations	Transportation/ Rail	-	-	-0	-150	-50	-
Reductions from all state actions		-	-	-4,350	-30,970	-69,370	-
Emissions with state actions		212,590	160,230	166,890	191,610	170,190	-20%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Collectively, all existing and planned activities (state, regional, and local) are projected to reduce San Carlos’ 2050 GHG emissions approximately 20 percent below 2005 levels, although 2050 emissions are projected to remain approximately 1 percent above 2018 levels. Table 14 shows the GHG emission reductions from these existing and planned local activities. Benefits from local and regional efforts are only shown if they will reduce GHG emissions beyond the level achieved by state efforts. Note that Table 14 does not reflect emissions reductions which are expected to occur due to implementation of the Reach Code adopted in early 2021. The calculations below were conducted prior to the adoption of the Reach Code by the San Carlos City Council; therefore, the Reach Code is not considered an existing action in this CMAP. Including the Reach Code as a stand-alone strategy ensures the City can implement and update the Reach Code to support the City’s GHG reduction goals. Details about the Reach Code, including implementation details and recommended associated actions, are provided under Strategy 5 in this chapter and in Chapter 6.



Table 14. San Carlos Community-wide GHG Emission Reductions from Existing and Planned Local and Regional Activities, 2005 to 2050

	Related Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Forecasted emissions with state actions		212,590	160,230	166,890	191,610	170,190	-20%
Peninsula Clean Energy *	Energy	—	—	-6,970	-12,390	0	—
New solar capacity	Energy	—	—	-60	Less than 10	0	—
All-electric and ZNE buildings	Energy	—	—	10	10	10	—
Public EV charging stations	Transportation	—	—	-150	-130	-110	—
Increased composting	Solid Waste	—	—	-210	-210	-210	—
Energy efficiency retrofits (California First, BayREN, and HERO)	Energy	—	—	-10	Less than 10	Less than 10	—
Caltrain electrification	Rail			0	-950	-1,360	
Peninsula Clean Energy ECO 100 **	Energy			-130	-130	0	
Streetlight LED retrofits***	Energy			0	0	0	
Reductions from all local and regional actions		—	—	-7,540	-14,360	-1,690	—
Forecasted emissions with all existing and planned actions		212,590	160,230	159,500	177,380	168,500	-21%

Table Notes: This is a list of the local and regional efforts with clearly quantifiable metrics that have been newly enacted or have increased implementation since 2009. All actions taken in 2018 or earlier are included in the inventory and therefore are already built into the forecast. Other actions may not have clearly quantifiable metrics, but still contribute toward community-wide GHG emission reductions.

* Reductions from PCE are in addition to reductions achieved by RPS and Title 24, as shown in Table 13. Note that PCE's 2050 GHG emissions is zero due to the state's RPS mandate that all electricity in California be carbon free by 2045. All reductions are included in the RPS row in Table 13, as there are now additional reductions that PCE may achieve.

** To avoid double-counting with the Peninsula Clean Energy item, these emissions reductions are not counted as part of the total.

***Reductions from Streetlight LED retrofits are at zero because all City accounts use PCE ECO100 electricity, which does not release GHG emissions.

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Residential Energy

GHG emissions from the residential energy sector are broken down into emissions from electricity and natural gas use. As shown in Table 15, emissions from residential electricity are anticipated to decrease by 100 percent by 2050, due to the requirement that electricity in California be carbon-free by 2045. Electricity-related emissions are also expected to decline in the shorter term, largely due to an increase in renewable energy supplies through PCE and PG&E, along with new solar installations, energy efficiency retrofits, and LED streetlight retrofits. Residential natural gas is anticipated to increase by approximately 7 percent between 2005 and 2050 as a result of an increase in population, without factoring in amendments to the San Carlos Building Code that require most new buildings not to use natural gas. Overall, emissions from the residential energy sector are anticipated to decrease by a total of 29 percent.

BayREN

The Bay Area Regional Energy Network (BayREN) is a collaborative effort with all nine Bay Area counties, led by the Association of Bay Area Governments that provides energy-efficiency programs, services, and resources. BayREN provides programs for single-family, multi-family, and business developments, which include financial incentives and rebates, tools to evaluate energy efficiency of existing structures, and education and training. BayREN also works with local Bay Area municipalities through a range of technical resources and services to enhance local action on climate change and reduction of GHG emissions.

Table 15. Residential Energy Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Residential electricity	16,190	4,050	1,610	120	—	-100%
Residential natural gas	32,840	29,170	29,470	33,010	35,060	7%
Total Emissions	49,030	33,220	31,080	33,130	35,040	-29%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Quick Facts:

- Residential electricity use fell 13 percent from 2005 to 2018.
- PCE provided 91 percent of all of San Carlos’ electricity in 2018, including 97 percent of household electricity use.
- BayREN and PCE offer a range of incentives and support for energy efficiency and electrification.
- Residential natural gas use has decreased 11 percent since 2005.

Non-residential Energy

GHG emissions from the non-residential energy sector are broken down into emissions from electricity and natural gas use. As shown in Table 16, emissions from non-residential electricity are anticipated to decrease by 100 percent due to an increase in renewable energy supplies through PCE and PG&E, along with new solar capacity and energy-efficient retrofits. Non-residential natural gas is anticipated to increase by 83 percent between 2005 and 2050, largely because of an increase in jobs. Overall, GHG emissions for the non-residential energy sector are anticipated to decrease by 39 percent.

SunShares Program

The SunShares program works to provide clean energy options through discounts on residential solar installation, discounts on battery storage, and provides

Table 16. Non-residential Energy Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Non-residential electricity	34,550	8,640	5,130	1,940	—	-100%
Non-residential natural gas	17,260	16,660	20,030	29,080	31,670	83%
Total Emissions	51,810	25,300	25,160	31,020	31,670	-39%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.





Quick Facts:

- Non-residential electricity use dropped 31 percent from 2005 to 2018.
- The San Mateo Green Business Program encourages businesses to operate in an environmentally sustainable manner.
- San Carlos participates in the Bay Area SunShares program, which provides discounts for rooftop solar systems.
- Non-residential natural gas use has decreased 3 percent since 2005.

EV Ready Program

PCE's EV Ready Program is a \$28 million electric-vehicle charging infrastructure program seeking to install 3,500 charging ports in San Mateo County. The program includes free technical assistance to help design and guide infrastructure implementation, access to negotiated electric-vehicle charging station pricing, and access to trained contractors to install the infrastructure.

Transportation and Rail

As shown in Table 17, GHG emissions from the transportation and rail sectors are anticipated to decrease by 24 and 69 percent, respectively. Overall, GHG emissions for the transportation and rail sectors are anticipated to decrease by 24 percent. Many state-led activities contribute to this decrease, including clean car standards and clean transit regulations. Local and regional programs that reduce GHG emissions in the transportation and rail sectors largely revolve around electrification of the Caltrain system and installing electric-vehicle charging infrastructure.

Table 17. Transportation and Rail Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Transportation	87,420	75,120	77,570	75,560	66,300	-24%
Rail	—	1,140	1,230	590	350	-69%
Total Emissions	87,420	76,260	78,800	76,150	66,650	-24%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Quick Facts:

- There was a 4 percent increase in total vehicle miles traveled in San Carlos from 2005 to 2018, but increased adoption of fuel-efficient and electric vehicles helped decrease emissions from transportation by 14 percent.
- The San Carlos Bicycle and Pedestrian Master Plan provides goals for reducing VMT and increasing safety of active transportation within the community.
- Electric-vehicle charging stations have been added in several locations, including at Wheeler Plaza and in the library parking garage.

Off-road Equipment and Stationary Sources

As shown in Table 18, GHG emissions from the off-road equipment sector is anticipated to increase by 27 percent while GHG emissions from the stationary source sector are anticipated to remain the same, collectively increasing the combined emissions for these sectors by 28 percent. There are few existing state, local, or regional actions that reduce GHG emissions from these sectors, apart from the LCFS off-road state program.

Table 18. Off-road Equipment and Rail Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO _{2e}	2018 MTCO _{2e}	2020 MTCO _{2e}	2030 MTCO _{2e}	2050 MTCO _{2e}	Percentage Change 2005 to 2050
Off-road equipment	11,170	12,540	10,640	19,760	16,100	44%
Stationary sources	—	—	70	70	70	0%
Total Emissions	11,170	12,540	10,710	19,830	16,170	44%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Solid Waste

As shown in Table 19, GHG emissions from the solid waste sector are anticipated to increase by 35 percent between 2005 and 2050, due to an increase in population and jobs. An increase in local and regional composting programs is anticipated to help slow this increase in GHG emissions from solid waste.



Table 19. Solid Waste Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Solid waste	13,520	12,290	13,040	16,350	18,220	35%

Quick Fact:

- In 2018, San Carlans disposed of 7 percent less solid waste than in 2005, largely because of an increase in recycling and composting.

Water and Wastewater

As shown in Table 20, GHG emissions from the water and wastewater sector are anticipated to increase by 11 percent between 2005 and 2050. Although water use will increase as the population and number of jobs in San Carlos does, the electricity used to transport the water will increasingly be supplied from renewable sources, helping to control the increase in GHG emissions.

Table 20. Water and Wastewater Sector GHG Emissions with Existing and Planned Activities

Sector	2005 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Water and wastewater	—	980	1,050	1,240	1,090	11%

Quick Facts:

- San Carlos community members reduced their water use by approximately 80 million gallons between 2010 and 2018.
- Lower water use, more efficient infrastructure, and increases in renewable energy helped decrease water-related emissions 16 percent between 2005 and 2018.
- Emissions from direct wastewater (gases released from decomposing wastewater) increased by 5 percent between 2005 and 2018.



City Operations Existing and Planned Reduction Strategies

As discussed in the previous community-wide section, California has adopted and committed to implementing policies to decrease GHG emission levels statewide, including from several of the major GHG emission sources in San Carlos. Similar to the community-wide inventory, the CMAP includes an assessment of San Carlos' City operations GHG emission-reduction benefits from these efforts, allowing the City to receive "credit" for the state's efforts. These efforts are the RPS and the Clean Car Standards. As the City is not currently planning to construct new facilities, the specific fuel use from City off-road equipment is not known, and the City does not operate public transit buses, there are no GHG emission reductions associated with Title 24, LCFS, or the Innovative Clean Transit Regulations.

The City of San Carlos transitioned to PCE's ECO100 program in 2016, meaning all electricity at the City's buildings and facilities are carbon free and 100% renewable!

Overall, these state activities are projected to decrease San Carlos' City operations GHG emissions by 2050 by 11 percent relative to 2018 levels and by 35 percent relative to 2015 levels. Table 21 shows the GHG emission reductions from state actions.

As with community GHG emission-reduction efforts, the City's 2009 CAP identifies early GHG emission-reduction activities for municipal activities. Since the CAP was adopted, the City has continued to act to reduce its municipal GHG emissions, such as receiving all of its electricity from renewable sources through PCE's ECO100 program. All existing and planned activities implemented since 2018, or which have increased participation since 2018, can be credited for additional GHG emissions reductions.

Collectively, all existing and planned activities (state, regional, and local) are projected to reduce San Carlos' 2050 City operations GHG emissions 35 percent below 2005 levels, or 11 percent below 2018 levels. Table 22 shows the GHG emission reductions from these existing and planned local activities. Benefits from local and regional efforts are only shown if they will reduce GHG emissions beyond the level achieved by state efforts.

Table 21. San Carlos City Operations GHG Emission Reductions
from State Activities, 2015 to 2050

	2015 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2015 to 2050
Forecasted emissions without state actions	1,470	1,080	1,080	1,140	1,230	-16%
Reductions from RPS	-	-	-	-20	-140	-
Reductions from Clean Car standards for employee commutes	-	-	-10	-20	-40	-
Reductions from Clean Car standards for City fleet	-	-	-10	-60	-90	-
Reductions from all state actions	-	-	-20	-100	-270	-
Emissions with state actions	1,470	1,080	1,060	1,040	960	-35%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Table 22. San Carlos City Operations GHG Emission Reductions from Existing and Planned Local and Regional Activities, 2015 to 2050

	2015 MTCO ₂ e	2018 MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2015 to 2050
Forecasted emissions with state actions	1,470	1,080	1,060	1,040	960	-35%
Peninsula Clean Energy ECO 100	—	—	-130	-130	—	—
Streetlight LED retrofits	—	—	—	—	—	—
Reductions from all local and regional actions	—	—	-130	-130	—	—
Forecasted emissions with all existing and planned actions	1,470	1,080	950	920	960	-35%

Table Notes:

Reductions from PCE are in addition to reductions achieved by RPS and Title 24, as shown in Table 13. All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

New Reduction Strategies

A central goal of the CMAP is to achieve additional GHG reductions to work toward the City's 2030 and 2050 reduction targets, recognizing that the reduction strategies in the 2009 CAP are insufficient to meet these reductions. To identify these additional reductions, the CMAP project team began with the GHG reduction strategies in the City's 2009 CAP. Some of these strategies have been fully implemented and do not need to be carried forward into the CMAP. Others are still applicable and can be revised or expanded to achieve additional GHG reductions. There are also opportunities to add entirely new strategies to address new and emerging issues not covered in the 2009 CAP.

The project team based the revised and new GHG reduction strategies on several sources, including:

- § The San Carlos inventories and forecast.
- § The existing and planned state, regional, and local accomplishments.
- § Discussions with City staff to identify past successes and challenges, plans and opportunities, and goals and priorities related to GHG reduction efforts.
- § Conversations and feedback from community stakeholders, partner agencies, and local organizations.
- § Input, feedback, and direction from several City advisory bodies and the City Council.
- § Comments and results from various community outreach techniques, including community workshops and online surveys.

Calculating Credit

This CMAP uses a process called quantification to determine the amount of GHG emissions reduced by each strategy. The foundation for the quantification calculations is the baseline GHG inventories and forecast. Activity data from the inventory, such as VMT or kWh, are combined with participation rates and data about the reduction in activity data from each action to calculate the GHG reduction benefit of each strategy. This approach ensures that the GHG reductions from San Carlos' CMAP strategies are tied to current and future activities that are actually occurring in the community.

Calculations for reduction in activity data come from tools and reports provided by government agencies; these agencies include the United States Environmental Protection Agency, the California Energy Commission, CARB, the California Air Pollution Control Officers Association, the United States Department of Energy, and local air districts. If accurate data are not available through these sources, the quantification uses case studies from comparable communities and applicable scholarly research.



The project team was able to identify GHG reductions for most of the strategies in this CMAP. However, there are a few that do not have a specific reduction level due to missing data or the lack of a reliable method. These efforts are still expected to reduce GHG emissions, but the level cannot be accurately determined. These strategies are labeled as “supportive”.

Renewable Energy Emissions Reductions in 2050

Strategies that only reduce electricity use or increase renewable electricity supplies will show zero GHG reductions in 2050. This is because all electricity sold in California must be carbon-free by 2045, as required by the state’s RPS. Since there will already be no emissions from electricity use in 2050, San Carlos cannot count additional reductions associated with electricity in this year. This CMAP already credits reductions from the RPS as an existing state program.

Local renewable energy systems and energy-efficiency strategies will continue to provide several co-benefits to the community, including lower electricity bills and increased resiliency against power disruptions, even if there are no measurable additional GHG reductions.

GHG Reduction Strategies

Based on the results of this process, the project team identified 33 GHG reduction strategies to include in the CMAP. These strategies include a mix of education and outreach programs to encourage GHG reduction activities, financial subsidies, and other enticements to incentivize GHG reductions, and mandates to require GHG efforts. These 33 strategies are organized into five sectors (energy, transportation and land use, off-road, waste, and water and wastewater) and eight goals:

1. Reduce energy use.
2. Transition to carbon-free energy sources.
3. Promote energy resilience.
4. Promote sustainable development that reduces VMT.
5. Transition to low-carbon transportation.
6. Support pollution-free outdoor equipment.
7. Become a zero-waste community.
8. Reduce community-wide water use.

Each strategy entry includes a description, the anticipated 2030 and 2050 GHG reductions achieved by the strategy at the projected performance level, and the recommended actions necessary to implement it. Each strategy entry also identifies the co-benefits of the strategy, which are advantages provided by the strategy beyond GHG reduction.

The 12 co-benefits are listed below, along with the number of CMAP strategies each co-benefit supports:



Conserves Resources
Supports 14 strategies



Enhances Local Economy
Supports 7 strategies



Enhances Mobility System
Supports 11 strategies



Improves Public Health
Supports 19 strategies



Improvement in Local Air Quality
Supports 12 strategies



Improves Quality of Life
Supports 14 strategies



Promotes Community Partnerships
Supports 31 strategies



Promotes Cost Savings
Supports 13 strategies



Promotes Equity
Supports 21 strategies



Provides Education
Supports 22 strategies



Supports New Technology
Supports 13 strategies



Supports Community Resiliency
Supports 14 strategies



Energy Sector

Goal 1: Reduce energy use

Electricity and natural gas are used to heat, cool, and light buildings, as well as to operate appliances and machinery. As the population in California rises, so does the demand on these energy supplies. State, regional, and local policy attempts to address this increase in demand in a phased approach, starting with reducing overall energy demand. Such decreases in demand can occur through retrofitting existing structures to increase energy efficiency or replacing appliances with more efficient or all-electric models. Policies then go a step further to ensure that the energy produced to meet demand are originating from clean and/or renewable sources, such as from solar, wind, or water. The strategies in this goal are designed to encourage the reduction of overall energy use in homes and non-residential buildings.

Strategy 1: Regional Energy Conservation and Efficiency Programs. Promote available energy efficiency and conservation opportunities, incentives, and technical assistance for businesses and residents.

	2030	2050
GHG Reduction (MTCO _{2e})	5,360	11,600

- § Assist businesses, schools, and non-profit organizations in accessing energy-efficiency programs, trade professionals, and financing opportunities by working with San Mateo County Energy Watch.
- § Conduct outreach to small business owners by partnering with the San Mateo County's Small Business Resources Center.
- § Expand energy saving opportunities and assistance for large and small commercial and industrial businesses by working with San Mateo County Energy Watch, PCE, and BayREN.
- § Expand the distribution of free or subsidized energy and water efficiency and conservation toolkits, devices, and services to residents and businesses citywide through existing opportunities, such as the lending programs offered by the San Carlos Library, San Mateo Energy Watch, or local non-profit organizations.

The Small Business Resources Center offers a wide variety of services for present and potential small business owners, including advising, training, information resources, events, and seminars.





- § Expand and better integrate funding and support for existing programs that support weatherization and increase energy efficiency in low-income households, including through partnerships with BayREN, PCE, and San Mateo County.
- § Encourage single-family homeowners to improve energy efficiency and resiliency in their homes by promoting Property Assessed Clean Energy programs, the BayREN Home+ program, BayREN Earth Day Workshops, Green House Calls, Home Energy Score evaluations, and appliance and electrification rebates.
- § Assess energy efficiency in single-family homes by partnering with San Mateo County, PCE, and other partners to promote the BayREN Green Labeling Home Energy Score program.
- § Provide incentives for installation of all-electric appliances in new residential construction and remodels by partnering with PCE and BayREN.
- § Assist San Mateo County staff, PCE, and other partners with their outreach campaigns, including, but not limited to, hosting workshops, promoting programs through City communication channels, promoting programs through interactions with homeowners and contractors, and sharing permitting data to inform targeted outreach.
- § Engage with tenants and owners of multi-family homes and promote the BayREN multi-family program.
- § Support BayREN and San Mateo County efforts to conduct outreach and education with local contractors to ensure they are updated on local code requirements and energy-efficient appliances and devices.
- § If annual reporting and monitoring shows the City is not on track to reduce community-wide energy use as needed to meet its 2030 GHG reduction target, research, develop, and adopt a Building

BayREN Programs

The Home+ program gets homeowners in touch with a Home Energy Advisor who provides advice on how to increase energy efficiency in their homes, in touch with contractors, and provides rebate and energy improvement information to ease the process.

The Green Labeling (Home Energy Score) program allows homeowners to better understand the energy efficiency in their homes on a scale of 1 to 10 and provides a report with customized recommendations for energy-efficiency upgrades.

The Water Upgrades \$ave program is designed to promote water conservation and energy efficiency in homes.

BayREN ZNE Technical Assistance program provides free engineering technical assistance to help local governments save energy and money while reducing their carbon footprints through retrofitting and constructing buildings to meet zero-net-energy goals.





Efficiency Program that would go into effect in 2025 and require owners of commercial, industrial, and residential buildings 10,000 square feet or larger to prepare an annual energy and water benchmarking report and submit it to the City, to help community awareness of building performance and identify opportunities for energy- and water-efficiency retrofits.

§ Research, consider, and implement an incentive program to encourage community members to reduce energy consumption.



Promotes Community Partnerships



Promotes Cost Savings



Promotes Equity



Provides Education



Supports New Technology





Strategy 2: K-12 Energy Conservation and Efficiency Education. Support San Mateo County’s Environmental Literacy and Sustainability Initiative and Peninsula Clean Energy’s K-12 energy educational resources in the San Carlos School District and county-wide.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Promote PCE’s educational resources to students and parents each year and encourage community educators to incorporate clean energy and climate change discussions into their curriculum, including the Electric Eco Hero Student Activity Packet by partnering with PCE and school districts.
- § Use City newsletters to spotlight community members, including K-12 teachers and students, who are working on climate change or sustainability and who are making a difference in the community.
- § Increase energy educational resources in the San Carlos School District and Sequoia Union High School District by working with the San Mateo County Office of Education.
- § Promote the San Mateo County Office of Education’s Youth Climate Leadership Ambassadors program, as well as climate leadership fellowship programs for teachers, school administrators, and facilities managers.



Promotes Community Partnerships



Provides Education





Strategy 3: City Facilities. Ensure energy conservation and efficiency in City buildings and facilities.

	2030	2050
GHG Reduction (MTCO ₂ e)	20	40

- § Initiate regular audits of existing City buildings and facilities to identify opportunities for energy conservation and efficiency upgrades or retrofits.
- § By 2022, develop a capital project list and funding strategy to complete energy-efficiency projects.
- § Add projects to the City’s Capital Improvement Program annually.
- § Request funding through the City’s budget process or as needed.
- § Complete energy-efficiency capital projects on the list with support from San Mateo County, PCE, the BayREN ZNE Technical Assistance program, and other partners, as appropriate.



**Enhances Local
Economy**



Promotes Cost Savings



**Supports New
Technology**



Goal 2: Transition to carbon-free energy sources

Most buildings, both residential and non-residential, use electricity and natural gas to operate appliances and other pieces of equipment. While sources of electricity have become much cleaner over time and will continue to become cleaner under state law and utility policies, the GHG emissions associated with using a unit of natural gas has remained constant, as natural gas is a fossil fuel and cannot become a cleaner energy source. Buildings that receive most or all their energy from electricity instead of natural gas can significantly reduce their GHG emissions as a result, especially if most or all of the electricity comes from renewable or other carbon-free sources. Buildings can be constructed to be mostly or all-electric, or existing buildings can be electrified as part of retrofit activities. Advances in electric appliances, such as those used for space heating, water heating, and cooking, have helped make building electrification easier and more cost effective. The strategies in this goal are geared towards increasing the use of electric appliances and devices over natural gas-fueled appliances and devices.

All-electric buildings create cost savings for property owners and tenants. An all-electric single-family home in San Carlos will save residents approximately \$4,100 over the home’s lifetime compared to a mixed-fuel home, when considering the different costs of energy at different times of use. When combined with high-efficiency appliances and solar panels, the savings are even greater, estimated at approximately \$9,870 over the home’s lifetime. Similarly, multi-family all-electric units save approximately \$1,860 compared to a mixed-fuel unit, and those savings increase to \$4,260 when using high-efficiency appliances and solar panels. Non-residential buildings, including offices, retail space, and hotels, also save money when constructed to be all-electric. State law requires that communities like San Carlos show that all-electric requirements and other standards for new buildings are cost-effective.

Strategy 4: Electrification. Transition to electricity as the primary energy source citywide.

	2030	2050
GHG Reduction (MTCO _{2e})	4,710	31,770

- § Identify and remove existing code, permitting, or other City requirements that present barriers to all-electric conversions of existing homes and businesses and consider incentives, such as permit streamlining or fee reductions, as feasible.
- § Support targeted outreach efforts to owners of older properties (1975 or older) to support their electrification transition by working with San Mateo County Energy Watch to ensure they are aware of opportunities, incentives, and resources available to them.
- § Encourage electrification retrofits in residential and commercial development by promoting financing programs through local organizations and agencies.





- § Promote building electrification and retrofitting by working with local organizations and agencies to increase community awareness.
- § Research and consider implementing an incentive program to encourage community members to transition to carbon-free energy sources.
- § Promote and support opportunities for residents to test electric equipment, such as portable induction cooktops, to encourage transitioning from gas to electric appliances.
- § Replace gas appliances in City facilities with electric models upon burnout of such devices, as feasible.

San Carlos Green, a local environmental group, hosts a program that loans induction cooktop and associated accessories to interested persons, with the goal of increasing the adoption of non-gas cooking appliances!



Enhances Local Economy



Improves Public Health



Promotes Community Partnerships



Promotes Cost Savings



Promotes Equity



Provides Education



Supports New Technology





Strategy 5: Building Codes. Advance electrification through local amendments to the California Building Code.

	2030	2050
GHG Reduction (MTCO _{2e})	11,300	6,440

- § Partner with local industry organizations, community-based organizations, and regional partners to inform and educate community members about the 2021 All-Electric Reach Code requirements and community benefits.
- § Evaluate, update, and re-adopt as needed an all-electric reach code upon each update to the California Building Code.
- § Explore and adopt, as feasible, local building code amendments requiring replacement of natural gas space and water heaters with electric models at end of life during the 2022 and successive Buildings Standards Code updates.
- § If San Carlos is not on the trajectory to meet its 2030 GHG reduction target by 2025, identify and consider enacting requirements to further reduce natural gas use in existing buildings.



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Strategy 6: Rooftop Solar. Continue to support and increase participation in rooftop and onsite solar energy systems in the community and at City facilities.

	2030	2050
GHG Reduction (MTCO ₂ e)	10	0

- § Continue to participate in the SunShares program to increase rooftop and onsite solar energy systems in the community and at City facilities.
- § Conduct community outreach and education to increase awareness of the benefits of installing solar.
- § Continually update the City’s Solar Permitting website to ensure materials are up to date and include all necessary information.
- § Create an inventory of City buildings and facilities to assess the feasibility of placing solar on each building and facility, including their Sun Score, the size of installation each could hold, and preservation of existing tree canopies.



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Savings**



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Strategy 7: Peninsula Clean Energy. Continue to support and promote PCE as the community’s official electricity provider with a goal to provide 100 percent carbon-free, renewable energy by 2025.

	2030	2050
GHG Reduction (MTCO ₂ e)	30	0

- § Encourage residents and businesses, especially large energy users, to opt into PCE’s ECO100 (100 percent renewable energy) program.
- § Encourage those not purchasing energy from PCE to do so.
- § Partner with PCE on programs it develops in the future that benefit the San Carlos community.



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Goal 3: Promote energy resilience

Regardless of where or how electricity is generated, it is transmitted to communities through a set of transmission lines and supporting infrastructure, collectively called the grid. Electricity in San Carlos is transmitted to customers through transmission lines owned by PG&E. As seen in recent years, the reliability of the power grid is decreasing due to aging infrastructure and service interruptions caused either by climate hazard events, such as wildfires, or caused intentionally through PSPS events. Unreliability in the grid system can be harmful for some populations, including those that rely on life-saving devices in their homes or during days of extreme heat when air conditioning in the home is critical for vulnerable populations. The strategies here are meant to increase the reliability of energy supply either through creating backup sources of clean energy in homes and businesses, or through clear public outreach.

Strategy 8: Battery Storage. Promote installation of small-scale onsite battery energy storage systems for existing and new development, including City facilities.

	2030	2050
GHG Reduction (MTCO ₂ e)	20	0

- § Explore opportunities to provide financial incentives to residents and business owners purchasing small-scale onsite battery energy storage systems for existing development by partnering with PCE and other community partners.
- § Continue to participate in the SunShares bulk buying program to take advantage of financial assistance to purchase onsite battery storage systems.
- § Work with PG&E on its efforts to prepare the community for power outages through battery storage programs and incentives, including the Self-Generation Incentive Program and related energy resilience efforts.



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Strategy 9: Grid Reliability. Explore opportunities to partner with PG&E and PCE to improve electrical grid reliability during PSPS events and other emergencies.

	2030	2050
GHG Reduction (MTCO _{2e})	Supportive	Supportive

- § Provide alternative electricity options at designated community resource centers during planned PSPS events by working with PG&E.
- § Install back-up power sources at key community facilities prioritizing solar panels, battery storage, and microgrid systems where feasible, with fossil-fuel generators being used only as a last resort.
- § Support efforts to reduce state and local regulatory barriers to microgrids.



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Improves Public Health



Promotes Community Partnerships



Promotes Equity



Supports Community Resiliency



Supports New Technology



Strategy 10: PSPS Response. Ensure the community is prepared during times of PSPS events and other emergencies.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Maintain the Public Safety Power Shutoff Community Guide on the City’s website to inform residents and businesses how to prepare and navigate possible PSPSs and other disaster-related power outages.
- § Encourage City partners to provide batteries to individuals that rely on life-sustaining medical equipment and medications that require refrigeration that can be negatively impacted by PSPSs by coordinating with PG&E, PCE, and the Center of Independence of Individuals with Disabilities.
- § Use San Mateo County Alert (SMC Alert) and social media to notify people of pending PSPS events.
- § Use the City’s Zero-Power Communications Program to ensure those without power receive regular updates from the City during a power outage.



Improves Quality of Life



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Supports Community Resiliency



Transportation and Land Use Sector

Goal 4: Promote sustainable development that reduces vehicle miles traveled.

The private automobile has long dominated San Carlos' transportation landscape, as in much of the United States. While convenient for some, private vehicle travel releases significant volumes of GHGs, taxes roads, and poses health and safety concerns for the community. Diversifying the safe, affordable, accessible, and reliable transportation options available to the San Carlos community ensures that all residents are able to participate in public life and gives all community members the freedom to choose transportation modes that promote health, reduce gasoline costs and time lost in traffic, and help the City meet its climate action goals. The strategies under this goal aim to reduce auto dependency by promoting urban density where it makes sense, making non-automobile travel more convenient and attractive, and enhancing the overall public realm from streets to public spaces. These strategies will help the San Carlos community reduce the number of miles they are driving, thereby reducing GHG emissions.



Strategy 11: Transit-Oriented Development. Encourage development of mixed-use projects, higher-density housing, and job growth within the General Plan’s recognized Transit-Oriented Development (TOD) corridor (Planning Areas 1, 2, and 3) while being mindful of surrounding uses.

	2030	2050
GHG Reduction (MTCO ₂ e)	1,260	1,890

- § Require that development within the TOD corridor maintains and improves the mobility of people and vehicles along and across the corridor through safety considerations, such as separated sidewalks and bike lanes or traffic-calming measures.
- § Establish and maintain land use patterns in the TOD corridor that will attract and serve riders of public transit, such as higher-density mixed-use buildings near existing high-frequency transit stops.
- § Revise land use and development standards in the TOD corridor as needed to remove any barriers to appropriate higher-density development.



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Promotes Equity



Strategy 12: Active Transportation. Prioritize bicycling and walking as safe, practical, and attractive travel options citywide, as directed by the Bicycle and Pedestrian Master Plan.

	2030	2050
GHG Reduction (MTCO _{2e})	1,630	1,570

- § Establish standards requiring that active transportation improvements, including bicycle lanes, sidewalks, and supporting infrastructure as needed, will be constructed as a condition of approval for larger developments, including commercial and office development on the east side.
- § Increase bicycle parking in publicly owned places, as feasible.
- § Increase the bicycle parking requirement for commercial projects to promote cyclist safety, security, and convenience.
- § Require large employers, including the City, to provide facilities that encourage bicycle commuting, including shower facilities and covered or indoor bicycle parking.
- § Actively promote walking and biking as safe modes of local travel, particularly for children attending local schools by partnering with the San Carlos School District Safe Routes to School Program.
- § Support the San Carlos School District’s crossing guard program.
- § Promote traffic-calming methods on City streets, such as landscaped median barriers and traffic circles.
- § Establish clear and convenient pedestrian rights-of-way with shade and minimal tripping hazards.
- § Incorporate bicycle-friendly intersections and boulevards into street design, as recommended by the Bicycle and Pedestrian Master Plan.
Support the construction of proposed bikeways and improvement areas, as outlined in the adopted Bicycle and Pedestrian Master Plan.
- § Promote incentive programs to fund the purchase of bicycles or electric-assist bicycles for low-income community members.
- § Make bicycles and electric-assist bicycles available for City employees for use on shorter business trips. Provide bicycle safety training and materials for drivers, bikers, and pedestrians.





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System**



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Quality**



**Improves Public
Health**



**Improves Quality of
Life**



**Promotes Community
Partnerships**



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Strategy 13: Neighborhood Hubs. Encourage the establishment of Neighborhood Hubs (as defined by the General Plan) within existing residential neighborhoods to support neighborhood-serving small-scale retail and service uses, including small stores selling fresh and locally grown produce and basic daily goods.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Examine zoning and land use designations that potentially limit the development of neighborhood hubs as currently allowed by the General Plan and Zoning Code and identify opportunities to encourage designation of neighborhood hubs, including amendments to the Zoning Code as appropriate.
- § Coordinate with community-based organizations to identify sites suitable for the development of neighborhood hubs.
- § Research and consider establishing pilot neighborhood hubs, as described in the San Carlos General Plan.



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Neighborhood Hubs

The San Carlos General Plan defines a neighborhood hub as a “node” or “focal point” in a neighborhood that offers neighborhood-serving retail and amenities in a reasonable walking distance from adjoining residential areas. These hubs would increase the accessibility of goods and services within existing neighborhoods and would be designed to promote community health, interaction, and socialization.



Strategy 14: Public Curbs. Assess opportunities in the downtown, mixed-use, office, and commercial areas to designate public curbs for passenger pick-up/drop-off in support of ridesharing.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Conduct studies and community outreach to better understand the use of public curbs in downtown, mixed-use, office, and commercial areas and to identify gaps and needs to support ridesharing and other curb uses that support mobility and opportunities to reduce vehicle emissions.
- § Identify and implement pilot programs to improve effectiveness of public curb use and make pilot programs permanent, as appropriate.
- § Regularly evaluate and revise the use of public curbs as situations change, including increased deployment of autonomous vehicles.



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Strategy 15: Public Transportation. Support improvements to public transit routes, services, and facilities to facilitate longer distance travel.

	2030	2050
GHG Reduction (MTCO _{2e})	2,750	7,190

- § Research and consider programs to support large employer-led shuttle services within San Carlos to connect their employees to public transit and core services. Explore encouraging or requiring shuttles to be all-electric.
- § Work with SamTrans to improve service coverage, frequency, and operating hours.
- § Support efforts by Caltrain to increase service frequency as part of the Caltrain Modernization Program.
- § Support increased integration of Bay Area transit systems.



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Strategy 16: Public Spaces. Create and maintain accessible public spaces, including the full spectrum of the public realm: sidewalks, alleys, pedestrian paseos, pedestrian and bicycle paths, plazas, squares, and public gathering spaces.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Include elements such as wide, smooth sidewalks, good lighting, safe crosswalks, clear signage, curb bulb-outs, curb cuts, street furniture and trees, and traffic-calming measures that allow people of all ages and abilities to exercise and safely access public transportation, community centers, schools, and goods and services.
- § Support initiatives in the Bicycle and Pedestrian Master Plan to identify and address barriers to safe or convenient walking, biking, and transit ridership from major residential areas to public areas of interest.
- § Continue efforts to implement the Bicycle and Pedestrian Master Plan with recognition of the plan as an important part of the City’s overall strategy to reduce GHGs in the transportation sector.
- § Require new large-scale developments to address transit, biking, and walking access as applicable through the City’s discretionary review process.
- § Provide for an education program to residents and businesses and increased code enforcement to minimize vegetation that degrades access along public rights-of-way.



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Strategy 17: Vehicle Miles Traveled. Reduce community-wide transportation-related emissions per resident and employee, with an emphasis on reductions from existing and new development in the city’s core commercial, office, and industrial areas, including development on the east side.

	2030	2050
GHG Reduction (MTCO _{2e})	310	400

- § Aid new and existing multi-family and commercial developments in implementing and expanding transportation demand management strategies.
- § Support General Plan goals and policies intended to reduce VMT for local and regional commute-related trips and personal trips, including constructing additional housing, as directed by the Housing Element, and to meet household size and income needs.
- § Explore revisions to the City’s Transportation Demand Management ordinance as needed to achieve additional trip reductions.
- § Research and consider creative solutions to reduce VMT, such as employer commuter programs or adopting work from home policies for City employees.
- § Ensure that new development on the east side considers and implements strategies to reduce VMT and transportation-related emissions.



Enhances Mobility System



Improves Local Air Quality



Improves Public Health



Improves Quality of Life



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Promotes Equity



Goal 5: Transition to low-carbon transportation

The promotion of clean transportation fuels, such as electricity or hydrogen, can ease a transition away from reliance on vehicles fueled by gasoline or diesel fuel. Providing increased support for vehicles that use these clean transportation fuels through public and private infrastructure makes it easier for residents who want to purchase one of these vehicles. Further, increasing the number of transportation modes available to San Carlos residents creates a healthier community, promotes equity, and reduces emissions. By providing individuals with a range of safe, reliable options to get to work, school, shopping, and other important destinations that are more sustainable than personal vehicles, the City can ensure that other modes of transportation are a feasible and effective alternative. This reduces dependence on personal vehicles in San Carlos, improving mobility options for all community members. The strategies in this goal are meant to support the switch to low-carbon transportation sources, including cleaner vehicles or through alternative modes of transportation.

Strategy 18: Electric Vehicles. Support residents and business owners to transition to electric and plug-in hybrid vehicles.

	2030	2050
GHG Reduction (MTCO ₂ e)	24,440	52,470

- § Increase the installation of electric-vehicle charging infrastructure throughout San Carlos by participating in PCE’s Electric Vehicle Ready Program and other existing or future programs.
- § Ensure the City’s electric vehicle infrastructure permitting procedures and requirements are consistent with state law, San Mateo County, and other San Mateo County cities to support standardization across communities.
- § Provide incentives for electric vehicle and plug-in hybrid vehicle use by working with local, regional, and state partners and agencies like PCE and the BAAQMD.
- § Work closely with owners of multi-family dwelling units to install electric vehicle charging stations.
- § Work with partner agencies to conduct outreach to car owners and provide information about programs to aid them in the transition to electric vehicles.
- § Ensure that new development on the east side includes EV charging stations for employees and other users.



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Strategy 19: Safe Routes to School. Continue to support the Safe Routes to Schools Program and reduction of GHG emissions from school-related trips.

	2030	2050
GHG Reduction (MTCO _{2e})	160	390

- § Promote “walk pools” or “walking buses” to increase the number of students who walk to school by partnering with school districts.
- § Promote incentives to provide bicycles to low-income youth in the community by working with regional partners.
- § Work with the San Carlos School District to continue supplemental funding of the crossing guard program, as feasible.



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Promotes Equity



Strategy 20: City Fleet. Transition the City fleet to zero-emissions vehicles or low-carbon fuels, as feasible.

	2030	2050
GHG Reduction (MTCO ₂ e)	230	390

- § Install electric vehicle chargers at City facilities as needed to provide sufficient chargers to City electric fleet vehicles.
- § Adopt an “electric vehicles first” policy to ensure electric vehicles are purchased when non-electric City fleet vehicles, including light-, medium-, and heavy-duty trucks, need to be replaced, to the extent replacement vehicles are feasible.



Enhances Mobility System



Improves Local Air Quality



Supports New Technology

Strategy 21: Car sharing. Promote electric vehicle and low-carbon fuel car-sharing programs.

	2030	2050
GHG Reduction (MTCO ₂ e)	5,310	5,040

- § Research and consider establishment of a car-sharing program with electric or low-carbon fuel vehicles.
- § Provide parking spaces for electric or low-carbon car share vehicles at convenient locations accessible by public transportation.
- § Work with car-share providers to ensure equitable access to electric or low-carbon car-share vehicles.
- § Support, and as appropriate enforce, state regulations to mandate adoption of electric vehicles by transportation network company (TNC) drivers.



Enhances Mobility System



Improves Local Air Quality



Promotes Community Partnerships



Promotes Equity



Strategy 22: Micromobility. Facilitate micromobility options, including low-speed individually owned or shared, human-powered and electric bicycles, scooters, and skateboards, for short trips and last mile commutes.

	2030	2050
GHG Reduction (MTCO ₂ e)	210	210

- § Work with large business owners and public transit service providers, including Caltrain, to examine the feasibility of incorporating infrastructure to support micromobility devices at large businesses and public transit stops.
- § Identify micromobility operators interested in providing service in San Carlos that is consistent with community values and expectations.
- § Conduct a micromobility pilot program, ensuring that equitable access to micromobility vehicles is protected.



Enhances Mobility System



Improves Local Air Quality



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Supports New Technology



Off-road Sector

Goal 6: Support pollution-free outdoor equipment

Shifting to alternative fuel equipment across the community promotes healthier air for all residents due to the reduction in gasoline or diesel pollution. This is especially important for sensitive populations, such as children, the elderly, and individuals with chronic respiratory disease. Such actions can also address equity issues by reducing the air pollution exposure of people who use this equipment, such as construction and landscaping workers.

Strategy 23: Clean-fuel construction and landscaping. Encourage hybrid and clean-fuel construction and landscaping equipment citywide.

	2030	2050
GHG Reduction (MTCO ₂ e)	2,450	2,740

- § Supply incentives for battery-operated or electric-powered landscaping equipment by collaborating with regional partners, such as the BAAQMD and PCE.
- § Continually track technological advances in clean-fuel construction and landscaping equipment.
- § Consider requirements for use of hybrid or clean-fuel construction equipment in new development when feasible.
- § Require hybrid or clean-fuel construction and landscaping equipment in City contracts when feasible.



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Improves Quality of Life



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Promotes Cost Savings



Promotes Equity



Supports New Technology



Waste Sector

Goal 7: Become a zero-waste community

Efforts to divert waste away from landfills not only reduce emissions, but also provide residents with an opportunity to focus on comprehensive sustainability and exercising awareness of individual impact on the environment, including minimizing waste generation and encouraging source reduction. The strategies for this goal build on existing City initiatives, and include new ones, to reduce overall waste in the community and ensure waste is sent to the appropriate location.

Strategy 24: Zero-Waste City. Promote zero-waste initiatives in City operations and public events.

	2030	2050
GHG Reduction (MTCO _{2e})	20	10

- § For municipal operations, establish a citywide zero-waste policy.
- § Continue to implement and update the City’s Environmental Purchasing Policy (EPP).
- § Require recycling and composting as a condition of approval for public events at City facilities and/or permitted by the City.
- § Research and consider a paperless policy at the City to reduce paper waste and support the expanded use of electronic documents for permit submittals, public hearing packets, and other public documents with exceptions as needed to meet accessibility needs of residents and stakeholders.



Conserves Resources



Provides Education



Strategy 25: Material reuse and repair. Support community-led initiatives to create a material reuse and repair program and continue to educate community members about ways to make unwanted items available for reuse.

	2030	2050
GHG Reduction (MTCO ₂ e)	330	770

- § Establish a source-reduction program that promotes options to rethink, refuse, reduce, reuse, regenerate, recycle, and recover materials by collaborating with regional partners.
- § Establish sharing, exchange, and reuse program(s), including fix-it clinics, swap events, second-hand markets, and shop local campaigns by collaborating with community and regional partners.
- § Promote awareness of life-cycle emissions of products through public outreach campaigns.



Conserves Resources



Enhances Local Economy



Promotes Community Partnerships



Provides Education



Strategy 26: Compostable Food Service Ware. Require food facilities to use non-plastic, compostable food service ware, including straws, utensils, plates, bowls, cups, food trays, clamshells, and other containers when distributing prepared food.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Develop and adopt an ordinance to prohibit specific types of single-use or disposable plastics, particularly for use by restaurants, caterers, and other commercial kitchens, by using the San Mateo County Disposable Food Service Ware Ordinance as a model.
- § Engage with businesses using food packaging to determine barriers to switching to biodegradable or compostable food packaging and work to remove those barriers.



Conserves Resources



Provides Education

Strategy 27: Construction and Demolition Waste. Increase the amount of waste recycled during construction and demolition of buildings.

	2030	2050
GHG Reduction (MTCO ₂ e)	460	900

- § Incentivize the recycling of construction debris by working with regional partners.
- § Research and consider providing financial incentives to encourage the recycling of construction debris.
- § Determine how certain construction materials may be donated and reused to help those in need by working with local community-based organizations and construction companies.



Conserves Resources



Promotes Community Partnerships



Provides Education



Strategy 28: Composting and Recycling. Partner with RethinkWaste to expand commercial and multi-family residential recycling and composting programs.

	2030	2050
GHG Reduction (MTCO ₂ e)	8,400	10,240

- § Provide educational outreach programs to multi-family residents, multi-family property owners, single-family homeowners, and business owners to support composting programs.
- § Increase the share of San Carlos residents and business owners that have green compost carts or bins by working with waste haulers.
- § Provide counter-top compost bins to residents of San Carlos by working with regional partners and community-based organizations.
- § Work with food service facilities to understand barriers to composting and work to mitigate these concerns.
- § Encourage local restaurants to partner with food rescue organizations to divert food that would otherwise be thrown away to non-profit organizations for distribution to those in need.



Conserves Resources



Promotes Community Partnerships



Provides Education

Strategy 29: Recycling Contamination. Work with waste haulers to reduce contamination of recyclables.

	2030	2050
GHG Reduction (MTCO ₂ e)	Supportive	Supportive

- § Improve educational efforts to community members concerning proper waste sorting.
- § Improve sorting machinery and techniques by working with waste haulers.



Conserves Resources



Provides Education



Strategy 30: Sustainable Food Consumption. Promote awareness of carbon-free and sustainable food consumption, materials, and consumer products.

	2030	2050
GHG Reduction (MTCO _{2e})	Supportive	Supportive

- § Support local and regional sustainable food sources, including community gardens, home vegetable and fruit gardening, farmers markets, food cooperatives, and community-based efforts to grow and share locally grown food.
- § Support state and regional efforts to prepare updated consumption-based GHG inventories and related analyses.



Conserves Resources



Promotes Community Partnerships



Provides Education



Water and Wastewater Sector

Goal 8: Reduce community-wide water use

Increasing the efficiency of water usage reduces emissions and helps conserve valuable resources, saving money for the City and its residents, reducing dependence on outside resources, and increasing resilience to water shortages. The strategies under this goal are aimed at increasing the overall reduction in water consumption through retrofits, landscaping, and water recycling.

Strategy 31: Water-efficient Retrofits. Encourage water-efficient retrofits of existing buildings by working with water providers and regional agencies.

	2030	2050
GHG Reduction (MTCO ₂ e)	30	50

- § Partner with BayREN to support the BayREN Water Upgrades Save program to encourage water conservation at municipal facilities and in the community.
- § Publicize available incentives and low-cost solutions to water-efficiency retrofits in existing buildings.



Conserves Resources



Enhances Local Economy



Promotes Cost Savings



Provides Education



Strategy 32: Water-wise Landscaping. Promote drought-tolerant and firewise landscaping.

	2030	2050
GHG Reduction (MTCO ₂ e)	Less than 10	0

- § Develop a native, drought-tolerant, and fire-resistant landscaping list and require new development or redevelopment to use this list in landscaping plans.
- § Enforce and update the Water-Efficient Landscaping Ordinance to reduce outdoor water use.



Conserves Resources



Promotes Cost Savings



Provides Education



Supports Community Resiliency

Strategy 33: Graywater and Recycled Water. Promote graywater and recycled water systems.

	2030	2050
GHG Reduction (MTCO ₂ e)	10	20

- § Update materials for homeowners and business owners to educate them on the onsite potential of graywater and recycled water systems.
- § Explore the feasibility of citywide graywater and recycled water systems.
- § Offer incentives for graywater, rainwater catchment, and other on-site water reuse systems in partnership with water agencies.
- § Determine how San Carlos can partner with Redwood City to use its recycled water, including reestablishing the community recycled water distribution program at the Corporation Yard.



Conserves Resources



Promotes Cost Savings



Provides Education



Supports Community Resiliency





Summary of Total GHG Emissions

Collectively, the strategies in this chapter achieve substantial GHG reductions for the years 2030 and 2050. Table 23 shows the reductions achieved by topic, and Figure 14 shows these reductions relative to San Carlos' community-wide emissions. Performance indicators in bold can be used to directly track implementation of the strategy. Other performance indicators can help inform general trends and higher-level progress toward GHG reduction targets. Detailed information on GHG emission reductions from existing state, regional, and local actions can be found in Tables 13 and 14 of this chapter. Detailed information on GHG reductions from each strategy can be found listed underneath the text of each CMAP strategy in this chapter and in Appendix A.

Figure 14. San Carlos GHG Emissions with CMAP Strategies

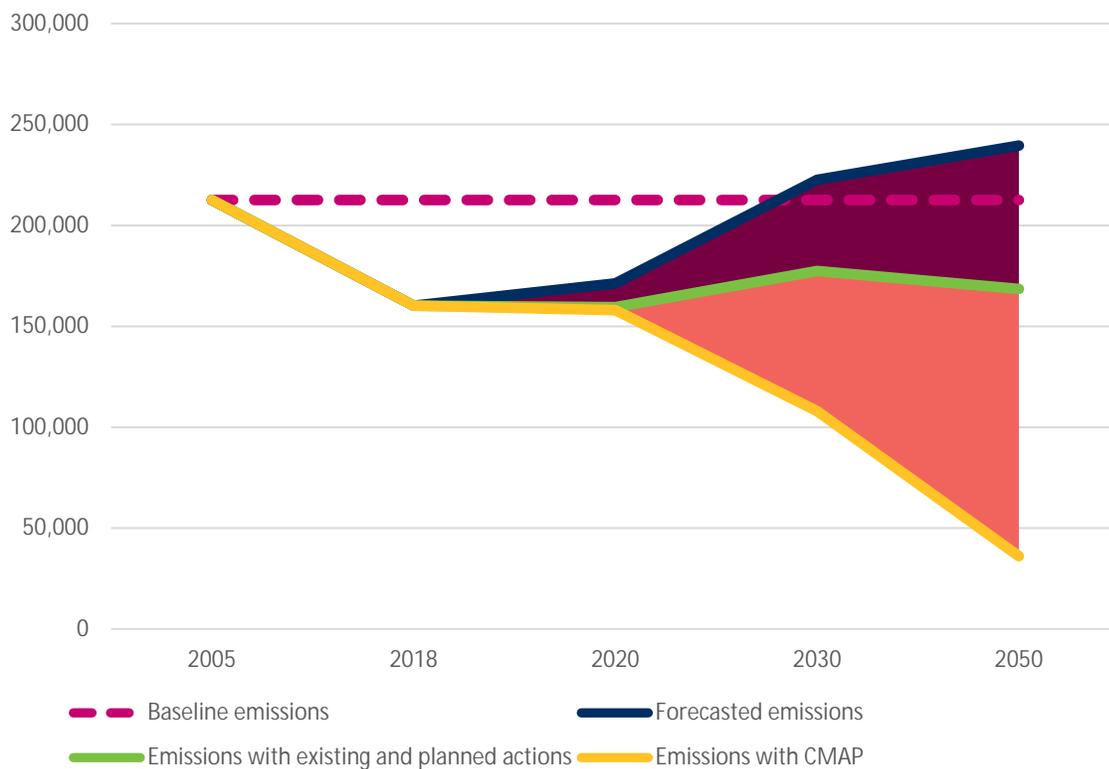




Table 23. GHG Reductions from CMAP Strategies Between 2030 and 2050 (in MTCO₂e)

Strategy Number	Strategy	2030 Reduction	2050 Reduction	Performance Metrics
1	Regional Energy Conservation and Efficiency Programs	5,390	11,600	<ul style="list-style-type: none"> § Number of retrofits performed. § Annual kWh of electricity used. § Annual therms used. § Number of businesses receiving financial incentives. § Number of homeowners receiving financial incentives. § Number of water or energy-saving devices distributed. § Number of Green House Calls and Home Energy Score Evaluations.
2	K-12 Energy Conservation and Efficiency Education	Supportive	Supportive	<ul style="list-style-type: none"> § Annual kWh of electricity used. § Annual therms used. § Number of teachers using educational resources.
3	City Facilities	20	40	<ul style="list-style-type: none"> § Number of City buildings and facilities audited for energy conservation and efficiency upgrades. § Annual kWh of electricity used at municipal buildings and facilities. § Annual therms used at municipal buildings and facilities.



Strategy Number	Strategy	2030 Reduction	2050 Reduction	Performance Metrics
4	Electrification	4,710	31,770	§ Number of electrification retrofits performed. § Annual kilowatt hours of electricity used. § Annual therms used. § Number of businesses receiving financial incentives. § Number of homeowners receiving financial incentives. § Number of solar installations.
5	Building Codes	11,300	6,440	§ Number of buildings electrified. § Number of therms used.
6	Rooftop Solar	20	0	§ Number and capacity of solar installations. § Annual kWh of electricity used. § Annual therms used.
7	Peninsula Clean Energy	30	0	§ Annual kWh of electricity supplied by the ECO100 program. § Number of incentives given.
8	Battery Storage	20	0	§ Number of solar installations with battery storage. § Number of financial incentives given.
9	Grid Reliability	Supportive	Supportive	§ Number of backup power systems installed.
10	PSPS Response	Supportive	Supportive	§ Number of businesses and homeowners engaged with. § Number of batteries supplied.
11	Transit-Oriented Development	1,260	1,890	§ Dwelling units and jobs per acre. § Annual VMT. § Annual public transit ridership.





Strategy Number	Strategy	2030 Reduction	2050 Reduction	Performance Metrics
12	Active Transportation	1,630	1,570	<ul style="list-style-type: none"> § Number of public bicycle parking stations. § Miles of biking and walking paths constructed. § Number of bicycle and pedestrian environment improvements made. § Annual number of bicycle and pedestrian related collisions and near-misses. § Annual review of school parent survey data as currently led by the School District. § Annual student walking and biking counts.
13	Neighborhood Hubs	Supportive	Supportive	<ul style="list-style-type: none"> § Number of neighborhood hubs.
14	Public Curbs	Supportive	Supportive	<ul style="list-style-type: none"> § Number of curb improvements made.
15	Public Transportation	2,750	7,190	<ul style="list-style-type: none"> § Number of bus riders. § Number of Caltrain riders. § Whether or not there is a shuttle service.
16	Public Spaces	Supportive	Supportive	<ul style="list-style-type: none"> § Annual VMT. § Miles of biking and walking paths constructed annually. § Annual number of bicycle and pedestrian related collisions and near-misses. § Number of bicycle and pedestrian environment improvements made.
17	Vehicle Miles Traveled	310	400	<ul style="list-style-type: none"> § Number of employees in commute reduction programs. § Annual VMT.



Strategy Number	Strategy	2030 Reduction	2050 Reduction	Performance Metrics
18	Electric Vehicles	24,440	52,470	§ Registrations for electric and plug-in hybrid vehicles. § Number of electric-vehicle charging stations.
19	Safe Routes to School	160	390	§ Number of students using active transportation. § Annual review of school parent survey data as currently led by the School District.
20	City Fleet	230	390	§ Number of City fleet vehicles that are electric vehicles.
21	Car sharing	5,310	5,040	§ Number of car-share vehicles. § Percentage of transportation network company (TNC) vehicles that are all-electric. § Number of parking spaces designated for car-share vehicles.
22	Micromobility	210	210	§ Number of micromobility trips and miles annually. § Establishment of micromobility program.
23	Clean-fuel Construction and Landscaping	2,450	2,740	§ Decline in off-road gasoline and diesel fuel. § Number of landscaping companies committed to using all-electric devices.
24	Zero-Waste City	20	10	§ Annual tons of waste sent to the landfill from City operations.
25	Material Reuse and Repair	330	770	§ Annual tons of non-organic non-recyclable waste sent to the landfill.





Strategy Number	Strategy	2030 Reduction	2050 Reduction	Performance Metrics
26	Compostable Food Service Ware	Supportive	Supportive	§ Annual tons of waste sent to the landfill. § Number of businesses committed to using biodegradable or compostable food packaging.
27	Construction and Demolition Waste	460	900	§ Annual tons of wood/lumber/pallet and construction/demolition waste sent to the landfill.
28	Composting and Recycling	8,400	10,240	§ Annual tons of green waste collected. § Annual tons of waste sent to the landfill. § Number of green waste bins in the community.
29	Recycling Contamination	Supportive	Supportive	§ Annual tons of waste sent to the landfill.
30	Sustainable Food Consumption	Supportive	Supportive	§ Number of farmers markets. § Number of community gardens.
31	Water-efficient Retrofits	30	50	§ Number of water-efficient retrofits. § Annual gallons of water used.
32	Water-wise Landscaping	Less than 10	0	§ Number of landscaping retrofits. § Annual gallons of water used.
33	Graywater and Recycled Water	10	20	§ Number of homes with graywater systems. § Annual gallons of water used.



Progress to Targets

In total, this CMAP is projected to reduce San Carlos' GHG emissions to 107,920 MTCO₂e by 2030 and 36,060 MTCO₂e by 2050, as shown in Table 24 and on Figure 15. This will reduce 2030 emissions to 40 percent below 1990 levels and reduce 2050 emissions to 80 percent below 1990 levels, allowing San Carlos to achieve its 2030 and 2050 GHG reduction targets.

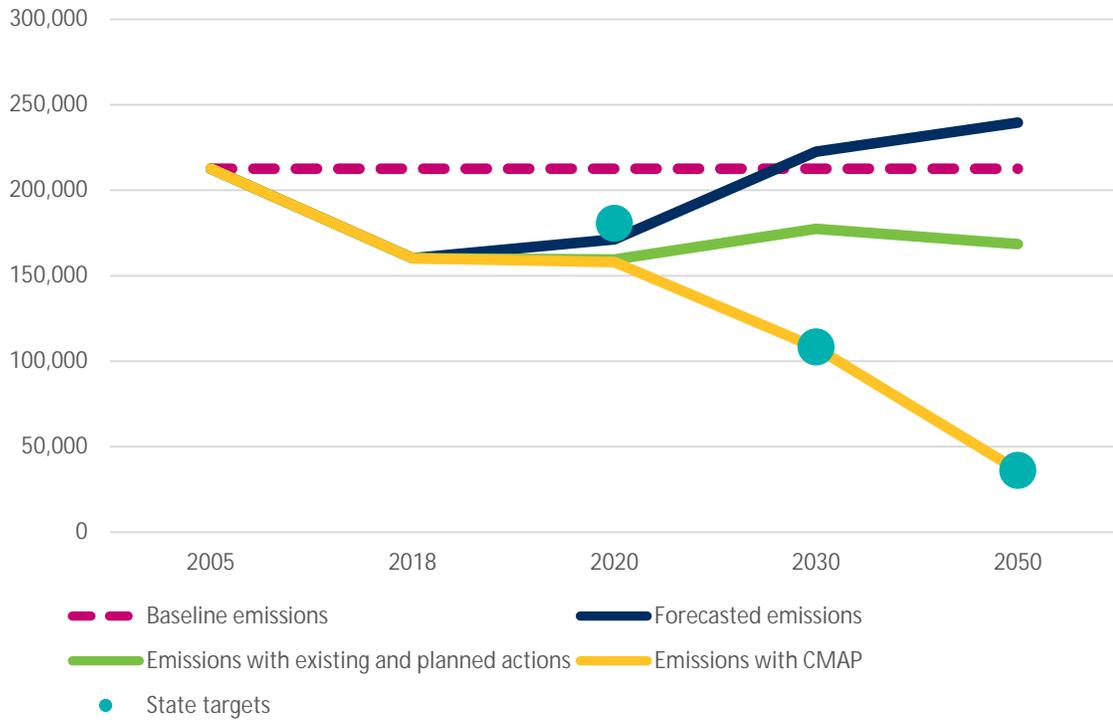
It is likely that there will be new policies and regulations, technologies, personal and economic behaviors and preferences, and other factors that emerge in coming years. These factors cannot be accurately forecast in this CMAP, but they will likely support GHG emissions reductions beyond the levels identified here. Future updates to the CMAP will be able to better assess emerging trends and unexpected changes and include them as part of the City's GHG reduction strategy as appropriate. Future revisions to the CMAP may include more stringent GHG reduction targets as they are feasible and appropriate.

Table 24. Progress Toward Targets in Total GHG Emissions (MTCO₂e)

	2030	2050
2005 Baseline emissions	212,590	212,590
Target emissions	108,420	36,140
Emissions with CMAP implementation	107,920	36,060
Percent below 1990 levels	-40%	-80%
Percent below 2005 baseline levels	-49%	-83%



Figure 15.
Progress Toward Targets in Total GHG Emissions (MTCO₂e)



While reducing local GHG emissions is an indispensable component of the City's CAP, the City also acknowledges that, due to the global nature of climate change, the San Carlos community will continue to be affected by GHG emissions, over which it has no direct control. To that end, Chapter 5 highlights the City's strategies for promoting adaptation to climate change.



5. SAN CARLOS' CLIMATE CHANGE ADAPTATION PATHWAY

Background

As discussed in Chapter 3, the City of San Carlos is expected to experience multiple direct and indirect impacts of climate change, including potential bayshore flooding, drought, extreme heat, inland flooding, human health hazards, landslide and debris flow, sea level rise, severe storms, and wildfire. These climate changes can have a variety of harmful impacts to the members of the San Carlos community, including damage to buildings and community-sustaining infrastructure, such as roads and energy and water service systems; interruption to work, home life, and other daily activities with consequent economic impacts; and potentially severe public health impacts, including injury, illness, and death resulting from exposure to air pollution, flood waters, fire, disease vectors, and high heat.

Some populations, assets, infrastructures, and services will be more vulnerable to these climate change effects than others. Some of the most vulnerable include residences, businesses, and infrastructure located within flood zones and areas more likely to be affected by sea level rise, wildfire, or landslide; those especially sensitive to the effects of air pollution and heat; those who lack the economic resources and/or community connections to prepare for and recover from extreme weather events; and those who are regularly exposed to outdoor weather or who might not be able to relocate in the case of an emergency.

The climate change adaptation strategies presented in this chapter consider and address these disparities in climate change vulnerability, as well as knowledge about which climate change effects are most likely to impact the community, their projected severity, and the projected time frame in which these climate changes are expected to occur. They aspire to foster climate change adaptation by reducing the severity of the climate change impacts on the community and by supporting the community's ability to respond to and recover from climate change-related disruption.



Climate Change Adaptation Strategies

Adaptation and Resilience Sector

Goal 9: Become a low-carbon, resilient community

Strategy 34: Low-Carbon Economy. Encourage a low-carbon, sustainable economy that moves away from industries reliant on fossil fuels and supports low- to no-carbon industries, products, and services.

- § Actively work across City departments and regional agencies to incentivize and attract businesses and industries that provide good living-wage jobs while not increasing GHG emissions.
- § Amend the purchasing policies of the City to include a preference for contractors and vendors that can demonstrate corporate sustainability and CAPs and commitment to incorporate best practices into its operations, when appropriate.
- § Encourage San Mateo County to divest City employee pension fund investments in fossil fuel companies.
- § Expand carbon-free and green job opportunities in San Carlos by working with workforce development agencies.
- § Encourage the use of sustainable materials, including low-carbon concrete, in new development and renovation projects.

Carbon Sequestration

Is the process of capturing and storing atmospheric carbon dioxide. This process occurs naturally in nature and is known to help reduce the impacts of climate change.

Examples of carbon sequestration opportunities in San Carlos include carbon absorbed by wetlands, older-growth trees in western San Carlos, and by street trees throughout the community.



Conserves Resources



Enhances Local Economy



Improves Public Health



Strategy 35: Carbon Offsets. Explore local and regional opportunities to offset local carbon emissions that cannot be reduced to zero.

- § Explore the feasibility of investing in local, regional, or other in-state carbon offsets if the City is not able to achieve carbon neutrality through implementation of this CMAP with a preference to explore and implement feasible options to offset emissions through City operations or onsite at City facilities, including City open spaces, parks, and urban forests before committing to other local, regional, or in-state carbon offset programs.
- § Identify local, regional, or in-state carbon offset opportunities for use by larger businesses in the community after implementation of feasible local actions to reduce GHG emissions.
- § Promote local carbon sequestration or GHG reduction programs led by local or regional organizations as opportunities for carbon offsets after implementation of feasible actions to reduce individual, household, or business GHG emissions.
- § Work with new large-scale developments to explore commitments to carbon neutrality.



Promotes Community Partnerships



Provides Education



Supports Community Resiliency

Strategy 36: Open Space Preservation. Preserve existing open space by supporting urban infill.

- § Continue to maintain natural resource protections on existing open space in San Carlos and partner with San Mateo County and surrounding jurisdictions to provide similar protections in surrounding areas.
- § Regularly identify underutilized parcels in existing infill areas to support increased housing and business opportunities consistent with the adopted Housing Element.



Conserves Resources



Improves Quality of life



Promotes Community Partnerships



Supports Community Resiliency



Goal 10: Prepare for, reduce vulnerability to, and adapt to changing climate conditions

Strategy 37: Heat Island Effect. Minimize the urban heat island effect.

- § Develop and enforce building code requirements for cool roofs and light color materials for roads, driveways, sidewalks, and roofs as part of retrofits and repaving activities to increase reflection of sunlight.
- § Increase the tree canopy by assessing existing tree canopy cover and plant health to identify priority areas and then develop a tree management and planting program, ensuring that recommended tree species are compatible with the City’s current and future climate conditions, City policy, and other community priorities.
- § Ensure that new and retrofitted large hardscaped areas, such as parking lots, incorporate mature trees consistent with the City’s street tree planting palette and other green infrastructure consistent with the Green Infrastructure Plan that is appropriate for current and future climate conditions.

Heat Islands
Urban areas that experience higher temperatures than outlying vegetative areas due to more impervious “hard” surfaces, such as buildings, roads, and other surfaces, which absorb and re-emit the sun’s heat. More vegetation in urban areas, including parks, landscaped areas, and street trees, help to keep temperatures lower.



Conserves Resources



Improves Quality of life



Improves Public Health



Promotes Community Partnerships



Promotes Cost Savings



Supports Community Resiliency



Strategy 38: Community Resilience Hubs. Establish a Community Resilience Hub network that includes a virtual resilience hub and a network of equitably located Community Resilience Hubs at existing or new community facilities.

- § Identify and map existing community facilities, such as libraries, gymnasiums, community centers, or auditoriums that can serve as community resilience hubs and support vulnerable populations during hazard events, including extreme heat and poor air quality events. Establish standardized temperature or air quality triggers for when they will open.
- § Establish a virtual resilience hub with detailed and up-to-date information about preparing for natural disasters, notifications and alerts related to public safety, virtual gathering and information-sharing spaces, and other resources to help improve community safety and resilience. A virtual resilience hub can be based on the City’s website but should be linked to other websites or virtual resources supported by community-based organizations, neighborhoods, businesses, and residents throughout the community.
- § Conduct a comprehensive energy resiliency needs assessment at critical City facilities and community resilience hubs and pursue funding opportunities to meet the identified needs.
- § Install energy storage and establish backup power and water resources at existing (as feasible) or potential new critical facilities, emergency shelters, resilience hubs, and cooling centers in case of power outages.
- § In coordination with local and regional emergency management services, host an annual “home showcase” event where San Carlos community members can showcase resilient features of their homes and businesses, including, but not limited to, graywater systems, solar and battery storage installations, electric-vehicle charging, and drought-resistant landscaping.

Community Resilience Hubs

Community-serving facilities that provide communication, education, and resources to support the community. These hubs provide an opportunity to effectively work at the nexus of community resilience, emergency management, climate change mitigation, and social equity while providing opportunities for community expression.





Improves Public Health



Promotes Community Partnerships



Promotes Equity



Provides Education



Supports Community Resiliency

Strategy 39: Sea Level Rise. Develop regionally coordinated sea level rise adaptation measures and programs in collaboration with San Mateo County Flood and Sea Level Rise Resiliency District, ABAG, San Francisco Bay Conservation and Development Commission (BCDC), BayAdapt, and other regional entities.

- § Collaborate with the Flood and Sea Level Rise Resiliency District, nearby cities, City/County Association of Governments (C/CAG), BCDC, utilities, affected agencies, east side property owners, and other entities to create a public-private partnership to develop, fund, and implement a regionally coordinated sea level rise adaptation plan.
- § Conduct a managed retreat feasibility study that identifies specific assets at risk and the cost of facilitating a managed retreat by partnering with the Adapting to Rising Tides Program, OneShoreline, neighboring cities, and community-based organizations.
- § Integrate nature-based solutions into sea level rise mitigation and adaptation strategies, including the construction of living horizontal levees rather than artificial levees, where possible.
- § Incorporate the Sea Level Rise Projection Map (included in this CMAP as Figure 10 and Figure 11) into the City's geographic information system for use by City staff, project applicants, and the public for identification of areas at risk of increased flooding and sea level rise.
- § Integrate sea level rise projections and analyses into applicable City development and environmental review processes.
- § Review and update the sea level rise data at least once every five years.

OneShoreline

Works throughout San Mateo County on projects that protect the community from flooding and erosion, enhance the environment, and create recreational opportunities.





- § Consider developing and adopting a Sea Level Rise Overlay District or Zone with associated land use regulations for site planning and minimum construction elevations that supports appropriate mitigation and adaptation in response to sea level rise data, in coordination with San Mateo County Flood and Sea Level Rise Resiliency District and neighboring jurisdictions.
- § Provide information to property owners and the public on areas subject to increased flooding due to sea level rise by working with neighborhood associations, realtors, community-based organizations, and property owners to disclose potential property risks and mitigation options.



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Provides Education



Supports Community Resiliency

Strategy 40: Disaster Preparedness Information. Provide disaster preparedness information to all residents and businesses in English, Spanish, Chinese, and other relevant languages.

- § Work with local non-profits and faith-based organizations to maximize disaster preparedness outreach to individuals who may be unaware of City or County programs and services.
- § Inform residents and businesses about risks of extreme heat and the resources available to reduce outdoor exposure during extreme heat events.
- § Coordinate with the San Mateo County Office of Emergency Services to continue to provide alerts about potential, developing, and ongoing emergency situations in relevant languages and formats appropriate to residents in the county through the SMC Alert system, including at-risk populations identified in the San Carlos Climate Change Vulnerability Assessment.
- § Develop a citywide evacuation plan, delineating evacuation route options, capacity, safety, and viability under different hazard scenarios and where possible, alternative routes where congestion or road failure could occur.
- § Assess evacuation access throughout San Carlos and implement improvements as needed.
- § Support efforts by City partners, including Community Emergency Response Team, neighborhood watch groups, and the Community Foundation of San Carlos, to support residents who may need evacuation assistance.
- § Coordinate with SamTrans or other regional partners to assist with evacuation efforts for those with limited mobility.
- § Encourage residents to have a plan for evacuation, particularly those with limited mobility.
- § Continue to host preparedness workshops for various climate hazards and emergency events.



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Provides Education



Supports Community Resiliency



Strategy 41: Community Wildfire Protection Plan. Develop a Community Wildfire Protection Plan, in coordination with San Mateo County Fire Department and CAL FIRE.

- § Collaborate with FIRE SAFE San Mateo County to develop a citywide Community Wildfire Protection Plan (CWPP) that is consistent with the San Mateo County CWPP.
- § Apply for grants and other funding mechanisms to retrofit cooling and ventilation systems at public buildings to support use of these facilities as Community Resilience Hubs and/or refuge sites for residents during periods of unhealthy air quality caused by excessive smoke from wildfires.

Wildfire Preparedness Workshops

San Carlos hosted Wildfire Preparedness workshops in 2019 and 2020 to educate the community and point community members to resources to increase their fire resilience and give evacuation pointers.



Improves Local Air Quality



Improves Quality of Life



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Supports Community Resiliency



Strategy 42: Vegetation Management. Promote vegetation management and fire-resistant landscape design on residential properties and businesses within the wildland-urban interface and very high fire severity zone.

- § Work with communities and neighbors to address defensible space within 100 feet of all structures or improvements on properties within mapped fire hazard zones.
- § Establish a Neighborhood Chipper Program in San Carlos in partnership with FIRE SAFE San Mateo.
- § Support the continued vegetation management of City parks by using goat grazing and hand crews to reduce the amount of dead and dying woody debris.
- § Develop a fire-safe education program to provide information about state fuel modification, defensible space, roads, water, signing, and other fire-safe regulations in collaboration with the Redwood City Fire Department, San Mateo County Fire, CAL FIRE, and FIRE SAFE San Mateo.
- § Continue code enforcement to ensure effective vegetation management by property owners in high fire hazard severity zones.



Improves Quality of Life



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Provides Education



Supports Community Resiliency



Strategy 43: Fire Risk Reduction Assessment. Develop a fire risk reduction assessment that can be used by project applicants and City staff in the development review process to identify and reduce or avoid potential harm through site design or other mitigation techniques within the very high or high fire severity zones.

- § Update the San Carlos Municipal Code to require new development in the City’s high fire hazard severity zones and wildland-urban interface areas to prepare and submit a fire risk reduction assessment.
- § Coordinate with the Fire Department to conduct fire-safe landscaping inspections and make recommendations for fixing vegetation hazards.



Improves Quality of Life



Promotes Community Partnership



Supports Community Resiliency

Strategy 44: Medical and Emergency Services. Coordinate with local medical providers to ensure that low-cost medical and emergency medical services are available to all City residents.

- § Ensure that shelters are available for persons experiencing homelessness during extreme events and other highly hazardous conditions by coordinating with San Mateo County Human Services Department.
- § Ensure that the local homeless population is aware of these resources.
- § Publicize information about free emergency medical care to community members, focusing on community members who are under-resourced or have been underserved by medical services.



Improves Quality of Life



Improves Public Health



Promotes Community Partnerships



Promotes Equity



Supports Community Resiliency

Strategy 45: Flooding and Pond Water. Reduce flooding and ponded water in the city by collaborating with local and regional flood-protection agencies.

- § Coordinate with the County Flood and Sea Level Rise Resiliency District to increase green infrastructure and ensure that flood channels and storm drainage systems are regularly assessed, cleaned, maintained, and upgraded to minimize flood risks to existing development.
- § Identify and remedy poor drainage areas to reduce disease risk from stagnant water.
- § Expand outreach programs to educate communities about potential increases in vector-borne diseases from stagnant water.
- § Increase development setbacks from creeks to increase permeable surfaces and reduce damage from stormwater.



Conserves Resources



**Promotes Community
Partnerships**



**Improves Public
Health**

The GHG reduction and climate adaptation strategies described thus far in the document pave the way to a city that is more sustainable, equitable, and resilient. To ensure that these strategies are effectively implemented and evaluated, Chapter 6 of this CMAP highlights ways to integrate these strategies with the City's and other local plans and initiatives.



6. CMAP IMPLEMENTATION

Implementing the Climate Mitigation and Adaptation Plan

Implementation of the CMAP will require that City leadership carry out the strategies in the CMAP and that they report the progress made towards these strategies. The City Manager's Office will be the lead department for coordinating CMAP implementation and related sustainability activities, including monitoring and reporting on progress. This CMAP includes an implementation program that ensures each strategy is assigned to a lead City department responsible for implementation, supporting City departments and community partners, time frames for implementation, and relative costs associated with each strategy.

The strategies in the CMAP are accompanied by a list of recommended actions that were selected through conversations with City staff, stakeholders, and the community. The list of recommended actions represents suggested means of achieving the strategy they support but are not meant to provide a prescriptive path to implementation. Furthermore, not all of the listed actions may be necessary for the City of San Carlos to reach its identified GHG reduction targets. Due to ongoing changes in technology and regulations, and the emergence of new best practices and funding opportunities, this approach enables the City to adapt and leverage new opportunities or partnerships without being constrained by a specific implementation pathway.

City staff will monitor progress and provide an annual update to the City Council and the community. As part of annual progress reports, the City's Sustainability Specialist and other City staff will evaluate the effectiveness of each strategy to ensure that anticipated emissions reductions are occurring and will report on progress made toward GHG reductions by applicable performance metrics as outlined in Table 23. If reductions do not occur as expected the City will modify and add additional strategies and actions to the CMAP to ensure the reduction target is achieved.

To ensure the success of the CMAP, the City will integrate the goals, strategies, and actions of this plan into other City programs, plans, and initiatives, including the City budget and Capital Improvement Program, as applicable. As the City moves forward with updating other planning documents, such as the General Plan, the San Carlos Municipal Code, area and specific plans, or other relevant plans, City staff will ensure that these documents support and are consistent with the CMAP.

Implementation Strategies

The following programs are designed to support City efforts to implement the CMAP.

Implementation Strategy 1. Monitor and report progress toward CMAP target achievement on an annual basis.

- § Assign responsibility for facilitating and supporting CMAP implementation to the City Manager's Office.
- § Secure funding and other necessary resources to establish a full-time Sustainability Specialist position in the City Manager's Office.
- § Identify key staff from each department responsible for supporting the Sustainability Specialist with information and updates for annual reporting and monitoring.
- § Continue to involve community-based organizations and other key stakeholders in reviewing and recommending CMAP action items.
- § Prepare an annual progress report on implementation of the recommended GHG reduction strategies for review and consideration by the City Council. When information is available, provide updates on estimated GHG emission reductions and current GHG emission levels.
- § Ensure the City's permit system is set up to track performance metrics for strategies related to new construction and retrofits.
- § Support regular updates to the regional consumption-based emissions inventory, using local and recent data to the greatest extent feasible, and support efforts to develop statewide best practices and guidance for consumption-based emissions inventories.

Implementation Strategy 2. Continue collaborative partnerships with agencies and community groups that support implementation of the CMAP.

- § Continue formal membership and participate in local and regional organizations that provide tools and support for energy efficiency, energy conservation, GHG emission reduction, adaptation, public information, and implementation of this CMAP.
- § At the direction of City Council, commit to formal membership through joint powers authorities or other partnerships as appropriate to implement high priority strategies from the CMAP.
- § Provide policy input to partner agencies (e.g., League of Cities (CalCities), PCE, ABAG/MTC, the BAAQMD, and San Mateo County Energy Watch) on policy barriers that need to be addressed at the state level.



Implementation Strategy 3. Secure necessary funding to implement the CMAP.

- § Identify funding sources and levels for reduction strategies as part of annual reporting.
- § Include emissions-reduction strategies in department work plans, budget, the Capital Improvement Program, and other plans, as appropriate.
- § Pursue local, regional, state, and federal grants to support implementation.
- § Explore dedicated funding sources for CMAP implementation.
- § Explore opportunities to allocate a portion of revenues from revenue-generating strategies to CMAP allocation.

Implementation Strategy 4. Continue to update the community-wide and City Operations GHG emissions inventories and evaluate the effectiveness and applicability of the CMAP every five years.

- § Prepare a 2022 GHG emissions inventory once data becomes available in 2023 and regularly prepare community-wide and City Operations GHG emissions inventories.
- § As appropriate, update the CMAP to incorporate new technology, practices, and other options to further reduce emissions and ensure the City remains on track to meet its reduction targets.

Implementation Strategy 5. Maintain and update CMAP to allow for greater resilience.

- § Coordinate updates of the CMAP, General Plan Safety Element, and Local Hazard Mitigation Plan cycle to ensure plan alignment and coordination of climate mitigation and adaptation efforts.
- § Assess the implementation status and effectiveness of adaptation strategies.

Work Plan

The Work Plan shown in Table 25 contains information to support City staff and the community in their implementation of the CMAP strategies to effectively integrate them into budgets, the Capital Improvement Program, and other programs and projects. Information about the sources of the data to monitor implementation of each strategy is given in Appendix A. Table 25 includes implementation details for the CMAP, which include specifics for how the strategy could be put into effect. These implementation details include the party responsible for implementing the strategy, the estimated time frame until completion, and a general estimation of cost. The City can use these implementation details to identify and prioritize strategies.

The strategies of success in Table 25 are defined as follows:

- § Strategy number: The number used to refer to each strategy in the CMAP and all corresponding workbooks.
- § Strategy: The language used to guide actions needed for reductions.
- § Action(s): The actions that provide support for each strategy.
- § GHG emission reductions: The amount of GHG emissions which would be reduced by 2030 and 2050 through implementation of each strategy and its associated actions.
- § Responsible Departments: The lead City department tasked with implementing the strategy and the City department that will support the lead department in implementing the strategy.
- § Partner Agencies/Organizations: Example local organizations that the City will partner with in implementing the given policy. Additional community partners will be welcome.
- § Applicability: Includes the building types, activities, or people that could be affected as a result of implementing the strategy.
- § Time Frame: The year by which a strategy should be effective by fiscal year's end. The exact status of a strategy will vary based on its actions, and many strategies will be ongoing through and beyond 2030. An effective strategy is one that will be actively on track to achieve its targeted GHG emission reductions, support adaptation to climate change effects, or achieve long-term resilience. For a strategy to be effective, the necessary programs and efforts should be active, and any infrastructure or other capital improvements should be in place. The effective year is not the end year, as many of the strategies are programs that are intended to remain in effect for the foreseeable future, and so they do not have end dates. Time frames for effectively setting up the strategies are described as follows:
 - Immediate
 - Near-Term (by 2022)
 - Mid-Term (by 2025)
 - Long-Term (by 2030)



§ Resource needs: Estimated level of resource needs to complete implementation of each strategy, ranked by low, medium, and high.

§ Estimated cost range: The estimated cost to the City to complete implementation of the strategy, ranked as follows:

- Low (less than \$10,000)
- Medium (\$10,000 to \$99,999)
- High (\$100,000 or above)

§ Funding options: General options for funding sources to complete implementation of each strategy.

Although significant GHG reduction and adaptation policies and initiatives are already in place, the actions proposed in this plan, by necessity, far surpass the scale of existing efforts.

Implementing the plan and ensuring that it results in real, additional GHG emissions reductions and improved resilience will require increased coordination across sectors and institutionalizing climate protection efforts across the community.

This chapter outlines the main components of the process for turning this plan into action and identifies specific actions from earlier chapters that are recommended for short-term implementation. This CMAP outlines reduction strategies and recommendations for implementation; however, it is not a technical implementation plan for San Carlos programs and community actions. City staff will lead CMAP implementation and collaborate and support community organizations, residents, businesses, and stakeholders as appropriate to create the individual programs based on the goals, strategies, and actions outlined in this report.

While short-term priorities are illustrated, please note that priorities can and do shift based on funding availability, advances in technology, new and better ideas, and other reasons. The CMAP, and this implementation section, should be considered a living document.



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Table 25. Implementation Table

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO _{2e})	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
ENERGY SECTOR										
<i>Goal 1: Reduce Energy Use</i>										
1	Regional Energy Conservation and Efficiency Programs. Promote available energy efficiency and conservation opportunities, incentives, and technical assistance for businesses and residents.	<ul style="list-style-type: none"> Assist businesses, schools, and non-profit organizations in accessing energy-efficiency programs, trade professionals, and financing opportunities by working with San Mateo County Energy Watch. Conduct outreach to small business owners by partnering with the San Mateo County's Small Business Resources Center. Expand energy saving opportunities and assistance for large and small commercial and industrial businesses by working with San Mateo County Energy Watch, PCE, and BayREN. Expand the distribution of free or subsidized energy and water efficiency and conservation toolkits, devices, and services to residents and businesses citywide through existing opportunities, such as the lending programs offered by the San Carlos Library, San Mateo Energy Watch, or local non-profit organizations. Expand and better integrate funding and support for existing programs that support weatherization and increase energy efficiency in low-income households, including through partnerships with BayREN, PCE, and San Mateo County. Encourage single-family homeowners to improve energy efficiency and resiliency in their homes by promoting Property Assessed Clean Energy programs, the BayREN Home+ program, BayREN Earth Day Workshops, Green House Calls, Home Energy Score evaluations, and appliance and electrification rebates. 	<p>2030: 5,360</p> <p>2050: 11,600</p>	<p>Lead Department: Community Development</p> <p>Supporting Departments: City Manager CDD - Building CDD - Economic Development Public Works</p>	<p>BayREN Peninsula Clean Energy San Mateo County Office of Sustainability San Mateo County Energy Watch Chamber San Mateo County San Mateo County Small Business Resource Center</p>	<p>Existing development New development</p>	Near-term	Medium	Medium	General Fund Grant funding Permit and impact fees Utility tariffs





Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<ul style="list-style-type: none"> Assess energy efficiency in single-family homes by partnering with San Mateo County, PCE, and other partners to promote the BayREN Green Labeling Home Energy Score program. Provide incentives for installation of all-electric appliances in new residential construction and remodels by partnering with PCE and BayREN. Assist San Mateo County staff, PCE, and other partners with their outreach campaigns, including, but not limited to, hosting workshops, promoting programs through City communication channels, promoting programs through interactions with homeowners and contractors, and sharing permitting data to inform targeted outreach. Engage with tenants and owners of multi-family homes and promote the BayREN multi-family program. Support BayREN and San Mateo County efforts to conduct outreach and education with local contractors to ensure they are updated on local code requirements and energy-efficient appliances and devices. If annual reporting and monitoring shows the City is not on track to reduce community-wide energy use as needed to meet its 2030 GHG reduction target, research, develop, and adopt a Building Efficiency Program that would go into effect in 2025 and require owners of commercial, industrial, and residential buildings 10,000 square feet or larger to prepare an annual energy and water benchmarking report and submit it to the City, to help community awareness of building performance and identify opportunities for energy- and water-efficiency retrofits. Research, consider, and implement an incentive program to encourage community members to reduce energy consumption. 								



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
2	K-12 Energy Conservation and Efficiency Education. Support San Mateo County's Environmental Literacy and Sustainability Initiative and Peninsula Clean Energy's K-12 energy educational resources in the San Carlos School District and county-wide.	<ul style="list-style-type: none"> Promote PCE's educational resources to students and parents each year and encourage community educators to incorporate clean energy and climate change discussions into their curriculum, including the Electric Eco Hero Student Activity Packet by partnering with PCE and school districts. Use City newsletters to spotlight community members, including K-12 teachers and students, who are working on climate change or sustainability and who are making a difference in our community. Increase energy educational resources in the San Carlos School District and Sequoia Union High School District by working with the San Mateo County Office of Education. Promote the San Mateo County Office of Education's Youth Climate Leadership Ambassadors program, as well as climate leadership fellowship programs for teachers, school administrators, and facilities managers. 	Supportive	Lead Department: City Manager Supporting Department: N/A	Peninsula Clean Energy San Mateo County Office of Education San Carlos School District Sequoia Union High School District	Schools	Immediate	Low	Low	General Fund Grant funding
3	City Facilities. Ensure energy conservation and efficiency in City buildings and facilities.	<ul style="list-style-type: none"> Initiate regular audits of existing City buildings and facilities to identify opportunities for energy conservation and efficiency upgrades or retrofits. By 2022, develop a capital project list and funding strategy to complete energy efficiency projects. Add projects to the City's Capital Improvement Program annually. Request funding through the City's budget process or as needed. Complete energy-efficiency capital projects on the list with support from San Mateo County, PCE, the BayREN ZNE Technical Assistance program, and other partners as appropriate. 	2030: 20 2050: 40	Lead Department: City Manager Supporting Department: Public Works	BayREN Peninsula Clean Energy San Mateo County Office of Sustainability	City Facilities	Near-term	Low	Low	General Fund Grant funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
<i>Goal 2: Transition to carbon-free energy sources</i>										
4	Electrification. Transition to electricity as the primary energy source citywide.	<ul style="list-style-type: none"> Identify and remove existing code, permitting, or other City requirements that present barriers to all-electric conversions of existing homes and businesses and consider incentives, such as permit streamlining or fee reductions, as feasible. Support targeted outreach efforts to owners of older properties (constructed in or before 1975) to support their electrification transition by working with San Mateo County Energy Watch to ensure they are aware of opportunities, incentives, and resources available to them. Encourage electrification retrofits in residential and commercial development by promoting financing programs through local organizations and agencies. Promote building electrification and retrofitting by working with local organizations and agencies to increase community awareness. Research and consider implementing an incentive program to encourage community members to transition to carbon-free energy sources. Promote and support opportunities for residents to test electric equipment, such as portable induction cooktops, to encourage transitioning from gas to electric appliances. Replace gas appliances in City facilities with electric models upon burnout of such devices, as feasible. 	<p>2030: 4,710</p> <p>2050: 31,770</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Building CDD - Planning</p>	<p>Peninsula Clean Energy Chamber San Mateo County San Mateo County Energy Watch</p>	<p>Existing development New development</p>	Immediate	High	High	<p>General Fund Grant funding Permit and impact fees Utility tariffs</p>
5	Building Codes. Advance electrification through local amendments to the California Building Code.	<ul style="list-style-type: none"> Partner with local industry organizations, community-based organizations, and regional partners to inform and educate community members about the 2021 All-Electric Reach Code requirements and community benefits. Evaluate, update, and re-adopt as needed an all-electric reach code upon each update to the California Building Code. 	<p>2030: 11,300</p> <p>2050: 6,440</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Building CDD - Economic</p>	<p>BayREN Peninsula Clean Energy</p>	<p>Existing development New development</p>	Near-term	High	Medium	<p>General Fund Permit and impact fees Utility tariffs</p>



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<ul style="list-style-type: none"> Explore and adopt, as feasible, local building code amendments requiring replacement of natural gas space and water heaters with electric models at end of life during the 2022 and successive Buildings Standards Code updates. If San Carlos is not on the trajectory to meet its 2030 GHG reduction target by 2025, identify and consider enacting requirements to further reduce natural gas use in existing buildings. 		Development CDD - Planning						
6	Rooftop Solar. Continue to support and increase participation in rooftop and onsite solar energy systems in the community and at City facilities.	<ul style="list-style-type: none"> Continue to participate in the SunShares program to increase rooftop and onsite solar energy systems in the community and at City facilities. Conduct community outreach and education to increase awareness of the benefits of installing solar. Continually update the City's Solar Permitting website to ensure materials are up to date and include all necessary information. Create an inventory of City buildings and facilities to assess the feasibility of placing solar on each building and facility, including their Sun Score, the size of installation each could hold, and preservation of existing tree canopies. 	2030: 10 2050: 0	Lead Department: City Manager Supporting Departments: CDD - Building CDD - Planning Public Works	BayREN Peninsula Clean Energy San Mateo County Office of Sustainability	Existing development New development	Near-term	Medium	High	General Fund Grant funding Permit and impact fees Utility tariffs
7	Peninsula Clean Energy. Continue to support and promote PCE as the community's official electricity provider with a goal to provide 100% carbon-free, renewable energy by 2025.	<ul style="list-style-type: none"> Encourage residents and businesses, especially large energy users, to opt into PCE's ECO100 (100% renewable energy) program. Encourage those not purchasing energy from PCE to do so. Partner with PCE on programs it develops in the future that benefit the San Carlos community. 	2030: 30 2050: 0	Lead Department: City Manager Supporting Departments: CDD - Building CDD - Planning	BayREN Peninsula Clean Energy Chamber San Mateo County	Existing development New development	Immediate	Low	Low	General Fund Utility tariffs

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
<i>Goal 3: Promote energy resilience</i>										
8	Battery Storage. Promote installation of small-scale onsite battery energy storage systems for existing and new development, including City facilities.	<ul style="list-style-type: none"> Explore opportunities to provide financial incentives to residents and business owners purchasing small-scale onsite battery energy storage systems for existing development by partnering with PCE and other community partners. Continue to participate in the SunShares bulk buying program to take advantage of financial assistance to purchase onsite battery storage systems. Work with PG&E on its efforts to prepare the community for power outages through battery storage programs and incentives, including the Self-Generation Incentive Program and related energy resilience efforts. 	<p>2030: 20</p> <p>2050: 0</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Building CDD - Planning</p>	BayREN Pacific Gas and Electric Peninsula Clean Energy	Existing development New development	Mid-term	Medium	Medium	General Fund Grant funding Permit and impact fees Utility tariffs
9	Grid Reliability. Explore opportunities to partner with PG&E and PCE to improve electrical grid reliability during PSPS events and other emergencies.	<ul style="list-style-type: none"> Provide alternative electricity options at designated community resource centers during planned PSPS events by working with PG&E. Install back-up power sources at key community facilities, prioritizing solar panels, battery storage, and microgrid systems where feasible, with fossil-fuel generators being used only as a last resort. Support efforts to reduce state and local regulatory barriers to microgrids. 	Supportive	<p>Lead Department: City Manager</p> <p>Supporting Departments: Public Works</p>	Pacific Gas and Electric Peninsula Clean Energy	Infrastructure	Mid-term	Low	Low	General Fund Grant funding Utility tariffs Bond funding
10	PSPS Response. Ensure the community is prepared during times of PSPS events and other emergencies.	<ul style="list-style-type: none"> Maintain the Public Safety Power Shutoff Community Guide on the City's website to inform residents and businesses how to prepare and navigate possible PSPSs and other disaster-related power outages. Encourage City partners to provide batteries to individuals that rely on life-sustaining medical equipment and medications that require refrigeration that can be negatively impacted by PSPSs by coordinating with PG&E, PCE, and the Center of Independence of Individuals with Disabilities. 	Supportive	<p>Lead Department: City Manager</p> <p>Supporting Departments: San Carlos/Redwood City Fire Department</p>	BayREN Pacific Gas and Electric Peninsula Clean Energy Center of Independence of Individuals with Disabilities	Community	Near-term	Low	Medium	General Fund Grant funding Utility tariffs



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<ul style="list-style-type: none"> Use San Mateo Alert (SMC Alert) and social media to notify people of pending PSPS events. Use the City's Zero-Power Communications Program to ensure those without power receive regular updates from the City during a power outage. 								
TRANSPORTATION AND LAND USE SECTOR										
<i>Goal 4: Promote sustainable development that reduces vehicle miles traveled</i>										
11	Transit-Oriented Development. Encourage development of mixed-use projects, higher-density housing, and job growth within the General Plan's recognized Transit-Oriented Development (TOD) corridor (Planning Areas 1, 2, and 3) while being mindful of surrounding uses.	<ul style="list-style-type: none"> Require that development within the TOD corridor maintains and improves the mobility of people and vehicles along and across the corridor through safety considerations such as separated sidewalks and bike lanes or traffic-calming measures. Establish and maintain land use patterns in the TOD corridor that will attract and serve riders of public transit, such as higher-density mixed-use buildings near existing high-frequency transit stops. Revise land use and development standards in the TOD corridor as needed to remove any barriers to appropriate higher-density development. 	<p>2030: 1,260</p> <p>2050: 1,890</p>	<p>Lead Department: CDD - Planning</p> <p>Supporting Departments: City Manager CDD - Building</p>	C/CAG	New development	Mid-term	Low	Low	General Fund Permit and impact fees
12	Active transportation. Prioritize bicycling and walking as safe, practical, and attractive travel options citywide, as directed by the Bicycle and Pedestrian Master Plan.	<ul style="list-style-type: none"> Establish standards requiring that active transportation improvements, including bicycle lanes, sidewalks, and supporting infrastructure as needed, will be constructed as a condition of approval for larger developments, including commercial and office development on the east side. Increase bicycle parking in publicly owned places, as feasible. Increase the bicycle parking requirement for commercial projects to promote cyclist safety, security, and convenience. Require large employers, including the City, to provide facilities that encourage bicycle 	<p>2030: 1,630</p> <p>2050: 1,570</p>	<p>Lead Department: Public Works</p> <p>Supporting Departments: City Manager CDD - Planning</p>	C/CAG	Transportation	Near-term	Low	Low	General Fund Grant funding Permit and impact fees Bond funding

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<p>commuting, including shower facilities and covered or indoor bicycle parking.</p> <ul style="list-style-type: none"> Actively promote walking and biking as safe modes of local travel, particularly for children attending local schools by partnering with the San Carlos School District Safe Routes to School Program. Support the San Carlos School District's crossing guard program. Promote traffic-calming methods on City streets, such as landscaped median barriers and traffic circles. Establish clear and convenient pedestrian rights-of-way with shade and minimal tripping hazards. Incorporate bicycle-friendly intersections and boulevards into street design, as recommended by the Bicycle and Pedestrian Master Plan. Support the construction of proposed bikeways and improvement areas, as outlined in the adopted Bicycle and Pedestrian Master Plan. Promote incentive programs to fund the purchase of bicycles or electric-assist bicycles for low-income community members. Make bicycles and electric-assist bicycles available for City employees for use on shorter business trips. Provide bicycle safety training and materials for drivers, bikers, and pedestrians. 								
13	Neighborhood Hubs. Encourage the establishment of "Neighborhood Hubs" (as defined by the General Plan) within existing residential neighborhoods to support	<ul style="list-style-type: none"> Examine zoning and land use designations that potentially limit the development of neighborhood hubs as currently allowed by the General Plan and Zoning Code and identify opportunities to encourage designation of neighborhood hubs, including amendments to the Zoning Code as appropriate. 	Supportive	<p>Lead Department: CDD - Planning</p> <p>Supporting Departments: City Manager CDD - Building CDD - Housing</p>	N/A	New development	Mid-term	Medium	Medium	General Fund Grant funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	neighborhood-serving small-scale retail and service uses, including small stores selling fresh and locally grown produce and basic daily goods.	<ul style="list-style-type: none"> Coordinate with community-based organizations to identify sites suitable for the development of neighborhood hubs. Research and consider establishing pilot neighborhood hubs, as described in the San Carlos General Plan. 								
14	Public Curbs. Assess opportunities in the downtown, mixed-use, office, and commercial areas to designate public curbs for passenger pick-up/drop-off in support of ridesharing.	<ul style="list-style-type: none"> Conduct studies and community outreach to better understand the use of public curbs in downtown, mixed-use, office, and commercial areas and to identify gaps and needs to support ridesharing and other curb uses that support mobility and opportunities to reduce vehicle emissions. Identify and implement pilot programs to improve effectiveness of public curb use and make pilot programs permanent, as appropriate. Regularly evaluate and revise the use of public curbs as situations change, including increased deployment of autonomous vehicles. 	Supportive	Lead Department: Public Works Supporting Department: CDD - Planning	C/CAG	Transportation	Mid-term	Medium	Medium	General Fund Grant funding
15	Public Transportation. Support improvements to public transit routes, services and facilities to facilitate longer distance travel.	<ul style="list-style-type: none"> Research and consider programs to support large employer-led shuttle services within San Carlos to connect their employees to public transit and core services. Explore encouraging or requiring shuttles to be all-electric. Work with SamTrans to improve service coverage, frequency, and operating hours. Support efforts by Caltrain to increase service frequency as part of the Caltrain Modernization Program. Support increased integration of Bay Area transit systems. 	2030: 2,750 2050: 7,190	Lead Department: Public Works Supporting Department: CDD - Planning	Caltrain SamTrans C/CAG MTC	Transportation	Near-term	Medium	High	General Fund Grant funding Bond funding
16	Public Spaces. Create and maintain accessible public spaces, including the full spectrum of the	<ul style="list-style-type: none"> Include elements such as wide, smooth sidewalks, good lighting, safe crosswalks, clear signage, curb bulb-outs, curb cuts, street furniture and trees, and traffic-calming measures that allow people of all ages and 	Supportive	Lead Department: Public Works Supporting Departments:	N/A	Community	Mid-term	High	Medium	General Fund Grant funding Bond funding

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO _{2e})	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	public realm: sidewalks, alleys, pedestrian paseos, pedestrian and bicycle paths, plazas, squares, and public gathering spaces.	<p>abilities to exercise and safely access public transportation, community centers, schools, and goods and services.</p> <ul style="list-style-type: none"> • Support initiatives in the Bicycle and Pedestrian Master Plan to identify and address barriers to safe or convenient walking, biking, and transit ridership from major residential areas to public areas of interest. • Continue efforts to implement the Bicycle and Pedestrian Master Plan with recognition of the plan as an important part of the City's overall strategy to reduce GHGs in the transportation sector. • Require new large-scale developments address transit, biking, and walking access as applicable through the City's discretionary review process. • Provide for an education program to residents and businesses and increased code enforcement to minimize vegetation that degrades access along public rights of way. 		City Manager CDD - Planning						
17	Vehicle Miles Traveled. Reduce community-wide transportation-related emissions per resident and employee, with an emphasis on reductions from existing and new development in the city's core commercial, office, and industrial areas, including development on the east side.	<ul style="list-style-type: none"> • Aid new and existing multi-family and commercial developments in implementing and expanding transportation demand management strategies. • Support General Plan goals and policies intended to reduce VMT for local and regional commute-related trips and personal trips, including constructing additional housing, as directed by the Housing Element, and to meet household size and income needs. • Explore revisions to the City's Transportation Demand Management ordinance as needed to achieve additional trip reductions. • Research and consider creative solutions to reduce VMT, such as employer commuter programs or adopting work from home policies for City employees. • Ensure that new development on the east side considers and implements strategies to reduce VMT and transportation-related emissions. 	<p>2030: 310</p> <p>2050: 400</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Planning Public Works</p>	Chamber San Mateo County Commuter.org	Transportation	Immediate	Medium	Medium	General Fund Grant funding Permit and impact fees



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
<i>Goal 5: Transition to low-carbon transportation</i>										
18	Electric Vehicles. Support residents and business owners to transition to electric and plug-in hybrid vehicles.	<ul style="list-style-type: none"> Increase the installation of electric vehicle charging infrastructure throughout San Carlos by participating in PCE's Electric Vehicle Ready Program and other existing or future programs. Ensure the City's electric vehicle infrastructure permitting procedures and requirements are consistent with state law, San Mateo County, and other San Mateo County cities to support standardization across communities. Provide incentives for electric vehicle and plug-in hybrid vehicle use by working with local, regional, and state partners and agencies like PCE and the BAAQMD. Work closely with owners of multi-family dwelling units to install electric vehicle charging stations. Work with partner agencies to conduct outreach to car owners and provide information about programs to aid them in the transition to electric vehicles. Ensure that new development on the east side includes EV charging stations for employees and other users. 	<p>2030: 24,440</p> <p>2050: 52,470</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Building CDD - Planning Public Works</p>	Bay Area Air Quality Management District Peninsula Clean Energy	Residents Businesses Visitors	Immediate	Low	Medium	General Fund Grant funding
19	Safe Routes to School. Continue to support the Safe Routes to Schools Program and reduction of GHG emissions related to school-related trips.	<ul style="list-style-type: none"> Promote "walk pools" or "walking buses" to increase the number of students who walk to school by partnering with school districts. Promote incentives to provide bicycles to low-income youth in the community by working with regional partners. Work with the San Carlos School District to continue supplemental funding of the crossing guard program, as feasible. 	<p>2030: 160</p> <p>2050: 390</p>	<p>Lead Department: Public Works</p> <p>Supporting Departments: City Manager CDD - Planning</p>	San Carlos School District San Mateo County Office of Education Sequoia Unified High School District	Schools Transportation	Near-term	Low	Low	General Fund



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
20	City fleet. Transition the City fleet to zero-emissions vehicles or low-carbon fuels, as feasible	<ul style="list-style-type: none"> Install electric vehicle chargers at City facilities as needed to provide sufficient chargers to City electric fleet vehicles. Adopt an “electric vehicles first” policy to ensure electric vehicles are purchased when non-electric City fleet vehicles, including light-, medium-, and heavy-duty trucks, need to be replaced, to the extent replacement vehicles are feasible. 	<p>2030: 230</p> <p>2050: 390</p>	<p>Lead Department: Public Works</p> <p>Supporting Department: City Manager</p>	San Mateo County Office of Sustainability	City fleet	Long-term	Medium	High	General Fund Grant funding
21	Car Sharing. Promote electric vehicle and low-carbon fuel car-sharing programs.	<ul style="list-style-type: none"> Research and consider establishment of a car-sharing program with electric or low-carbon fuel vehicles. Provide parking spaces for electric or low-carbon car-share vehicles at convenient locations accessible by public transportation. Work with car-share providers to ensure equitable access to electric or low-carbon car-share vehicles. Support, and as appropriate enforce, state regulations to mandate adoption of electric vehicles by TNC drivers. 	<p>2030: 5,310</p> <p>2050: 5,040</p>	<p>Lead Department: City Manager</p> <p>Supporting Department: Public Works</p>	N/A	Residents Businesses Visitors	Mid-term	Medium	Low	General Fund Grant funding
22	Micromobility. Facilitate micromobility options, including low-speed individually owned or shared, human-powered and electric bicycles, scooters, and skateboards, for short trips and last mile commutes.	<ul style="list-style-type: none"> Work with large business owners and public transit service providers, including Caltrain, to examine the feasibility of incorporating infrastructure to support micromobility devices at large businesses and public transit stops. Identify micromobility operators interested in providing service in San Carlos that is consistent with community values and expectations. Conduct a micromobility pilot program, ensuring that equitable access to micromobility vehicles is protected. 	<p>2030: 210</p> <p>2050: 210</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Planning Public Works</p>	Caltrain	Streets	Mid-term	Low	Low	General Fund Grant funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
OFF-ROAD SECTOR										
<i>Goal 6: Support pollution-free outdoor equipment</i>										
23	Clean-fuel construction and landscaping. Encourage hybrid and clean-fuel construction and landscaping equipment citywide.	<ul style="list-style-type: none"> Supply incentives for battery-operated or electric-powered landscaping equipment by working with regional partners, such as the BAAQMD and PCE. Consider requirements for hybrid or clean-fuel construction equipment as a condition of approval for new development when feasible. Continually track technological advances in clean-fuel construction and landscaping equipment. Require hybrid or clean-fuel construction and landscaping equipment in City contracts when feasible. 	<p>2030: 2,450</p> <p>2050: 2,740</p>	<p>Lead Department: City Manager</p> <p>Supporting Department: Public Works</p>	Bay Area Air Quality Management District Peninsula Clean Energy San Mateo County Office of Sustainability	Private and public equipment	Mid-term	Low	Medium	General Fund Grant funding
WASTE SECTOR										
<i>Goal 7: Become a zero-waste community</i>										
24	Zero-Waste City. Promote zero-waste initiatives in City operations and public events.	<ul style="list-style-type: none"> For municipal operations, establish a citywide zero-waste policy. Continue to implement and update the City's Environmental Purchasing Policy (EPP). Require recycling and composting as a condition of approval for public events at City facilities and/or permitted by the City. Research and consider a paperless policy at the City to reduce paper waste and support the expanded use of electronic documents for permit submittals, public hearing packets, and other public documents with exceptions as needed to meet accessibility needs of residents and stakeholders. 	<p>2030: 20</p> <p>2050: 10</p>	<p>Lead Department: City Manager</p> <p>Supporting Department: N/A</p>	N/A	City operations	Mid-term	Low	Low	General Fund Grant funding
25	Material Reuse and Repair. Support community-led initiatives to create a material reuse and repair program and continue to educate	<ul style="list-style-type: none"> Establish a source-reduction program that promotes options to rethink, refuse, reduce, reuse, regenerate, recycle, and recover materials by working with regional partners. Establish sharing, exchange, and reuse program(s), including fix-it clinics, swap events, second-hand markets, and shop local 	<p>2030: 330</p> <p>2050: 770</p>	<p>Lead Department: Public Works</p> <p>Supporting Department: City Manager</p>	Recology RethinkWaste	Community	Mid-term	Low	Low	General Fund Grant funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	community members about ways to make unwanted items available for reuse.	<p>campaigns by working with community and regional partners.</p> <ul style="list-style-type: none"> Promote awareness of life-cycle emissions of products through public outreach campaigns. 								
26	Compostable Food Service Ware. Require food facilities to use non-plastic, compostable food service ware, including straws, utensils, plates, bowls, cups, food trays, clamshells, and other containers when distributing prepared foods.	<ul style="list-style-type: none"> Develop and adopt an ordinance to prohibit specific types of single-use or disposable plastics, particularly for use by restaurants, caterers, and other commercial kitchens, by using the San Mateo County Disposable Food Service Ware Ordinance as a model. Engage with businesses using food packaging to determine barriers to switching to biodegradable or compostable food packaging and work to remove those barriers. 	Supportive	<p>Lead Department: City Manager</p> <p>Supporting Department: Economic Development</p>	Chamber San Mateo County	Residents Businesses Visitors	Near-term	Medium	Low	General Fund Grant funding
27	Construction and Demolition Waste. Increase the amount of waste recycled during construction and demolition of buildings.	<ul style="list-style-type: none"> Incentivize the recycling of construction debris by working with regional partners. Research and consider providing financial incentives to encourage the recycling of construction debris. Determine how certain construction materials may be donated and reused to help those in need by working with local community based organizations and construction companies. 	<p>2030: 460</p> <p>2050: 900</p>	<p>Lead Department: CDD - Buildings</p> <p>Supporting Departments: City Manager Public Works</p>	Recology RethinkWaste	Existing development New development	Mid-term	Low	Low	General Fund Grant funding Permit and impact fees



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
28	Composting. Partner with RethinkWaste to expand commercial and multi-family residential recycling and composting programs.	<ul style="list-style-type: none"> Provide educational outreach programs to multi-family residents, multi-family property owners, single-family homeowners, and business owners to support composting programs. Increase the share of San Carlos residents and business owners that have green compost carts or bins by working with waste haulers. Provide counter-top compost bins to residents of San Carlos by working with regional partners and community based organizations. Work with food service facilities to understand barriers to composting and work to mitigate these concerns. Encourage local restaurants to partner with food rescue organizations to divert food that would otherwise be thrown away to non-profit organizations for distribution to those in need. 	<p>2030: 8,400</p> <p>2050: 10,240</p>	<p>Lead Department: City Manager</p> <p>Supporting Departments: CDD - Planning Public Works</p>	Recology RethinkWaste	City facilities Existing development New development	Near-term	Medium	Low	General Fund Grant funding
29	Recycling. Work with waste haulers to reduce contamination of recyclables.	<ul style="list-style-type: none"> Improve educational efforts to community members concerning proper waste sorting. Improve sorting machinery and techniques by working with waste haulers. 	Supportive	<p>Lead Department: Public Works</p> <p>Supporting Department: City Manager</p>	Recology RethinkWaste	Waste haulers	Near-term	Low	Low	General Fund Grant funding
30	Sustainable Food Consumption. Promote awareness of carbon-free and sustainable food consumption, materials, and consumer products.	<ul style="list-style-type: none"> Support local and regional sustainable food sources, including community gardens, home vegetable and fruit gardening, farmers markets, food cooperatives, and community-based efforts to grow and share locally grown food. Support state and regional efforts to prepare updated consumption-based GHG inventories and related analyses. 	Supportive	<p>Lead Department: City Manager</p> <p>Supporting Department: CDD - Planning</p>	N/A	Community	Mid-term	Low	Low	General Fund Grant funding

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
WATER AND WASTEWATER SECTOR										
<i>Goal 8: Reduce community-wide water use</i>										
31	Water-efficient retrofits. Encourage water-efficient retrofits of existing buildings by working with water providers and regional agencies.	<ul style="list-style-type: none"> Partner with BayREN to support the BayREN Water Upgrades Save program to encourage water conservation at municipal facilities and in the community. Publicize available incentives and low-cost solutions to water-efficiency retrofits in existing buildings. 	2030: 30 2050: 50	Lead Department: Public Works Supporting Departments: City Manager CDD - Building	BayREN Water providers	Existing development	Near-term	Low	Low	General Fund Grant funding Permit and impact fees
32	Water-wise Landscaping. Promote drought-tolerant and firewise landscaping.	<ul style="list-style-type: none"> Develop a native, drought-tolerant, and fire-resistant landscaping list and require new development or redevelopment to use this list in landscaping plans. Enforce and update the Water-Efficient Landscaping Ordinance to reduce outdoor water use. 	2030: Less than 10 2050: 0	Lead Department: City Manager Supporting Departments: CDD - Building CDD - Planning Fire Department	N/A	Existing development New development	Near-term	Low	Low	General Fund Grant funding Permit and impact fees
33	Graywater and Recycled Water. Promote graywater and recycled water systems.	<ul style="list-style-type: none"> Update materials for homeowners and business owners to educate them on the onsite potential of graywater and recycled water systems. Explore the feasibility of citywide graywater and recycled water systems. Offer incentives for graywater, rainwater catchment, and other on-site water reuse systems in partnership with water agencies. Determine how San Carlos can partner with Redwood City to use its recycled water, including reestablishing the community recycled water distribution program at the Corporation Yard. 	2030: 10 2050: 20	Lead Department: City Manager Supporting Departments: CDD - Building CDD - Planning City Manager	N/A	Existing development New development	Mid-term	Medium	Medium	General Fund Grant funding Permit and impact fees
ADAPTATION AND RESILIENCE SECTOR										
<i>Goal 9: Become a low-carbon, resilient community</i>										
34	Low-Carbon Economy. Encourage a low-carbon, sustainable economy that moves away	<ul style="list-style-type: none"> Actively work across City departments and regional agencies to incentivize and attract businesses and industries that provide good living-wage jobs while not increasing GHG emissions. 	Supportive	Lead Department: City Manager	Workforce development agencies	Businesses Community	Immediate	Low	Low	General Fund Grant funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	from industries reliant on fossil fuels and supports low- to no-carbon industries, products, and services.	<ul style="list-style-type: none"> Amend the purchasing policies of the City to include a preference for contractors and vendors that can demonstrate corporate sustainability and CAPs and commitment to incorporate best practices into its operations, when appropriate. Encourage San Mateo County to divest City employee pension fund investments in fossil fuel companies. Expand carbon-free and green job opportunities in San Carlos by working with workforce development agencies. Encourage the use of sustainable materials, including low-carbon concrete, in new development and renovation projects. 		Supporting Departments: CDD - Economic Development CDD – Planning						
35	Carbon Offset. Explore local and regional opportunities to offset carbon emissions that cannot be reduced to zero.	<ul style="list-style-type: none"> Explore the feasibility of investing in local, regional, or other in-state carbon offsets if the City is not able to achieve carbon neutrality through implementation of this CMAP with a preference to explore and implement feasible options to offset emissions through City operations or onsite at City facilities, including City open spaces, parks, and urban forests before committing to other local, regional, or in-state carbon offset programs. Identify local, regional, or in-state carbon offset opportunities for use by larger businesses in the community after implementation of feasible local actions to reduce GHG emissions. Promote local carbon sequestration or GHG reduction programs led by local or regional organizations as opportunities for carbon offsets after implementation of feasible actions to reduce individual, household, or business GHG emissions. Work with new large-scale developments to explore commitments to carbon neutrality. 	Supportive	Lead Department: City Manager Supporting Departments: CDD - Economic Development	N/A	Community	Mid-term	Medium	Medium-to-high	General Fund Grant funding Bond funding

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
36	Open Space Preservation. Preserve existing open space by supporting urban infill.	<ul style="list-style-type: none"> Continue to maintain natural resource protections on existing open space in San Carlos and partner with San Mateo County and surrounding jurisdictions to provide similar protections in surrounding areas. Regularly identify underutilized parcels in existing infill areas to support increased housing and business opportunities consistent with the adopted Housing Element. 	Supportive	Lead Department: CDD – Planning Supporting Departments: CDD - Building City Manager	N/A	New development	Immediate	Low	Medium	General Fund Grant funding Bond funding Permit and impact fees
Goal 10: Prepare for, reduce vulnerability, and adapt to changing climate conditions										
37	Heat Island Effect. Minimize the urban heat island effect.	<ul style="list-style-type: none"> Develop and enforce building code requirements for cool roofs and light color materials for roads, driveways, sidewalks, and roofs as part of retrofits and repaving activities to increase reflection of sunlight. Increase the tree canopy by assessing existing tree canopy cover and plant health to identify priority areas and then develop a tree management and planting program, ensuring that recommended tree species are compatible with the City’s current and future climate conditions, City policy, and other community priorities. Ensure that new and retrofitted large hardscaped areas, such as parking lots, incorporate mature trees consistent with the City’s street tree planting palette and other green infrastructure consistent with the Green Infrastructure Plan that is appropriate for current and future climate conditions. 	Supportive	Lead Department: CDD – Planning Supporting Departments: CDD - Building Public Works	N/A	City facilities Existing development New development	Mid-term	Medium	Low	General Fund Grant funding Bond funding
38	Community Resilience Hubs. Establish a Community Resilience Hub network that includes a virtual resilience hub and a network of equitably located	<ul style="list-style-type: none"> Identify and map existing community facilities, such as libraries, gymnasiums, community centers, or auditoriums, that can serve as community resilience hubs and support vulnerable populations during hazard events, including extreme heat and poor air quality events. Establish standardized temperature or air quality triggers for when they will open. 	Supportive	Lead Department: City Manager Supporting Departments: CDD - Planning Fire Department Public Works	N/A	Community	Near-term	Medium	Low	General Fund Grant funding Bond funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	Community Resilience Hubs at existing or new community facilities.	<ul style="list-style-type: none"> Establish a virtual resilience hub with detailed and up-to-date information about preparing for natural disasters, notifications and alerts related to public safety, virtual gathering and information-sharing spaces, and other resources to help improve community safety and resilience. A virtual resilience hub can be based on the City’s website but should be linked to other websites or virtual resources supported by community-based organizations, neighborhoods, businesses, and residents throughout the community. Conduct a comprehensive energy resiliency needs assessment at critical City facilities and community resilience hubs and pursue funding opportunities to meet the identified needs. Install energy storage and establish backup power and water resources at existing (as feasible) or potential new critical facilities, emergency shelters, resilience hubs, and cooling centers in case of power outages. In coordination with local and regional emergency management services host an annual “home showcase” event where San Carlos community members can showcase resilient features of their homes and businesses, including but not limited to, graywater systems, solar and battery storage installations, electric-vehicle charging, and drought-resistant landscaping. 								
39	Sea Level Rise. Develop regionally coordinated sea level rise adaptation measures and programs in collaboration with San Mateo County Flood and Sea Level	<ul style="list-style-type: none"> Collaborate with the Flood and Sea Level Rise Resiliency District, nearby cities, City/County Association of Governments, San Francisco Bay Conservation and Development Commission, utilities, affected agencies, east side property owners, and other entities to create a public-private partnership to develop, fund, and implement a regionally coordinated sea level rise adaptation plan. 	Supportive	Lead Department: City Manager Supporting Department: CDD - Planning	Association of Bay Area Governments San Francisco Bay Conservation and Development Commission BayAdapt C/CAG Flood and Sea Level	Community	Long-term	Low	Low	General Fund Grant funding Bond funding



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
	Rise Resiliency District, ABAG, BCDC, BayAdapt, and other regional entities.	<ul style="list-style-type: none"> Conduct a managed retreat feasibility study that identifies specific assets at risk and the cost of facilitating a managed retreat by partnering with the Adapting to Rising Tides Program, OneShoreline, neighboring cities, and community-based organizations. Integrate nature-based solutions into sea level rise mitigation and adaptation strategies, including the construction of living horizontal levees rather than artificial levees, where possible. Incorporate the Sea Level Rise Projection Map (included in this CMAP as Figure 10 and Figure 11) into the City's geographic information system for use by City staff, project applicants, and the public, for identification of areas at risk of increased flooding and Sea level rise. Integrate sea level rise projections and analyses into applicable City development and environmental review processes. Review and update the sea level rise data at least once every five years. Consider developing and adopting a Sea level Rise Overlay District or Zone with associated land use regulations for site planning and minimum construction elevations that supports appropriate mitigation and adaptation in response to sea level rise data, in coordination with San Mateo County Flood and Sea level Rise Resiliency District, OneShoreline, and neighboring jurisdictions. Provide information to property owners and the public on areas subject to increased flooding due to sea level rise by working with neighborhood associations, realtors, community-based organizations, and property owners to disclose potential property risks and mitigation options. 			Rise Resiliency District OneShoreline					



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
40	Disaster Preparedness Information. Provide disaster preparedness information in English, Spanish, Chinese, and other relevant languages in the community.	<ul style="list-style-type: none"> Work with local non-profits and faith-based organizations to maximize disaster preparedness outreach to individuals who may be unaware of City or County programs and services. Inform residents and businesses about risks of extreme heat and the resources available to reduce outdoor exposure during extreme heat events. Coordinate with the San Mateo County Office of Emergency Services to continue to provide alerts about potential, developing, and ongoing emergency situations in relevant languages and formats appropriate to residents in the county through the SMC Alert system, including at-risk populations identified in the San Carlos Climate Change Vulnerability Assessment. Develop a citywide evacuation plan, delineating evacuation route options, capacity, safety, and viability under different hazard scenarios and where possible, alternative routes where congestion or road failure could occur. Assess evacuation access throughout San Carlos and implement improvements as needed. Support efforts by City partners, including Community Emergency Response Team, neighborhood watch groups, and the Community Foundation of San Carlos, to support residents who may need evacuation assistance. Coordinate with SamTrans or other regional partners to assist with evacuation efforts for those with limited mobility. Encourage residents to have a plan for evacuation, particularly those with limited mobility. 	Supportive	Lead Department: City Manager Supporting Department: Fire Department	CAL FIRE San Mateo County Sheriff's Office of Emergency Services	Community	Mid-term	Low	Low	General Fund Grant funding

Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<ul style="list-style-type: none"> Continue to host preparedness workshops for various climate hazards and emergency events. 								
41	Community Wildfire Protection Plan. Develop a Community Wildfire Protection Plan, in coordination with San Mateo County Fire Department and CAL FIRE.	<ul style="list-style-type: none"> Collaborate with FIRE SAFE San Mateo County to develop a citywide Community Wildfire Protection Plan (CWPP) that is consistent with the San Mateo County CWPP. Apply for grants and other funding mechanisms to retrofit cooling and ventilation systems at public buildings to support use of these facilities as Community Resilience Hubs and/or refuge sites for residents during periods of unhealthy air quality caused by excessive smoke from wildfires. 	Supportive	Lead Department: City Manager Supporting Departments: CDD - Planning Fire Department	CAL FIRE FIRE SAFE San Mateo County San Mateo County Fire Department	Community	Mid-term	Medium	Low	General Fund Grant funding
42	Vegetation Management. Promote vegetation management and fire-resistant landscape design on residential properties and businesses within the wildland-urban interface and very high fire severity zone.	<ul style="list-style-type: none"> Work with communities and neighbors to address defensible space within 100 feet of all structures or improvements on properties within mapped fire hazard zones. Establish a Neighborhood Chipper Program in San Carlos in partnership with FIRE SAFE San Mateo. Support the continued vegetation management of City parks by using goat grazing and hand crews to reduce the amount of dead and dying woody debris. Develop a fire-safe education program to provide information about state fuel modification, defensible space, roads, water, signing, and other fire-safe regulations in collaboration with the Redwood City Fire Department, San Mateo County Fire, CAL FIRE, and FIRE SAFE San Mateo. Continue code enforcement to ensure effective vegetation management by property owners in high fire hazard severity zones. 	Supportive	Lead Department: City Manager Supporting Departments: CDD - Planning Code Enforcement Fire Department	CAL FIRE County Fire FIRE SAFE San Mateo County	Community	Mid-term	Low	Low	General Fund Grant funding Permit or impact fees



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
43	Fire Risk Reduction Assessment. Develop a fire risk reduction assessment that can be used by project applicants and City staff in the development review process to identify and reduce or avoid potential harm through site design or other mitigation techniques within the very high or high fire severity zones.	<ul style="list-style-type: none"> Update the San Carlos Municipal Code to require new development in the City's high fire hazard severity zones and wildland-urban interface areas to prepare and submit a fire risk reduction assessment. Coordinate with the Fire Department to conduct fire-safe landscaping inspections and make recommendations for fixing vegetation hazards. 	Supportive	Lead Department: City Manager Supporting Department: Fire Department	CAL FIRE County Fire FIRE SAFE San Mateo County	Community	Mid-term	Medium	Low	General Fund Grant funding Permit or impact fees
44	Medical and Emergency Services. Coordinate with local medical providers to ensure that low-cost medical and emergency medical services are available to all residents in the city.	<ul style="list-style-type: none"> Ensure that shelters are available for persons experiencing homelessness during extreme events and other highly hazardous conditions by coordinating with San Mateo County Human Services Department. Ensure that the local homeless population is aware of these resources. Publicize information about free emergency medical care to community members, focusing on community members who are under-resourced or have been underserved by medical services. 	Supportive	Lead Department: City Manager Supporting Department: N/A	Kaiser San Mateo County Human Services Department San Mateo County Public Health Department Sequoia Hospital Palo Alto Medical Foundation	Community	Mid-term	Low	Low	General Fund Grant funding
45	Flooding and Pond Water. Reduce flooding and ponded water in the city by collaborating with local and regional flood-protection agencies.	<ul style="list-style-type: none"> Coordinate with the County Flood and Sea Level Rise Resiliency District to increase green infrastructure and ensure that flood channels and storm drainage systems are regularly assessed, cleaned, maintained, and upgraded to minimize flood risks to existing development. Identify and remedy poor drainage areas to reduce disease risk from stagnant water. Expand outreach programs to educate communities about potential increases in vector-borne diseases from stagnant water. 	Supportive	Lead Department: City Manager Supporting Department: CDD - Planning	San Mateo County Flood and Sea Level Rise Resiliency District San Mateo County Mosquito and Vector Control District	Community	Long-term	Low	Low	General Fund Permit or impact fees Capital Improvement Program



Strategy No.	Strategy	Action(s)	GHG Reductions (MTCO ₂ e)	Responsible Departments	Partner Agencies/ Organizations	Applicability	Timeframe	Resource Needs	Estimated Cost Range	Funding Options
		<ul style="list-style-type: none"> Increase development setbacks from creeks to increase permeable surfaces and reduce damage from stormwater. 								



7. GLOSSARY

Adaptation. Making changes in response to current or future conditions (such as the increased frequency and intensity of climate-related hazards), usually to reduce harm and to take advantage of new opportunities.^{34, 35}

Adaptive Capacity. The “combination of the strengths, attributes, and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities.”³⁶

Assets. A valued feature of a community that may be harmed by climate change. Assets may include buildings, infrastructure, community services, ecosystems, and economic drivers.

Carbon Neutral. Reducing GHG emissions to zero, either by entirely eliminating all GHG emissions or by balancing out all remaining GHG emissions through carbon removal practices to that the “net” emissions are zero.

Climate Change. A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.

Climate Justice. The concept that no group of people should disproportionately bear the burden of climate impacts or the costs of mitigation and adaptation.³⁷

Disadvantaged Communities. Areas disproportionately affected by environmental pollution and other hazards that can lead to negative public health effects, exposure, or environmental degradation, or with concentrations of people that are of low income, high unemployment, low levels of homeownership, high rent burden, sensitive populations, or low levels of educational attainment. Criteria are determined by California legislation.^{38,39}

Equity. The state in which each individual or group is allocated the resources needed to reach an equal outcome.⁴⁰

Exposure. The presence of people, infrastructure, natural systems, and economic, cultural, and social resources in areas that are subject to harm.⁴¹

Extreme Event. When a weather or climate variable exceeds the upper or lower thresholds of its observed range.^{42, 43}

Frontline Communities. Term used by communities to self-identify as places that experience the impacts of issues such as environmental pollution, climate change, and the economic crisis first and most severely. These communities are most often communities of color and low income.⁴⁴

Hazard. An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural losses, damage to the environment, interruption of business, or other types of harm or loss.⁴⁵

Hazard Mitigation. Sustained action taken to reduce or eliminate the long-term risk to human life and property through actions that reduce hazard, exposure, and vulnerability.⁴⁶

Impact (Climate Impact). The effects (especially the negative effects) of a hazard or other conditions associated with climate change.

Resilience. The capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience. Community resilience is the ability of communities to withstand, recover, and learn from past disasters to strengthen future response and recovery efforts.

Risk. The potential for damage or loss created by the interaction of hazards with assets such as buildings, infrastructure, or natural and cultural resources.

Sensitivity. The level to which a species, natural system, or community, government, etc., would be affected by changing climate conditions.⁴⁷

Social Vulnerability. The susceptibility of a given population to harm from exposure to a hazard, directly affecting its ability to prepare for, respond to, and recover.^{48, 49}

Susceptibility. A person or population's potential for vulnerability due to demographic, socioeconomic, and geolocation characteristics.

Vulnerability. Climate vulnerability describes the degree to which natural, built, and human systems are susceptible "...to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt."⁵⁰

Vulnerability Assessment. An analysis of how a changing climate may harm a community and which elements—people, buildings and structures, resources, and other assets—are most vulnerable to its effects based on an assessment of exposure, sensitivity, the potential impact(s), and the community's adaptive capacity.

Vulnerable Communities. Vulnerable communities experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. These disproportionate effects are caused by physical (built and environmental), social, political, and/or economic factor(s), which are exacerbated by climate impacts.⁵¹

Vulnerable Populations. Vulnerable populations include, but are not limited to, women, racial or ethnic groups, low-income individuals and families, individuals who are incarcerated or have been incarcerated, individuals with disabilities, individuals with mental health conditions, children, youth and young adults, seniors, immigrants and refugees, individuals who are limited English proficient (LEP), and lesbian, gay, bisexual, transgender, queer, and questioning (LGBTQQ) communities, or combinations of these populations.^{52, 53}





CMAP APPENDICES

Appendix A – GHG Technical Appendix

Appendix B – Community and Stakeholder Engagement

Appendix B.1. Climate Mitigation and Adaptation Plan - Phase 1 Public Engagement Summary

Appendix B.2. Climate Mitigation and Adaptation Plan - Phase 2 Public Engagement Summary

Appendix C – Vulnerability Assessment





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Appendix A. GHG Technical Appendix

This technical appendix provides details for the greenhouse gas (GHG) emissions inventory and forecast. It summarizes the data sources, assumptions, and performance metrics used to assess the potential for GHG savings from state, regional, and local existing and planned efforts and the community-wide GHG emission-reduction strategies included in San Carlos' Climate Mitigation and Adaptation Plan (CMAP). Chapter 1 of the CMAP provides an introduction, including purpose of the plan, regulatory framework, and information on plan preparation. Chapter 2 of the CMAP contains a summary of the GHG emissions inventory and forecast. Chapter 3 describes San Carlos' vulnerability to climate change. Chapters 4 and 5 provide the City's GHG emission reduction and adaptation pathway, and Chapter 6 provides the CMAP's implementation program.

Technical Data for Inventory and Forecast

The GHG emission-reduction strategies in the CMAP are based on San Carlos' GHG emission inventory and forecast. The inventory and forecast identify past and projected future GHG emissions attributed to San Carlos. The inventory and forecast each consist of two pieces:

- § A community-wide GHG inventory and forecast, which identifies GHG emissions that result from activities of residents, employees, and other community members occurring within the community. Examples include residents driving cars, homes using water, and businesses using electricity.
- § A City operations GHG inventory and forecast, which summarizes emissions that are a direct result of San Carlos' government operations. Examples include electricity and water used in City buildings or the fuel used for City vehicles.

The community-wide GHG emissions inventory covers the calendar years 2005, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, and 2018. The City operations GHG emissions inventory covers the calendar years 2015, 2017, and 2018. Both the community-wide and City operations forecast projected GHG emissions for the years 2020, 2030, and 2050.

Prior to developing the CMAP, San Carlos worked with the San Mateo County-wide Regional Climate Action Planning Suites (RICAPS) to develop community-wide inventories for the calendar years 2005 and 2010 through 2017, and to prepare the City operations inventories. As part of the CMAP work, City staff revised these existing inventories to be consistent and to use current methods and data sources and prepared a new 2018 community-wide inventory.

Inventory Methods

Activity Data and Emissions Factors

GHG emissions are generated by various activities that are largely commonplace in daily life. Some daily activities release GHG emissions in the location of the activity, such as gases released anytime a car is driven. On the other hand, some activities cause GHG emissions to be released elsewhere, such as someone using electricity to power their home, which generates GHG emissions in the location of the power plant that supplies the power, and not in the home itself. Therefore, San Carlos must consider the GHG emissions caused by activities attributed to the community, including GHG emissions generated both inside and outside its jurisdictional boundaries. Such records, called activity data, may be directly measured or may be modeled.

To prepare the inventory, City staff combined data on the amount of activity occurring in San Carlos or otherwise attributable to the community or to City operations with information on the amount of GHG emissions produced per unit of activity, called an emissions factor. For example, an emissions factor for on-road transportation would identify the amount of GHGs produced per VMT (vehicle miles traveled). When combined with records of the total VMT attributable to San Carlos, this allows the City to identify the GHG emissions associated with on-road vehicle use. These emission factors may be provided by utility companies, state or regional agencies, inventory guidance documents, or other sources. They may also be estimated if direct records are not available.

Protocols

A series of guidance documents, called protocols, provide recommendations on how to adequately assess GHG emissions. The project team prepared the new GHG inventories and updates to past GHG inventories consistent with the guidance in widely adopted, standard protocol documents. These protocols provide guidance on what activities will be evaluated in the GHG inventories and how emissions from those activities will be measured. Using standard methods also allows for an easy comparison of GHG emission levels across multiple years and communities. GHG inventories are estimates of GHG emissions based on these standard methods and verified datasets. While they are not direct measurements of GHG emissions, the use of the standard methods identified in the protocol, in combination with accurate data from appropriate sources, allows GHG inventories to provide reliable estimates of local emission levels.

San Carlos' City operations GHG inventory relies on the Local Government Operations Protocol (LGOP), which was first developed in 2008 and was updated in 2010. The LGOP is a tool for accounting and reporting GHG emissions of local government (municipal) operations and is used throughout California and the United States. The LGOP includes guidance from several existing programs as well as the state's mandatory GHG reporting regulations.



The community-wide GHG inventory uses the United States Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), which was first developed in 2012 and updated in 2019. The California Governor’s Office of Planning and Research encourages cities and counties to follow the U.S. Community Protocol for community-wide GHG emissions.

Units of Measurement

These GHG inventories assess emissions in a unit called carbon dioxide equivalent (CO_{2e}), which is a combined unit of all GHGs analyzed in the inventory. As different GHGs have different effects on the processes that drive climate change, CO_{2e} is a weighted unit that reflects the relative potency of the different GHGs, known as the Global Warming Potential (GWP). These inventories report amounts of GHGs in metric tons of CO_{2e} (MTCO_{2e}), equal to 1,000 kilograms or approximately 2,205 pounds.

The GHG inventories for the San Carlos CMAP use the most recent available GWPs, provided by the Intergovernmental Panel on Climate Change as part of the 2013 Fifth Assessment Report. Table A-1 shows the GWPs for the GHGs included in this inventory.

Table A-1. GWPs by GHG

Gas	Fifth Assessment Report GWP
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	28
Nitrous oxide (N ₂ O)	265

Inventory Sectors

Sectors are the sources of GHG emissions assessed in an inventory. Most sectors include smaller categories of activity data and GHG emissions, known as subsectors. The community-wide GHG emissions inventory includes the following sectors:

- § **Residential Energy** GHG emissions are those that residential units generate from the use of electricity and natural gas.
- § **Non-residential Energy** includes GHG emissions from electricity and natural gas use in non-residential properties.
- § **Transportation** GHG emissions are those created by on-road transportation, such as driving a car, in terms of VMT.
- § **Off-road Equipment** includes GHG emissions from equipment with a motor that are not driven on roads, such as tractors for construction or equipment used for landscape maintenance.

- § **Rail** includes GHG emissions from both the Caltrain and freight trains.
- § **Stationary Sources** are those GHG emissions from large industrial sites, commercial businesses, warehouses, or power plants.
- § **Solid Waste** includes the GHG emissions released from trash collected in the City of San Carlos and transported to a landfill elsewhere.
- § **Water and Wastewater** accounts for the electricity used to transport every gallon of water or wastewater.
- § **Land Use and Sequestration** includes GHG emissions absorbed and stored in trees and soils.

The City operations GHG emissions inventory includes the following sectors:

- § **Energy** includes the GHG emissions of electricity, natural gas, and propane used to power City buildings, facilities, and operations.
- § **Commute** covers GHG emissions that result from the total annual miles that City staff drive to get to and from work.
- § **Fleet** includes the GHG emissions released by City vehicles based on the total gallons of fuel used.
- § **Solid Waste** accounts for the GHG emissions released from the collection of trash at City buildings and facilities, which are transported to a landfill elsewhere.
- § **Water and Wastewater** accounts for the energy used to transport every gallon of water and wastewater to and from City buildings and facilities.
- § **Refrigerant** includes the amounts of refrigerants used to refill air conditioners in City buildings and vehicles.

Community Inventory Results

San Carlos' GHG emissions totaled 212,600 MTCO_{2e} in 2005, declining to 160,250 MTCO_{2e} in 2018 (a decrease of 25 percent). In all years, transportation sector remained the largest source of GHG emissions in San Carlos, hovering around 41 percent from 2005 to 2015, rising to 46 percent in 2016 and to 47 percent by 2018.

The transportation sector was followed by the residential and non-residential energy sectors as the second and third dominant emitters, respectively. Residential energy hovered between 23 and 25 percent from 2005 to 2014, declining slightly in more recent years to between 20 and 21 percent. Non-residential energy was quite similar with average proportions of total GHG emissions between 22 and 24 percent between 2005 and 2015, until the share of non-residential GHG emissions dropped to 18 percent in 2016. The share of non-residential energy GHG emissions decreased 1 percent per year between 2016 and 2018, resulting in a total of 16 percent of community-wide GHG emissions in 2018.



Off-road equipment and solid waste were the next largest source of GHG emissions in San Carlos, each providing approximately 5 to 8 percent of community-wide emissions. Both the rail and water and wastewater sectors remained at approximately 1 percent between 2005 and 2018. Finally, stationary sources, the lowest emitter of GHG emissions in San Carlos, represented less than 1 percent of emissions for all years except for 2017, when stationary sources were responsible for approximately 3 percent of emissions.

Table A-2 shows the community-wide GHG emissions by sector for 2005 and 2018 and the change in emissions between these years.

Table A-2. Community-wide GHG Emissions: Percentage Change Between 2005 and 2018 by Community-wide Sector

Sector	2005	2018	Percentage Change 2005 to 2018
Residential Energy	49,030	33,220	-32%
Non-residential Energy	51,800	25,310	-51%
Transportation	87,420	75,120	-14%
Off-road Equipment	11,180	12,540	12%
Rail	0	1,150	-4%
Stationary Sources	0	0	0%
Solid Waste	13,530	12,290	-9%
Water and Wastewater	0	980	-17%
Land Use and Sequestration	-360	-360	0%
Total Annual MTCO_{2e}	212,600	160,250	-25%

Table Notes:

Due to limited data availability, 2005 GHG emissions for rail, stationary sources, and water and wastewater were not available. Stationary source GHG emissions for 2018 were also not available. All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

The sectors that experienced the largest decrease in annual GHG emissions are residential and non-residential energy, which reduced by 32 and 51 percent, respectively. This is primarily due to the introduction of Peninsula Clean Energy (PCE) service in November 2016. PCE supplies electricity to most customers in San Carlos and uses sources of electricity that emit fewer GHGs than electricity supplied from Pacific Gas and Electric Company (PG&E). As a result of PCE beginning operations, GHG emissions associated with electricity use have declined substantially. Improvements in energy efficiency have reduced the amount of electricity and natural gas use in San Carlos despite a growing population, which has also contributed to reduce energy related GHG emissions.



The second sector to experience the largest decrease was water and wastewater at a decrease of 17 percent, also due to cleaner sources of energy being used to process and treat water and wastewater.

The transportation, solid waste, and rail sector GHG emissions declined as well. The transportation sector saw a GHG emission decrease of 14 percent, primarily because of the increase of fuel-efficient and electric vehicles. Solid waste and rail experienced decreases of 9 and 4 percent, respectively.

The only sector to experience an increase in GHG emissions is off-road equipment. GHG emissions from this sector rose by 12 percent. Off-road equipment GHG emissions increased due at least in part to an increase in construction activity and a growing population.

GHG emissions associated with land use and sequestration remained constant, as there are no records of undeveloped natural land being developed in San Carlos during this period.

Sector Details

Residential Electricity

San Carlos' GHG emissions from residential electricity totaled approximately 4,060 MTCO₂e in 2018, compared to 16,190 MTCO₂e in 2005, a decline of 75 percent. While residential electricity use has fallen approximately 13 percent over this period due to increases in energy efficiency, much of the decline in emissions is due to electricity coming from cleaner sources. This trend accelerated in 2016, when most electricity used in San Carlos started being supplied by PCE, which uses a cleaner mix of energy sources than PG&E. Table A-3 provides a breakdown of the activity data and GHG emissions for residential electricity by each individual year included in the updated community inventory.



Table A-3. Residential Electricity GHG Emissions
2005–2018 by Subsector

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (kWh)</i>					
Residential Electricity PG&E	73,001,420	74,949,010	66,844,910	1,632,460	-97%
Residential Electricity PCE	0	0	0	62,109,800	—
Residential Total	73,001,420	74,949,010	66,844,910	63,742,260	-13%
<i>GHG Emissions (MTCO_{2e})</i>					
Residential Electricity PG&E	16,190	15,210	12,410	160	-99%
Residential Electricity PCE	0	0	0	3,900	—
Residential Total	16,190	15,210	12,410	4,060	-75%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Residential Natural Gas

GHG emissions from residential natural gas use totaled approximately 29,170 MTCO_{2e} in 2018, compared to roughly 32,840 MTCO_{2e} in 2005, a decrease of 11 percent. This decrease in natural gas GHG emissions is largely due to improvements in energy efficiency of natural gas appliances and potential changes in heating demand such as shifts in weather patterns that reduce demand for home heating. Table A-4 provides a breakdown of the activity data and GHG emissions for residential natural gas by each individual year included in the updated community-wide GHG inventory.

Table A-4. Residential Natural Gas GHG Emissions, 2005–2018

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (therms)</i>					
Residential Natural Gas	6,175,740	6,493,230	4,984,720	5,485,490	-11%
<i>GHG Emissions (MTCO_{2e})</i>					
Residential Natural Gas	32,840	34,530	26,510	29,170	-11%

Table Note: All numbers are rounded to the nearest 10.

Non-residential Electricity

San Carlos' GHG emissions from non-residential electricity, including GHG emissions from direct access electricity totaled approximately 5,980 MTCO_{2e} in 2018, compared to approximately 34,550 MTCO_{2e} in 2005, a decline of 75 percent. While non-residential electricity use has fallen approximately 31 percent over this period due at least in part to increases in energy efficiency, the rest of the decline in GHG emissions is due to electricity coming from cleaner sources. As mentioned above, this trend accelerated in 2016, when PCE started to supply electricity in San Carlos, which uses a cleaner mix of energy sources than PG&E. Table A-5 provides a breakdown of the activity data and emissions for non-residential electricity by each year included in the updated community-wide inventory.



Table A-5. Non-residential Electricity GHG Emissions 2005–2018 by Subsector

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (kWh)</i>					
Non-residential Electricity PG&E	155,750,230	108,909,110	112,478,910	14,990	-99%
Non-residential Electricity PCE	0	0	0	95,202,320	—
Direct Access Electricity	0	14,543,350	22,071,670	12,976,610	—
Non-residential Total	155,750,230	123,452,460	134,550,580	108,193,910	-31%
<i>GHG Emissions (MTCO_{2e})</i>					
Non-residential Electricity PG&E	34,550	22,100	20,880	Less than 10	-99%
Non-residential Electricity PCE	0	0	0	5,980	—
Direct Access Electricity	0	4,870	6,250	2,660	—
Non-residential Total	34,550	26,980	27,130	8,660	-75%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Non-residential Natural Gas

Non-residential natural gas GHG emissions totaled approximately 16,660 MTCO_{2e} in 2018, compared to roughly 17,260 MTCO_{2e} in 2005, a decrease of 3 percent. This decrease in natural gas GHG emissions may be due to changes in weather conditions (affecting the need for natural gas heating), and general improvements in energy efficiency. Conversions from natural gas to electric appliances may also contribute to reduced natural gas emissions. Table A-6 provides a breakdown of the activity data and emissions for non-residential natural gas by each individual year included in the updated community inventory.

Table A-6. Non-residential Natural Gas Emissions, 2005–2018

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (therms)</i>					
Non-residential Natural Gas	3,245,310	3,087,880	3,046,210	3,133,690	-3%
<i>GHG Emissions (MTCO_{2e})</i>					
Non-residential Natural Gas	17,260	16,420	16,200	16,660	-3%

Table Note: All numbers are rounded to the nearest 10.

Transportation

San Carlos community members drove approximately 194.6 million vehicle miles in 2005, increasing to just over 202 million vehicle miles in 2018. The VMT in 2005 resulted in approximately 87,420 MTCO_{2e}, which dropped to roughly 75,120 in 2018, a 14 percent difference. Although VMT increased between 2005 and 2018, total emissions decreased due to increasingly fuel-efficient vehicles, along with a wider adoption of electric vehicles. Table A-7 provides a breakdown of the activity data and emissions for on-road transportation by each individual year included in the updated community inventory.

Table A-7. On-Road Transportation Emissions, 2005–2018

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (VMT)</i>					
On-Road Transportation	194,591,700	187,010,620	198,115,490	202,006,640	4%
<i>GHG Emissions (MTCO_{2e})</i>					
On-Road Transportation	87,420	81,560	76,750	75,120	-14%

Table Note: All numbers are rounded to the nearest 10.

There are three types of vehicle trips assessed in this inventory: those that begin and end in San Carlos; those that have one end point in San Carlos and the other end point elsewhere; and those that pass through San Carlos but do not begin or end in the community. Trips that begin and end in San Carlos are fully counted in this inventory. Trips that have one end point in San Carlos have



50 percent of the VMT counted in this inventory, while the other half is implicitly counted in the inventory of the other community. Pass-through VMT is not counted in this inventory, in accordance with the U.S. Community Protocol.

Off-road Equipment

Emissions from off-road equipment in San Carlos has increased approximately 12 percent between 2005 and 2018, from 11,180 MTCO_{2e} in 2005 to 12,540 MTCO_{2e} in 2018, based on data available from the California Air Resources Board. Table A-8 shows the change in GHG emissions for each individual year. As shown, the off-road equipment that has increased the most significantly is recreational equipment, pleasure craft (recreational water vessels), and transport refrigeration units, which rose by 49, 55, and 59 percent, respectively. Construction and mining equipment rose by 12 percent, while lawn and garden equipment rose a more moderate 3 percent. These increases are largely attributed to increases in population that San Carlos experienced in this time frame.

Conversely, two types of off-road equipment experienced a decrease in annual GHG emissions between 2005 and 2018. Light commercial equipment and industrial equipment decreased by 1 and 2 percent, respectively, while entertainment equipment decreased by a total of 17 percent. These decreases may be due to more energy-efficient equipment becoming available in combination with changing community equipment needs.

**Table A-8. Off-Road Transportation GHG Emissions
2005–2018 by Subsector**

Off-road Equipment	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>GHG Emissions (MTCO_{2e})</i>					
Construction and Mining	6,460	7,030	7,320	7,240	12%
Entertainment	20	20	20	20	17%
Industrial	1,790	1,780	1,890	1,750	-2%
Lawn and Garden	560	560	580	580	3%
Light Commercial	1,260	1,270	1,350	1,250	-1%
Pleasure Craft	300	360	430	470	55%
Railyard Operations	1	1	1	1	0%
Recreational	90	110	130	140	49%
Transport Refrigeration Units	690	840	1,060	1,090	59%
Total Off-road Equipment	11,180	11,960	12,780	12,540	12%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Solid Waste

San Carlos' community-wide GHG emissions associated with municipal solid waste (MSW) thrown away by community members decreased by 9 percent between 2005 and 2018, reporting 13,530 MTCO_{2e} in 2005 and 12,290 MTCO_{2e} by 2018. This is due to an increase in recycling and composting in the city, which reduces the amount of solid waste that is taken to a landfill. However, the community-wide GHG emissions released from alternative daily cover (ADC) applied at landfills increased by 7 percent in the same period, potentially due to changes in landfill operation procedures. Table A-9 presents specific solid waste data for each year.

Table A-9. Solid Waste GHG Emissions 2005–2018 by Subsector

Sector	2005	2010	2015	2018	Percentage Change 2005 to 2018
<i>Activity Data (tons)</i>					
MSW	45,440	33,860	40,070	42,200	-7%
ADC	830	3,770	1,370	890	7%
Solid Waste Total	46,270	37,630	41,440	43,090	-7%
<i>GHG Emissions (MTCO_{2e})</i>					
MSW	13,320	10,030	11,460	12,070	-9%
ADC	210	930	340	220	7%
Solid Waste Total	13,530	10,960	11,800	12,290	-9%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Water and Wastewater

GHG emissions from San Carlos' water and wastewater consumption decreased between 2005 and 2018. Indirect water decreased by 60 percent while indirect wastewater decreased by 17 percent. Although the activity data in Table A-10 does not show a dramatic decrease in the gallons of water used, and although indirect wastewater activity data indicates an increase in gallons, the GHG emissions for these subsectors decreased due to an increase in energy efficiency, which reduced the overall GHG emissions released from the electricity used to pump the water and wastewater. GHG emissions released from direct wastewater grew slightly by 5 percent, likely due to population increase.

Table A-10. Water and Wastewater GHG Emissions
2005–2018 by Subsector

Sector	2005	2010	2015	2018	Percentage Change 2010 to 2018
<i>Activity Data (gallons)</i>					
Indirect Water	0	1,181,899,750	956,702,070	1,103,477,690	-7%
Indirect Wastewater	0	472,759,900	549,280,000	846,131,610	79%
Water and Wastewater Total	0	1,654,659,660	1,505,982,070	1,949,609,300	18%
<i>GHG Emissions (MTCO_{2e})</i>					
Indirect Water	0	350	260	140	-60%
Indirect Wastewater	0	130	140	110	-17%
Direct Wastewater	0	700	700	730	5%
Water and Wastewater Total	0	480	390	240	-49%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Land Use and Sequestration

GHG emissions from land use and sequestration can be either positive or negative. Natural lands and street trees absorb carbon, storing it in wood, plants, and soil. As a result, when natural land is preserved or when more street trees are planted, emissions from this sector are negative because GHGs are being removed from the atmosphere. However, developing natural lands or converting them to a different form (for example, replacing forests with crop land) or removing street trees causes carbon to be released, creating GHG emissions.

In San Carlos, there was no reported development of natural land or removal of street trees during the inventory period, causing GHG emissions to be negative. As there was no net change in land use or sequestration activities, the net amount of GHGs absorbed by natural land and street trees has remained constant for all inventory years. In San Carlos, there are approximately 80 acres of forested land (predominately oak trees, with some eucalyptus and other trees) and an estimated 350 hectares of street tree canopy. The forested areas absorb approximately 220 MTCO_{2e} annually and the street trees absorb approximately 140 MTCO_{2e} annually, creating net GHG emissions of -360 MTCO_{2e}. Any changes to the City’s Protected Tree Ordinance may impact these numbers. The effect on the climate from the removal of larger trees should be considered in any updates and permit issuance.

City Operations Inventory Results

In 2015, San Carlos' City operations inventory totaled approximately 1,465 MTCO₂e, falling to 1,085 MTCO₂e in 2018, a decline of 26 percent. The highest emitter of GHG emissions by City operations was the energy sector in 2015 and 2017, but overall energy GHG emissions decreased while the fleet sector increased, resulting in the fleet sector becoming the largest emitter, by proportion, in 2018. In 2015, energy GHG emissions accounted for 49 percent of annual GHG emissions, falling to 26 percent by 2018. Conversely, fleet accounted for only 27 percent of annual GHG emissions in 2015, which grew to 45 percent of annual GHG emissions by 2018. Other sectors indicate varying results. The commute sector started at 20 percent of annual GHG emissions in 2015, increasing to 28 percent in 2017, and decreasing to 21 percent in 2018. Solid waste GHG emissions grew from 3 percent in 2015 to 5 percent in 2018. The water and wastewater sectors did not have data for 2015; however, 2017 and 2018 data indicate that water and wastewater only accounted for 1 percent of annual GHG emissions. Lastly, refrigerants accounted for 1 percent of annual City operations GHG emissions in 2015, rising to 3 percent in 2018. Table A-11 shows the City operations GHG emissions by sector and how emissions have changed from 2015 to 2018.

Table A-11. Percent Change Between 2015 and 2018 by City Operations Sector

Sector	2015	2017	2018	Percentage Change 2015–2018
Energy	710	280	280	-60%
Commute	290	210	230	-22%
Fleet	400	200	490	21%
Solid Waste	50	50	50	9%
Water and Wastewater	0	Less than 10	Less than 10	4%
Refrigerants	10	10	30	150%
Total	1,465	757	1,085	-26%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

City operations GHG emissions fluctuated between each inventory year. Annual GHG emissions decreased by 48 percent between 2015 and 2017, then increased by 43 percent between 2017 and 2018. Overall, GHG emissions between the years 2015 and 2018 decreased by only 26 percent. This fluctuation is likely due to many factors. First, the energy sector saw a 60 percent decline in GHG emissions between 2015 and 2018 due to the introduction of PCE renewable energy service in 2016. The commute sector additionally experienced a decline of 22 percent between 2015 and



2018, which was a result of less VMT by City employees and increasing efficiency of cars. The refrigerant sector increased by 150 percent between 2015 and 2018, largely due to the infrequent need of recharging vehicle and building air conditioning units. The fleet sector saw an increase of 21 percent of GHG emissions between 2015 and 2018, which is due to increased VMT by City staff. Solid waste and water and wastewater GHG emissions increased by 9 and 4 percent, respectively.

Sector Details

Energy

San Carlos' GHG emissions from City operations energy use totaled 280 MTCO₂e in 2018, a decrease of 60 percent between 2015 and 2018. Much of this decrease is a result of a 70 percent decrease in overall electricity GHG emissions from buildings and facilities, public lighting, and water and wastewater services. This is primarily due to PCE replacing PG&E as the electricity provider for City facilities in 2016, allowing City facilities to use cleaner sources of power. Further, the City's use of natural gas in City-owned buildings and facilities decreased by approximately 44 percent. This may be at least partially the result of increased energy efficiency and weather conditions that led to lower building heating requirements. Energy efficiency retrofits to City buildings, including City Hall and the public library, have helped to reduce municipal electricity and natural gas use. Additionally, the sale and ultimate demolition of City-owned commercial buildings as part of the Wheeler Plaza project has helped to decrease natural gas GHG emissions along with a potential decline in heating demand. The City only reported the use of 10 gallons of propane in 2017, with data unavailable for 2015 or 2018. As shown in Table A-12, the GHG emissions from the 10 gallons used in 2017 are less than 1 MTCO₂e. Diesel generator use similarly remained a very small share of energy-related emissions, generating less than 1 MTCO₂e.



Table A-12. Energy Activity Data and GHG Emissions Change
Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2015–2018
<i>Activity Data (kWh/therms/gallons)</i>				
Building and Facility electricity use	1,725,910	1,392,340	1,459,850	-15%
Public Lighting electricity use	628,770	609,870	608,760	-3%
Water and Stormwater services electricity use	33,270	38,890	37,690	13%
Total Building and Facility natural gas use (therms)	50,440	27,990	28,010	-44%
Total Water and Stormwater services natural gas use (therms)	0	60	0	—
Total Building and Facility propane use (gallons)	0	10	0	—
Total Generator diesel use (gallons)	20	80	80	267%
<i>GHG Emissions (MTCO₂e)</i>				
Building and Facility electricity use	320	90	90	-71%
Public Lighting electricity use	120	40	40	-67%
Water and Stormwater services electricity use	6	2	2	-62%
Total Building and Facility natural gas use	270	150	150	-44%
Total Water and Stormwater services natural gas (therms)	0	Less than 10	0	—
Total Building and Facility propane use	0	Less than 10	0	—
Total Generator diesel use	Less than 10	Less than 10	Less than 10	267%
Total Overall Emissions	710	280	280	-60%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Employee Commute

Commute GHG emissions are calculated in gallons, representing the annual gallons of fuel used by City employees to get to and from work. The data come from surveys of City employees conducted by Commute.org. As shown in Table A-13, annual GHG emissions from the commute sector decreased from 290 MTCO_{2e} in 2015 to 210 MTCO_{2e} in 2017, a 27 percent reduction. Then from 2017 to 2018, commute GHG emissions increased from 210 to 230 MTCO_{2e}, which is a slight increase of 7 percent. Overall, GHG emissions from the commute sector decreased a total of 22 percent between 2015 and 2018. The drop in GHG emissions is driven by a large decline in gasoline use for commuting, which was partially (although not entirely) offset by an increase in diesel fuel use. The specific reasons for these changes are not apparent in the data, although changing vehicle fuel efficiency may play at least some role.

Table A-13. Commute GHG Emissions Change Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2015–2018
<i>Activity Data (gallons)</i>				
Commute	34,660	25,250	26,330	-24%
<i>GHG Emissions (MTCO_{2e})</i>				
Commute	290	210	230	-22%

Table Note: All numbers are rounded to the nearest 10.

Fleet

Fleet data include the gallons of gasoline, diesel, compressed natural gas (CNG), and kilowatt-hours (kWh) associated with the City's vehicle fleet. The City does not have any electric vehicles in its fleet; therefore, electric vehicles are not included in Table A-14. Overall fleet GHG emissions increased from 400 MTCO_{2e} in 2015 to 490 MTCO_{2e} in 2018, an increase of 21 percent. However, between 2015 and 2017, the fleet sector decreased in annual emissions by 51 percent. The reason for this fluctuation is unknown but may be the result of differing calculation methods used in 2015 and 2017. Overall, annual GHG emissions from gasoline fleet vehicles increased by 41 percent, diesel vehicles decreased by 27 percent, and CNG vehicles were entirely phased out, resulting in no further emissions from these vehicles.

Table A-14. Fleet GHG Emissions Change Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2015–2018
<i>Activity Data (gallons)</i>				
Gasoline vehicles	33,370	14,280	47,260	42%
Diesel vehicles	11,870	7,700	8,650	-27%
CNG vehicles	60	10	—	—
<i>GHG Emissions (MTCO_{2e})</i>				
Gasoline vehicles	280	120	400	41%
Diesel vehicles	120	80	90	27%
CNG vehicles	Less than 1	Less than 1	—	—
Total MTCO_{2e}	400	200	490	21%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Solid Waste

As shown in Table A-15, City operations GHG emissions related to solid waste increased slightly between 2015 and 2018, only 9 percent. The reason for this slight increase is unknown and may be due to normal variations in daily behaviors. Due to data limitations, activity data for this sector is estimated based on the number of trash bins and the frequency of janitorial service in City facilities.

Table A-15. Solid Waste GHG Emissions Change Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2015–2018
<i>Activity Data (US tons)</i>				
Solid Waste	160	160	180	9%
<i>GHG Emissions (MTCO_{2e})</i>				
Solid Waste	50	50	50	9%

Table Note: All numbers are rounded to the nearest 10.



Water and Wastewater

Water and wastewater GHG emissions increased approximately 4 percent between 2017 and 2018. As shown in Table A-16, data for 2015 was not provided. GHG emissions associated with both indirect water use and indirect wastewater increased by roughly 9 percent, while direct process wastewater decreased by 5 percent. Indirect water and wastewater emissions are the result of electricity needed to move and process water and wastewater, and such GHG emissions likely decreased due to the increase in electricity sourced from renewable sources through PCE.

Table A-16. Water and Wastewater Emissions Change Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2017–2018
<i>Activity Data (million gallons)</i>				
Indirect water use	—	20	20	15%
Indirect wastewater use	—	20	20	6%
<i>GHG Emissions (MTCO_{2e})</i>				
Indirect water use	—	3	3	9%
Indirect wastewater use	—	2	2	9%
Direct process wastewater	—	2	2	-5%
Total MTCO_{2e}	—	7	7	4%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Refrigerants

As shown in Table A-17, GHG emissions associated with refrigerants increased from 10 to 30 MTCO_{2e} between 2015 and 2018, a difference of 142 percent. This jump is attributed to an increase of 10 pounds in building air conditioners and an increase of 20 pounds in vehicle air conditioners between the same years. This may be due to increases in the amount of equipment needing service or more frequent maintenance activities.

Table A-17. Refrigerant GHG Emissions Change Between 2015 and 2018 by Subsector

Sector	2015	2017	2018	Percentage Change 2015–2018
<i>Activity Data (pounds, lbs.)</i>				
Building air conditioners	20	20	30	65%
Vehicle air conditioners	0	0	20	—
<i>GHG Emissions (MTCO_{2e})</i>				
Building air conditioners	10	10	20	67%
Vehicle air conditioners	0	0	10	—
Total MTCO_{2e}	10	10	30	142%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Community-Wide Forecast

The forecast of community-wide GHG emissions is based on the results of the 2018 community-wide GHG emissions inventory, combined with San Carlos' 2018 and future demographic projections (population, households, and jobs). Service population is the sum of population and jobs. Table A-18 shows the demographic projections used to prepare the GHG emissions forecast. Demographic data for 2018 is from the U.S. Census and the California Department of Finance. Projections for 2020, 2030, and 2050 are from the San Carlos General Plan and City Economic Development Division staff.

Table A-18. San Carlos Community-wide Demographic Projections, 2018 – 2050

	2018	2020	2030	2050	Percentage Change 2018-2050
Population	29,860	30,150	33,600	37,930	27%
Households	11,560	11,700	13,380	14,650	27%
Jobs	16,190	19,480	28,450	31,110	92%
Service population *	46,050	49,630	62,050	69,040	50%

* Service population is the sum of population and jobs



The draft GHG forecast assumes that each person in San Carlos will continue to contribute the same amount of GHG emissions to the community total, so that the amount of GHG emissions increases proportional to the projected increase in community demographics. There is one exception, which is that emissions associated with land use changes and biomass sequestration assume that the City does not develop open space land and that the number of street trees in the community remains constant.

The forecast for the calendar year 2020 is based on projected changes in demographics, assuming “normal” levels of activity. It is not an assessed inventory of 2020 GHG emissions. The 2020 forecast does not reflect the impacts of stay-at-home orders, business closures, relocations, or other changes in behavior or activities because of the COVID-19 pandemic.

San Carlos’ community-wide GHG emissions are expected to increase 13 percent by 2050 relative to 2005 levels, or increase by 50 percent relative to 2018 levels, if no action is taken at any level, including by state, regional, and local agencies. While emissions decreased substantially from 2005 to 2018, the rise in emissions from demographic growth after 2018, especially from increased job growth, is expected to override this earlier decline. Table A-19 shows San Carlos’ forecasted community-wide GHG emissions.

Table A-19. San Carlos Draft Community-wide GHG Emissions
Forecast, 2005 – 2050

Sector	2005 Inventory MTCO _{2e}	2018 Inventory MTCO _{2e}	2020 MTCO _{2e}	2030 MTCO _{2e}	2050 MTCO _{2e}	Percentage Change 2005 - 2050
Residential electricity	16,190	4,050	4,100	4,680	5,130	-68%
Residential natural gas	32,840	29,170	29,520	33,760	36,970	13%
Non- residential electricity	34,550	8,640	9,860	10,510	11,490	-67%
Non- residential natural gas	17,260	16,660	20,050	31,940	34,670	101%
Transportation	87,420	75,120	80,960	101,220	112,620	29%
Off-road equipment	11,170	12,540	11,500	21,340	17,370	56%
Rail*	-	1,140	1,230	1,540	1,710	50%
Stationary sources*	-	-	70	70	70	0%
Solid waste	13,520	12,290	13,250	16,560	18,430	36%
Water and wastewater*	-	980	1,060	1,320	1,460	49%
Sequestration†	-360	-360	-360	-360	-360	0%
Total	212,590	160,230	171,240	222,580	239,560	13%

Table Notes:

* Due to limited data availability in 2005, emissions for rail and water and wastewater are not available and therefore the percent reduction is calculated between 2018 and 2050. Data for stationary sources was not available for the years 2005 or 2018 and therefore the percentage change was calculated between 2030 and 2050.

† Informational item. These emissions are negative due to carbon being sequestered in soil and biomass from forested land and street trees.

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Tables A-20 and A-21 show forecasted community-wide activity data and GHG emissions by subsector.



Table A-20. San Carlos Community-Wide Forecasted Activity Data
(2018 – 2050)

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2050
Residential Electricity PGE (kWh)	1,632,460	1,652,230	1,889,470	2,068,820	27%
Residential Electricity PCE (kWh)	62,109,800	62,861,990	71,888,330	78,711,810	27%
Residential Natural Gas (therms)	5,485,490	5,551,920	6,349,120	6,951,770	27%
Non-residential Electricity PGE (kWh)	14,990	18,040	26,340	28,800	92%
Non-residential Electricity PCE (kWh)	95,202,320	114,548,560	167,295,000	182,936,640	92%
Non-residential Natural Gas (Therms)	3,133,690	3,770,490	5,506,700	6,021,560	92%
Direct Access (kWh)	12,976,610	12,976,610	12,976,610	12,976,610	0%
On-road Transportation (VMT)	202,006,640	217,710,960	272,193,530	302,856,430	50%
Construction and Mining Equipment	-	0	-	-	-
Entertainment Equipment	-	0	-	-	-
Industrial Equipment	-	0	-	-	-
Lawn and Garden Equipment	-	0	-	-	-
Light Commercial Equipment	-	0	-	-	-
Pleasure Craft	-	0	-	-	-
Railyard Operations	-	0	-	-	-
Recreational Equipment	-	0	-	-	-

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2050
Transport Refrigeration Units	-	0	-	-	-
Caltrain (passenger miles)	366,550	395,050	493,910	549,550	50%
Freight (fuel gallons)	19,730	21,260	26,590	29,580	50%
Stationary Sources	-	0	-	-	-
MSW (tons)	42,200	45,480	56,860	63,270	50%
ADC (tons)	890	960	1,200	1,330	50%
Indirect water (kWh)	1,454,780	1,567,880	1,960,240	2,181,060	50%
Indirect wastewater (kWh)	1,118,590	1,205,550	1,507,240	1,677,030	50%
Direct wastewater	-	0	-	-	-
Forest trees and soil (hectares)	80	80	80	80	0%
Street trees (hectares)	350	350	350	350	0%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



Table A-21. San Carlos Community-Wide Forecasted GHG Emissions
(2018 – 2050)

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2050
Residential Electricity PGE	150	150	170	190	27%
Residential Electricity PCE	3,900	3,950	4,510	4,940	27%
Residential Natural Gas	29,170	29,520	33,760	36,970	27%
Non-residential Electricity PGE	0	0	0	0	-
Non-residential Electricity PCE	5,980	7,200	10,510	11,490	92%
Non-residential Natural Gas	16,660	20,050	29,280	32,010	92%
Direct Access	2,660	2,660	2,660	2,660	0%
On-road Transportation	75,120	80,960	101,220	112,620	50%
Construction and Mining Equipment	7,240	5,490	13,180	8,420	16%
Entertainment Equipment	20	20	40	40	100%
Industrial Equipment	1,750	2,110	3,080	3,360	92%
Lawn and Garden Equipment	580	590	670	740	28%
Light Commercial Equipment	1,250	1,500	2,200	2,400	92%
Pleasure Craft	470	480	540	600	28%
Railyard Operations	0	0	0	0	-
Recreational Equipment	140	140	160	180	29%
Transport Refrigeration Units	1,090	1,170	1,470	1,630	50%
Caltrain	940	220	1,270	1,410	50%
Freight	200	1,010	270	300	50%
Stationary Sources	0	70	70	70	-
MSW	12,070	13,010	16,260	18,100	50%
ADC	220	240	300	330	50%
Indirect water	140	150	190	210	50%
Indirect wastewater	110	120	150	160	45%

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2050
Direct wastewater	730	790	980	1,090	49%
Forest trees and soil	-220	-220	-220	-220	0%
Street trees	-140	-140	-140	-140	0%
Total	160,230	171,240	222,580	239,560	50%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

City Operations Forecast

The forecast of San Carlos' City operations GHG emissions is based on the results of the 2018 City operations GHG emissions inventory, combined with the City's future employment projections. Table A-22 shows the employment projections used to prepare the GHG emissions forecast.

Table A-22. San Carlos City Operations Demographic Projections, 2018 – 2050

	2018	2020	2030	2050	Percentage Change 2018 to 2050
City employees	98	99	104	114	16%

Table Note: The 2018 employees figure was provided by the City of San Carlos and the forecasted City employee figures were calculated assuming an annual increase of 0.5 percent.

San Carlos' City operations GHG emissions are expected to decrease 16 percent by 2050, relative to 2015 levels, if no action is taken at any level, including by state, regional, and local agencies. The draft forecast assumes that each City employee will continue to contribute the same amount of GHG emissions to the City's total, so that the amount of GHG emissions increases proportional to the projected increase in employees. San Carlos' City operations GHG emissions are projected to remain below 2015 levels, as emissions decreased enough between 2015 and 2018 that the rise in emissions from employment growth is not expected to be enough to erase this earlier decline. However, a 14 percent increase in City emissions is forecasted between 2018 and 2050 if nothing were to be done during that time on the state, regional, or local level. As with the community-wide forecast, the 2020 forecast of City operations is a projection and does not reflect impacts on City emissions because of the COVID-19 pandemic. Table A-23 shows San Carlos' forecasted City operations GHG emissions.



Table A-23. San Carlos Draft City Operations GHG Emissions Forecast, 2015 – 2050

Sector	2015 Inventory MTCO ₂ e	2018 Inventory MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2015 to 2050
Energy	720	280	280	300	310	-57%
Commute	290	230	230	240	270	-7%
Fleet	400	490	490	520	560	40%
Solid waste	50	50	50	50	60	20%
Water and wastewater	Less than 10	Less than 10	Less than 10	Less than 10	Less than 10	-
Refrigerants	10	30	30	30	30	200%
Total	1,470	1,080	1,080	1,140	1,230	-16%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Tables A-24 and A-25 show forecasted City operations activity data and GHG emissions by subsector.

Table A-24. San Carlos City Operations Forecasted Activity Data, 2018 – 2050

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2015
Building and facility electricity use (kWh)	1,459,850	1,474,380	1,547,010	1,692,260	16%
Building and facility natural gas use (therms)	28,010	28,290	29,680	32,470	16%
Building and facility propane use (gallons)	-	0	-	-	-
Public lighting electricity use (kWh)	608,760	608,760	608,760	608,760	0%
Water and stormwater services electricity use (kWh)	37,690	38,070	39,940	43,690	16%
Generator Diesel Use (gallons)	80	80	80	90	13%
Water and stormwater services natural gas use (therms)	-	0	-	-	-

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2015
Commute trips (gallons)	26,330	26,590	27,900	30,520	16%
Gasoline vehicles (gallons)	47,260	47,730	50,080	54,780	16%
Diesel vehicles (gallons)	8,650	8,740	9,170	10,030	16%
Electric vehicles	-	0	-	-	-
CNG vehicles (gallons)	-	0	-	-	-
Solid waste (US tons)	180	180	190	210	17%
Indirect water use (kWh)	29,780	30,080	31,560	34,520	16%
Indirect wastewater use (kWh)	22,830	23,060	24,190	26,460	16%
Direct process wastewater	-	0	-	-	-
Building air conditioners (pounds)	30	30	30	30	0%
Vehicle air conditioners (pounds)	20	20	20	20	0%

Table A-25. San Carlos City Operations Forecasted GHG Emissions, 2018 – 2050

Subsector	2018	2020	2030	2050	Percentage Change, 2018-2015
Building and facility electricity use	90	90	100	100	11%
Building and facility natural gas use	150	150	160	170	13%
Building and facility propane use	-	0	0	0	-
Public lighting electricity use	40	40	40	40	0%
Water and stormwater services electricity use	-	0	-	-	-
Generator Diesel Use	-	0	-	-	-
Water and stormwater services natural gas use	-	0	-	-	-
Commute trips	230	230	240	270	17%
Gasoline vehicles	400	400	420	460	15%
Diesel vehicles	90	90	100	100	11%
Electric vehicles	-	0	-	-	-
CNG vehicles	-	0	-	-	-



Subsector	2018	2020	2030	2050	Percentage Change, 2018-2015
Solid waste	50	50	50	60	20%
Indirect water use	-	0	-	-	-
Indirect wastewater use	-	0	0	0	-
Direct process wastewater	-	0	-	-	-
Building air conditioners	20	20	20	20	0%
Vehicle air conditioners	10	10	10	10	0%
Total	1,080	1,080	1,140	1,230	14%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

State GHG Emission Reductions

California has adopted and committed to implementing policies to decrease GHG emission levels statewide, including from several of the major GHG emission sectors present in San Carlos. Many of these policies are identified in the State’s Climate Change Scoping Plan (Scoping Plan), which was originally adopted in 2008 in response to the California Global Warming Solutions Act. The Scoping Plan outlines several regulatory and market-based solutions to achieving California’s GHG emission-reduction goals. Successive updates to the Scoping Plan in 2014 and 2017 revised these state-level actions and identified additional opportunities for GHG emission reductions, as applicable.

While the Scoping Plan and related documents lay out several policies to reduce GHG emissions, the CMAP will focus on the policies that have most direct and apparent benefits to San Carlos. The project team has assessed San Carlos’ community-wide local GHG emission-reduction benefits from these efforts, allowing the community to receive “credit” for the state’s efforts. These efforts are:

1. The Renewables Portfolio Standard (RPS) that requires increases in renewable electricity supplies.
2. The Clean Car Standards that require increased fuel efficiency of on-road vehicles and decreased carbon intensity of vehicle fuels.
3. The updated Title 24 building energy efficiency standards that require new buildings to achieve increased energy efficiency targets.
4. The Low Carbon Fuel Standard (LCFS) that mandates reduced carbon intensity of fuels used in off-road equipment.
5. The Innovative Clean Transit Regulations, or zero-emission bus mandates, requiring public transit buses to reduce and ultimately eliminate tailpipe emissions.

Overall, these state activities are projected to cause San Carlos' community-wide GHG emissions by 2050 to be 6 percent above 2018 levels, but 20 percent lower than 2005 levels. Table A-26 shows the community-wide GHG emission reductions from state actions.

Table A-26. San Carlos Community-wide GHG Emission Reductions from State Actions, 2005 – 2050

	2005 Inventory MTCO ₂ e	2018 Inventory MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2005 to 2050
Forecasted emissions without state actions	212,590	160,230	171,640	222,580	239,560	13%
Reductions from RPS	-	-	-120	-1,730	-19,650	-
Reductions from Clean Car standards	-	-	-3,240	-25,380	-46,160	-
Reductions from Title 24	-	-	-130	-2,130	-2,240	-
Reductions from LCFS (off-road only)	-	-	-860	-1,580	-1,270	-
Reductions from Innovative Clean Transit Regulations	-	-	-	-150	-50	-
Reductions from all state actions	-	-	-4,350	-30,970	-69,370	-
Emissions with state actions	212,590	160,230	166,890	191,610	170,190	-20%

Table Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.



State activities are projected to decrease San Carlos' City operations GHG emissions by 2050 by 11 percent relative to 2018 levels and by 35 percent relative to 2015 levels. Table A-27 shows the City operations GHG emission reductions from state actions.

Table A-27. San Carlos City Operations GHG Emission Reductions from State Actions, 2015 – 2050

	2015 Inventory MTCO ₂ e	2018 Inventory MTCO ₂ e	2020 MTCO ₂ e	2030 MTCO ₂ e	2050 MTCO ₂ e	Percentage Change 2015 to 2050
Forecasted emissions without state actions	1,470	1,080	1,080	1,140	1,230	-16%
Reductions from RPS	-	-	-0	-20	-140	-
Reductions from Clean Car standards for employee commutes	-	-	-10	-20	-40	-
Reductions from Clean Car standards for City fleet	-	-	-10	-60	-90	-
Reductions from all state actions	-	-	-20	-100	-270	-
Emissions with state actions	1,470	1,080	1,060	1,040	960	-35%

All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Technical Data for Existing and Planned Activities

These calculations are based on four primary types of data and research:

- § The inventory and forecast of San Carlos' GHG emissions, as discussed above and summarized in **Chapter 2** of the CMAP.
- § Reports, guidance documents, and toolkits prepared by government agencies.
- § Peer-reviewed reports and other credible research documents.
- § Case studies for similar jurisdictions.

The community-wide and City operations inventory and forecast serve as the foundation for the quantification of San Carlos' GHG reduction strategies, supplemented with additional data types and research. The inventory and forecast provide activity data, such as kWh of electricity used, or VMT. The project team combined the activity data with data sources that identify the potential for reduction and performance targets that estimate the level of implementation. This provides the total savings in activity data for the years 2030 and 2050. The project team then multiplied the activity data savings by the relevant emissions factor to obtain the total GHG savings from the strategy.

This section discusses the data sources, methods, and assumptions for the quantification of the existing and planned local activities. Only some existing and planned local activities are quantified. Other activities, not included here, may have GHG reduction benefits but City staff cannot accurately determine the level of reductions.

Table A-28 shows the emissions factors used in the quantification. These emission factors reflect the GHG reductions from existing state accomplishments, such as RPS. Note that the quantification for many strategies, especially those that related to electricity, will use multiple emissions factors.

Table A-28. Emission Factors with State Reductions

Activity Type	Units	2005	2018	2030	2050
Electricity (PG&E)	MTCO ₂ e/ kWh	0.000222	0.000095	0.000075	0.000000
Electricity (PCE)	MTCO ₂ e/ kWh	N/A	0.000063	0.000059	0.000000
Electricity (Direct access)	MTCO ₂ e/ kWh	N/A	0.000205	0.000150	0.000000
Electricity (combined)	MTCO ₂ e/ kWh	0.000222	0.000363	0.000065	0.000000
Natural gas	MTCO ₂ e/ therms	0.000449	0.000372	0.000319	0.000277
Transportation	MTCO ₂ e/VMT	0.000222	0.000095	0.000075	0.000000



Activity Type	Units	2005	2018	2030	2050
Caltrain	MTCO ₂ e/ passenger mile	N/A	0.047643	0.047619	0.047638
Freight	MTCO ₂ e/ fuel gallons	N/A	0.000546	0.000541	0.000551
Solid waste (MSW)	MTCO ₂ e/ton	0.293134	0.286019	0.285948	0.286030
Solid waste (ADC)	MTCO ₂ e/ton	0.240964	0.247191	0.242718	0.243478
Solid waste (combined)	MTCO ₂ e/ton	0.534098	0.533210	0.528666	0.529508

EA 1: Peninsula Clean Energy

GHG savings

	2030	2050
GHG savings (MTCO ₂ e)	12,930	0

Assumptions

	2030	2050
Residential PCE kWh	63,308,550	63,338,150
Non-residential PCE kWh	155,732,960	156,288,960

EA 2: New solar capacity

GHG savings

	2030	2050
GHG savings (MTCO ₂ e)	Less than 10	0

Assumptions

	2030	2050
Residential solar capacity (kW)	1,190	1,190
Non-residential solar capacity (kW)	330	330
Residential solar generation (kWh)	1,964,700	1,964,700
Non-residential solar generation (kWh)	551,990	551,990



EA 3: All-electric and zero net energy buildings

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-4,310	-4,310
Natural gas savings (therms)	1,810	1,810
GHG savings (MTCO _{2e})	10	10

Assumptions

	2030	2050
Number of all-electric multi-family units	6	6
Number of zero net energy single-family homes	1	1

EA 4: Public EV charging stations

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-132,570	-132,570
GHG savings (MTCO _{2e})	130	110

Assumptions

	2030	2050
Number of public EV charging stations	3	3

EA 5: Increased composting

Activity data and GHG savings

	2030	2050
Waste savings (tons)	470	470
GHG savings (MTCO _{2e})	210	210

Assumptions

	2030	2050
Increase in composted tonnage (relative to 2018)	470	470



EA 6: Energy efficiency retrofits

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	43,870	43,870
Natural gas savings (therms)	870	870
GHG savings (MTCO _{2e})	Less than 10	Less than 10

Assumptions

	2030	2050
Percent of retrofitted homes on PCE	100%	100%

EA 7: Caltrain electrification

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-2,310,870	-3,276,600
Diesel savings (gallons)	92,050	132,500
GHG savings (MTCO _{2e})	950	1,360

Assumptions

	2030	2050
Percent of Caltrain service that is electrified	75%	97%

EA 8: City facilities on ECO100

GHG savings

	2030	2050
GHG savings (MTCO _{2e})	130	0

Assumptions

	2030	2050
Percent of City facilities on ECO100	100%	100%



Technical Data for Future Activities

This section discusses the data sources, methods, and assumptions for the quantification of the GHG reduction strategies included in the San Carlos CMAP. In addition to the sources presented here, these calculations also rely on the San Carlos GHG inventory and forecast, as shown previously in this appendix and summarized in **Chapter 2** of the CMAP.

Some of these strategies are identified as “Supportive”, as they do not have GHG reductions that City staff are able to accurately determine.

Goal 1: Reduce energy use

Strategy 1: Regional energy conservation and efficiency programs

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	20,297,840	45,508,270
Natural gas savings (therms)	979,540	2,180,780
GHG savings (MTCO _{2e})	5,390	11,600

Assumptions

	2030	2050
Percent of non-residential buildings with energy efficiency retrofits	20%	35%
Percent of residential buildings with energy efficiency retrofits	20%	35%
Number of commercial buildings sold annually	50	50
Number of housing units sold annually	220	220
Percent of eligible retrofits made as part of pre-sale improvements	60%	60%

Performance indicators

	2030	2050
Existing housing units receiving energy efficiency retrofits	2,340	4,100
Existing businesses receiving energy efficiency retrofits	450	780
Housing units participating in retrofits at time of sale	2,200	6,600
Businesses participating in retrofits at time of sale	500	1,500



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Strategy 2: K-12 energy conservation and efficiency education

Activity data and GHG savings

This strategy is supportive of other strategies to increase energy efficiency in schools and to improve energy efficiency education. Some activity and GHG reductions created by this strategy are addressed in other strategies, while others cannot be accurately assessed. There are no quantified activity and GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 3: City facilities

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	215,480	390,190
Natural gas savings (therms)	4,130	7,490
GHG savings (MTCO ₂ e)	20	40



Assumptions

	2030	2050
Municipal facilities with energy efficiency improvements (number of energy accounts)	37	67

Performance indicators

	2030	2050
Average reduction in energy use per retrofitted facility	40%	40%

Sources

California Energy Commission. 2006. "California Commercial End-Use Survey".
https://ww2.energy.ca.gov/ceus/2006_enduse.html.



Goal 2: Transition to carbon-free energy sources

Strategy 4: Electrification

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-2,539,650	-17,098,730
Natural gas savings (therms)	886,680	5,975,230
GHG savings (MTCO ₂ e)	4,710	31,770

Assumptions

	2030	2050
Percent of existing commercial buildings that electrify	25%	40%
Percent of commercial appliances replaced at time of electrification	50%	60%
Restaurants as a percent of commercial buildings	4%	4%
Percent of electrified restaurants retaining gas cooking	90%	90%
Percent of existing homes that electrify	25%	50%
Percent of residential appliances replaced at time of electrification	50%	60%
Percent of electrified homes retaining gas cooking	25%	25%

Performance indicators

	2030	2050
Existing housing units that electrify	2,190	4,390
Existing housing units that mostly electrify but retain gas cooking	730	1,460
Existing commercial buildings (not including restaurants) that electrify	540	860
Existing restaurants that electrify	Less than 10	Less than 10
Existing restaurants that electrify but retain gas cooking	20	40

Sources

American Society of Heating, Refrigerating, and Air-Conditioning Engineers. 2015. *ASHRAE Technical FAQ 58*. <http://897aed0416dc49905795-462663dae8bc713a9fe28731e009176c.r4.cf1.rackcdn.com/documents/ASHRAE-TC-07.08-FAQ-58.pdf>.

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Strategy 5: Building codes

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-6,132,760	-3,508,160
Natural gas savings (therms)	2,126,330	1,211,930
GHG savings (MTCO _{2e})	11,300	6,440

Assumptions

	2030	2050
Percent of new residential buildings complying with all-electric reach codes	95%	95%
Percent of new non-residential buildings complying with all-electric reach codes	90%	95%
Restaurants as a percent of commercial buildings	4%	4%
Percent of electrified restaurants retaining gas cooking	75%	75%
Percent of electrified homes retaining gas cooking	25%	15%

Performance indicators

	2030	2050
New all-electric housing units	1,200	1,540
New mostly-electric housing units with gas cooking	400	270
New non-residential all-electric buildings (not including restaurants)	890	420
New all-electric restaurants	10	Less than 10
New mostly-electric restaurants with gas cooking	30	10



Sources

California Energy Commission. 2006. "California Commercial End-Use Survey".
https://ww2.energy.ca.gov/ceus/2006_enduse.html.

California Energy Commission. 2006. "California Commercial End-Use Survey".
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<https://smcenergywatch.org/contact/resources/>.

Strategy 6: Rooftop solar

GHG savings

	2030	2050
GHG savings (MTCO ₂ e)	20	0

Assumptions

	2030	2050
Percent of existing homes installing solar PV	20%	50%
Percent of existing non-residential buildings installing solar PV	10%	30%
Percent of municipal facilities installing solar PV	15%	20%
Average residential solar system capacity (kW)	5.9	5.9
Average non-residential solar system capacity (kW)	14.9	14.9

Performance indicators

	2030	2050
Number of existing homes with solar arrays	2,340	5,850
Solar capacity on existing homes (kW)	13,870	34,680
Number of existing non-residential buildings with solar arrays	230	740
Solar capacity on existing non-residential buildings (kW)	6,160	8,990

Sources

National Renewable Energy Laboratory. 2021. "PVWatts". <https://pvwatts.nrel.gov/>.



San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].
<https://smcenergywatch.org/contact/resources/>.

Strategy 7: Peninsula Clean Energy

GHG savings

	2030	2050
GHG savings (MTCO ₂ e)	10	0

Assumptions

	2030	2050
Percent of electricity supplied by PCE (excluding direct access)	95%	96%

Performance Indicators

	2030	2050
kWh supplied by PG&E (excluding direct access)	35,820	16,040

Sources

Peninsula Clean Energy. 2021. “Power mix”. <https://www.peninsulacleanenergy.com/power-mix/>

Peninsula Clean Energy. 2021. “Residential rates”. <https://www.peninsulacleanenergy.com/for-residents/>

Goal 3: Promote energy resilience

Strategy 8: Battery storage

GHG savings

	2030	2050
GHG savings (MTCO ₂ e)	20	0

Assumptions

	2030	2050
Percent of residential solar energy systems installing battery storage	25%	40%
Percent of non-residential solar energy systems installing battery storage	25%	40%
Percent of municipal solar energy systems installing battery storage	25%	40%



Performance Indicators

	2030	2050
Residential battery storage systems	590	2,340
Residential battery capacity (kWh)	8,780	35,100
Non-residential battery capacity (kWh)	4,000	14,460
Municipal battery capacity (kWh)	4,620	10,780

Sources

California Public Utilities Commission. 2015. *Proposed Decision: Revising the Greenhouse Gas Emissions Factor to Determine Eligibility to Participate in the Self-Generation Incentive Program*. <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M153/K157/153157353.PDF>.

Lazard. 2018. *Lazard's Levelized Cost of Storage Analysis – Version 4.0*. <https://www.lazard.com/media/450774/lazards-levelized-cost-of-storage-version-40-vfinal.pdf>

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table]. <https://smcenergywatch.org/contact/resources/>.

Strategy 9: Grid reliability

Activity data and GHG savings

This strategy supports increased energy resilience in San Carlos. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 10: Public Safety Power Shutoff Response

Activity data and GHG savings

This strategy supports increased energy resilience in San Carlos. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.



Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Goal 4: Promote sustainable development

Strategy 11: Transit Oriented Development

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	3,943,400	6,807,600
GHG savings (MTCO ₂ e)	1,260	1,890

Assumptions

	2030	2050
Percent increase in dwelling units/acre	14%	25%
Percent increase in jobs/acre	46%	60%

Performance Indicators

	2030	2050
Dwelling units/acre	3.80	4.16
Jobs/acre	8.08	8.84

Sources

California Air Pollution Control Officers Association. 2010. “Quantifying Greenhouse Gas Mitigation Measures”.

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table]. <https://smcenergywatch.org/contact/resources/>.

Strategy 12: Active transportation

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	5,103,630	5,678,560
GHG savings (MTCO ₂ e)	1,630	1,570



Assumptions

	2030	2050
Miles of bike lanes	30	36
Are traffic calming measures installed across the city?	Yes	Yes
Is bike parking provided in most non-residential areas?	Yes	Yes

Performance Indicators

There are no additional performance indicators beyond those identified in the Assumptions table.

Sources

California Air Pollution Control Officers Association. 2010. “Quantifying Greenhouse Gas Mitigation Measures”.

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table]. <https://smcenergywatch.org/contact/resources/>.

Strategy 13: Neighborhood hubs

Activity data and GHG savings

This strategy supports increased resilience in San Carlos and other measures that promote neighborhood-scale mixed-use development, helping to reduce vehicle dependence. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 14: Public curbs

Activity data and GHG savings

This strategy supports more efficient use of curb space to allow for increased mobility and reduced vehicle dependence. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 15: Public transportation

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	8,114,030	25,658,670
Electricity savings (kWh)	-1,912,760	-6,969,930
Diesel savings (gallons)	-15,290	-7,260
GHG savings (MTCO _{2e})	2,750	7,190

Assumptions

	2030	2050
Bus commute share	8%	12%
Increase in Caltrain ridership	87%	263%

Performance Indicators

	2030	2050
Daily Caltrain riders at San Carlos station	736,790	1,434,590
Daily bus ridership in San Carlos	1,430	2,420

Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures".

Caltrain. 2019. *Caltrain Business Plan – Developing a Long-Range Vision for Caltrain: City of San Carlos Booklet*. https://caltrain2040.org/wp-content/uploads/CBP_CIA_R2_Booklet_SanCarlos-2.pdf.

US Census Bureau. 2018. Table B08006: Sex of Workers by Means of Transportation to Work, 2018 American Community Survey 5-Year Estimate.

Strategy 16: Public spaces

Activity data and GHG savings

This strategy supports a more appealing pedestrian space, with the goal of supporting active transportation and reducing vehicle dependence. There are no quantified activity or GHG savings associated with this strategy.



Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 17: Vehicle Miles Traveled

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	1,130,410	1,839,020
GHG savings (MTCO ₂ e)	310	400

Assumptions

	2030	2050
Percent of new employees in commute reduction programs	60%	85%
Percent of existing employees in commute reduction programs	10%	25%

Performance Indicators

	2030	2050
Number of employees in commute reduction programs	10,940	17,490

Sources

California Air Pollution Control Officers Association. 2010. "Quantifying Greenhouse Gas Mitigation Measures".

Goal 5: Transition to Low-Carbon Transportation

Strategy 18: Electric vehicles

Activity data and GHG savings

	2030	2050
Electricity savings (kWh)	-18,911,370	-42,293,810
GHG savings (MTCO ₂ e)	24,440	52,470

Assumptions

	2030	2050
Workplace parking spaces with EV charging	50%	95%
Multi-family parking spaces with EV charging	35%	95%
Additional public EV chargers	15	25

Performance Indicators

	2030	2050
Number of workplace parking spaces with EV charging	4,420	9,670
Number of multi-family parking spaces with EV charging	1,400	4,590
Net increase in EV chargers at parking spaces on City property and streets	15	25
Number of registered EVs	7,570	16,450

Sources

California Air Resources Board. 2021. EMFAC2021 V1.0.1 Emission Inventory. <https://arb.ca.gov/emfac/emissions-inventory/>.

California Energy Commission. 2021. “ZEV and Infrastructure Stats Data”. <https://www.energy.ca.gov/files/zev-and-infrastructure-stats-data>.

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table]. <https://smcenergywatch.org/contact/resources/>.

US Department of Energy. 2021. “FuelEconomy.gov”. <https://fueleconomy.gov/>



Strategy 19: Safe Routes to School

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	501,530	1,415,400
GHG savings (MTCO _{2e})	160	390

Assumptions

	2030	2050
Average round-trip school trip (miles)	4	4
Current percent of students using active transportation	5%	5%
Target percent of students using active transportation	13%	25%

Performance Indicators

	2030	2050
Students commuting using active transportation	1,080	2,330

Sources

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].
<https://smcenergywatch.org/contact/resources/>.

Strategy 20: City fleet

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	308,870	539,740
GHG savings (MTCO _{2e})	230	390

Assumptions

	2030	2050
Percent of City gasoline vehicles replaced with electric vehicles	50%	80%
Percent of City diesel vehicles replaced with electric vehicles	15%	25%

Performance Indicators

	2030	2050
Municipal gasoline use (gallons)	21,730	9,000
Municipal diesel use (gallons)	7,450	6,820



Sources

ICLEI Local Governments for Sustainability USA. 2019. US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.

<http://www.icleiusa.org/tools/ghgprotocol/community-protocol>.

Strategy 21: Car sharing

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	1,077,870	1,199,110
Electricity savings (kWh)	-4,228,340	-3,935,400
GHG savings (MTCO _{2e})	5,310	5,040

Assumptions

	2030	2050
Percent VMT reduction from car share members	37%	37%
Number of car share users per vehicle	20	20
Percent of TNC vehicles that are all-electric	90%	95%

Performance Indicators

	2030	2050
Number of car share vehicles available	20	20

Table Note: The performance indicator for TNCs is included in the registered EV total presented as part of Strategy 18.

Sources

California Air Pollution Control Officers Association. 2010. “Quantifying Greenhouse Gas Mitigation Measures”.

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].

<https://smcenergywatch.org/contact/resources/>.



Strategy 22: Micromobility

Activity data and GHG savings

	2030	2050
Traffic savings (VMT)	655,890	740,410
Electricity savings (kWh)	-18,330	-20,690
GHG savings (MTCO _{2e})	210	210

Assumptions

	2030	2050
Average per-capita e-scooter trips per year	26	26
Average e-scooter trip length (miles)	1.15	1.15
Average per-capita e-bike trips per year	0.29	0.29
Average e-bike trip length (miles)	1.12	1.12

Performance Indicators

	2030	2050
Number of e-scooters	730	820
Total e-scooter miles	1,023,960	1,155,920
Total e-scooter trips	887,650	1,002,040
Number of e-bikes	180	205
Total e-bike miles	10,910	12,310
Total e-bike trips	9,780	11,040

Sources

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].
<https://smcenergywatch.org/contact/resources/>.



Goal 6: Support pollution-free outdoor equipment

Strategy 23: Clean-fuel construction and landscaping

GHG savings

	2030	2050
GHG savings (MTCO _{2e})	2,450	2,740

Assumptions

	2030	2050
Percent decline in gasoline and diesel landscaping equipment use	25%	55%
Percent decline in gasoline and diesel construction equipment use	20%	35%

Performance Indicators

Due to challenges tracking this information with currently available sources, there are no performance indicators for this measure.

Sources

ICLEI Local Governments for Sustainability USA. 2019. US Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.

<http://www.icleiusa.org/tools/ghgprotocol/community-protocol>.



Goal 7: Become a zero-waste community

Strategy 24: Zero waste city

Activity data and GHG savings

	2030	2050
Waste savings (tons)	60	50
GHG savings (MTCO ₂ e)	20	10

Assumptions

	2030	2050
City operations diversion rate	95%	95%

Performance Indicators

	2030	2050
Tons of waste from City operations	20	20

Sources

City of San Carlos. 2020. Climate Mitigation and Adaptation Plan, Existing and Planned Activities Questionnaire [personal communication].

Strategy 25: Material reuse and repair

Activity data and GHG savings

	2030	2050
Waste savings (tons)	1,530	3,250
GHG savings (MTCO ₂ e)	330	770

Assumptions

	2030	2050
Decrease in non-organic and non-recyclable tonnage	30%	60%

Performance Indicators

	2030	2050
Total tonnage of non-recyclable non-organic waste	3,580	2,160

Sources

California Air Resources Board. 2011. "Local Government Operations Protocol for Greenhouse Gas Assessments". <https://ww3.arb.ca.gov/cc/protocols/localgov/localgov.htm>.



California Air Resources Board. 2011. Landfill Methane Emissions Tool [data table].
<https://ww2.arb.ca.gov/resources/documents/landfill-methane-emissions-tool>.

California Department of Resources Recovery and Recycling. 2020. 2018 Disposal-Facility-Based Characterization of Solid Waste in California.
<https://www2.calrecycle.ca.gov/Publications/Details/1666>.

Strategy 26: Compostable food service ware

Activity data and GHG savings

This strategy supports a decrease in plastic use, which is an environmental pollutant, but does not directly contribute to GHG emissions that can be attributed to San Carlos. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 27: Construction and demolition waste

Activity data and GHG savings

	2030	2050
Waste savings (tons)	1,840	3,400
GHG savings (MTCO ₂ e)	460	900

Assumptions

	2030	2050
Decrease in wood, lumber, and pallet generation	25%	45%
Decrease in other construction and demolition waste generation	40%	60%

Performance Indicators

	2030	2050
Total tonnage of wood, lumber, and pallet waste	3,010	2,460
Total tonnage of other construction and demolition waste	1,250	930



Sources

California Air Resources Board. 2011. “Local Government Operations Protocol for Greenhouse Gas Assessments”. <https://ww3.arb.ca.gov/cc/protocols/localgov/localgov.htm>.

California Air Resources Board. 2011. Landfill Methane Emissions Tool [data table]. <https://ww2.arb.ca.gov/resources/documents/landfill-methane-emissions-tool>.

California Department of Resources Recovery and Recycling. 2020. 2018 Disposal-Facility-Based Characterization of Solid Waste in California. <https://www2.calrecycle.ca.gov/Publications/Details/1666>.

Strategy 28: Composting and recycling

Activity data and GHG savings

	2030	2050
Waste savings (tons)	17,510	31,130
GHG savings (MTCO ₂ e)	8,400	10,240

Assumptions

	2030	2050
Target diversion rate for recyclables	80%	85%
Residential composting participation rate	90%	95%
Non-residential composting participation rate	90%	95%

Performance Indicators

	2030	2050
Tons of landfilled recyclable material	9,030	11,980
Tons of composted material	11,680	13,410

Sources

California Air Resources Board. 2011. “Local Government Operations Protocol for Greenhouse Gas Assessments”. <https://ww3.arb.ca.gov/cc/protocols/localgov/localgov.htm>.

California Air Resources Board. 2011. Landfill Methane Emissions Tool [data table]. <https://ww2.arb.ca.gov/resources/documents/landfill-methane-emissions-tool>.

California Department of Resources Recovery and Recycling. 2020. 2018 Disposal-Facility-Based Characterization of Solid Waste in California. <https://www2.calrecycle.ca.gov/Publications/Details/1666>.



Strategy 29: Recycling contamination

Activity data and GHG savings

This strategy supports improved recycling efforts by reducing contamination of recyclable materials. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.

Strategy 30: Sustainable food consumption

Activity data and GHG savings

This strategy supports increased sustainability and indirect GHG emissions by promoting awareness of sustainable food options. There are no quantified activity or GHG savings associated with this strategy.

Assumptions

This is a supportive strategy. There are no assumptions associated with this strategy.

Performance indicators

This is a supportive strategy. There are no performance indicators associated with this strategy.

Sources

This is a supportive strategy. There are no quantification sources associated with this strategy.



Goal 8: Reduce water use

Strategy 31: Water efficient retrofits

Activity data and GHG savings

	2030	2050
Water savings (gallons)	36,405,180	60,675,300
Electricity savings (kWh)	96,790	161,310
GHG savings (MTCO ₂ e)	30	50

Assumptions

	2030	2050
Percent of existing homes with water efficiency retrofits	30%	50%
Percent of non-residential buildings with water efficiency retrofits	30%	50%
Percent of municipal facilities with water efficiency retrofits	30%	50%

Performance Indicators

	2030	2050
Number of existing homes with water efficiency retrofits	3,510	5,850
Number of non-residential buildings with water efficiency retrofits	670	1,120
Number of municipal facilities with water efficiency retrofits	30	50

Sources

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].
<https://smcenergywatch.org/contact/resources/>.

Strategy 32: Water-wise landscaping

Activity data and GHG savings

	2030	2050
Water savings (gallons)	68,446,730	124,905,900
Electricity savings (kWh)	157,430	287,280
GHG savings (MTCO ₂ e)	Less than 10	0

Assumptions

	2030	2050
Percent of existing homes complying with water-efficient landscaping standards	30%	50%

Performance Indicators

	2030	2050
Number of existing homes complying with water-efficient landscaping standards	4,010	7,330

Sources

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table].
<https://smcenergywatch.org/contact/resources/>.

Strategy 33: Graywater and recycled water

Activity data and GHG savings

	2030	2050
Water savings (gallons)	7,661,300	25,438,100
Electricity savings (kWh)	20,230	67,170
GHG savings (MTCO ₂ e)	10	20

Assumptions

	2030	2050
Percent of existing homes with graywater systems	5%	20%
Percent of existing non-residential buildings with graywater systems	5%	20%
Percent of new homes with graywater systems	15%	25%
Percent of new non-residential buildings with graywater systems	20%	25%

Performance Indicators

	2030	2050
Number of existing homes with graywater systems	590	2,340
Number of existing non-residential buildings with graywater systems	110	450
Number of new homes with graywater systems	270	770
Number of new non-residential buildings with graywater systems	280	430



Sources

California Department of Water Resources and State Water Resources Control Board. 2018. Making Water Conservation a California Way of Life. <https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/Make-Water-Conservation-A-California-Way-of-Life/Files/PDFs/Final-WCL-Primer.pdf>.

San Mateo County Energy Watch. 2021. RICAPS Menu of Measures, version 9.4 [data table]. <https://smcenergywatch.org/contact/resources/>.

US Environmental Protection Agency. 2009. Water Efficiency in the Commercial and Institutional Sector. <https://www.epa.gov/sites/production/files/2017-03/documents/ws-commercial-ci-whitepaper.pdf>.



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Appendix B. Community and Stakeholder Engagement

Appendix B.1. Climate Mitigation and Adaptation Plan - Phase 1 Public Engagement Summary

Appendix B.2. Climate Mitigation and Adaptation Plan - Phase 2 Public Engagement Summary

Appendix B.1. Climate Mitigation and Adaptation Plan - Phase 1 Public Engagement Summary

MEMORANDUM

DATE November 12, 2020

TO Adam Lokar, Management Analyst, Sustainability Specialist
City of San Carlos

FROM Tammy L. Seale, PlaceWorks, Climate Action and Resilience, Principal
Eli Krispi, PlaceWorks, Climate Action and Resilience, Senior Associate
Torina Wilson, PlaceWorks, Project Planner

SUBJECT Climate Mitigation and Adaptation Plan - Phase 1 Public Engagement Summary

This memorandum summarizes the two community workshops held as part of the first phase of outreach for the City of San Carlos Climate Mitigation and Adaptation Plan (CMAP). This memorandum includes a description of the workshops, discusses the questions asked of participants in small group breakout rooms, and presents the results of each question.

Community Workshop Summary

The City hosted two 2-hour community workshops online via Zoom on August 26, 2020 and October 1, 2020 in effort to engage the San Carlos community in the planning process for the CMAP. Each community workshop followed the same agenda and included the same information and materials.

PlaceWorks project manager Tammy Seale facilitated the workshops and provided support while City staff project manager Adam Lokar and PlaceWorks assistant project manager Eli Krispi led the presentation and the question-and-answer session. In addition, staff from the City and PlaceWorks provided facilitation and notetaking support during small group discussions.

The City promoted the workshops through the Spotlight newsletter, which was mailed to all San Carlos addresses, other City electronic newsletters, and through email and social media announcements. Participants registered for one or both workshops through the City's website in advance of each workshop. Workshop registrants received multiple reminder emails in advance of the workshops. The reminder emails also included a Zoom Workshop Participation Guide and links to CMAP handouts and project information to review in advance of the workshop. A total of 70 registrations were received for both workshops with approximately 30 attendees in total.

Workshop Purpose and Desired Outcomes

The City hosted the workshops to raise awareness and help inform members of the community about the CMAP, to share initial results of the technical analyses (including the GHG inventories, assessment of existing programs, and the vulnerability assessment), and to begin brainstorming with the community on GHG reduction and adaptation strategies.

- § Participants will gain a better understanding of the CMAP update, including what it will accomplish and why the City is preparing it.
- § Participants will learn about how San Carlos contributes to climate change, how climate change may harm the community, and what the community has done and can do in the future to address these challenges.
- § Participants will engage with members of the CMAP project team and share their ideas and vision for a sustainable and resilient San Carlos.
- § The City will provide an inclusive, equitable, and transparent opportunity for participation in the planning process.
- § The City will receive high quality input from the public to assist with the next steps of the CMAP planning process.

Agenda

The agenda for both workshops was the same, as follows.

6:30 pm - Welcome and Zoom poll

6:45 pm - Introduction to workshop and welcome from Mayor Ron Collins

6:55 pm - Project presentation

7:15 pm - Question and answer session

7:20 pm - Small group discussions in Zoom Breakout Rooms

8:20 pm - Rapid Report Back

8:30 pm - Workshop wrap-up and end

Small Group Discussions

After the presentation and question and answer portion of each workshop, community workshop participants joined small groups with a facilitator and a note taker. The small group discussions allowed for an interactive and in-depth exploration of specific topics using the breakout room feature of the Zoom platform. Small group facilitators asked participants five questions organized by sector:



9. **Energy Sector.** What actions do you do or would like to do at home or your business to increase energy efficiency and energy resilience? Are there challenges or barriers to those actions? When thinking about those actions, should the City consider mandatory requirements for energy efficiency and renewable energy beyond the State’s building and energy code requirements (also called reach codes)?
10. **Transportation Sector.** What actions do you do or would like to do at home or your business to reduce transportation-related emissions? Should the City replace existing City cars/fleet with electric cars and install more electric vehicle charging stations? Are there challenges or barriers to those actions?
11. **Waste Sector.** What actions do you do or would like to do at home or your business to reduce GHG emissions and increase resilience related to garbage and recyclable or reusable materials? Are there challenges or barriers to those actions?
12. **Extreme Events.** What climate hazards are of most concern to you? What areas of the city have experienced climate hazards? How can we be prepared and reduce the impacts of these events?
13. **Implementation.** Where does climate change fit into the City’s goals and budget? In support of this question, facilitators shared the City Council Vision Statement which read as follows:
The City of San Carlos will continue to move with confidence into the future as a desirable, vibrant, inclusive and business friendly community, admired by all as a great place to live, learn, work and play.

The majority of workshop participants chose to provide suggestions to the City regarding steps to move towards a more sustainable community. Most of the participants expressed support for the City’s CMAP and existing sustainability and climate action efforts while providing constructive feedback to increase success of reducing GHGs in the future. The feedback received for each question, from both workshops, is summarized by question and topic below.

Question 1: Energy Sector

Facilitators asked workshop participants three questions related to the energy sector:

1. What actions do you do or would like to do at home or your business to increase energy efficiency and energy resilience?
2. Are there challenges or barriers to those actions?
3. When thinking about those actions, should the City consider mandatory requirements for energy efficiency and renewable energy beyond the State’s building and energy code requirements (also called reach codes)?

Workshop participants’ responses are presented below, sorted into six categories: 1) suggestions; 2) challenges/barriers; 3) reach codes; 4) actions; 5) issues; and 6) general comments and questions.

Suggestions

Energy Efficiency and Electrification

- § Create financial incentives for gas to electricity conversion.
- § Breakdown between gas use and electricity use. Reduce reliance on natural gas and shift towards using more electricity.
- § Shift from gas powered leaf blowers to electric leaf blowers.
- § Gas power blowers should be banned.
- § Streamline/modify building permit process to allow for energy efficient construction.
- § Sunnyvale has had a 16-year journey towards efficiency, switching to solar and electric vehicles. Updating house little by little (no big remodel), with intention to use natural gas. It is more expensive to retrofit rather than build new. Start with new construction, it's less expensive to build with all electric, rather than gas. Contractors and cost- building market and knowledge does bring cost down; a phased approach is a great way. Electric vehicle is a solution. There's a lot of benefit in doing case studies.
- § Resident wishes to turn off lights at home more, suggest using plug cord to turn on electronics.
- § Educational outreach to community advertising cost-saving of efficiency upgrades.
- § PG&E plans during power shut offs with City recommendations of backup generators or batteries.
- § Improving the comfort of your home by making it more energy efficient.
- § Would like for home to have battery backup for fridge, etc.
- § Follow lead of surrounding communities – such as not allowing natural gas in new construction – move towards electricity.
- § PCE program has ECO50 program and ECO100 program more money will give you 100% energy. Can PCE handle an incentive if 70-90% of San Carlos go to program?
- § Clean energy preference; switch from gas to electric. Heat pump water and space heaters could go a long way to stop use of natural gas – contributor to global warming.
- § City should take a leadership role through upgrades/energy retrofits to ensure facilities are energy efficient as possible.

Rooftop Solar and Heat Pumps

- § Promote residential solar.
- § Would like more solar within the community, such as on roofs, home battery, more regulation to mandate solar on new buildings, electric cars powered by solar.
- § Participate in community bulk buying programs such as SunShares, which leads purchasing for solar panels and EV. Try to add heat pumps to the list of eligible items.
- § Support for solar on roofs (close to net zero energy).
- § Goal – heat pump (can heat and cool).



- § Build solar carports for electric vehicles. Look into making available (alternative if there is a lack of space on roof).
- § The facility at Shoreway Environmental Center has solar panels. It costs more but want to do the right thing and invest. Next 5-10 years, Recology will need new trucks and have been looking at alternative fuels, but can these trucks maintain same capacity long term? Interested in looking to see what the City is doing and other waste haulers.
- § Suggestion to block out sunlight in house to save energy (i.e., curtains), suggestion to use solar panel.
- § Solar or battery technology for homes.
- § Going solar to offset increased use on electric grid (leasing options to make it more affordable).
- § Would like the City to encourage people to use more solar.
- § Shade trees prevent from putting solar on house efficiently. Trees keep house cool in summer but not good for solar energy.
- § Tesla has solar panels that have shingles, each shingle is its own solar panel. Hope San Carlos has something like Tesla shingle. Panels are an eyesore.
- § Solar, however, barriers include roof condition; potential to use Tesla solar panels.

Energy Resiliency

- § Works at Tesla. The City should generate its own energy within city limits. Have some energy independence. The blackouts are more likely to happen in future, but there are some models from other cities that we can copy.
- § Explore a micro grid for energy resilience.
- § Great to use PCE but it would be great for the City to have own utility, combine with PCE and provide to city. Help reduce energy usage and have more freedom.

General/ Best Practices

- § Make expertise more accessible.
- § Encourage use of drying racks.
- § Energy audits.
- § We need to ween off fossil fuels, protect and preserve nature, enact laws for energy code requirements.
- § More action on the City level on climate change.
- § Encourage through City Manager communication, repetition is good.
- § Backup plan for rural neighborhoods; perhaps check into San Carlos unincorporated areas.

Incentives

- § Neighborhood engagement programs such as community-based rewards/incentives.
- § Government should subsidize people who cannot afford electric changes.

- § Financing options to allow paying overtime for home upgrades, for homeowners. Many folks can't just swap out appliances.
- § Suggestion to think of incentive vs. mandatory (mandatory usually takes more time and resources but has more certainty).
- § Rebate programs for water heating.

Challenges/ Barriers

Appliance and Equipment Upgrades

- § Accessing technical resources for energy efficient upgrades.
- § Accessing professionals (contractors) who can provide energy efficient products.
- § Moved in house in '93, replace windows, not sure if there was a City rebate programs at the time. Replaced gas heater with more efficient model. Quality issues with those gas heater models that qualified for rebate. City was helpful with solar panels (in '07) arranged volume deal and got discount and no City fees. Appreciate City assistance. Lost power for a few days last October. Revisiting solar installation. Read proposal to eliminate natural gas and in favor of electric. Concern – cost (main concern) electric heated, biggest part of bill in winter. Nervous to be dependent on one energy source, diversify risk.
- § Need to hit zero GHG emissions. Soon have to think about installing gas water heaters, heat pumps are an efficient heat solution. First stage, new buildings mandate for installing electric heat and water. Next 10 years start doing this to eliminate gas space and water heating, including commercial spaces.

Cost

- § Incentives are expensive and can create slower results.
- § Embodied carbon is a challenge because it is expensive, would like to reuse building materials to reduce carbon. Embodied carbon is the amount of carbon that you spend when you choose your materials. (i.e., cement has a high carbon footprint).
- § Financial (look into incentives or rebate).
- § Solar energy barriers high cost of installation.
- § Barrier in the incremental cost of efficiency upgrades to convert to electric appliances.
- § Resident has solar on his roof, would like the battery backup to be less expensive.
- § Home is not set up properly for battery backup due to cost for rewiring.
- § Concerns about correct metering affecting billing rates.

Contractors and Development

- § Barriers of HVAC contractors and architects who are stuck in their ways.
- § The biggest barrier is lack of contractors educated in energy efficiency. Remodeled home 6 years ago, had to have special certified contractor and contractor wasn't. Rebate system for



energy efficiency needs to be easier to use. Mandatory requirements – only when fix contractor issue. Didn't have permit issues with City 6 years ago, neighbors now have a harder time. Permitting process should be easier.

- § Promoting transit-oriented development is difficult because height limit reduces energy efficiency of building and there is lack of community support around permitting building height.
- § San Carlos is relatively built-out.
- § Challenge is a lack of work folks that know how to do this stuff. Took 8 months to find someone to install charger. Difficult to get vendors who can stall.

Other

- § Lack of education on going electric.
- § Resiliency issues.
- § Getting solar cells on roof – issues with storage, air from fires impacts efficiency – solution: better battery storage.
- § Main challenge is being a renter (can't make changes to home).
- § PCE can't handle current demand to provide what people are requesting.

Reach Codes

Responses that concern reach codes were varied but generally offered support or suggestions as follows:

- § Modify building permit codes to require appliances with improved efficiency.
- § Water reduction, going above and beyond Title 24 regulations, and utilize Pulgas Creek to rehab/restore the surrounding environment (This is for a new development at OCR/Industrial and Commercial).
- § Would like decarbonization, electrifying and getting rid of gas (to improve health and community), but gas would cost more, and electrifying is the way to go.
- § Reduce gas consumption – ask people to exchange old appliances with new electric appliances (buy in bulk to save money).
- § Require new buildings to install solar.
- § Fully electrify commercial and residential buildings (better option, get rid of gas).
- § Support for San Carlos to adopt reach code requirements.
- § Support of City to go above and beyond State standards (support to go electric, support mandates). Change starts at the City level.
- § When updating commercial and residential buildings: require it to be all electric.
- § Existing homes/commercial buildings – require gradual updates with time.
- § Create incentives for development to meet energy efficiency standards (such as reach codes).
- § Utilizing City/state programs to improve energy efficiency (PACE/Hero Program).

- § Mandatory City standards to regulate water heaters, stoves, and furnaces for all new construction to switch over to electric appliances (Berkeley, Redwood City, and other cities have already implemented something similar).
- § The City should have mandatory requirements for residents to change from gas to electric.
- § Resident thinks reach codes should be applied to new and existing buildings, especially when ownership is transferred.
- § No to building new gas buildings, develop programs to provide rebates for replacing old gas equipment with electric.
- § Burnout ordinances – requirement for non-functioning, old gas equipment to be replaced with electric.
- § Should have electric requirements for new construction.
- § New developments in the City require A/C - summer spike. Needs balance.
- § Implement Reach codes (support from the community).
- § City should require as much as it could get away with for new construction, pass state's regulation.
- § City should go beyond State requirements. Okay to be more aggressive. A lot of catching up to do. Specifically, for major remodels not just brand-new homes. Should include commercial not just residential.
- § Burn out? Ordinance. Menlo Park requirement (make sure it's equitable for those on fixed incomes).

Actions

Several participants provided detail on specific actions they take to increase energy efficiency and resilience, such as:

- § Replaced windows, has contract with solar.
- § Resident bikes everywhere and tries not to drive.
- § Google nest and electric car.
- § Turn off the lights – simple but effective.
- § Just signed up for OhmConnect – connects to PG&E account, helps you track usage and how you can be more mindful. (<https://www.ohmconnect.com/>)
- § Recently replaced non energy efficient furnace with efficient furnace, drive hybrid, local farmers markets for mostly all of food.
- § Live in older home and replaced old furnace and vacuumed out old insulation and put in new R35. Try to bring older home up to code in newer homes.
- § Have solar hot water to heat house in winter. Like to shop at local farmers market and ride bike everywhere, would like to run the house off car battery.



Issues

Several residents raised issues they have noticed in the community:

- § Neighbors are buying inefficient generators due to power shutoffs.
- § New normal of power shutoffs causing people to buy generators and backup batteries.
- § However, inefficient generators can use up fossil fuels that are harmful to the environment.
- § Too many cars on road during “Spare the Air” Day.
- § Neighbors are buying diesel generators. Not a good sign.
- § More hot days is requiring us to consume more energy.

General

Finally, several residents asked questions, or provided general comments, in their small groups, including:

- § How many businesses actually utilize renewable energy?
- § Resident has gas heating and would like to change it to electric.
- § Resident is electrifying house, energy-efficient, replacing light bulbs, heat pump water, electric vehicle and solar panels.
- § Would be nice to see trend line of this progress. How many people have solar and opted for ECO100 so we can see results of choices as a community?
- § \$8,000 available for low-income homeowners who want to convert to electric. PCE Program to launch in December 2020.
- § PACE – financing program for rooftop solar; but does it include all electrification?

Question 2: Transportation Sector

Facilitators asked community workshop participants three questions related to the transportation sector:

1. What actions do you do or would like to do at home or your business to reduce transportation-related emissions?
2. Should the City replace existing cars/fleet with electric cars and install more electric vehicle charging stations?
3. Are there challenges or barriers to those actions?

Workshop participants’ response are presented below in four categories: 1) suggestions; 2) challenges/barriers; 3) City fleet; and 4) general comments and questions.

Suggestions

Active Transportation and Infrastructure

- § Promote walking and biking and reduce driving.

- § Building efficient/safe bike/pedestrian infrastructure/network.
- § Convert streets to pedestrian spaces.
- § Developing additional bicycle infrastructure to improve access for bicyclists throughout the city.
- § Bike lanes, electric car/transportation infrastructure.
- § Alternative transportation – walking and biking (slow streets, protected bike lanes to encourage people to get out).
- § Walking/bicycling/scooters.
- § We need a bike pedestrian superhighway.
- § Increase bike facilities/routes at Walnut, Brittan or Elm.
- § Promote sustainable green streets to slow traffic, bike/pedestrian-friendly, trees, good landscaping, underground utilities.
- § Walk a lot to shopping not at farmers' market. Walking should be in general plan. E-mobility like scooters and bikes that other cities have would be nice to have shared bikes. People working from home nice. If we can get high speed internet more people can work from home.
- § Support City efforts to make San Carlos as bike friendly as possible. Implement as many recommendations in that plan as possible. Focus on safety, ensure bike safety from cars. Bike only streets, such as Laurel closure due to COVID-19.
- § Network of protected bike paths, visible striping, concrete barriers/including natural such as trees.
- § Education is critical. Educate how to prepare for bicycling; for safe ridership; more advocacy, bike clubs, promote events centered on biking; make it a part of our culture, e.g., Holland so people are aware of how to coexist with bikes. Bicycling/Driving safety and awareness. Cars dangerous to cars. Bicyclists also need to build their awareness.
- § Walking/biking more often.

Public Transportation

- § Improve efficiency of transit (e.g., Caltrain).
- § Suggestion for shuttle around San Carlos from major streets to residential streets (Laurel St. to residences).
- § Solar powered gondolas around San Carlos for transporting residents.
- § Electric shuttle system (especially for hills).
- § Laurel Street (open air electric shuttle, keep street closed-encourage walking).
- § Encourage individuals to take transit.
- § Improve service of transit operators.
- § Solutions to last-mile issue (Caltrain).
- § Public transit should be encouraged.
- § Living in the hills makes it a challenge to bike – increase public transportation to hill areas.



- § Make public transportation easier and more commuter friendly.
- § School transportation – look into how to reduce transportation emissions. More buses, etc.
- § Transportation – husband and kid taking Caltrain to work and school every day. Encourage people to use alternative transportation methods.
- § Caltrain electrifying tracks. Once ready, San Carlos should roll out public message, we have a nice train station and will be able to stop at every station, go faster, and quieter. Opportunity for public message roll out, good message.
- § Public message – encourage people to vote ½ tax to fund Caltrain.
- § Subsidizing people getting passes. That would encourage people to take advantage. Not just people who live in San Carlos. Encourage employers to provide.
- § Could we get a grant for that? Maybe state and federal grants to cover.
- § Lyft and Little House in Menlo has a contract that Lyft will drive to senior centers and med. appts. Don't have to be senior to drive to med. appt.
- § San Carlos adult community center offers something similar. Message roll out with that program.
- § Shuttles for employees, to/from train station, to business centers.
- § Incentives for carpooling/transit ridership.

Electric Vehicles and Infrastructure

- § Statistics about EV charger usage (At City Hall or Wheeler Plaza).
- § Golf cart to do errands around city.
- § More charging stations would encourage people to switch to electrifying cars.
- § Support increasing charging stations – make it mandatory for apartment buildings to have charging stations.
- § Every City property should have electric charging stations (as well as on streets – Laurel St., San Carlos Ave., etc.).
- § Support investing in fast charging stations (have a variety to support all vehicles).
- § More charging stations at Wheeler Plaza.
- § Solar options to power charging stations.
- § Replace gas-powered vehicles with electric.
- § Promote development of electric car infrastructure.
- § Incentivizing multi-family residential development to incorporate electric vehicle.
- § Promote development of electric car infrastructure.
- § Additional charging stations throughout the city.
- § Require new businesses/construction to implement new charging stations.
- § Electric cars.
- § City should have street/curbside chargers and chargers in all City-owned parking lots or public places.

- § Residents need more access to chargers within facilities.
- § Chargers need to charge faster (10-15 min.).
- § We should have multiple levels/varieties of chargers depending on the vehicle/equipment.
- § There needs to be a market and leadership signal for electrifying.
- § Supports Gavin Newsom's electric car requirements.
- § Does the City have data on how many households have electric/hybrid cars? This can help determine how many charging stations we need.
- § Factor in distance between charging stations – vehicle miles traveled.
- § Signs telling people where charging stations are will help. At library man was panicking, he didn't know where he can charge car. Haven't noticed signs.
- § Seems like no brainer as old vehicles retire, new ones would be electric.
- § In the 2009 CAP, policy to adopt hybrids and electric vehicles. Has this been done? Should go all in on electric vehicles as soon as existing cars expire.
- § Requirement for outsourced City services/vendors/contractors to also convert their fleet.
- § Adaptors for faster electric vehicle charging. Think about maximizing the use from 9 am to 3 pm.
- § Increase charging stations due to Governor's recent legislation. Make it readily available.
- § Retrofit parking spaces to include EV charges.

Off-road Equipment

- § Reduce use of gas-powered lawn mowers and other equipment.
- § Prohibit gas-powered equipment in city.
- § Incentive to convert existing equipment to all-electric.
- § We need more batteries for electric blowers or carry batteries in their vehicle.

General

- § Bulk buying – SunShare program for that does community bulk buy for solar and EVs so far. They should add heat pump water heaters to the bulk buy menu.
- § City incentives to get residents to get their cars off the street, maybe expanding driveways to make room for bike lanes.
- § Places/routes for wildlife to travel.
- § All new paving should have more reflective material for routes.
- § City should implement environmentally friendly streets, etc.
- § Tree (reduce heat) island effect on routes.
- § Cool roofs.
- § High density housing near transit.
- § Menlo Park's mandates to not park on the street and park on your property instead.



§ Own a plug-in hybrid... buy 30 gallons of gas per year. The City climate action plan is 10-11 years old, it called for the City to replace its fleet. The City hasn't done that, interested in obstacles.

Challenges/ Barriers

Electric Vehicles, Equipment, and Infrastructure

- § Challenge to electric car is that the batteries are damaging to the environment.
- § Lack of existing charging stations.
- § Difficulty for workers to charge electric blower 8 hours a day.
- § Resident was charging her golf cart and a City worker stopped her from using the City-owned electric charger.
- § People do not want to sit around and wait for long period of times for their equipment/vehicle to charge.
- § Charging stations close to Laurel Street – barrier is lack of parking on Laurel.
- § Concerns over range of EVs to get to locations further away.

Active Transportation and Safety

- § Try to walk and bike more places, challenge is the city is designed around vehicles, not always good and safe routes. Transit options – more people in one vehicle reduces emissions a lot. Electric vehicles – don't think we can get where we need based on switching everything to electric vehicles, but big step.
- § San Carlos bike ped and transit unfriendly. Crossing Brittan Ave., it's like putting life at risk, not enough bike parking downtown. Bus stop on El Camino by Walgreens – trying to cross El Camino was almost hit too many times. Make city safer especially for children. Neighbor's child was hit crossing in San Carlos. Needs to be more accessible, walking around San Carlos with stroller is difficult, no ramps. Transit easy to go north-south, not easy to go east-west.
- § San Carlos very bike and ped unfriendly. Signs saying share the road is like a joke. Comparing roads to Redwood City, we should see more bike paths. Can do a lot more to make city ped and bike friendly, bike and ped loops can show people what life can be by walking and biking without fear. The City should make it easy to get permits for installing wall connectors or EV charges, this is costly, not a good cost equation, it does add up.
- § Brittan park – scooter and skateboards banned. Also not allowed on street according to code. Old code needs to be removed?
- § Many cars don't pay attention to ped in crosswalk. Educate cyclist to be more careful.
- § Improve visibility for pedestrians at intersections (Olive at Elm, ADLP at Alma, Brittan at Tamarack, Cedar at Cherry).
- § Install more rectangular rapid flashing beacons (RRFBs).
- § Part 1 – few have said bike everywhere.

Public Transportation

- § Issues with SamTrans schedules not matching school system.
- § Caltrain has gotten worse, and commutes take longer over the years due to favoring baby bullets.
- § City offered shuttle that would take people from home to various people. It didn't get used and didn't get funded. Development happening those building will be finished and populated with business folks. Would be nice to have shuttle to take people from business to train or Laurel St. Wouldn't have to drive or walk. New businesses east of train wondering if worth revisiting. Timing was wrong or interest level wasn't there before. Two years will be more populated. Keep as many cars off streets while encouraging people to enjoy downtown at lunch.

Existing Development and Cost

- § Retrofitting is expensive with home charging. Adds on to cost of buying first electric vehicle. City should move to electric cars. Charging stations is important, older electric car doesn't get far. The more the City can make available, everyone can take the risk of a longer journey in electric car.
- § Multi-family barriers include no place to charge overnight in multi-family complexes. Workplaces – charging during the day is beneficial there's a lot of solar on the grid that goes unused during the day.
- § Buildings in San Carlos tend towards electrical systems, unreliable power, and high cost of power storage/batteries.
- § As an example, in Menlo Park, 40% multi-family, very challenging for those living in multi-family to get access to EV charging. Concern existing buildings difficult to retrofit/may be expensive. Require for new buildings.

Parking and Public Realm

- § Challenge: reduce parking supply (e.g., street parking).
- § Lack of parking for users of transit.
- § Charging stations close to Laurel Street – barrier is lack of parking on Laurel.

General

- § Solar panel reflections, good for environment but maybe bad for birds?
- § City has still not implemented environmentally friendly plans.

City Fleet

Several community workshop participants expressed support for the City transitioning to an electric fleet. Support and suggestions on the transition include the following:

- § The City fleet should be replaced with electric cars.
- § The City should install more electric vehicle charging stations.



- § Replace the municipal fleet with EVs and require more EV charging citywide especially where it can be used in daylight when the solar power is abundant.
- § Support City investing in electric vehicles/trucks (would like a timeline rolled out).
- § May need an emissions analysis to determine whether this action is appropriate (e.g., cost/benefit analysis).
- § There are programs in place to support establishment of electric fleet.
- § Not necessarily a priority, but there is momentum toward electric fleet in California.
- § Accelerate conversion to nonpolluting vehicles within 10 years.
- § Replacing City fleet.
- § Requiring delivery trucks, buses, etc. to convert to fuel efficient vehicles.
- § City has not done anything on implementation and should have a deadline on converting to electric vehicles.
- § Yes, agree with City fleet being electric – but factor in charging during peak times.
- § Electric fleet – nice to have electric car share as fleet.

General

Several community workshop participants expressed opinions or asked questions which were not part of the dedicated small group discussions. These include:

- § Electrical cars have fewer parts.
- § Holistic view of debate – lower activity, reduce distance.
- § Balance of workplace and residency (mixed use project).
- § Balance of job housing (more affordable housing) – struggle of feasibility.
- § Costs are decreasing for electric cars.
- § At the Caltrans station, a worker was using a gas-powered leaf blower.
- § All new paving should have more reflective material for routes.
- § City should implement environmentally friendly streets, etc.
- § Tree (reduce heat) island effect on routes.
- § Cool roofs.
- § We should be concerned about catastrophic events.
- § Menlo Park is a good model for environmentally friendly implementation.
- § Working from home reducing emissions – could the City have employees work from home in the future to reduce emissions.
- § State say by 2035 no more gas cars in state.
- § Gov say no gas cars sold after 2035. Give thought as to what are we doing?
- § Can someone reverse it? Let's assume no.
- § Consider how telecommuting can play a role in reduced vehicles trips. Requirements for business to have some levels of telecommuting.

Question 3: Waste Sector

Small group facilitators asked community workshop participants two questions related to the waste sector, including:

1. What actions do you do or would like to do at home or your business to reduce GHG emissions and increase resilience related to garbage and recyclable or reusable materials?
2. Are there challenges or barriers to those actions?

Workshop participants' responses are presented in two categories: 1) suggestions; and 2) challenges/barriers.

Suggestions

Waste Reduction and Recycling Education

- § School field trip to recycling center.
- § Community outreach/education/signage that indicate compost waste bins.
- § Practice and teach in schools.
- § Adopt waste management agency community/outreach educational programs.
- § What's actually being recycled vs being thrown away?
- § Information push to residents to inform them of what trash, recycle, and compost goes where. Update this information regularly.
- § Recology tours are very informative for the community – would like to see more education on recycling/composting, etc.
- § Education to residents. Would like to see the City have better communication. Should be a priority.
- § Would it help to provide communication to point folks to this? Yes, repetition is good, on a regular basis.
- § Best way to reach? People don't read newsletters, I read the whole thing.
- § Newsletter isn't cheap, print in color.
- § I always read those, get friends to read them.
- § Give residents an option to opt into email version, cost saving may be easier to read.
- § Can get lost in email, would be nice to read but don't have time.
- § Like mailing, tell them they can get the same in email. Can get info without actual piece of paper.
- § People like the feeling of small community, small village. Hard copy has a small community feel.
- § Like taking a particular topic and exploring in detail. Learned a lot about SC from that.
- § Education needs improvement to teach people how to sort.



- § Education. Cannot be stated enough. Raise awareness and programs to learn how to recycle. Start with the youth at schools – all the way to senior centers.
- § Encouragement to reduce waste, especially now during COVID/shelter in place.
- § Understanding what items can actually be recycled vs. thrown away.
- § Additional signage of what goes where (Trash, Recycling, Compost).

Single Use Items- Plastic

- § Reduce/prohibit use of single-use plastic products.
- § Reduce plastic through legislation? (fight plastic pollution and pass proposed laws AB 54 and SB 1080).
- § Reduce single-use plastic.
- § Various organizations are giving things away or swapping materials (re-using items).
- § Eliminate plastics, junk mail, unwanted newspapers.
- § Recyclable and plastic – try to reduce plastics in life but difficult, everything comes in plastic, so much is not recyclable. Solution – State policy to state if not recyclable then don't sell it.
- § City provide incentives to restaurants to reduce plastic (especially with takeout food).
- § Reduce single-use plastics and/or encourage use of sustainable packaging materials but barrier is that it is expensive.
- § Prohibit single-use containers citywide.
- § Get rid of plastic bags.
- § Recology does not have a destination for recycling plastic bags.
- § Still seeing plastic bags all the time due to loophole with bags being reusable.
- § Buy less and buy used. Kid into thrifting.
- § Single-use plastics should be eliminated; look towards alternatives. Statewide initiative coming on the ballot next year. (San Francisco and Berkeley have restrictions on usage.
- § Disappointing to hear not everything gets recycled as promised/intended. How can we get businesses to offer less plastic?
- § Consider requiring all restaurants from providing plastic, non-recyclable containers. Are restaurants required to compost? Look into.

Reduce, Reuse, Recycle

- § Not much plastic is recycled in San Carlos.
- § Delivery program for exchanging/giving away materials through bikes or scooter riding.
- § Community group of learning how to build or fix things to decrease carbon footprint and reuse materials.
- § Our landfill might fill up and might cause spikes in pricing, if people knew, they might have incentive to recycle.
- § Smaller radius offering of items for re-use.

- § Suggestion to have a community repair clinic to extend life of materials.
- § Recycle plastic film again.
- § City of Menlo Park focuses on eclectic more vs. waste – support San Carlos having the same approach.
- § Focus on source reduction.
- § City could focus on source reduction for own suppliers.
- § Recycling everything, composting, reduce buying plastic containers, bottles, etc.
- § Textile recycling. Would like to see the City invest in technology to reduce textile waste.
- § Plastic film is difficult to recycle, manage.
- § It's great that San Carlos offers recycle and compost. Would like to see more recycle and compost bins downtown.

Composting

- § Compost – where it takes place? Located in disadvantaged communities? Looked into environmental justice?
- § Promote composting.
- § Vermicomposting.
- § Sunnyvale has separate food scraps from yard waste. Works well to have separate stream.
- § Develop public composting facilities.
- § Promote recycling of water for compost purposes.
- § Legislation to reduce decomposable waste in trash bins, how would this be monitored?
- § Backyard compost, organic garden.
- § Try to get a multi-family facility to use compost. Bit of a challenge but if keep at it, it can work.

Development

- § We should mandate reach codes.
- § Might be an overreach to make residents switch out their existing appliances for more eco-friendly products (might need to incentivize residents instead to encourage them).
- § Adopt codes requiring trash-capture units in stormwater runoff drains as part of new development (including private property).
- § Planning commission requires landscaping, require edible landscaping.
- § What can't be used for edible landscaping – bird friendly, trees.
- § Native and draught tolerant landscaping.

Water and Wastewater

- § Extract organic waste from natural streams.
- § Promote installation of graywater systems.
- § New houses should store water. Capture 1,500 gallons of water during rainy season.
- § Promotion and legalization of gray water systems would be good.



- § Redwood Shores uses gray water to water everything.
- § Gray water illegal in San Carlos.

General

- § Extend reduction/prohibition to businesses.
- § Suggestion to have a community lending program to lend tools.
- § Buying food that others wouldn't want.
- § Community garden.
- § Ban gas leaf blowers.
- § Plant more female trees. Arborists recommend male trees. Could be part of compost.
- § Methane is 80x more than GHG, Ox Mountain Landfill. Only 20 more years of life left in it; cities from Burlingame to East Palo Alto; looking at methane capture. Do more. Look into.
- § Focus on fossil fuels first, then pivot to waste in terms of Climate Change. Electric garbage trucks!
- § Improve waste pick-up effectiveness.
- § Promoting off cycle energy usage, plan to run washing machine after 10 pm, promote that thing to use less capacity overall.
- § Solar you do opposite, run when sun is out.

Challenges/ Barriers

Reduce, Reuse, Recycle

- § News about China not accepting recycled plastic. What's happening with plastic that goes in recycle bin? Unclear what happens. Would like more feedback in community, communication is lacking.
- § Disposable requirements during pandemic restrictions.
- § Decline in restaurant sustainability progress due to COVID.
- § From RethinkWaste employee – Huge market rates for cardboard, lots of cardboard and can market those materials. Need to avoid 3-7 plastics as much as possible, there's no market for 3-7 plastic right now.

Odor

- § Negative effects including odor.
- § Certain techniques may mitigate odor.

General

- § Inconvenient/time-consuming.
- § “Pay as You Throw” if you use less, pay less – but this approach was challenged. Cost issues drove the elimination of this approach.

- § TerraCycle (New Jersey) – example. Look into their model. Everything from cigarette butts to shampoo bottles, razors. Get stores to do this as well. Barriers = not very convenient for people to implement.
- § Education and messaging.
- § Hard to buy products in alternatives with less plastic packaging.

Question 4: Extreme Events

Community workshop participants were asked three questions related to extreme events:

1. What climate hazards are of most concern to you?
2. What areas of the City have experienced climate hazards?
3. How can we be prepared and reduce the impacts of these events?

Workshop participants' responses cover six topic areas: 1) wildfire; 2) sea level rise; 3) flooding and drought; 4) extreme heat; 5) non-climate; and 6) general comments and questions.

Wildfire

Areas of concern

- § Brittan Canyon/Devonshire Canyon.
- § Wildfire areas: hillside areas.
- § Fires in open forests and hills.
- § Scared of wildfire. Two blocks from hills.
- § Large areas of San Carlos are in a wildfire hazard area including unincorporated areas, i.e., Devonshire. Hasn't been cleared; need efforts to clear out underbrush.
- § Wildfires, especially in the hills and western San Carlos.

Resilience and Mitigation

- § Identify and plan for emergency evacuation routes.
- § Identify and plan for access points for emergency personnel to access fire zones.
- § Public communication.
- § WUI Code requirements for fire resistant homes/buildings (at least for hills).
- § Inclusive and feasible fire safety suggestions/workshops/education as well as follow up.
- § Ways to reduce impact: Green infrastructure/groundwater retention, facilitate fuel management activities, brush clearance requirements, and practice community fire drills.
- § Urban Limit Line? Does San Carlos have one? Limit development that is in fire prone areas.
- § Removing dead vegetation.
- § Removing invasive species of plants.
- § Burying electrical lines.
- § Goats at Eaton Park – is that enough? Are there other ways to help prevent wildfires?



- § SC got money for mitigation of hilly trees of San Carlos, good idea to keep a maintenance thing going.
- § Get goats every so often. Hire 200 goats good idea.
- § People should be allowed to keep goats.
- § Woodside PV Ready – example. Discussions about not just defensible space around each home but looking at the neighborhood as a whole; harden/strengthen neighborhoods; fire breaks, vegetation management at the neighborhood level; group effort required.
- § Need firebreaks, but they don't appear like they are wide enough to do what they are intended to.
- § Suggest to bury power lines, maybe when San Carlos is doing a re-paving project.
- § Put power lines underground.
- § Consistent brush clearing throughout the city and woodlands.
- § Wildfire – what the City can do in regard to private property, encourage vegetation management.

Challenges/ Barriers

- § Coordinate between multiple jurisdictions (County, City).
- § Emergency access during wildfires.
- § No parking areas to keep clear for evacuation routes.
- § Old (highly flammable) building materials in existing development.

Health

- § Air quality, air heat, smoke, hard to breathe.
- § Air Quality impact days.
- § What we're going through at moment – wildfire... smoke levels. Prevents walk or cycle rather than drive. Run a/c because can't open window. Terrible air quality due to smoke. Seems to be becoming annual event. Smoke will affect lives sooner than sea level rise.
- § Wildfire concerns. Nobody immune from climate change impact.
- § Air quality issues, due to wildfires. Peninsula very much impacted from fires. For vulnerable populations, those with health conditions.
- § Smoke.

General

- § Wildfires, suggestion to open the gate so people have a way out when evacuating.
- § Fire.
- § Wildfire risk factors: Lightning/wind/extreme heat, emergency egress routes.
- § Are Cities working together? Fire can spread quickly. Pull resources.
- § Just look out your window today.
- § Fires, big concern.



Sea Level Rise

Location

- § Sewage treatment plant.
- § Wastewater sea level rise (threat to East Side office buildings, ecological impact in East San Carlos).
- § Sea level rise areas: East San Carlos, Highway 101 corridor.
- § Concern about real estate subject to sea level rise. If eventually have to retreat from these areas, why invest building in these areas?

Resilience and Mitigation

- § Modify facility to withstand impacts of sea level rise.
- § San Carlos should invest in house boats.
- § Pedal boats and gondolas.
- § Keep San Carlos airport from flooding.
- § Change location of sewage treatment plant.
- § Sea level rise comment – RethinkWaste facility that materials go to are on that side of 101 (rising sea level side). Working on planning for sea level rise.

Challenges/ Barriers

- § Issue: cost and timing of treatment facility adaption should be identified in plan.
- § One that doesn't get much talk is sea level rise – San Carlos will be affected if we don't reach climate goals, 101 will be underwater at current projections. Concern – raising sense of urgency without creating panic.

Flooding and Drought

Location

- § Industrial area at risk for flooding.
- § Easter houses complaining about flooding.
- § South end of Laurel floods every year.

Challenges/ Barriers

- § Four creeks in City limits.

Resilience and Mitigation

- § Code requirements for flood lands homes/commercial buildings.
- § Channelization of creeks.
- § Removal of debris from creeks.
- § Drought –implications, keeping water supply.



Extreme Heat

Challenges/ Barriers

- § Grid goes down and causes extra heat in residential homes.
- § Heat – no AC in households.

Resilience

- § Establish cooling centers for those without air conditioning on days of extreme heat.
- § For the Heat waves we bought a window heat pump that cools us in the summer and heats us in the winter.
- § To address cooling resilience, we added more insulation in the attic and walls. Our home became a better thermal battery.
- § Extreme heat affecting us the most. Don't have AC, don't want to get it, haven't needed it. At most 2 days a year have these hot days, can't open house because of smoke, getting more of these hot days a week or two at time. It's here now.
- § Extreme heat – only place open was Red Morton – just me and another person were there.
- § Plant native trees for heat (shading, street trees).

General

- § Intense heat.
- § Electricity use seems like it will go up; due to air rise in temperatures, the need to run air conditioning, air filters.
- § Extreme heat.

Non-Climate

Public Safety Power Shutoffs

- § Opening resource centers during power shutoffs.
- § Can we have group batteries so people with solar can share with other residents (especially when PG&E is down)?
- § Grids should overlap and have more points of contact, perhaps group together with other neighbors.
- § Public safety power shut offs.
- § Be prepared for power shut offs with Powerwall's – make that available to the community (have a cooling center for vulnerable, refrigeration for medications, etc.).
- § Community level battery storage (microgrid, PCE- backup at sources).
- § PGE turning off power that's an extreme even for some who need power.

General

- § Earthquakes (although unrelated to climate).
- § Earthquakes preparedness. Are buildings ready?
- § Landslides – in the 80s
- § Mudslides – in 2005
- § Let lightening come with rain, not dry lightning.

Evacuation

- § Information and instructions on evacuation routes.
- § More evacuation preparedness.
- § Materials for preparedness.

General

Many community workshop participants provided miscellaneous comments that were not associated with a specific climate hazard or extreme event. These are as follows:

- § Promote City messaging on climate hazards/events.
- § Perhaps for yard tools we can work with BAAQMD to have a justice related replacement of gas fired yard tools. Or a number of contiguous cities could work together on replacement.
- § Improving/updating building codes.
- § Whole house fan.
- § Nights aren't as cool as used to be.
- § Garden – plants much drier during summer months than used to.
- § San Carlos with so much flat land – topography.
- § Nothing raises your energy bill more than A/C.
- § New heat pump cooler heaters that don't use a lot of power. They run in reverse to heat and run like fridge to cool.
- § Uses difference from outside/inside temperatures.
- § Need listing of vendors who can install, Eastman Lance – bay area plumbing and heating in Redwood City (recommended vendor).
- § Can carry these from room to room or install in window.
- § State has stuff from vulnerability assessment. Getting those things in place would be good, where are we supposed to go for evacuation, I have no idea and how much time do we have, do we get out of area on own.
- § Consider requiring heat pump, with two-way valves that can both heat and cool.



Question 5: Implementation

Question five asked the community workshop participants where they believe climate change fits into the City's goals and budget. Participant responses are broad in topics but are generally within the four categories: 1) prioritization; 2) actions; 3) suggestions and best practices; and 4) general comments and questions.

City Prioritization

Community workshop participants provided support for the City to prioritize climate change initiatives, as well as suggestions for the City, including:

- § Prioritize climate change as an issue to be addressed by the City's goals and budget.
- § Less costly to implement policies and actions now than manage climate change effects later.
- § Adopt 5 to 10-year agenda with climate objectives.
- § Allocate resources/budget toward climate change.
- § Keep climate change a priority. San Carlos shouldn't fall behind other municipalities.
- § Climate change should be a high priority because of high damage from sea level rise, properties are at risk, high costs to install sea walls.
- § Climate change has one of the most expensive consequences, so it should be a high priority.
- § There needs to be a timeline, department delegation, measurable progress (concrete metrics), goals, review regularly, communication and updates with the community (widely distributed).
- § Prioritize fire management activities, sea level rise mitigation.
- § Quick action could create opportunity for more (grant funding).
- § Implement/prioritize actions that would have the most impact.
- § What are the major risks and costs of delay of not responding to climate change?
- § Every day we wait, it gets more expensive in health risks, etc.
- § Confidence into the future is at jeopardy due to the current climate crisis. City needs to be proactive to keep vision statement.
- § These things make it livable in San Carlos. This is high up there on priority list.
- § The City should absolutely address climate change. Otherwise, people may move; get tired of smoke, move away from hazardous areas.
- § We can't afford not to put resources towards this.
- § City has to put measures in place as San Carlos will be impacted by Climate Change – mitigation/adaptation is key.

Actions

Community Events and Engagement

- § San Carlos generates a lot of trash with community events (such as art & wine events, etc.).
- § City should have park cleanup events.
- § City should have service projects or community service days.

- § Janitor is picking up trash, but the community should be encouraged to do more cleanup.
- § Neighbors Helping Neighbors Program – volunteer effort for delivering food (San Carlos should do something similar to this to help the climate).
- § Citizen run commission to work with City and consultants.
- § Should be promoted to raise awareness.
- § Get kids/students involved.
- § Make a way for residents to privately fund/donate (citizen empowerment).
- § Encourage personal choices within residents.
- § Education/informing residents (communication).
- § City could utilize social media to get the word out on climate change.
- § Draw attention to climate change/environmental changes.
- § Encourage citizen engagement.

Budget and Tracking

- § Annual report on sustainability (update on implementation on climate plan).
- § Inclusion on budget.
- § Tracking system.
- § Sustainability is important, but cost/benefit analysis is required to determine what level of the budget should be dedicated to addressing climate change.
- § Explore innovative/external funding opportunities.
- § Green Revolving Door Fund.
- § Projections of what will happen within the next few years/decades.
- § Quantifying what the City has done, so that progress can be tracked and reported on.
- § Elements/items need to be quantified, especially on what actions the City can take.
- § Need a timeline for implementing any identifiable elements.
- § City should tax businesses.

General Ideas

- § Space for community garden.
- § City never buys another internal combustion engine again. Make a pledge and lead by example: make biking easier; make sure we have really good commute options; yes, to changing infrastructure.
- § Working with businesses and housing.
- § Homeowner incentives for solar panels and infrastructure for charging vehicles.
- § Overall energy reduction incentives.
- § Making buildings greener.
- § Working with developers on commercial and residential buildings to be green and help tackle these problems.



- § Some responsibility lies with City and some with residents. City can have a larger responsibility like money, sewer plan, individual, city and regional responsibility.
- § Menlo Park involved but San Carlos not in Sierra Club, plan for dealing with sea level rise in the Bay. We should be also.
- § Green jobs (Naomi Klein's book) - jobs that don't have a large carbon footprint. Consider what green jobs are and promote those.
- § Consider new levels of telecommuting. People can move anywhere.

Suggestions and Best Practices

- § Identify strategies and best practices that address negative effects of climate change.
- § Implement actions that align with (or reach beyond) State efforts.
- § Enact reach codes.
- § Adopting (all electric) reach codes.
- § Look at City of Menlo Park metrics.
- § Think regionally and locally.
- § Work with other cities.
- § Implement offsets (mitigation measures), sequestration techniques, drawdowns.
- § Create incentives for businesses to reduce carbon emissions.
- § Develop more outreach efforts with public.
- § Increasing resident participation, informing the youth about climate change to look towards the future.
- § Vulnerabilities – such as homeless population.
- § We should show that climate change measures can work because California can set an example globally.
- § City should list grass root organizations that offer various help so residents can find these programs more easily.
- § Adopt standard practices.
- § Walnut Creek increased cost of public parking to fund water facility.
- § Intergovernmental/regional cooperation.

General

- § The impact that San Carlos could have on this global issue may not warrant budget allocation.
- § Private sources.
- § How will the City consider funding for these new projects (grants?)?
- § Addressing the smoke.
- § Consumer activities.

- § Have questions about plan, just don't know if they're covered, does the plan say contributing a percentage of money or power to make regional solutions work. For example, sewage will be under water. Sewer probably flooded now but they don't tell us.
- § Floods and fire don't stop at city border, how affect City budget? How much money are we contributing to plans?
- § City is getting involved to pull together – plans are intricate and fit together.
- § Airport isn't in San Carlos, but it would affect us if it flooded. Are people planning for sewage plan? Are they planning for the airport or just talking about it?
- § Revenue tight due to COVID, when City doesn't have money to pay something, maybe homeowner can step up. If we can each do a little bit, we'll make some progress.
- § What's more important – spending on homelessness or dealing with sea level rise?
- § In fact, this vision statement should mention Climate Change, and integrated.
- § If Foster City builds levees, where does that push the water?

Next Steps

This memorandum provides the summary of the phase one community workshops for the San Carlos CMAP. The CMAP project team will use this feedback as a reference point for establishing GHG reduction targets and drafting strategies to be included in the CMAP.

The City provided project handouts to workshop participants. These materials are also available on the CMAP website.



Appendix B.2. Climate Mitigation and Adaptation Plan - Phase 2 Public Engagement Summary

MEMORANDUM

DATE May 25, 2021

TO Adam Lokar, Management Analyst, Sustainability Specialist

FROM Tammy L. Seale, PlaceWorks, Climate Action and Resilience, Principal
Eli Krispi, PlaceWorks, Climate Action and Resilience, Senior Associate
Torina Wilson, PlaceWorks, Associate

SUBJECT Climate Mitigation and Adaptation Plan - Phase 2 Public Engagement Summary

This memorandum summarizes the City's virtual community workshop, responses to the Shape San Carlos online survey, and feedback received from stakeholder meetings held as part of the second phase of outreach for the City of San Carlos Climate Mitigation and Adaptation Plan (CMAP). This memorandum includes a description of the outreach activities and includes detailed responses in the appendices.

Virtual Community Workshop Summary

Workshop Purpose and Desired Outcomes

The City hosted the workshop on February 9, 2021, to share updates on the CMAP process to-date and provide an opportunity for community feedback on revisions to, and creation of, proposed climate action strategies. The goals for participants at the workshop were to:

- § Understand the progress and next steps of the CMAP update.
- § Learn about how the community has already reduced GHG emissions and which existing community actions can be modified to further reduce them.
- § Engage with members of the CMAP project team and provide initial feedback and opinions on draft GHG reduction and adaptation strategies.
- § Have access to an inclusive, equitable, and transparent opportunity for participation in the planning process.
- § Share their ideas to achieve the vision of a sustainable and resilient San Carlos.

The City promoted the workshop through electronic newsletters, posts to social media, and email announcements. Workshop registrants received multiple reminder emails in advance of the workshop. The reminder emails also included a Zoom Workshop Participation Guide to review in advance of the workshop. The City received 77 registrations for the workshop and approximately 35 people ultimately participated, along with City staff and members of the consultant team.



Agenda

The agenda for the workshop was as follows.

- 6:30 pm Welcome: Introduction to workshop, welcome from Mayor Laura Parmer-Lohan, and a poll
- 6:45 pm Project presentation
- 7:10 pm Small group discussions in Zoom Breakout Rooms
- 7:50 pm Rapid Report Back
- 8:00 pm Workshop wrap-up and end

PlaceWorks project manager Tammy Seale facilitated the workshop and provided support while PlaceWorks assistant project manager Eli Krispi led the presentation and question and answer session. In addition, PlaceWorks and City staff provided facilitation and notetaking support during the small group discussions.

Workshop Results

The workshop format invited participants to provide input and feedback to the Project Team through the chat box, an online poll, and in small group discussions. The results from the online poll and small group discussions are summarized in this section and detailed in Appendices 1 and 2.

Mentimeter Poll

Prior to the project presentation, Tammy Seale, the workshop facilitator, launched a poll using Mentimeter, an online survey platform. Participants accessed the Mentimeter website through a separate internet browser using a QR code or a link. The poll included the following questions:

- § Would you like an overview of how to use Zoom?
- § Have you participated in workshops, surveys, or other activities for the Climate Mitigation and Adaptation Plan?
- § What is the most important climate action for the City of San Carlos?
- § What actions are you taking to support the community's climate action goals?

A majority of participants indicated they had been involved in the CMAP process at some point, largely through attending workshops in August and October 2020 or through online materials and surveys.



Most participants indicated that decarbonizing buildings and transportation and increasing access to electric vehicles is the most important climate action for the City. Actions which participants indicated they take part in to support the community's climate action goals included driving EVs, installing solar, advocating for the Reach Code, and using energy efficient appliances in their homes. Detailed responses to each of the Mentimeter questions can be found in Appendix B.2-1.

Small Group Discussions

After the presentation and question and answer portion of the workshop, community workshop participants joined small groups with a facilitator and a note taker. The small group discussions allowed for an interactive and in-depth exploration of specific topics using the breakout room feature of the Zoom platform. Facilitators led the small group discussions and note takers summarized the discussion using Google Docs while sharing their screen so participants and the facilitator could track the meeting notes.

The intent of the small group discussions was to provide an opportunity for community feedback on revisions to, and creation of, proposed climate action strategies. As such, PlaceWorks drafted preliminary strategies for four different sectors: 1) climate adaptation and resilience; 2) energy use, supply, and resilience; 3) transportation and land use; and 4) waste, water, and wastewater. Each sector included two to three goals, each with example strategies and/or example actions to spark a discussion.

Participants were asked to share their thoughts on what the San Carlos community can do to support the strategies, what barriers they may face, or any important considerations or implementation ideas the City should consider while creating draft strategies. Participants were also encouraged to share additional strategies or ideas. Feedback for each goal was categorized under one of three headings: 1) suggestion; 2) barrier; and 3) considerations and/or implementation. Each heading was color-coded to organize the input. Suggestions were green, barriers were red, and the considerations and/or implementations were yellow. During the breakout rooms, note takers shared their screens and took notes simultaneously. A summary of the responses follows. Detailed notes from the small group discussions can be found in Appendix B.2-2.

Climate Adaptation and Resilience Feedback

Participants focused on the use of vegetation and open space as both suggestions and barriers when given example strategies for the climate adaptation and resilience sector. Several participants stated that encouraging native and drought resistant landscaping can help protect against wildfire and increased planting could sequester carbon. However, some participants noted that the planting of more vegetation could potentially increase the risk of wildfire in the community due to more vegetation fuel. Participants also suggested focusing on improving emergency evacuation routes and signage in the community.

Energy Use, Supply, and Resilience Feedback

Suggestions regarding the energy use, supply, and resilience sector include a more aggressive switch from gas to electric appliances and cars. Several participants noted that the cost of switching appliances can be too high for some community members. Implementation considerations included incentives for making these appliances less expensive so that all members of the community could have an option to electrify their homes and cars.

Transportation and Land Use Feedback

Land use suggestions included ensuring a balance of jobs and housing units. Most feedback on the transportation and land use sector was focused on transportation. Suggestions included looking into micromobility programs, expanding infrastructure for EVs, and encouraging residents to switch to electric landscaping equipment. Barriers included the terrain with the hills making it more challenging to use active forms of transportation in some areas of the community. Considerations included expanding information for residents such as providing the location of EV charging facilities and providing rebates for replacing older cars with electric vehicles to increase the incentive to go electric.

Waste, Water, and Wastewater Feedback

Feedback received on the waste, water, and wastewater sector was limited due to time. Suggestions included rewarding residents for water conservation and providing compost tumblers.

Post Workshop Survey

The City sent an email with a follow-up survey to registered participants after the public workshop. The survey asked participants to share comments on the CMAP, if they would participate in future online workshops and events hosted by the City, and if they would like to provide feedback on the virtual workshop. Six participants responded to the post workshop survey. Feedback received on the post workshop survey included suggestions such as creating a citizens committee and expanding the amount of time the workshop ran for. Several comments were received from one participant who requested that all strategies in the final CMAP be tailored to have quantifiable goals and an attainable plan to reach them. The detailed responses on the post workshop survey can be found in Appendix B.2-3.

Online Survey

The City posted an online survey from March 3rd to March 19th via the Shape San Carlos page on the City's website. The survey included seven questions asking participants to share their thoughts on the draft strategies which were also shared with workshop participants. The City received 27 responses. Feedback received on each individual question is listed verbatim in Appendix B.2-4 to this memo. The questions asked in the online survey, along with a brief summary of the findings follow.



1. “Share your thoughts on the strategies above to become a low-carbon, resilient community. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Respondents stated a desire to see the draft strategies related to being a low-carbon and resilient city re-worded to be less vague and to include additional language on how to quantify progress towards achieving the strategies. Several comments pertained to open space and vegetation such as increasing tree plantings and outdoor access trails to increase active transportation and the appreciation of the outdoors. Several respondents also indicated that solar installation, electrification, and increased energy efficiency are of the utmost importance, and that the City can do more to encourage these practices, largely through incentives.

2. “Share your thoughts on the strategies above to prepare for, reduce vulnerability, and adapt to climate conditions. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Responses to Question 2 generally provided support for the draft strategies related to vulnerability and adapting to climate change. Some comments provided suggestions to strengthen language or to build in social equity and justice. Several comments related to climate hazards such as wildfire and suggested ways to educate residents on how to stay safe and what to do in case of an emergency. More comments were received on planting trees and other vegetation, along with switching from gas to electric powered landscaping equipment.

3. “Share your thoughts on what the San Carlos community can do to reduce energy use and transition to carbon free energy sources. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Responses to Question 3 generally provided support for the draft strategies related to reducing energy use and transitioning to carbon free energy sources. Responses included strengthening strategy language to be easily quantifiable and enforceable, encouraging behavior shifts which could reduce the use of plastic or idling in cars, and starting climate education at a young age. Several comments noted the importance of increasing solar installations on homes and businesses, banning the use of natural gas, and educating tradespeople on the benefits of electric appliances.

4. “Share your thoughts on the strategies above to promote sustainable development. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Several responses to Question 4 regarding the promotion of sustainable development touched on neighborhood hubs and housing density. Comments included general support for mixed-use development and neighborhood hubs with pedestrian friendly design. There were mixed comments both in support for, and against, higher density housing development. Several comments noted the importance of expanding the public transit system, providing incentives to use it, and on ensuring a safe and comfortable environment for active transportation.

“Share your thoughts on the strategies above to transition to low carbon transportation. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Many responses to Question 5 expressed enthusiastic support for draft strategies related to the transition to low carbon transportation. Comments generally touched on increasing the availability of EV charging stations and providing rebates. Several comments noted the importance of public and active transportation, including suggestions to explore micromobility.

5. “Share your thoughts on the strategies above to become a zero-waste community. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Comments in response to Question 5 generally focused on encouraging residents to reduce their consumption and to encourage businesses to replace their plastic single-use containers with compostable packaging. Comments also noted the importance of composting and how the City can encourage more aggressive composting and recycling citywide.

6. “Share your thoughts on the strategies above to reduce water use. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Responses to Question 6 included suggestions to limit the amount of new water hookups, to encourage drought-resistant landscaping, and remove lawns. Comments also highly suggested encouraging residents to harvest rainwater, implementing purple pipe systems, and graywater systems. Several comments additionally suggested that the City encourage residents and businesses to conserve water, largely through replacing landscaping that is not drought resistant.

Stakeholder Meetings

The City hosted four stakeholder meetings to share brief updates on the CMAP process and to provide an opportunity for community stakeholders to provide input specific to their area of expertise and work in the city and larger region, as applicable. The City hosted meetings with four groups representing the business community, Peninsula Clean Energy, San Mateo County, and local environmental groups. The results from stakeholder outreach are summarized in this section and is detailed in **Appendix B.2-5**.

San Carlos Business Committee

A total of 12 community stakeholders in the business community attended the Business Committee meeting on April 20, 2021 and provided feedback on the CMAP. Attendees included Redwood City-San Mateo County Chamber of Commerce, San Carlos business owners, a school director, a representative from the hospitality industry, a representative from Recology, and a representative from a real estate organization.



The stakeholders provided general support for the CMAP process and goals and asked several clarifying questions. Feedback on general strategies included the need for businesses to have small scale on-site battery storage to provide stability when switching to solar electricity, working with the Arbor Bay School to create a pilot program for solar panels on their roof, ensuring local contractors are knowledgeable of all-electric and energy-efficient appliances, and the prospect of micromobility and an enhanced active transportation system.

Peninsula Clean Energy (PCE)

The CMAP Project Team met with Rafael Reyes, the Director of Energy Programs at PCE. Rafael provided an update on the timeline of PCE's current and upcoming projects and programs. Specific recommendations for the CMAP included looking into adopting a Reach Code for existing buildings, re-adopting an updated Reach Code following each update of the California Building Code, working with PCE on installation of electric vehicle charging stations and promoting electrification of home appliances, and ensuring the permitting and standards of water heater installation is consistent with other neighboring jurisdictions. Upcoming programs include on-bill financing for home and business retrofits, a pilot electric vehicle program with Lyft, and a technical assistance program for municipal fleet electrification.

San Mateo County

The CMAP Project Team met with staff from the San Mateo County Office of Sustainability to learn more about the County's related programs and projects. The County is currently updating its Climate Action Plan and leading energy efficiency, climate action, and sea level rise regional programs and initiatives. The County shared suggestions for a Reach Code for existing buildings, electrifying municipal facilities through a decarbonization plan, adopting an EV first policy for the City fleet, and helping County officials reach out to multi-family property owners or low-income single-family homeowners to incentivize electrification and other improvements. County staff additionally included several recommendations for programs that the City can partner on, including the Home Energy Score and Green House Calls programs.

OneShoreline

The CMAP project team met with representatives from OneShoreline, which consist of employees of the San Mateo County Flood and Sea Level Rise District. Feedback from OneShoreline included completed projects, raising of development to protect against sea level rise, warning systems, enhancing of the levee system, and other projects to protect development along the shoreline from flooding and sea level rise.

Environmental Groups

The CMAP Project team met with stakeholders representing five environmental groups in the San Carlos and San Mateo County area, including San Carlos Green, the Bay Area Climate Reality Project, Citizens Climate Lobby, Sierra Club Loma Prieta Chapter, and Sustainable San Mateo County. Each of the representatives stated that their organizations were doing work in the community to advocate for building and transportation decarbonization and overall

electrification, including lobbying for the now-adopted Reach Code. The environmental stakeholders stated that building and transportation decarbonization were the most important GHG reduction strategies the City should focus on in the CMAP, along with installing solar, encouraging tree planting, conducting more extensive community education, and providing incentives to influence a change in behavior. Adaptation strategy priorities included sea level rise and flooding, wildfire preparedness, evacuation routes, and extreme heat.

Miscellaneous Stakeholder Feedback

In addition to the engagement activities summarized herein, several stakeholders submitted feedback in emails to City staff. Input was broad, and include the following:

- § Strengthening the language used in the CMAP strategies to ensure they can be robustly implemented.
- § Concern that the rising water table could result in chemical release in eastern San Carlos from underground storage tanks.
- § Setting a goal to be carbon neutral by 2030.
- § Ensuring each element is impactful, quantifiable, on a timeline, is able to be implemented by the City, and is assigned to a specific City department for implementation.
- § Ban of all natural gas use in new and existing development.
- § Requiring that EV charging stations are installed in new development and in major remodels.
- § Requiring installation of solar in all new multi-family and commercial construction.
- § Consideration for detailed timeline information.
- § Explanation on why San Carlos needs nature-based adaptation.

Next Steps

This memorandum provides the summary of the phase two community workshop and the results of the online Shape San Carlos survey for the San Carlos CMAP. The CMAP project team will use this feedback as a reference point for drafting the strategies to be included in the CMAP.



Appendix B.2-1: Community Workshop Mentimeter Poll Results

The Mentimeter poll questions and participant answers are listed below.

- § Would you like an overview of how to use zoom?
- 24 respondents answered “No”.
 - 1 responder answered “Yes”.
- § Have you participated in workshops, surveys, or other activities for the Climate Mitigation and Adaptation Plan?
- 6 participants indicated they had attended the virtual workshop in August 2020.
 - 11 participants indicated they had attended the virtual workshop in October 2020.
 - 6 participants indicated they had participated in the Shape San Carlos survey in the fall of 2020.
 - 6 responders indicated they had visited the project website previously.
 - 5 participants indicated they had reviewed the CMAP materials on the website.
 - 5 respondents indicated they had talked with City staff.
 - 5 participants indicated they had participated in reach code meetings or hearings.
- § What is the most important climate action for the City of San Carlos?
- Clear and quantifiable pathway to decarbonizing existing and new buildings.
 - Plan for enabling mass adoption of EV charging, including for existing multi-family residents.
 - Motivate people to convert to electric vehicles.
 - Act like this is a crisis! Be bold and swift.
 - Create regulations to discourage non-environment friendly initiatives (like ban gas powered leaf blowers, and be stricter on allowed vehicle emissions) and reward environment friendly like energy efficient appliances, solar, EVs, water saving, etc.
- § What actions are you taking to support the community’s climate action goals?
- a. Driving electric vehicles.
 - b. Putting energy efficient upgrades in home, taking transit instead of driving.
 - c. Install solar panels, reduce single-use plastic consumption, ride bicycle to run errands.
 - d. Installed solar, getting EV.
 - e. Living lightly to the extent I can. Lower thermostat. Walking instead of driving. Hybrid car.
 - f. Solar, EV, native plants.



- g. Getting rid of landscaping near my house.
- h. Advocating for reach code. Member of Citizens Climate Lobby, advocating for a fee on carbon emissions.
- i. Lobby for reach code. Shifting to electric appliances. Driving less, walking more.
- j. I'm not a resident of San Carlos but work on climate initiatives in a neighboring city.
- k. Walking when possible and driving a bicycle and electric car.
- l. We have solar cells. Walk instead of drive. Do not use blowers that kick dust and particulates in the air.
- m. Planning to replace gas water heater with a heat pump water heater. Rarely drive anywhere and use a hybrid when I do drive.
- n. We own hybrid cars, walk, or take public transportation whenever possible. Compost at home, have solar panels, changed our light bulbs and appliances to energy efficient, reuse and recycle whenever possible. Converted home to environment friendly (installed solar, installed drip irrigation, increased insulation to max rating to minimize heating/AC use, installed LED lighting, installed solar heater for pool, replaced high energy use appliances, etc.).
- o. Educating myself on the climate action goals and spreading awareness through conversation.
- p. Reducing my family carbon footprint in all aspects of daily living.
- q. Repair appliances when possible instead of buying new ones.
- r. We clean our solar cells regularly.
- s. Replaced gas water heaters with heat pump water heaters; installed solar panels that cover 95-100% of our electricity; replace gas stove with induction stovetop; drive an EV; planning replacement of gas furnace with heat pump; sealed and insulated.



Appendix B.2-2: Workshop Small Group Discussion Responses

1. Climate Adaptation and Resilience Sector

Goal 1: Become a Low Carbon, Resilient Community

Example Strategy: Support expansion of carbon free or green jobs in San Carlos.

Example Strategy: Encourage a low-carbon, sustainable economy that moves away from industries reliant on fossil fuels and supports low to no carbon industries, products, and services.

Example Strategy: Explore local and regional opportunities to offset carbon emissions that cannot be reduced to zero.

Example Strategy: Preserve existing open space by supporting urban infill.

Suggestions

- § Microgrids that provide continuous electricity.
- § Increased use of pervious surfaces (streets, driveways, etc.) and bioswales.

Barriers

- § Moving away from fossil fuels: what do we do when PG&E shuts of the power?
- § Inland flooding and sea level rise: stormwater gets funneled into 3 creeks; will become more serious problem with sea level rise.

Considerations and/or Implementation

No considerations and/or implementation feedback was received for this goal.

Goal 2: Prepare for, reduce vulnerability, and adapt to changing climate conditions.

Example Strategy: Promote tree planting to reduce the urban heat island effect.

Example Strategy: Establish a network of equitably located Community Resilience Hubs.

Example Strategy: Develop regionally coordinated sea level rise adaptation measures and programs in collaboration with ABAG, BCDC, BayAdapt, and other regional entities.

Example Strategy: Provide disaster preparedness information in English, Spanish, Chinese, and other relevant languages in the community.

Example Strategy: Develop a Community Wildfire Protection Plan, in coordination with San Mateo County Fire Department and CAL FIRE.

Example Strategy: Promote vegetation management and fire-resistant site design on residential properties and businesses.

Example Strategy: Develop a fire and landslide risk reduction assessment that can be used by project applicants and City staff in the development review process to identify and reduce or avoid potential harm through site design or other mitigation techniques.

Example Strategy: Coordinate with local medical providers to ensure that low-cost medical and emergency medical services are available to all residents in the city.

Suggestions

- § Use drought resistant and fire-resistant plants/trees.
- § Make the streets greener than they used to be.
- § Fire department conducting inspections and making recommendations for fixing the vegetation hazard. Previous program was helpful.
- § Reward water and electricity conservation. Like discounts for drip irrigation systems, solar and battery systems, etc.
- § Bicycle corridors – less on street parking and more bike lanes.
- § Evacuation routes signage or making routes one-way during an evacuation or emergency.

Barriers

- § Tree planting: drought resistant plants.
- § Vegetation management on private property.
- § Hazard could be in various areas.

Considerations and/or Implementation

- § Are there any requirements?
- § Special evacuation design for streets for specific hazards (smoke, flooding, etc.) and direction for people to go based on the hazard. Zonehaven used by the County. Consider communication method.



2. Energy Use, Supply, and Resilience Sector

Goal 1: Reduce energy use.

Example Strategy: Promote available energy efficiency and conservation opportunities, incentives, and technical assistance for businesses and residential development to promote cost savings.

Example Strategy: Support promotion and use of PCE's K-12 energy educational resources in the San Carlos School District and county-wide.

Suggestions

§ Gas to electric: bulk buying discount for appliances.

Barriers

§ Would not want the gas appliances to be placed in another house/dump.

Considerations and/or Implementation

§ City did that for solar 10 years ago. City is making information available for energy rebates/upgrades/retrofits.

Goal 2: Transition to carbon free energy sources.

Example Strategy: Transition to electricity as the primary energy source citywide.

Example Strategy: Increase rooftop and onsite solar energy systems in the community and on City facilities.

Example Strategy: Promote proposed 2021 All-Electric Reach Code (if adopted), which requires all-electric for new construction and substantial 50% rebuilds with exceptions and solar for new high-rise multi-family and non-residential development.

Example Strategy: Continue to promote Peninsula Clean Energy (PCE).

Example action: Encourage residents and businesses, especially large energy users, to opt into PCE's ECO100 program.

Example action: Encourage those not purchasing energy from PCE to do so.

Example action: Partner with Peninsula Clean Energy (PCE) and BayREN to provide incentives for installation of all-electric appliances in new residential construction and remodels.

Suggestions

- § Set up options for when PG&E turns off power.
- § Reach Code require shift to electric when gas appliances burn out (all appliances).
- § City cars transition to electric.
- § Shuttles (electric) that would run around town. Or rent an electric golf cart/vehicle.

Barriers

- § Have to watch out for cost differential. Need rebates to help all households afford.

Considerations and/or Implementation

- § Microgrids or batteries.
- § Need to be cheaper to go all electric than stick to gas.

3. Transportation and Land Use Sector

Goal 1: Promote sustainable development.

Example Strategy: Encourage development of mixed-use projects, higher density housing, and job growth within the Transit Oriented Development (TOD) corridor while being sensitive to surrounding uses.

Example Strategy: Encourage the establishment of “Neighborhood Hubs” within existing residential neighborhoods to support neighborhood-serving small-scale retail and service uses, including small stores selling fresh and locally grown produce and basic daily goods. (General Plan Goal LU-3)

Example Strategy: Create and maintain accessible public spaces.

Example Strategy: Prioritize bicycling and walking as safe, practical, and attractive travel options citywide as directed by the Bicycle and Pedestrian Master Plan.

Example Strategy: Support improvements to public transit routes and facilities to facilitate longer distance travel.

Example Strategy: Assess opportunities in the downtown, mixed-use, and commercial areas to designate public curbs for passenger pick-up/drop-off in support of ridesharing.

Suggestions

- § Balance the number of jobs to the number of housing units.
- § We could look into getting the LimeBikes that you see everywhere in Seattle, especially if we add more bike racks.
- § Public/community gardens where people could rent a plot.



Barriers

- § Job/housing numbers need to be consistent in the CMAP.
- § Difficult to ride bikes up/down the hills. Great for the flatter areas of the city.

Considerations and/or Implementation

- § Has San Carlos completed research on existing programs like this?

Goal 2: Transition to low carbon transportation.

Example Strategy: Reduce community-wide transportation related emissions per resident and employee.

Example Strategy: Support residents and business owners to transition to electric and plug-in hybrid vehicles (EVs/PHEVs).

Example action: Expand EV/PHEV charging infrastructure at City facilities and community-wide.

Example action: Work with local, regional, and state partners and agencies, like Peninsula Clean Energy and the Bay Area Air Quality Management District, to provide incentives for EV/PHEV use.

Example Strategy: Facilitate micromobility options for short trips. Micromobility devices include low-speed individually owned or shared bicycles, electric bicycles, electric scooters, and electric skateboards.

Suggestions

- § Need more charging facilities, on every block where there is a parking space. EV parking every 3 spaces or so.
- § Electrifying City fleet.
- § Easier to return or recycle old cars.

Barriers

- § No barrier feedback was received for this goal.

Considerations and/or Implementation

- § Consider map of where to find the charging stations. Need to be consistent where they all work the same way. Need to be fast.
- § Rebates for old cars.

Goal 3: Support pollution-free outdoor equipment

Example Strategy: Encourage hybrid and clean-fuel construction and landscaping equipment citywide.

Suggestions

- § Gas powered Leaf Blowers would be banned in San Carlos like other cities in the Bay Area have done already.
- § Lawn mowers.
- § Barriers.
- § Need to have charging stations for electric landscaping or construction equipment.

Considerations and/or Implementation

- § No considerations and/or implementation feedback was received for this goal.

4. Waste, Water, and Wastewater Sector

Goal 1: Become a zero waste community.

Example Strategy: Partner with RethinkWaste to expand commercial and multi-family residential recycling and composting programs.

Example Strategy: Increase the amount of waste recycled during construction and demolition of buildings.

Example Strategy: Support community-led initiatives to create a material reuse and repair program and continue to educate community members about ways to make unwanted items available for reuse.

Example Strategy: Require takeout food packaging and disposable food service ware to be biodegradable or compostable. Includes all bags, sacks, wrapping, containers, bowls, plates, trays, cartons, cups, straws and lids.

Example Strategy: Work with waste haulers to reduce contamination of recyclables.

Example Strategy: Promote awareness of life cycle emissions of products.

Suggestions

- § Reward water and electricity conservation. Like discounts for drip irrigation systems, solar and battery systems, etc.
- § Compost tumblers.

Barriers

- § No barrier feedback was received for this goal.

No considerations and/or implementation feedback was received for this goal.



Appendix B.2-3: Post Workshop Survey Responses

Comments on the CMAP include:

- § We didn't talk about trees at all. And I don't know what actual mitigation is planned. Is the only mitigation going to be how we are going to change some of our behaviors?
- § Set a bold local goal: Zero carbon by 2030. Focus directly on reducing the burning and leaking of methane and gasoline. Everything else is small change. Each element should be impactful, quantifiable, on a timeline, implementable by the City, and assigned to a City department.
 - Impactful: Go for the big-impact elements. Don't get bogged down in little changes that are not anticipated to have much GHG reduction effect.
 - Quantifiable: Every element should have a quantifiable, numerical goal so that we can track progress in implementing each element. What gets measured gets managed. For example, replace 50% of internal-combustion City fleet vehicles with all-electric vehicles by 2025, and 100% by 2030.
 - On a Timeline: Provide intermediate deadlines, not just a deadline of 10 years from now to implement all elements, or to then realize the elements have not been implemented.
 - Implementable by the City: Remove any element that begins with "encourage residents". Only include elements that the City has the power to implement, such as by adopting codes, modifying City properties, making City purchasing decisions, or incorporating techniques or materials into City construction.
 - Assigned to a City department: Specify which department is responsible for implementing each element and include implementation progress in that department head's annual review process as well as annual report to City Council on progress towards CMAP implementation.
 - Focus on for Immediate Adoption:
 - Reach Code to cease installation of gas infrastructure and equipment in new construction, including residential and commercial construction. Reach Codes to require conversion of gas equipment to electric at the time of major remodel. For examples, see East Palo Alto (Reach Code applies to 50% rebuilds), and Burlingame (Reach Code applies to 50% remodels that replace HVAC).
 - Codes to require installation of additional electric vehicle charging infrastructure in new and major-remodel construction.
 - Codes to require installation of solar PV in all new multi-family and commercial construction.

- Focus on with Timeline:
 - Require conversion of gas equipment to electric at time of equipment replacement (even if not remodeling). For example, see Menlo Park CAP (calls for HVAC electrification at furnace or AC replacement, and water heater electrification at replacement).
 - Require electrification of gas appliances in single-family homes upon home sale beginning 2025. See Palo Alto 2nd draft SCAP.
 - Set 2030 deadline for all gas furnaces and water heaters to be electric. For example, see Menlo Park CAP; Palo Alto 2nd draft SCAP.
 - Set 2030 deadline and develop plan for decommissioning gas lines in residential areas. See Palo Alto 2nd draft SCAP.
 - Set 2045 deadline and develop plan for decommissioning gas lines in non-residential areas.
 - Install EV charging stations in all City-operated parking lots, and street-side EV charging near Laurel Street and in areas with a substantial concentration of existing multi-family residences. By 2030, retrofit all City buildings with electric equipment instead of gas.
 - Replace all gas-powered City vehicles with all-electric vehicles.
 - Change contracts to eliminate use of gas-powered landscaping equipment on City properties.
 - Eliminate City pension fund investment in fossil fuel companies. We look forward to release of the Vulnerability Assessment, as information in that report will likely be useful in explaining the necessity of setting a bold reduction goal, as well as crucial in developing adaptation strategies.

Thank you for your efforts to tackle the climate change issue.

- § Great meeting really liked the format although I couldn't stay until the end. Wish there was a way for San Carlos residents to make suggestions year-long and upvote other suggestions that we think make sense to help San Carlos prioritize initiatives.
- § One item that I didn't notice in the 2008 plan was to perhaps create a citizens committee to help further its goals. This sort of thing may help us to encourage our neighbors to adopt more sustainable practices. Thus, I think community outreach will be essential in implementing the CMAP. Most people who live here are probably only aware of the minimal tactics for "greening" their lifestyles - i.e., recycling, installing solar panels, driving electric or hybrid cars.
- § The format was great, one hour would be easier for me, breakout rooms was great experience. It was my first time, and I didn't get to ask why San Carlos has not banned Gas Leaf blowers like Los Gatos and many other cities in California (<https://www.losgatosca.gov/2059/Leaf-Blower-Ordinance>). That's so easy to implement for the City, and the noise and dust is really annoying now that we all work from home.



Appendix B.2-4: Online Survey Results

The draft strategies included the following topics:

1. Becoming a low-carbon, resilient community.
2. Decreasing vulnerability and adapting to changing climate conditions.
3. Reducing energy use and transition to carbon free energy sources.
4. Promoting sustainable development.
5. Transitioning to low carbon transportation.
6. Becoming a zero-waste community.
7. Reducing water use.

Question 1

Question 1 asked “Share your thoughts on the strategies above to become a low-carbon, resilient community. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Some feedback received was concerned with the wording of the strategies, including:

- § The language is too vague to understand what practical steps would be taken. Do the above statements mean higher density apartments lining El Camino or blocking off Laurel Street to cars so that it is a pedestrian only area? Is "green jobs" even an accepted term? Does "encourage" mean impose taxes? I support a change in mindset from the current carbon polluting being free to capturing the costs. I have to pay to have my garbage carted away. Those who put carbon in the air should not get a free ride.
- § In general, these strategies are worded in a way that makes them difficult to measure. These describe a direction we want to take, but for this to be a plan, it needs to have specific and measurable targets. For instance, rather than support expansion of green jobs, identify what kinds of green or carbon free jobs we will expand and how many per year or by a certain year. Instead of "encouraging" a low carbon economy, we should disincentivize carbon emitting businesses from moving into SC. One way might be to add a "carbon" tax to their property tax or business tax. This would discourage it through an economic mechanism. Be more specific about "preserving open space" because the City can't prevent private landowners from building on existing open space. So, perhaps change this to say, "any government owned open space". Use verbs that generate specific action and lend themselves to being measurable. It is better to have fewer goals that revolve around actions the City actually has the power to control and then determine specific results/outcomes so the City and residents can be held accountable. I fear that by using this kind of language it becomes too easy to consider something that is included on the City's website to be used to demonstrate that the City is taking action. Set measurable goals and then use the website and other means to "promote and encourage" for the purpose of achieving the measurable goals. And post progress to motivate "good behavior."

Several comments provide support, or the lack thereof, of the draft strategies, including:

- § Your strategies seem naive to me. They miss the important idea of net zero technologies. Among items, this means that the entire system needs to be understood from beginning to end so that we know that what we are doing is indeed net zero carbon. Systems need to be analyzed over their entire lifecycle to understand carbon, water, and mining impacts for critical minerals. Importantly, the idea of net zero embraces the notion that some use of fossil fuels might be both economic and expedient, but that the carbon impacts need to be mitigated. The ideas of net zero and life cycle analysis are important when it comes to buildings and transportation.
- § The notion of greater and greater suburban density always comes up. In principle, this always sounds fine until someone builds a large, ugly apartment building on your block (1673 Laurel St for instance). Continuing to provide ample single-family housing and well-planned multi-unit dwellings seems like the right way forward. Neighborhoods, however, should not be sacrificed at the expense of urban infill. Filling in vacant lots also seems fine. But the mantra should not be density, density, density.
- § All strategies are important and because we are in a time bind with climate change, all should be implemented. The community will need a lot of education about what is happening, how critical it is, and what individuals can and must do to help.
- § We should be mindful of any additional costs that may be involved in implementing these strategies. I am not supportive of urban infill as this can lead to a lower quality of life (more traffic and congestion along with parking problems).

Several comments pertained to open space and vegetation, including:

- § Existing open space is a lovely idea, but there is precious little of it, and some of it is already earmarked for lavish luxury homes.
- § Increase city tree plantings and promote property owners tree investments
- § Develop bay shoreline infrastructure: promenades, trails, water viewing restaurants
- § Connecting trails between RWC and Belmont
- § It's especially important to preserve existing open spaces and historical type of city (please, stop building high buildings in downtown, it leads to hustle, crowd and overwhelming with cars and pollution).
- § Preserving existing open space is a priority. Don't add any more single-family zoning, and rezone single-family for medium-density multi-family where possible (create a permanent City position dedicated to this! we're not a bedroom community anymore). Continue to develop biosciences and tech spaces in East San Carlos *while also* encouraging restaurants and services there -- workers need lunch, and we don't need additional cars on Laurel.



§ The easiest and most egalitarian thing that can start immediately is PLANT TREES! The City should set an example by filling in public voids, especially sidewalks, with established trees. City wide tree planting events will encourage residential planting and following up on code enforcement to plant a tree after one is removed should be closely monitored. SC needs to up its canopy game. It's diminished over the years and is only going in one direction...and it's not up. Trees = Good Living.

Additional comment pertaining to transportation were provided, including:

§ Create pedestrian streets (modeled after Boulder).

§ Bike lanes.

- Currently, the bike lane on San Carlos Ave ends somewhere halfway to Tierra Linda school. I am not sure if my kids will ever use a bike lane which ends halfway on this important route.
- More pedestrian zones, e.g., Laurel Street to encourage less traffic.
- More one-way roads to enhance safety for kids and bikers.
- Better public transport (better schedules with more frequent intervals and attractive bus stops).
- As transportation is responsible for the largest percentage of CA emissions, it seems it should be our priority as a community to address this and encourage the adoption of plug-in vehicles. This means more public charging and perhaps some incentives to encourage installation of chargers at offices, restaurants, cinemas and homes but also for residents to switch to plug-in vehicles.
- Why not bring back the successful program in San Carlos (I think it was called "____Scoot"). I used it frequently to go downtown and to dr. appts. It was free, and I was able to call ahead and request a pickup. Students also used it to get to school. There are now electric buses/vans that could shuttle people around San Carlos.
- Great ideas on how to move toward becoming a low carbon, resilient community. San Carlos should strongly support walking and biking by improving sidewalks and bike lanes, strictly monitoring areas where cars try to run stop signs disregard pedestrians, even when you're out walking with kids. Write tickets to fine the bad drivers.

Additional comments received pertained to solar installation and/or electrification and general energy efficiency, including:

§ Support installation of solar panels on homes. People are busy and don't know what their options are for solar. The City could pre-select a few companies and negotiate lower prices with free advertising. Also, let people know about leasing options.

§ Energy-efficient street lighting.

§ San Carlos City Council needs to have a prioritized list of largest carbon emissions and a plan to reduce these largest emissions the most soonest. Must be deterministic and aim to net zero carbon emissions by residents and city by 2030 to prevent catastrophic local impacts. So... partner with PCE to promote 100% clean electricity rate, incentivize EV or e-Bike purchases & charging infrastructure for all, *give* \$100 and expedite for any home electrification or solar building permit. The city should also accelerate the bicycle master plan, convert city fleet to all EV's (including trucks), and require low carbon asphalt & cement etc. Let's get real and specific in reducing the biggest pools of carbon emissions quickly!

General comments received included discussion of incentives, high density housing, and equity. These include:

- § Support high density housing and mixed-use near transit. Create a Downtown Specific Plan, so the public can weigh in on what uses/densities should be allowed in various areas.
- § Eliminate all new high density apartment buildings. Require off street parking for each bedroom at rate of one spot min. per bedroom.
- § San Carlos should focus on Equity throughout the plan. See Oakland's Equitable Climate Action Plan as an example: <http://www.oakland2030.com/>. Our focus should prioritize local and regional actions over offsets.

Because Climate Action is urgent and this is a rapidly evolving area on both technology and policy fronts, the plan should include a process for regularly evaluating new strategies. For example, Portland and Palo Alto Mandatory Deconstruction policies supporting local resilience and low carbon, low-cost building materials.

Specific additions suggested:

- Support equitable policies and plans in becoming a low carbon, resilient community.
- Commit to annual strategic updates to incorporate advances in this urgent, rapidly changing field.
- Champion equitable, no or low-carbon transportation, building, and materials consumption and waste management policies.
- Develop annual City awards program to recognize community leaders on Climate Adaptation and Resilience.

Key strategies should include:

- Align all planning policies and regulations with the San Carlos Equitable Climate Action Plan
- Support local infrastructure to respond to disasters: Reuse & Repair Infrastructure, Mandatory Deconstruction
- Extreme heat event planning for vulnerable populations



- § I believe that we need to keep the end goal firmly in mind as we face the future: reduction or elimination of carbon that is released into the atmosphere. This goal will require thinking very differently from the status quo. It will be difficult for many people to change their behavior and we should be prepared with educational materials and gentle, persistent insistence that this goal be achieved. The urban infill idea sounds promising assuming that there is the accompanying infrastructure to support more lives.
- § Use economic incentives. Use "offsets" = tax for carbon intense behavior and incentives to reward green jobs and carbon free practices.

Question 2

Question 2 asked “Share your thoughts on the strategies above to prepare for, reduce vulnerability, and adapt to climate conditions. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

Several comments offered general support, questions, or suggestions, including:

- § Good. Will there be metrics to measure progress?
- § All the options listed above sound important and meaningful. I would support all of them.
- § Wish you had numbered these! The third through seventh are of critical importance. I believe they are already somewhat underway unless I'm mistaken. In some ways presenting educational programs via zoom may reach more people. Neighborhood meetings also may help. The community is already concerned about fire since we've seen large parts of California burn. Sea level rise will require more education.
- § I have to say I don't care for the format of this survey, so I'll provide my input here. I suggest creating a simple list of "What can you do?" Here's a sample list from UC Davis -- <https://climatechange.ucdavis.edu/what-can-i-do/10-tips-for-climate-action/>. A couple of additional suggestions: 1) Work with restaurants to have them use recyclable take out containers and reduce utensils and napkins or use recyclable products (most people eat at home these days and don't need utensils). 2) Work with Recology to educate people what to put in what bin and what happens when you use the wrong bin. 3) Educate the community on the advantages of going Vegan for their health and the environment. At a minimum suggest Meatless Mondays. 4) Eliminate all plastic bags (a lot say reuse which I don't think people do). 5) Educate people about organizations that can reuse or recycle, e.g., UPS for bubble wrap, Green Citizen in Burlingame for electronics. 6) Reduce coffee cups used at Starbucks, Peets and other take-out coffee places.
- § These all seem like positive, effective moves against climate change. What is a Community Resilience Hub?

- § I think substantially reducing community carbon emissions is job #1 (see above comments) - this is urgent - we are out of time- the impacts are sooner and bigger than predicted. But job #2 is adaptation... what is our east-of-Cordilleras plan for sea level rise that could peak at as much as 20' higher??? Downtown under water too - what is the plan?? And YES, to a Community Wildfire Protection plan with CAL FIRE. Start with fuels reduction urgently on hillsides east of Crestview which are a conflagration waiting to happen due to neglect on wild properties at the west side of town. There's been NO action on this.
- § Pick the highest impact one or two of these. I'd go with bullet #3 as regional coordination is key. San Carlos is not an island.
- § These are all necessary strategies however, terms like "promote, establish and develop" don't drive action that is meaningful. We need x number of trees planted in x neighborhood/streets that will reduce urban heat by xx%. Please define Community Resilience Hubs. I assume they are "cooling centers" during extreme heat waves and blackouts. Identify how many would we need to adequately reduce vulnerability? I assume we are already doing some of these things, like collaborating with ABAG, etc. and CAL FIRE and offering information in relevant languages. Regarding the Wildfire protection Plan, we need to specify the "how" are we going to protect our land, homes and residents. i.e., evacuation routes, fire sensing camera installations in vulnerable areas, communications system to inform the public of fire location and evacuation routes, inspections for safe hardening around homes, periodic workshops to educate the public, etc. Specific items for a plan are necessary to ensure accountability. I like the fire/landslide risk assessment that would be part of the permitting process and best practices for building in risk areas should be in our building codes. I would add something about checking in on the elderly, a system perhaps that contacts neighborhood "point" people who would agree to check on their neighbors.
- § Hire someone with a background in ethnic studies so that you don't embarrass yourself by calling "Chinese" a language. Would you be embarrassed if it listed American or Canadian as a language? Try Cantonese or Mandarin.
- § How about banners on Laurel: "San Carlos believes climate change is real."

Many comments were related to wildfire, including:

- § Educate residents on fire safety as we do for earthquakes
- § I don't have confidence at all in the development of citywide fire safety measures that have teeth. There is too much passivity and a profound lack of urgency on the city's side and on the fire Marshall's side, and the latter strike me as very reactive not at all proactive. I fear telling everyone to clear their own brush and make a safety evacuation plan is an abdication of leadership and just offloads responsibility and makes it appear it's simply a matter of individual responsibility rather than a community wide issue.
- § Wildfire protection and removal of debris on surrounding hills is an immediate concern.



- § Given the wildland-urban interface in the western portion of San Carlos, wildfire mitigation should be one of your top priorities.
- § Increase the setbacks between houses in new constructions to prevent fires from spreading quickly. Require that people tearing down houses to build new houses to plant more trees to replace the ones they cut down.
- § For fire, try imposing setbacks, which clearly have been ignored by all of the recent construction.
- § Fire and sea-rise risk reductions are absolutely must-do activities and should not be deferred.

Several comments were received pertaining to trees and vegetation, including:

- § Street tree planting should be a requirement. In San Jose, street trees are required before a home can be sold. The City could also help fund this effort. Advertise the fact the trees reduce the heat island effect, but they also add value to the street. It could also be a great community building exercise where residents plant the trees with expert help. You could also get the schools involved.
- § If the Laurel Street closures become permanent, consider tearing out the asphalt in favor of parklets--greenery and fountains will help keep downtown cool; allocate space for restaurants to plant edible gardens. Paint the other roads in town white so they no longer act as heat sinks. Offer incentives for businesses and property owners to install reflective roofs and/or green roofs (like at the Cal Academy). Let's figure out how to keep the power on in the hills--maybe we need a smart grid? --and how to meet the needs of disabled people during power outages in the meantime.
- § Consider allergies when choosing trees to plant.
- § Planting trees is certainly a way to encourage fairly easy community participation, although its impact on climate change is very limited and should not be seen as a substitute for more effective ways of sequestering carbon.

General miscellaneous comments received included:

- § Key strategies should include:
 - Align all planning policies and regulations with the San Carlos Equitable Climate Action Plan
 - Support local infrastructure, training, and planning exercises to ensure effective responses to climate disasters
 - Develop extreme heat event plans for vulnerable populations (outreach, shelters, etc.) - perhaps this is covered in Community Resilience Hubs
- § We should implement a ban on gas-powered landscaping tools. There are battery-powered tools available now that are better and quieter, without the pollution. The City could also offer

rebates on tools, batteries, and chargers as a carrot to encourage the switch-over as well as the impending stick of a ban.

- § Given the recent legislation to remove gas from residences, this could be expanded into a general push for electrification with rebates, educational material, easier permitting, etc., as buildings are a significant source of GHGs in the community and have health issues if burning gas inside.
- § Make polluters pay for sea level rise adaptation. Those who profited from selling lead are not paying for all of their damage. Let's not do this again.
- § I have no idea what "equitably located Community Resilience Hubs" are.
- § One can look at structural engineering for earthquakes to understand 2 important approaches to resiliency. The first approach is to construct and retrofit buildings so that they withstand the most violent of earthquakes more or less unscathed. The second approach, primarily considered for retrofits, is to design so that loss of life and property is minimized. This is often a cheaper and more realistic approach to old buildings. I think that the latter approach is best suited to climate resiliency and especially to wildfires. Get the most bang for your buck.
- § One major vulnerability revealed by the recent exceptionally cold conditions in Texas was time of use (TOU) rates for electricity. California is trying to transition to TOU, and rate payers must opt out rather than opt in. Rates will truly be TOU after the 1-year guarantee that costs will not go up expires. We are one summer heat event or a wildfire away from all having to pay exorbitant electricity bills. Our electricity system is not resilient in the way that it should be.

Question 3

Question 3 asked "Share your thoughts on what the San Carlos community can do to reduce energy use and transition to carbon free energy sources. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider."

General support, lack of support, suggestions, and question related feedback includes:

- § For bullet point 5, I would add "promote and enforce Reach Code, not just promote.
- § We have ancient wiring all over the city. Cars cluttering both sides of even the narrowest streets. Not sure how clean energy fits in as it implies modernity. The city's infrastructure is already so in neglect that I can't imagine new bandwidth for reducing energy use especially in the era of blackouts. Just telling everyone to reduce energy is virtual signaling without action.
- § Market forces do that but promote anyway possible.
- § Schools still use a lot of plastic (e.g., everything goes into a Ziploc bag) and single use items (such as annual t-shirts for the fun run, handed out in plastic bags). It seems like there is not much awareness of the huge problems with plastic even among teachers & parents, let alone the kids.



- § Parents still pick-up their kids by waiting at the school in their car with the engine on causing more CO2. Very often that is for 10-15 minutes. Signs should remind them to turn the engine off!
- § More aggressive language and actions are needed.
- § Commitment to City leadership on Net Zero emission facilities with transparent public reporting on progress/lessons learned.
- § Track and report progress on City energy consumption and clean energy use by program annually.
- § Strategic deployment of energy storage too, in coordination with PCE's plans and to help with resilience.
- § YES to every measure mentioned above.
- § Require recharging stations for electric cars. Impose stiff fines for gas cars that park in stalls signed for electric cars. Create city list of residents who voluntarily act in positive ways re climate change. A registry that a future generation can look back at and see how made sacrifices and who remained selfish. Maintain on City website climate change facts and the impact of various lifestyle choices on carbon emissions. What will reduce carbon footprint more: reducing meat eating or shifting to an electric stove that uses electricity from sources burning fossil fuels?
- § What are the "available energy efficiency and conservation opportunities, incentives and technical assistance" right now?
- § All of these strategies are imperative to reaching the goal of reduction or elimination of carbon being released into the atmosphere. They must be supported with logic and education, and with rebates where appropriate.
- § Use the community carbon emissions inventory to prioritize big reductions in emissions first. So add incentives for EV & E-bike purchases and charging infrastructure at homes, parking areas, and apartments. Promote PCE 100% clean electricity rate plan with a goal of 100% adoption. Add a small carbon tax locally (I'll gladly pay my share) to pay for: 1) additional home electrification rebates with income ramp 2) EV and e-bike adoption 3) incentive to builders to expand charging infrastructure beyond Reach code 4) Convert gas stations to other uses like community centers or gardens or fast-chargers (and ban all new gas pumps). Let's get serious about all this with concrete steps to reduce biggest carbon pools fastest. And set a goal of zero net carbon emissions by 2030 per what science says we must do to prevent catastrophic climate impacts. Further down the list would be a ban on gas-powered blowers and mowers by gardeners coupled with a rebate for converting to electric mowers and blowers (which are also quieter).
- § I'm not sure that K-12 education is something that should be part of a CMAP. The outcome of this in terms of its effect on reducing energy use and transition to renewables would be difficult to measure. Something like this can be included as auxiliary actions/programs that

support reaching carbon neutral but we need to have our plan be a plan where each element is actually quantifiable so we can measure our progress and our success or failure. In addition to promoting opportunities to conserve and be efficient, San Carlos needs to offer true, specific incentives and in-house educational workshops that will result in behavior changes. Offer a place people can bring un-recyclable items like single use plastic so the City can find a source that will use these products in responsible ways. (There are companies making clothing, concrete, etc. from plastic) This is a way the City can generate revenue that can then be used to incentivize other "green" programs. "Transition to electricity" is a great goal, but not measurable as stated. One way to do this is to declare a year whereby we will be carbon neutral as our overarching goal that shapes everything within the plan. Then specify actions and or quantify outcomes that will result in that transition... like requiring all city vehicles and buildings to be electric by a certain year. Install x number of wind turbines on City property off Crestview or partner with the County to use county land. Set a target to have City facilities be 100% electric by 2030. Purchase battery storage so that City buildings and vehicles don't use the grid and can use the savings on utility bills to fund other projects. Expand 2021 Reach Codes so that all single-family homes are required to be all electric. Have a requirement that all gas appliances be replaced with electric upon burn out. Set a specific percentage of SC homes will opt up to PCE's 100%.

Feedback related to solar installations includes:

- § Solar should be on every City facility, along with hybrids cars.
- § Solar program is my favorite option. Unfortunately, I am unaware of other listed program's details.
- § Transitioning to solar is key, not just for city buildings but for all buildings in the community.
- § PV on all buildings, where practical, too, not just city buildings.
- § Strictly require solar energy for new constructions and give tax breaks to solar retrofits.

Several comments received highlighted the City's role in promoting existing programs and general sustainability issues, including:

- § Encouraging and educating contractors to get on board with electrification - most don't seem to know what a heat pump water is for instance, so that's really a bottleneck for electrification efforts.
- § Promote the ECO Plus energy program--not enough people know about it. Incentivize electric ovens/stoves and electric washer/dryers -- let's get people off of natural gas ASAP.
- § I have used Peninsula Clean Energy since it was first offered but have been unhappy about the lack of real push to encourage people to sign up for it. Many residents I know seem to know nothing about it.



- § Provide incentives, together with PCE, for *existing* building conversions to all-electric, especially for heating, cooling, and water heating.
- § Improve the resilience of the grid. Partner with PCE and PG&E to harden transmission lines (perhaps moving some underground) and to secure a local emergency backup solution.

Many respondents also indicated all-electric reach codes in their responses, including:

- § Building Codes should be updated to require the latest technology. Palo Alto is a good example of this.
- § Requiring all electric for homes/apartments is not yet most efficient way to go green. Carbon generation required to make required equipment far exceeds savings.
- § Top priority Adopt All-Electric Reach Code - this has both climate and health benefits.
- § You've done enough with "All-Electric Reach Code." No need to burden homeowners with additional costs and regulations.
- § The promise of an all-electric future is substantially oversold, in my opinion, because the state is unable (politically and economically) to build an electrical grid that is at least double in size and safe. Likewise, the state does not have the resources to build sufficient electricity storage for what will be needed in an all-electric future. The problem of 24/7/365 reliable electricity supply needs to be substantially solved. To be clear, 7 days of interrupted power per year is 98% reliability. Most people that I know would tell you that 7 days per year is 7 days too many. So, I do not support all electric reach codes. Diversity of supply is the key to a resilient system and to a system that can provide backup power. All electric is not diverse. Even more importantly, phasing out of natural gas infrastructure significantly limits future options of zero carbon hydrogen and zero net carbon power to gas energy storage. Hydrogen and power to gas can use this existing infrastructure and they will be net zero carbon. The state cannot build a big enough lithium-ion battery to meet its energy storage and energy distribution needs. But it could build substantial storage in the way of hydrogen and power to gas. In the interim, we can make sure that our natural gas system is safe and as leak free as possible. This includes buildings.
- § incentive to builders to expand charging infrastructure beyond Reach code.
- § San Carlos needs to be a leader in all-electric. It's probably the biggest single lever a city has that it can do on its own. The greenhouse gas impact of natural gas (methane) is 25-80x higher than CO₂. That makes electrification one of the highest impact things we can do. All-Electric Reach Code is the way to go and will drag along all the other items listed in the list.

Question 4

Question 4 asked "Share your thoughts on the strategies above to promote sustainable development. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider."

Responses regarding neighborhood hubs and housing density include:

- § For bullet point 2, I would include "study allowing 2, 3, & 4-plex units within single-family zoning to support the Neighborhood Hubs". Small scale retail and service uses can only survive if there are enough families living close by to support them. A neighborhood hub in our typical single-family neighborhoods is very difficult to sustain.
- § We need to be bold and allowed small commercial services along the Alameda. Start with live-work uses. Provide more transit along this corridor. People we be afraid that they are losing the neighborhood feel, but actually, we will gain by seeing our neighbors at the corner store.
- § We need to go back to the "old days" and encourage mixed uses.
- § Live the idea of neighborhood hubs but would this only be in areas of new development? The hills are in desperate needs of such a hub, but where would it go? Are we going to change zoning restrictions to accommodate them, and are we actually talking about ALL areas of San Carlos or just the chosen parts near downtown that seemingly get the only innovative new projects or even crosswalks?
- § I am strongly against of higher density housing program, it leads to negative consequences speaking of both ecology and social atmosphere. Please, don't do it. All other listed approaches makes total sense, I would support each of them.
- § Mixed use projects should be evaluated on a case-by-case basis, especially in residential areas. High density housing brokers in many problems to a community that was not created with that goal in mind.
- § (Rephrase public transit) - Support abundant, affordable access to public transit and clean new mobility.
- § Establish permanent and temporary car-free zones (thanks for working on this!)
- § Create a Zero Emission Vehicle Action Plan, including charging station infrastructure.
- § Keep the pedestrianized areas that have been implemented in Laurel and elsewhere!
- § Neighborhood hubs is a way to urbanize the suburbs. Keep R1 zoning as it is. Single-family home neighborhoods are the essence of suburban San Carlos. There is room for more residential on top of retail at the south end of town. That area would benefit from it and ease the boom on the north end.
- § Important but difficult. Many residents do not like the higher density housing at and near Wheeler Plaza and the train tracks. People need to be nudged into a new way of thinking.
- § This is a tough one for those of us that are retired and live in the hills. The "Neighborhood Hubs" idea is intriguing, farmers' markets on the weekends in school parking lots?
- § Please see earlier comments about density. The "Neighborhood hubs" idea sounds completely out of place for an already dense city like San Carlos. Where would these hubs go? Are you going to decommission housing to build them? Where is this food going to be grown locally? Are you going to have trucks regularly driving through neighborhoods to restock these hubs? Please come up with realistic and workable options.



- § Love the idea of more small bakeries and grocery stores/bodegas selling fresh and locally grown produce like you have in Europe. Need a real sense of a "town center" and "town green". Need more outdoor outlets of San Carlos' elderly community to walk around safely and do their daily shopping.
- § In order to reach RHNA numbers we need to rezone the residential areas to allow multi-unit buildings in neighborhoods where there are currently only single-family homes so that developers can purchase these SFH's and develop duplexes and small multi-unit blogs. Using the word "encourage" again is too passive and isn't measurable. Switch language to say "Establish "x" mixed use and "x" high density housing by xxxx. Meet with a community development consultant to determine feasibility (and strategy for) establishing Neighborhood hubs so there can be a measurable goal. These are all wonderful things to strive for, we just need to have measurable targets within these goals.

Several responses regarding transportation were provided, including:

- § Streets need to be made safe for biking as a real means for transportation. We need to make Safe Routes to School a priority. Parents are afraid, but you can educate the students and get them to convince their parents that it is safe.
- § Most of the above transport strategies are not practical. But the city should encourage greater use walking/biking/public transit to schools. Reduce traffic congestion created by school drop-off parents.
- § Public transport must be more attractive & affordable by using modern buses, clean & safe waiting areas. The bus stop at Tierra Linda is usually (when school ends) so crowded, has no sunroof and as such is not a good example. Same with the bus stop at Arundel school. Very unattractive. Knowing from cities with nice public transport in Europe, these would at least have a bench & sunroof and therefore be more visible as a bus stop.
- § Bicycling, pedestrian drop off zones and bike/car/scooter rentals areas would be great. And YES to city bus service again.
- § Bicycling is not an option for many of us for a variety of reasons, so I urge you not to disrupt our transportation system to address the concerns of the vocal few who are pressing this issue. If you want to improve transportation, then do not allow for massive new commercial developments like the recently completed project on Industrial. This project has also increased the jobs/housing imbalance.
- § Older people need a way to get around town and access to downtown without walking or bicycling, options that are too difficult for them. They must not be left out.
- § Whoever is in charge of creating bike lanes seems to hate those who would ride bikes. Would you ride a bike down the middle of a four-lane street? Just look at Whipple over the 101 and you will see a green lane for bikes in the middle of four lanes of traffic. Look at bike lanes that have space then abruptly end with nowhere to go but into traffic on Alameda from Arundel to

Carlmont. I support real bike lanes. Just putting up a sign or putting the words in white on a street does not create a safe bike lane. Public curbs? Cut off cars from Laurel between Brittain and San Carlos permanently.

- § Generally, thoughtful improvements to increase bike ability would be great. The intersection of Alameda de las Pulgas and San Carlos Ave used to be a good intersection to be a bicyclist. Now it is an utter mess. Hopefully, ways can be found to help both pedestrians and bicyclists.
- § Higher density downtown is inevitable in the Bay Area, but you must couple it with super safe / fast / friendly e-bicycle and walking amenities. So, accelerate implementing complete routes of the Bicycle Master Plan by 2025 latest. And decide on some open space or green belts downtown to complement the higher housing density - parks and density must be planned and implemented together if we want a city of good living. So, I love your whole list here - let's get serious about it, including one-way streets downtown that would make room for super safe and dedicated and fast bike lanes in the mix.
- § Good list above, except for "ridesharing" drop-off/pickup. Uber/Lyft and other ridesharing services are single occupant auto traffic masquerading as carpooling. What we need are measures that promote multi-modal and micromobility to help get people out of their cars. That takes a carrot and stick. European cities have had great success by both making automobile traffic slower and more expensive, while promoting bike, pedestrian and public transportation.

Comments regarding open space and vegetation include:

- § San Carlos could use a few large community gardens, as a first step to food sovereignty and to provide a public learning space for garden-curious people--consider placing one near the Adult Community Center. Allow for duplexes, mother-in-law units, and other untraditional multi-family arrangements on single plots of land to increase affordable housing stock without massive construction projects; ALL new projects near downtown should be LEED Platinum and zoned mixed-use.
- § If the city is going to promote higher density housing and meet state mandated targets, the city must also increase investment in parks and open space. Our parks and open spaces are already under heavy use, especially athletic fields for organized youth and adult sports leagues and "pickup games."

Question 5

Question 5 asked "Share your thoughts on the strategies above to transition to low carbon transportation. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider."



General support for these draft strategies includes:

- § Yes, to all the above.
- § All listed approaches here are good.
- § Yes, yes, yes, as I listed above before I know what your later questions would be...
- § Yes, to all. Just keep R1 zoning as it is.
- § Yes, to all this. The key to switching out of cars is biking and walking that are truly: SAFER, FASTER, CHEAPER than cars.

Responses related to hybrid and electric vehicles include:

- § For bullet point 2, Transitioning to electric and hybrid vehicles can reduce greenhouse gasses, but does not reduce traffic congestion.
- § Rebates for electric cars need to come from the State, but the City can streamline the permitting process for solar, power walls, and electric chargers. The barriers are money and knowing what options are best.
- § Provide e-charging stations. As far as I know there is not a single one in SC. Good spot would be libraries.
- § To encourage the adoption of electric vehicles, install more chargers -- not everyone has their own garage. Add incentives for businesses to set aside space for micromobility storage -- no one's going to leave their pricy electric vehicle on the street.
- § Emissions can be reduced by making entry to electric cars easier. Require new construction to have recharging spaces. The same for public parking. Stiff fines for gas cars using EV parking spaces. EV public trans for downtown area.
- § Please consider programs that will benefit senior who have difficulties getting around San Carlos. I certainly couldn't use a bike, scooter or skateboard! Please bring back the shuttle that was available for rides within San Carlos. I loved that shuttle and could call for a pickup for a date/time and would be dropped off downtown or elsewhere for dr. appts.
- § How would the city "encourage" hybrid and clean-fuel construction and landscaping equipment?
- § Offer incentives to help residents purchase EV and Hybrid vehicles. Incentivize residents to reduce number of vehicles per household to 1 perhaps by offering a property tax credit. I like the micromobility concept and local shuttles to commercial area and train station. Determine phases in which we establish some (identify number and schedule) micromobility stations so that residents can gradually adapt their transportation habits. All city vehicles should be electric asap. Partner with neighboring cities to develop a micromobility/shuttle plan so people can get to RWC or San Mateo to do shopping or go to work. Replace large SamTrans buses with electric shuttles for 10-25-mile distances. Perhaps develop light rail electric transportation regionally and make Cal Train more long distance based. Commit to City landscaping and construction equipment being 100% electric by 2025. I feel that the City should set goals and

develop strategies where they have direct control and funding. There can be auxiliary goals included in the plan where the City doesn't have control, but they shouldn't be used to measure progress or be counted as items that contribute statistically to results.

Responses included mention of micromobility, active transportation, and public transportation, including:

- § More emphasis needs to be put on alternative modes of transportation including more small bus or shuttle routes throughout the city in addition to micro mobility.
- § Because of our hilly terrain in San Carlos there are many more challenges to viable micro mobility types. Increase community-wide free transportation utilizing electric buses.
- § Facilitating micromobility is great -- add neighborhood carsharing and carpooling.
- § Micromobility devices are inviting injury with so many cars and make-believe bike lanes.
- § Micromobility trumps all. Fewer single-occupant car miles solves both congestion and climate impact.
- § Improve bicycle safety with protected lanes and reduced stop signs along major routes.

Miscellaneous feedback includes:

- § Palo Alto now requires deconstruction on all projects. This could be done in San Carlos to reduce C&D waste.
- § Well seeing as maybe 30 percent of residents live in the hills it would be effective to create a nonindividual vehicle method between hills and downtown or even adding a hub in the hills as previously mentioned but I see no energy around this idea from city leaders who only focus on downtown/flat regions where they reside. I see such passivity and resistance to any meaningful change that I'm cynical that it's just lip service in a city with ineffective leadership.
- § Add: Support community telework infrastructure to reduce transportation impacts.
- § Strengthen from "Encourage" to "Require" clean-fuel construction and landscaping equipment citywide.
- § Strongly consider banning gas-powered leaf blowers -- not only are they are annoyingly loud, they produce terrible pollution in residential areas; electric blowers, raking, and sweeping are all feasible alternatives.
- § I am not convinced any of these strategies will move the needle in terms of reducing the global carbon emissions problem. Better to focus on the basic day-to-day needs of the community and overseeing a transportation system that allow residents to conveniently move about to go to jobs or deal with the other necessities of life.
- § This can be a question of money for many people, especially the older population. Again, their transportation needs must be considered.
- § In the second bullet point, the way to support residents and business owners is to provide them with rebates or other incentives.



- § If the last bullet point refers to city-owned vehicles, then that verb should be changed from "encourage" to "require". Any vehicle operating within the city limits should be required or rewarded for going clean: trash collection, postal service, buses, Sheriff's fleet, etc.
- § San Carlos could take a great step forward in truly clean transportation by embracing hydrogen fueling stations and converting the city fleet of vehicles to a large fraction of hydrogen. Many people that I know would use a hydrogen vehicle but that fueling options for city residents are not great.
- § Also, I think that it is important for politicians to realize that Californians would all start to starve in about 24-48 hours if it wasn't for the diesel that fuels agriculture and the system of food distribution. This is a reality that we cannot wish away. What can be done is to find ways to offset these emissions.
- § The City should lead by example and accelerate its transition to low carbon transportation for its fleet and the fleet of its primary contractors (e.g., fire, sheriff, park maintenance, etc.).
- § Support Caltrain.

Question 6

Question 6 asked "Share your thoughts on the strategies above to become a zero-waste community. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider."

General support, lack of support, general comments, and suggestions include:

- § These are good strategies, but more effectively implemented on the State level, not so much at the municipality level.
- § All listed options are good. Please, start with opening of plastic bag's gathering points.
- § I fully support San Carlos becoming a Zero Waste community and know that cities and businesses around the world are implementing Zero Waste (+90% waste reduction). This reduces embodied carbon in materials and methane, a fast-acting climate pollutant emitted by organics (food, grass, wood, etc.) in landfills.
- § Add more focus on reduction and reuse -- see Oakland's Equitable Climate Action Plan.
 - Implement a mandatory deconstruction policy to reduce building waste and provide local, low-carbon building materials. (Palo Alto, Portland models)
 - Eliminate single-use plastics and prioritize reuse in food preparation, distribution, and sale.
 - Strengthen infrastructure and partnerships for edible food recovery.
 - Eliminate disposal of compostable organic materials (see state law SB 1383)
 - Implement City low-carbon purchasing policy and track and report on results annually.

- Develop business low-carbon purchasing program with annual results reporting and awards.
- § When going about these strategies please be mindful of the costs on the end users. We are facing higher costs for all utilities so let's not overburden our residents unless absolutely necessary.
- § Again, make information verifiable and available on City website. Is our recycling just being dumped in the ocean without our knowledge?
- § These ideas all sound good. The final point about life cycle emissions is very important to ensure that we are not just wasting resources.
- § Give incentives to residents to capture rainwater, use low water usage plants, increase eaves depth for natural cooling.
- § Yes. Also encourage all restaurants to offer a low carbon meal option (non-beef and vegetarian using local regenerative agriculture products for example) on their menus to encourage residents to sometimes eat with lower carbon emissions as an option. Raises awareness, conversation, and good carbon free economy behaviors in every type of restaurant.

Responses regarding food packaging waste and single use plastics include:

- § Require all restaurants to provide biodegradable food packaging.
- § Require all grocery stores to abolish plastic bags (Safeway is using plastic bags only these days! Many vegetable departments still use non-biodegradable bags - except for Trader Joes).
- § Start campaign at schools to abolish plastic bottles on campus & Ziploc bags and encourage reusable lunch boxes & bottles.
- § A BIG step in becoming a less wasteful community and also an economical one is to require takeout food packaging to be compostable. The more these items are used the less expensive they become to produce.
- § With all the takeout in this town, requiring using biodegradable/combustible materials should be an immediate course of action. This includes the containers used by the adult center for their lunch program.
- § Biodegradable or compostable food service ware is an excellent idea; also work with restaurants to establish guidelines for accepting customer's containers for refills and takeout.
- § Since the market for processing recyclables seems to have dried up, we should be focusing on reducing our dependence on plastic in the first place. Single use containers should be replaced with refillable multi-use containers. Work with Bianchini's, Trader Joes, and Lucky to make this happen. We have gotten used to bringing our own shopping bags; we can get used to bringing our own shampoo bottles.



- § Consider economic mechanism such as requiring charge / tax for takeout packaging or disposables. Make it an economic choice for customers rather than a mandate. E.g., charging \$.25 per bag at grocery stores provides surprisingly strong motivation for people to bring their own--even at a silly low price.

General responses regarding waste, recycling, and composting include:

- § Require deconstruction for all projects to reduce C&D. The barriers are the number of companies that do this work, but as more cities require this, the companies will start forming. (Palo Alto example) This should have a neutral to minimal cost.
- § Many residents already participate "Buy Nothing" Facebook groups, but this should be promoted by the City. No barriers.
- § For recycling, there have been recent stories that material is not actually being recycled. Residents need to know where the materials are really going, as this will help motivate them to participate. There should also be a "store" where recycled products are sold - full circle!
- § Recycling capabilities really seem to have dropped off - can we get them back to the level they were at before?
- § Composting should be required across the city, no exceptions. If waste technicians notice someone is trashing compost, 1) send a sustainability ambassador to educate the resident, then 2) issue a warning, and if they still won't adapt 3) fine the resident. Establish a permanent kiosk at the library for accepting batteries and e-waste recycling. Pilot a zero-waste program at one of the SCSD schools, with the aim of eliminating single-use plastic -- can't hurt to educate the next generation.
- § All stellar ideas, especially curbing construction, and to-go waste. I order food according to how it's packaged. Community led education is a must.
- § Great ideas and very important. We are behind many communities in what items we can recycle...for instance, black plastic, wire hangers, etc. Take-out has increased so much during the pandemic and may continue. Compostable items from places like Gott's (not in San Carlos, but a good example) are excellent.
- § How about having Composting classes in San Carlos to encourage people to compost and grow their own veggie gardens?
- § On a more immediate note, it is very silly that plastic film recycling (bags, bread wrappers, and so on) has stopped due to the pandemic. County wide, getting plastic film recycling going again would be a great help. Also, grocery stores should start to bag your groceries in bags that you carried into the store.
- § Establish some community gardens and composting stations for the gardens. Ban plastic bags and single use plastic. Set specific target of zero waste by xxxx for construction and demolition. If there are materials that can't be recycled, find ways to "reimagine" their use. Artists and schools may have uses for construction materials from demolished buildings. Definitely

require that take out packaging be compostable or biodegradable. Some should be for grocery and other retail stores. Create an educational program through using signage around town that promotes zero waste. Just like we painted the electrical boxes with artwork, we can use those to message our community. Use all kinds of creative methods for educating residents and building a campaign about making San Carlos carbon neutral by xxxx. Shopping bags can carry messages. The sides of buses and other city owned vehicles. We need the public to want to change through an effective messaging and educational campaign.

Question 7

Question 7 asked “Share your thoughts on the strategies above to reduce water use. Consider sharing what barriers you may face, or any important considerations or implementation ideas the City should consider.”

General comments provided include the following:

- § Dual plumbing should start to be required.
- § No comment.
- § Ditto, these are good initiatives at the State level.
- § All options look good. I would add to landscaping part that let's also promote food growing. If you have space and water, it's much more reasonable to grow a fruit tree than the lawn.
- § Best strategy to insure reducing water use is to limit new water hookups. High density housing has no monitoring of individual units' usage, therefore greater water waste is created.
- § Yes, to everything but don't let a drought get in the way of promoting tree planting. The water should go to trees not grass.
- § I have limited knowledge about this area but have read in the past that the 4th above is very difficult and complicated for individual homeowners to put into place. I've done the 3rd...it can be expensive, and you have to like the "look". Saves money in the long run though.
- § All no-brainers.
- § Yes.

Responses related to rainwater harvesting, and use of recycled water and graywater systems include the following:

- § Establish large scale production of recycled water for all uses - landscape and personal. The technology already exists for water to be recycled to 100% purity in several cities and communities nationwide.
- § The City could provide residents with free graywater barrels and compost bins with classes to teach residents how to use them.



- § Does San Carlos have a purple pipe system? New office buildings should be required to use this type of system. Given Palo Alto is restricting office development, more offices will come here, meaning there are few barriers other than bringing the main pipe to the site.
- § Does San Carlos have a purple pipe system? New office buildings should be required to use this type of system. Given Palo Alto is restricting office development, more offices will come here, meaning there are few barriers other than bringing the main pipe to the site.
- § Provide incentives for homeowners to collect rainwater.
- § Better use of gray water and recycled water is a key. Where can one get more information about what is available and practical?
- § Recycled water (purple pipe) should be made available for irrigation.
- § Love idea of incentives for rainwater collection and use, as well as greywater.
- § These water savings strategies sound great. In the past, I've run into barriers (lack of knowledge - self & contractors, city rules & regulations, etc.) especially regarding greywater and rainwater capture solutions. Please include education & outreach in your solution, not just incentives.
- § Motivate a transition to gray water by offering homeowners consulting services or workshops and offering a tax break on property taxes. Set a goal of how many water efficient retrofits will result from these efforts. Maybe 10 in the first year with an annual increase.

Several responses were received pertaining to water conservation, including:

- § Encourage removal of residents' lawns and replacement with native plants.
- § Provide rebates or other incentives for homeowners or property owner who replace their thirsty single-species lawn with xeriscaping (concrete does NOT count, show me some soil!) and/or California natives; be sure to educate residents on bird- and insect-friendly plant species.
- § Look around our neighborhoods. Many have already installed drought tolerant vegetation. Highlight these small victories.
- § Consider a water usage tax to provide economic incentive for reduced water usage. Tax should be equal regardless of commercial vs. residential vs. municipal use.

Appendix B.2-5: Stakeholder Meeting Feedback

San Carlos Business Committee Meeting

Participants

- § Wendy Schettino - San Mateo County Chamber of Commerce
- § Maggie Fahey - San Mateo County Chamber of Commerce
- § Tom Davids - former mayor of San Carlos and former Chair of San Carlos Chamber of Commerce
- § Amy Buckmaster- San Mateo County Chamber of Commerce
- § Paula Ebejer-Moffitt - San Carlos business owner
- § Jason Mansfield - BKF consultant and past Chair of Business Committee and San Carlos Chamber of Commerce
- § Felicia Basques - San Mateo County Chamber of Commerce
- § Nicholas Dell'Ergo - Residence Inn General Manager
- § Susan Rose - Arbor Bay School Director
- § Robert Tersini - Vice President of Sobrato Organization (real estate)
- § Yvette - Recology San Mateo County
- § Bobby-Jo Keating - Owner of Companion Care Services

Questions from the Committee and General Comments

- § Is San Carlos the first City to be doing this?
- § Does San Carlos or the City have recycled water on new projects? Is the City able to tap into that?
- § For new construction, if someone wants to do a remodel, do they now have to follow the reach code? The Business Committee has not taken a position on the reach code because PG&E is so unreliable.
- § The Residence Inn has solar to heat their water, etc., but they are not familiar with what other energy efficiency or climate action requirements are required as they remodel.
- § What happens as we look forward with all our development, will we automatically see increases that need to be adjusted down to account for the increase?
- § Is there a plan to have more charge stations for electric vehicles? They are becoming more popular.
- § Will we be getting a quarterly report or something, how will we get updated?
- § What do you need from us as an organization? How can we help you in the next stages?



Strategy Discussion

- § The bottom energy strategy (small scale onsite battery storage) is essential because they need that stability. Is the City planning to go all electric on their fleet or has it already been done?
- § Arbor Bay school is in a City-owned building and would love to be a pilot project for solar panels on the roof, please keep us in mind. A pilot project for a city-owned building (the school pays their own PG&E bill) and they are really interested in seeing how to reduce electricity and gas consumption on site.
- § Does the City provide guidance on making decisions related to solar energy? I live in a condo and it needs a new roof. Can we combine a new roof with a solar energy project? Without going to the industry and asking questions, is there an objective source of information maybe on the City website that residents can go to instead of going to people in the field?
- § Was on the phone with a farmers market vendor with an all-electric food truck. We used to have Scoot shared micromobility vehicles. You're talking about getting people out of their cars, and as we start to emerge into the world again, not everyone rides a bike or rides transit. Most people seem to need to drive. How do we move people to and around events? We need additional ways to get people out of their cars. Same with vendors in the markets and such, getting vendors to use electric resources.
- § As an engineer that works for developers and cities. Seeing developers struggle to implement these things such as stormwater treatment to dual pump buildings to all electric to levees. Each individual project seems like a stepping-stone, but a lot of these project are regional and bigger projects. It is probably helpful to start planting the seed at this level for future ideas where you can implement a regional solution where a developer can pay into it or the City can start to implement it with impact fees or similar. Sometimes a developer has to do something huge like an 8-foot levee even though they know there is a more regional project like Highway 101 flooding that they could contribute to financially. That type of immediate project that is a need for 50 years from now would be more beneficial than building something like a levee that would only be needed in 100 years.

Peninsula Clean Energy

Question 1

Question 1 asked *“What programs does PCE have which support energy efficiency and electrification of buildings and transportation in San Carlos? How long will these programs be available?”*

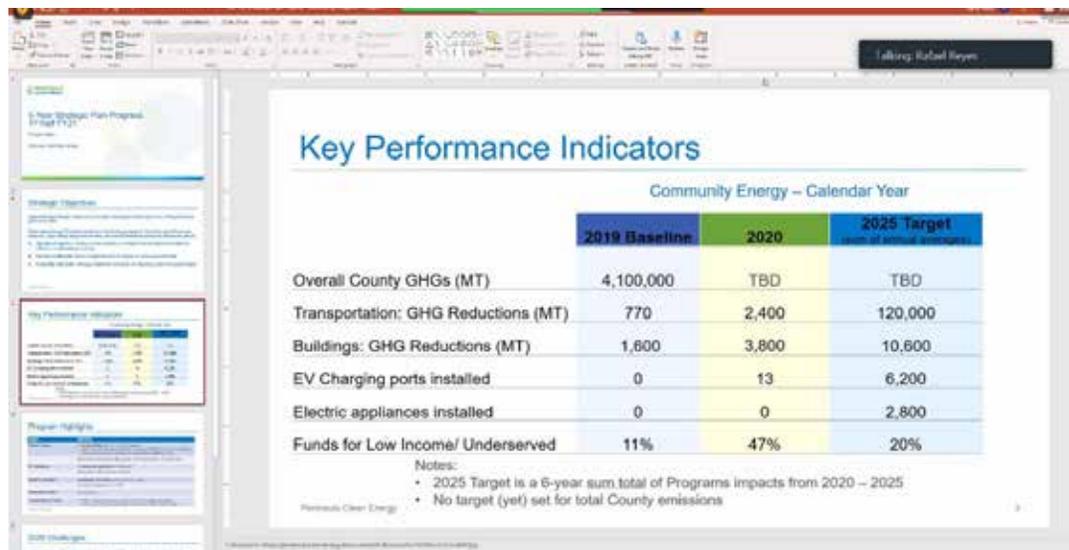
- § In terms of Peninsula Clean Energy programs, there is Board approval that needs to happen, but 3–4-year timeframes have been approved for all the incentive programs, including vehicle and electric buildings incentives. Focused on used vehicles for the vehicle incentive program.
- § Home upgrades (heat pump and water heaters) has a 4-year time frame. There may be additional appliances added over time.

- § Low-income home upgrade program is likely to run for 2 years and could then be extended. Offering up to \$6,000, not \$8,000 as noted in the fact sheet.
- § The assistance and training have approval to run for another year but could be extended beyond that.
- § Reach code program is focused on new construction. Will run for another year. Peninsula Clean Energy will be doing work to support local governments to re-up those codes with the new code cycle, set to go into effect in 2023. Have begun some work in regard to existing building codes. It is complicated and the time frames for that are not fully clear. Developing models and tools. Menlo Park is actively engaged in that process right now. Reach code program should be extended.
- § Menlo Park is currently looking at a reach code for existing buildings (it's in their CAP).

Question 2

Question 2 asked *“Do they have performance foals or metrics that will bet racked and available to the City?”*

- § There is a board dashboard with metrics out to 2025. (see image below) These are a roll-up of average annual emissions benefits from directly measurable aspects of their programs (they don't count policy work, etc.). This image is the 2019 baseline, including overall county emissions based on the County office of sustainability.



- § Two largest programs are EV charging and electric appliances.
- § It isn't too hard to produce a report on the number of things done in one City. PCE could produce a chart of all things specific to San Carlos.
- § The “buildings” section number represents an annual average of a 10-year projection.



Question 3

Question 3 asked *“What programs would PCE like to launch in the future?”*

- § The most significant thing will be on-bill financing for retrofits, including for electrification. Since getting the upfront money for retrofits is one of the largest barriers, this should help overcome at least some concerns. This program should launch in 2021.
- § There is a pilot EV electrification project in the works with Lyft to rent [lease?] 100 electric vehicles for use by Lyft drivers. If that is successful, PCE will ramp it up.
- § Municipal fleet program (technical assistance) will launch this year. There will be some incentive support.
- § Not much fully new stuff in the short term, beyond the items above, will be happening for now.

Question 4

Question 4 asked *“Does PCE have any strategy recommendations for inclusion in the CMAP?”*

- § Things of particular value would be re-upping the reach codes for the next building cycle for new construction. Then #2 is potentially exploring measures on existing buildings. Maybe one option is to require that installations of new water heaters are electric. Menlo Park may prove a useful case study.
- § Lots of concern and challenges around permitting water heaters and standardizing the processes. Some issues dealt with on the solar side are quite helpful. As always, it is helpful to have engagement to promote electric vehicles and supporting charging where needed, particularly fast charging. Permitting chargers can also be challenging. Some standardization across communities for permitting procedures and requirements would be helpful.
- § Is there something cities can do about load shifting, etc.? It is expected the next round of the state code will include information on wiring for batteries. Permitting around batteries can be challenging, especially in existing buildings. Of course, education and such are really helpful.
- § The education work around resilience is possibly an area where cities can be more involved in. San Carlos has some wildfire risk areas so that education could be valuable.
- § Brisbane has put in place a commercial energy benchmarking ordinance. It is interesting on multiple levels because it encourages more transparency and starts groundwork for electrification. San Carlos does have a significant commercial sector, and this could be extremely valuable.

Question 5

Question 5 asked *“Is PCE targeting any account or user types for their programs?”*

- § This is mixed. If we look at the EV work, it's very consumer centric. But charging is focused on multi-unit dwelling because that is where the challenge is. Some focus on commercial.

Appliances is focused only at residential. Resilience work is a mix of residential and commercial.

- § How can cities help target specific audiences beyond small communication online? Electric vehicles is the one with the biggest emissions and economic benefit. There isn't full visibility in how the City engages in property owners, but the City can really help get multi-unit dwelling owners to install EV charging. Any forums with property owners, or any permitting the City can do, to get these in multi-unit dwelling units to have plug in spaces.

Question 6

Question 6 asked *"How does PCE partner with school districts? Does PCE track progress of school-based programs such as the Electric Eco Hero Student Activity Packet?"*

- § There is quite a bit done with schools. There is the dashboard, they are doing curriculum materials. Sponsoring fellows. Doing projects with schools and teachers. Rafael has slides he can share about these programs.

Question 7

Question 7 asked *"Are there any direct access accounts that could potentially convert to PCE-supplied energy? Are there accounts in San Carlos that cannot convert to PCE?"*

- § There is not a lot to share on direct access due to customer privacy. Customers on direct access could switch to PCE if they wanted.

Question 8

Question 8 asked *"How does PCE advertise their services to those who have opted out of your programs?"*

- § From the standpoint of opt-outs there are very few. The participation rate is around 98.5%.

Follow-up Email Correspondence with PCE

- § Regarding your question about school districts, the main way we engage is through the County Office of Education (Andra Yeghoian). She introduced us to the San Carlos school district a few years back, where we sponsored an energy dashboard pilot. In addition to that, we sponsor the County Office of Education's Youth Climate Leadership Ambassadors program, as well as climate leadership fellowship programs for teachers, school administrators, and facilities managers. We would love help promoting that resource.
- § As of January 1, 2021, ECOPlus (our default product) is now 100% carbon-free, and we intend to keep it that way. You can assume zero GHG emissions for all PCE customers from electricity from now into the future.
- § ECO100 continues to be both 100% carbon-free and 100% renewable.
- § San Carlos currently has a 97.27% community participation rate of eligible accounts in PCE. That's 14,236 active accounts.



- § 685 accounts, or 1.59% of active accounts, are enrolled in ECO100. From a GHG perspective that no longer makes much difference. The current advantage of ECO100 is higher renewable content, and that it all comes from wind and solar in California.

San Mateo County Office of Sustainability

Participants

- § Susan Wright, Sustainability Program Manager
- § Denise Lin, Sustainability Coordinator
- § Alexandria Gallizioli, Resource Conservation Specialist

Questions

General Strategy Input

- § County is interested in a reach code with existing buildings and tracking similar local efforts, including the Menlo Park effort. Their CAP goal is carbon neutral by 2030.
- § The efforts around electrification would be great to get all the cities on board.
- § The County has been coordinating with RICAPS on new and revised policies. There is interest in expanding the existing RICAPS policy on green building for new municipal facilities to also include existing building electrification and decarbonization. Beyond a policy, there needs to be something adopted in the code that requires this. The County wants to create resources to make it easier for people to take action, such as clear direction about how to purchase electric appliances and find knowledgeable contractors who can install them.
- § Suggest adopting an EV first policy.

Municipal Facilities Strategy Discussion

- § Municipal facilities should be set up for benchmarking. For example, Redwood City is looking to do a remodel of their fire house, and there is an opportunity there for ZNE tech assistance.
- § The County provides support for decarbonization of municipal facilities, although the specific type of support depends on the project. The amount of assistance a project can receive varies based on the criteria of available incentives and other assistance programs. Cities needs to, at a minimum, show they are committed to bringing the project through to fruition to receive support.
- § The County is wanting to get all the assistance and information into one location so that it is easy for municipalities to access. Energy Watch is energy efficiency focused. The County is partnering with PCE on this to see if PCE can put money towards municipal electrification.
- § Suggest the City continue to look at CIP list and plug in the County and PCE in the process for assistance. County and PCE can assist the City to replace things that need replacing.

Small Businesses Strategy Discussion

- § On the commercial side of things, working with small businesses. Right now, the County is trying to be as holistic as they can. They started a small business resource center on the sustainability website. It has a list and goes into detail on financial and technical assistance for programs for small businesses. Businesses can fill out an interest form or call a desk phone to get more help. Also, able to provide a referral out to programs at municipalities.
- § County has been reaching out to municipal economic development directors to have them be a part of county-wide efforts. County wants to cooperate and work together with economic development directors to have them all work together.
- § Assistance programs mainly includes energy efficiency in small businesses (LED lighting, efficient water heater or energy star appliances). The types of available incentives depends on the businesses and their funding and loans they can take out, but BayREN does provide some financial incentives. This works with personal credit so small businesses can also build credit as they do this. There is also a green business program where they can fully improve the sustainability of the business' operations. In addition, there are benchmarking services that the County can provide to decide when to do what and be sure their status to see where they can plug them into programs.
- § For some businesses, there may not be any up-front costs based on certain programs. Some businesses will be “incentivized” through their commitment to conserve energy. They are still working on the details of this program.

Residential Strategy Discussion

- § Single-family Green House Calls program includes lots of energy efficiency and electrification rebates. Rebates for installation, duct-sealing, etc. Electrification rebates cover heat pumps, water heaters, induction stoves, electric dryers, etc. The program used to require people agree to multiple actions to take part in the program but now residents can decide to do as few as one to three measures, as is feasible for their home. The audience so far has been used by upper income folks and the County is hoping to get more low-income homes to participate. The rebate program can be used by renters/owners of 1-4 units.
- § Home Energy Score is like the BayREN audit so people can see how their home is performing before they invest in upgrades. There is a \$200 rebate that covers most of the cost of the assessment.
- § One program that can help ensure these efforts succeed is the home energy score program. Under these programs, cities require at the time of listing a home or the time of sale that the seller disclose the Home Energy Rating System (HERS) score for the property. For rebates, cities primarily just do promotion but don't have them in policies. Some reach codes require energy efficiency upgrades under certain conditions.



- § It seems like there are a lot of cities right now thinking about how they can really help these programs. County is looking at how they can get the cities to work together as much as possible.
- § The County has been in a few efforts like mapping with stakeholders and homeowners and contractors to map out a system to electrify. Some methods included permitting or rebates. In general, the County is trying to give more people access to information and other resources on electrification. There needs to be more information in one location that is easily accessible.
- § There is a new page on the County's sustainability website regarding electrification-this is where there is compiled information for people to look at regarding electrification.
- § Two cities have mentioned that they are interested in accelerating the transition away from natural gas as a community (Menlo Park and Half Moon Bay). Staff meeting with PG&E Grid Edge group to start the conversations on how to continue this transition, including how to ensure homes transfer to electric over gas.
- § County wants to reach out to owners of older properties (1975 or older) and to property owners in naturally low-income household areas to encourage them to go through the multi-family electrification program. The County wants to conduct workshops in summer or later in the year.
- § Energy code trainings are still going on, training contractors, etc., on heat pumps, insulation, code requirements, etc.

Schools Strategy Discussion

- § County is having interesting conversations with the County Office of Education. Some staff there are committed to energy efficiency and want the school district to understand that their schools should support local community efforts and do their part. Staff are trying to connect the school district with cities to be more involved in each city's CAP so that that the CAP integrates with what the schools are doing. This is something that San Carlos can look at. Use schools as an education/communication resource and also as a place to increase energy efficiency. There is a State program that is funding HVAC improvements as a COVID response, but it furthers the efforts for climate plans because they are more efficient.

Senate Bill 1383

- § Staff on the call need to check with their colleagues, who can provide the CMAP team with more information on this topic.

OneShoreline

- § One of the District's first projects is the Bayfront Canal Project to protect mobile homes in Redwood City.
- § All development projects should be located 10 feet above the current high tide line (or approximately 6 feet above the current 100-year FEMA floodplain).

- § There is a county-wide early warning system for floods, currently under construction. It will use stream gauges to anticipate flood conditions.
- § The Redwood Shores area will be put into the 100-year floodplain if the deficiencies in the area's protective levees aren't addressed.
- § The District is developing policies to require developments to understand their vulnerability to flooding/sea level rise and how the development will affect the area's hydrology. There will be a focus on a coordinated approach at certain locations.
- § District agrees with an overlay zone for sea level rise hazards and can help develop/sell it.
- § Most new biotech is located in areas protected by the Redwood Shores levee rehabilitation project. The City should ask for this project to also cover the area between Brittan and Whipple Avenues.

Environmental Stakeholders

Participants

- § Suzanne Emerson, San Carlos Green
- § Kathleen Goforth, Bay Area Climate Reality Project
- § Ellyn Dooley, Citizens Climate Lobby
- § David Crabbe, Sierra Club Loma Prieta Chapter
- § Kan Parthiban, Sustainable San Mateo County

Question 1

Question 1 asked "How does your organization lead or support climate action in San Carlos (and/or San Mateo County)? Please share details of programs, activities, outreach, events, etc."

- § Citizens Climate Lobby is more national and anything local happens if someone sees the need. Citizens Climate Lobby has been involved in an endorsement from the Council from the carbon dividend policy and working with the Council to update that resolution for the new Congress bill in April. Also working on electrifying the City and lobbying/advocating for strong reach codes.
- § Climate Reality is international but there is the Bay Area chapter which has a policy action team with a squad in each county. The San Mateo County squad is just getting started. There are about 100 members in San Mateo County. So far, the group's local action has been advocating for reach codes and electrification. They also advise members in other cities on the peninsula based on their own experiences. They collaborate with other organizations and have a big network to partner with and mobilize people for Council or Supervisor meetings. Building electrification and transportation decarbonization are the biggest initiatives right now.



- § San Carlos Green is using their Facebook page to promote local opportunities to be involved or local initiatives like electrification. They also focus on getting adoption of the reach codes and additional support for that like a portable induction cooktop borrowing program so people can try it out (this is separate from the library). San Carlos Green would like to help out with deep carbonization of homes and transportation and getting the word out.
- § Fossil fuel-free Silicon Valley is also doing an induction cooktop loaner program.
- § Sierra Club Loma Prieta chapter is San Mateo and Santa Clara counties. There is a “Climate Action Leadership” team that is on the Loma Prieta chapter website. They have been working in the counties to track what they are doing and sharing information. They also have a program where they are promoting green sustainable streets with street trees and drainage.
- § Sustainable San Mateo County has an indicators report that is a broad scope area for all of San Mateo county. There is a new program that is ongoing and open-ended file where anyone can provide their input on their own sustainability problems. This could be done as a partnership with the San Carlos section where the local community can provide their own issues and the City could look at those and track the issues in the community.

Question 2

Question 2 asked “What types of climate action strategies do you think have been most effective locally and/or regionally or for you personally? Who has led those actions? How were they funded?”

- § Some of the most effective are Peninsula Clean Energy and the SunShares program that allows the City or County to pre-vet solar installers and negotiate discounts on solar energy systems, BayREN and PCE rebates for electrification and energy efficiency measures, the induction cooking loaner program is effective, and building relationships with elected officials. Also effective in raising awareness is the wildfire preparedness workshops because they were really informative but there needs to be follow through with that information.
- § Curious if TOD near the train tracks has reduced the number of cars. Proposes that the City do a study in those areas to see if the people there are indeed going lighter on cars. Need to do more sea level rise mitigation which there are upcoming sea level rise workshops. Most places in the Bay are putting up levees to address it but it isn’t very effective and is not good for the environment. The whole east side developed area needs to be coordinated with in the East Area plan.
- § The CMAP workshops were really valuable in getting public input and encouraging people to get involved.
- § The curbside recycling program has been really great in getting people to divert their compostables.

Question 3

Question 3 asked “What are the top GHG reduction strategy priorities that you would like to see in the CMAP? What does the City need to implement those actions?”

- § Priorities are building decarbonization, transportation emissions reduction. For building decarbonization, there needs to be electrification for existing buildings (either replacing gas appliances with electric ones at burnout or some separate program), as in the Half Moon Bay example. On transportation, increase access to EV charging, provide incentives for purchase of EVs, and reducing vehicle miles traveled are all important. Also would like to see that the City will commit to supporting all the strategies in the CMAP and to have a mechanism for evaluating them. It should be clear how strategies or actions relate to GHG reduction and adaptation goals (with everything that the City does). Would like there to be an explicit goal in the CMAP saying that the City wants to be a leader and to partner with other cities to do even bigger things.
- § Top three priorities are what was just said: buildings, transportation, and full electrification. These will require incentives and money to do this. There needs to also be a lot of public information and education and awareness because otherwise it will be an uphill battle, and nothing will change. Use whatever means we have possible to let them know what decarbonization is and what electrification is because then people will be able to get on board and change their behavior. The City needs to also go all electric with their buildings, vehicles, maintenance crews, everything that the City has control over. It won't be easy, but it is at least in their control to do it. Everything needs to be really quantifiable. Don't include goals that are dependent on what the public does because we can't track emission reduction from these, there needs to be a track to accomplish these goals.
- § Focus on making sure the CMAP focuses on things the City has the ability to do. That might be adopting ordinances, getting grants, and other things that only the City can do. Avoid things like “Encourage residents to X.”
- § Instead of suggesting things, incentives to do the right thing should be offered. For example, incentives for owners of multi-family development to install EV charging stations. They won't do it unless they have incentives. Anything we would like to have private developers do; you need to incentivize it.

Question 4

Question 4 asked “What are the top GHG climate adaptation priorities that you would like to see in the CMAP? What does the City need to implement those actions?”

- § One thing that hasn't been mentioned are regenerative practices and areas such as wetlands and opportunities for carbon sequestration. There isn't much information given to the public on these. Everything that lands on a property needs to be harnessed and not sent to storm drains. Maintain the wetlands and protect them from development.



- § Look at more sustainable and environmentally friendly ways to adapt (other than levees, etc.)
- § Make sure that buildings being built in the hillside areas are meeting best management practices for fire safe design, including no wood exteriors or gutters that collect leaves.
- § Working with Cal FIRE is important in terms of thinning open space landscaping. Suggest having the fire department visit all houses in the City to see if there are any issues in terms of landscaping. Have them give a warning and if the homeowner doesn't correct these issues then the fire department does it themselves and then they charge the homeowner. In the areas in the wildland urban interface, underground the electric lines.
- § Not sure what the City is doing in terms of sea level rise in flatland areas. Is there a requirement that new buildings are built on higher elevations? Are there bans on having critical infrastructure in low lying areas?
- § Marin has a great fire safe landscaping page online that the City could look at as an example. It sets standards for people to follow that are really actionable.
- § Maybe look at having permeable paving and provide incentives to homeowners to conduct retrofits to protect themselves from sea level rise and flooding. Has the City looked at the industrial areas to see if there would be any contamination from flooding? The City needs to evaluate some sort of program to give financial incentives to get people air purifiers that they can use during extreme fire smoke events. Definitely have the fire department check in on landscaping of homes. This could either be a one-on-one meeting or can also have programs where a woodchipper is brought into a neighborhood and people in one neighborhood can all utilize that tool together. The SunShares program did some of the work up front to vet the contractors and get financial incentives, maybe this can also happen with fire safe materials like closing gaps or replacing doors, arborists, etc. Look at installing cameras for fire detection. Provide purple air monitors for residents and expand the network of those in the city. Extreme heat mitigation is also important, establish cooling centers, provide assistance for people to stay in their homes as possible. Have a system that we can use to check on the elderly during extreme heat events. Native tree planting should also be done to create shade and cool off the community. The current list of City-approved trees has no native species on the list and that needs to change.
- § The natives are very important for soil and water conservation as well. Incentivize lawn to landscape system and incentivize the use of recycled water for landscaping instead of fresh water.
- § Evacuation routes for wildfire areas on the northern side of the City. Lots of those streets couldn't fit two-way streets or fire trucks. Utilize NextDoor to put together groups to work on these issues and spread the work.



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Appendix C. Vulnerability Assessment

Climate Change and San Carlos

What is Climate Change?

Climate change is a long-term change in the average meteorological conditions in an area. Currently, the global climate is changing due to an increase in greenhouse gas (GHG) emissions that trap heat near the Earth's surface. While some levels of these gases are necessary to maintain a comfortable temperature on Earth, an increased concentration of these gases due to human activity traps additional heat, changing Earth's climate system in several ways. This can create intensified or new hazardous conditions that can increase the risk of damage to critical infrastructure, injury to sensitive populations, and disruption of essential services. To have a better understanding of how a changing climate may harm San Carlos, and which aspects of the community – including people, buildings and infrastructure, services, and economic drivers – are most vulnerable to its effects, City staff prepared a vulnerability assessment as part of preparation of this Climate Mitigation and Adaptation Plan. This report presents a summary of the vulnerability assessment methods and results.

Climate Change Modeling Considerations

The Intergovernmental Panel on Climate Change (IPCC), an organization that represents the global scientific consensus about climate change, has identified four climate scenarios, also called Representative Concentration Pathways (RCPs), which can be used to project future conditions. RCPs are labeled with different numbers (e.g., RCP 2.6, RCP 6) that refer to the increase in the amount of energy that reaches each square meter of Earth's surface under that scenario. The four RCPs are:

- § **RCP 2.6:** Under this scenario, global GHG emissions peak around 2020 and then decline quickly.
- § **RCP 4.5:** Under this scenario, global GHG emissions peak around 2040 and then decline.
- § **RCP 6:** Global emissions continue to rise until the middle of the century.
- § **RCP 8.5:** Global emissions continue to increase at least until the end of the century.

Projections of climate hazards from Cal-Adapt, the Bay Area Adapting to Rising Tides (ART) project, and other sources, rely on climate models, which are computer simulations that forecast future climate conditions under these different RCP scenarios. It is critical that the City account for all reasonably plausible future conditions, including the most severe of plausible conditions, which will help ensure greater resiliency from climate change. Therefore, the projections in the Vulnerability Assessment use the RCP 8.5 scenario, following State of California guidance. No model can project future conditions perfectly, but current models are heavily reviewed by climate scientists and can accurately reproduce observed climate conditions.

The vulnerability assessment also relies on the understanding that “weather” and “climate” are two different things. “Weather” describes the conditions at a particular time and place, and “climate” describes the long-term average of conditions. Because there are large variations in the weather, it is difficult to accurately project weather conditions more than a few days in advance. However, because climate is a long-term average, it can be projected out for years or decades with a high degree of accuracy. It is important to remember that, because climate is an average, it does not say whether an event will or will not occur, only how likely it is. For example, extreme heat is likely to become more frequent in San Carlos, but a year with few heat waves does not mean that this projection is wrong, because the projection only says that extreme heat days are expected to occur, on average, more often than in the past.

Climate Change in California

The most accurate data for California-specific projections is available for the RCP 4.5 and RCP 8.5 scenarios. These scenarios help generate climate models, which are meant to simulate conditions across the globe. The model divides Earth’s surface into cells using a grid, and then forecasts the conditions in each square of the grid. The size of these squares makes them suitable for projecting global conditions, but they are too big to accurately model the difference in climate across smaller areas.⁵⁴ Per state guidance, these models have been “downscaled” to much finer grids, which means that they have grids that are less than four miles on each side to show projections on a county or city level. The California 4th Climate Change Assessments and Cal-Adapt provide a foundation of climate change science and downscaling for the state. The State of California has also developed a comprehensive set of reports and tools that local jurisdictions can use to assess climate change hazards and how to prepare for these hazards. The State-provided reports and tools that were used in the vulnerability assessment include:

- § Cal-Adapt.org
- § California 4th Climate Change Assessments (statewide and regional reports)
- § California Adaptation Clearinghouse
- § California Adaptation Planning Guide
- § California Building Resilience Against Climate Effects
- § Planning and Investing for a Resilient California
- § Safeguarding California

San Carlos Vulnerability Assessment

In San Carlos, climate change is expected to intensify existing hazards, such as wildfire and drought, or create new hazards, such as sea level rise, which are listed below. The vulnerability assessment evaluates how hazards are expected to occur, including frequency and severity, and how this will affect community populations and assets.



Vulnerability Assessment Method

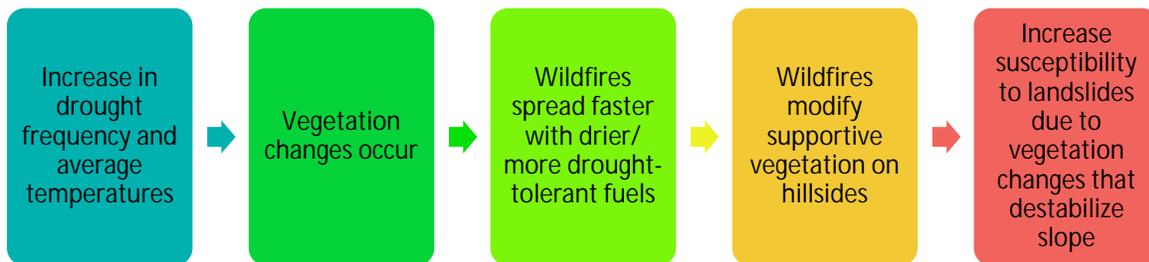
The vulnerability assessment primarily follows the recommended process in the *California Adaptation Planning Guide*, published in 2020 by the California Governor’s Office of Emergency Services. This includes a four-step process: (1) characterizing the City’s exposure to current and projected climate hazards; (2) identifying potential sensitivities and potential impacts to City populations and assets; (3) evaluating the current ability of the populations and assets to cope with climate impacts, also referred to as its adaptive capacity; and (4) identifying priority vulnerabilities based on systematic scoring. **Figure C-1** presents these steps.

Figure C-1. California Adaptation Planning Guide
Recommended Model



Step 1. Identify Exposure. The goal of this step is to characterize the community’s exposure to current and projected climate change hazards. The climate change hazards included in the vulnerability assessment are **bayshore flooding, drought, extreme heat, inland flooding, human health hazards, landslides, sea level rise, severe weather, and wildfire**. (See pages 5 to 11 for hazard descriptions.) These hazards are discussed in more detail later in this report. Some of the hazards are compounding climate change effects where once climate change hazard leads to another, also known as “cascading effects”. **Figure C-2** provides an example of these cascading effects.

Figure C-2. Example of Cascading Effects



The climate change hazard data was derived from up-to-date information, including the state Cal-Adapt database, the *California Adaptation Planning Guide*, the *California 4th Climate Change Assessment, Adapting to Rising Tides*, the *County of San Mateo Sea Level Rise Vulnerability Assessment*, and the *San Mateo County Hazard Mitigation Plan*.ⁱⁱ

As discussed previously, projections of climate change hazards rely on multiple scenarios that reflect different levels of GHG emissions and concentrations over time. The Cal-Adapt database, which provides California-specific climate change hazard projections, uses RCP 4.5 for a low emissions scenario and RCP 8.5 for a high emissions scenario. The Governor's Office of Planning and Research *Planning and Investing for a Resilient California* document and the *California Adaptation Planning Guide* recommend using RCP 8.5 for analyses considering impacts through 2050 and 2100, as there are minimal differences between emission scenarios for the first half of the century and for late-century projections this is a more conservative and risk-adverse approach. City staff used the RCP 8.5 scenario as input for global climate models on the Cal-Adapt database and other resources.

Step 2. Identify Sensitivities and Potential Impacts. This step involved evaluating potential future climate change impacts to community populations and assets. City staff first identified a comprehensive list of populations and assets to understand how susceptible different people, places, ecosystem services, and services within the community are affected by climate change hazards. This list includes 16 populations, 16 infrastructure types, 10 building types, 6 important economic assets, 6 ecosystems and natural resources, and 8 key community services, as shown in **Table C-1**. These populations and assets allowed City staff to build resiliency for the most susceptible people and assets in the city. Some assets, such as the Silicon Valley Clean Water Wastewater Treatment Plant, are in neighboring cities but serve San Carlos, and therefore were included in the assessment. Following confirmation of this list, City staff developed an applicability matrix, which looked at which hazards are likely to affect which populations and assets. For example, human health hazards are likely to impact most populations, but it would not physically affect buildings.

ⁱⁱ The *San Mateo County Hazard Mitigation Plan* is currently being updated and is likely to be completed in September 2021. Relevant data can be added to the Vulnerability Assessment Report when the public review draft of the Hazard Mitigation Plan becomes available.



Table C-1. List of Populations and Assets

Category	Populations or Assets		
Populations	Children (Under 10)	Outdoor workers	Renters
	Cost-burdened households	Persons experiencing homelessness	Seniors (65+)
	Households in poverty	Persons living on single access roads	Senior live alone
	Immigrants and refugees	Persons with chronic illnesses	Undocumented persons
	Linguistically isolated populations	Persons with disabilities	
	Low-Income households	Persons without access to lifelines	
Infrastructure	Airports	Evacuation routes	Single access roads
	Bridges	Flood control infrastructure	Solid waste facilities and closed landfills
	Caltrain station and line	Hazardous materials sites	Transit stops
	Communication facilities	Major roads and highways	Water and wastewater infrastructure
	Electrical substations and transmission lines	Natural gas pipelines	
	Electrical vehicle charging stations	Parks and open space	
Buildings	Community centers	Homes and residential structures	Schools
	Commercial centers	Libraries	Transit Centers
	Emergency shelters	Medical and care facilities	
	Government buildings	Public safety buildings	



Category	Populations or Assets		
Important Economic Assets	Aviation Museum	Industrial/manufacturing centers	Outdoor recreation
	Biotechnology	Major employers	Regional Parks
Ecosystems and Natural Resources	Annual grassland	Oak woodland	Scrub
	Aquatic habitat	Riparian habitats	Wetlands
Key Community Services	Communication services	Government administration & community services	Solid waste removal
	Emergency medical response	Public safety response	Water and wastewater
	Energy delivery	Public transit access	

After the applicability review, City staff evaluated potential impacts to the applicable populations and community assets. To identify how great the impacts of each relevant hazard are on the populations and community assets, City staff considered several different questions that helped ensure the assessment broadly covered a range of potential harm. Based on the results of the impact (IM) assessment, City staff ranked each sensitivity on a five-point scale (0 – 4) for each relevant exposure. IM0 is the lowest score (lowest impact) and IM4 is the highest score (highest impact). Impact is considered a negative quality, and therefore, a higher impact score means that there is a higher potential for harm to a population or asset. A lower impact score means that there is a lower potential for harm to a population or asset.

Step 3. Assess Adaptive Capacity. Adaptive capacity is the ability of populations and community assets to prepare for, respond to, and recover from the impacts of climate change. City staff evaluated each population and asset for adaptive capacity by considering a series of questions. Based on the results of the adaptive

Direct Impacts vs. Indirect Impacts

Direct impacts are those that immediately affect buildings and infrastructure, health or populations, or immediate operations of economic drivers or community services, and they can lead to secondary *indirect impacts* on the broader system or community, including populations or asset types in a different category. For example, severe weather can *directly* damage electrical transmission lines causing power outages, which can *indirectly* impact persons with chronic illnesses who depend on the electricity for life support systems.



capacity (AC) assessment, City staff ranked each population or asset on a five-point scale (0 to 4), ranging from AC0 (the lowest adaptive capacity) to AC4 (the highest adaptive capacity). Adaptive capacity is considered a positive attribute, so a higher adaptive capacity score will mean that a population or asset may be more adaptable to the hazard. A lower adaptive capacity score means that a population or asset may have a harder time adjusting to the changing conditions.

Step 4. Prioritize Vulnerability Scoring. City staff used the impact and adaptive capacity scores for each population and asset for each relevant hazard to determine the vulnerability score. The vulnerability (V) score reflects how susceptible a population or asset is to harm from a particular hazard. Vulnerability is assessed on a scale of 1 to 5. The matrix in **Table C-2** shows how impact and adaptive capacity scores combine and translate into a vulnerability score.

Table C-2. Vulnerability Scoring Matrix

		IMPACT SCORE				
		IM0	IM1	IM2	IM3	IM4
ADAPTIVE CAPACITY SCORE	AC0	V3	V4	V5	V5	V5
	AC1	V2	V3	V4	V5	V5
	AC2	V1	V2	V3	V4	V5
	AC3	V1	V1	V2	V3	V4
	AC4	V1	V1	V1	V2	V3

Climate Change Hazards and Key Vulnerabilities

The vulnerability assessment assigns vulnerability scores to 375 different pairing of hazards and populations or assets. This section summarizes the climate change hazards at the local level and discusses the significant vulnerabilities created by those hazards. For a complete list of vulnerability scores, see Appendix C-1.

Drought

A drought occurs when conditions are drier than normal for an extended period, making less water available for people and ecosystems. Droughts are a regular occurrence in California; however, scientists expect that climate change will lead to more frequent and more intense droughts statewide. Overall, precipitation levels are expected to remain similar, with more years of extreme precipitation events and droughts that last longer and are more intense. California Water Service (Cal Water) and other water providers in San Carlos purchase water from the City and County of San Francisco, derived from the Hetch Hetchy Regional Water System in the Sierra Nevada Mountains along the Tuolumne River.⁵⁵ During drought conditions, water stored in the Hetch Hetchy system’s primary reservoir could decrease due to lack of rainfall and reduction in



snowpack due to higher temperatures, causing water shortages during extended drought conditions or price hikes that could increase economic instability of low-income residents. The watershed feeding Hetch Hetchy Reservoir could experience a reduction in baseflow of 2.7 inches, or 24 percent, during an extended drought period.⁵⁶ This reservoir is also fed by slowly melting snowpack that provides water throughout the year. Snow water equivalence, or the amount of water stored in the snowpack, is projected to decrease by an average of 1,230 inches, or 45 percent, during an early-century drought (2023 to 2042) and an average of 1,710 inches, or 62 percent, during a late-century drought (2051 to 2070).⁵⁷

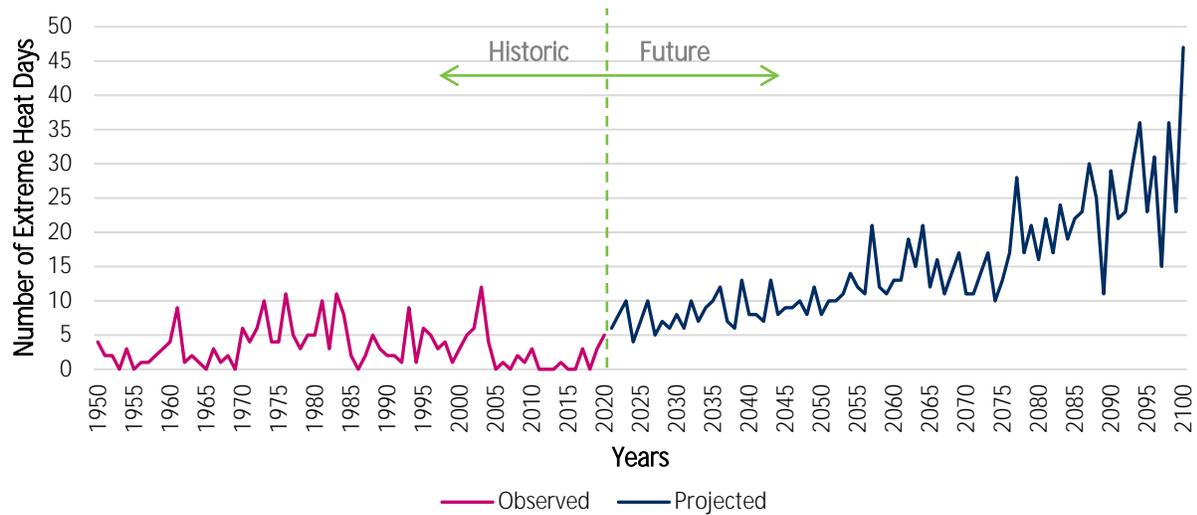
At the local level, the aquatic habitat, wetlands, and riparian habitats that depend on water from the Pulgas, Brittan, Belmont, and Cordilleras Creeks are most vulnerable. In an early-century drought (2023 to 2042), the City could experience a drop in average precipitation from an average of 19.9 inches per year to an average of 17.4 inches per year, which would subsequently lower baseflows in streams from an average of 5.6 inches per day to 4.1 inches per day.⁵⁸ In a late-century drought (2051 to 2070), precipitation could also drop to an average of 17.4 inches per year and cause baseflows in streams to drop to 4.0 inches per day.⁵⁹ This could lower water quality and raise water temperatures, causing lower dissolved oxygen levels and algae growth that can harm a variety of fish species.⁶⁰ Wetlands and riparian habitats can experience increased soil erosion, degradation of landscape quality, and loss of biological productivity.⁶¹ Since wetlands act as a buffer between developed areas and San Francisco Bay, helping to protect the community from sea level rise and bayshore flooding, degradation of wetlands could decrease the amount of water that the ecosystem can absorb and reduce the protection that the wetlands provide. Drought conditions can also dry out vegetation and increase wildfire conditions, which could put a strain on firefighting equipment and personnel.

Extreme Heat

Extreme heat occurs when temperatures rise significantly above normal levels. In San Carlos, an extreme heat day occurs when temperatures reach above 94.7 degrees Fahrenheit (°F). As shown in **Figure C-3**, the number of extreme heat days in San Carlos is projected to increase from 4 days historically⁶², to an average 11 extreme heat days per year during mid-century (2040 to 2060) and an average of 22 extreme heat days per year during the late-century (2070 to 2099).

Figure C-3. Projected Extreme Heat Days in San Carlos

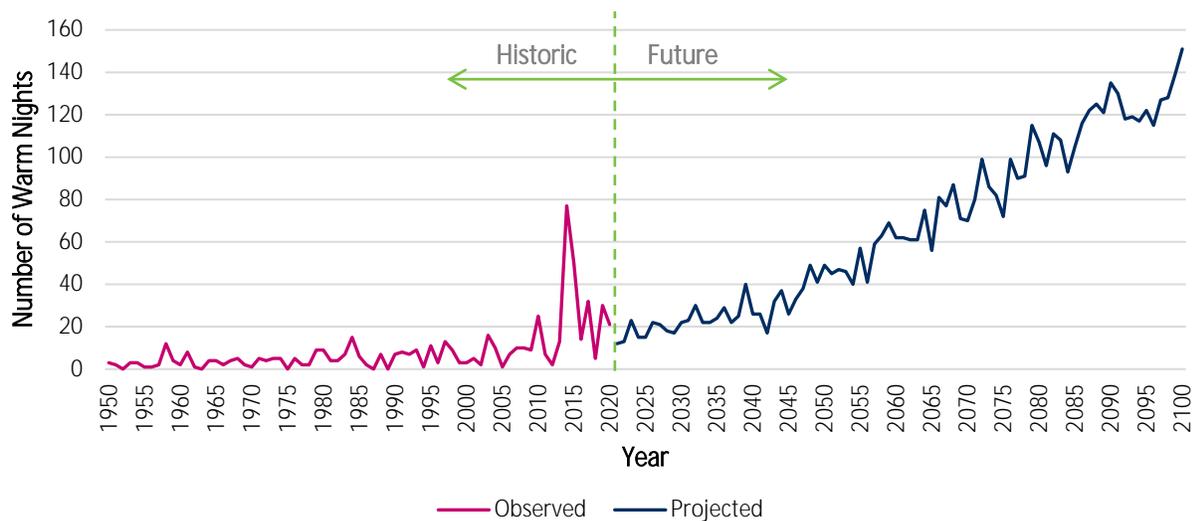




Sources: Cal-Adapt, 2020, and National Oceanic and Atmospheric Administration, 2020.

Extreme heat can also occur in the form of warmer nights, as temperatures do not cool down overnight to provide relief from the heat. In San Carlos, a warm night occurs when the temperature stays above 59.5°F. As shown in **Figure C-4**, the number of warm nights in San Carlos is projected to increase from an average of 5 historically⁶³, to an average of 45 warm nights per year by mid-century, and an average of 109 warm nights per year by the end of the century.

Figure C-4. Projected Warm Nights in San Carlos



Sources: Cal-Adapt and National Oceanic and Atmospheric Administration, 2020.

Extreme heat can cause heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, in addition to worsening respiratory and cardiovascular conditions. The most vulnerable populations are those that spend a disproportionately high amount of time outside, such as

children, outdoor workers, and persons experiencing homelessness, as well as those with sensitive or compromised immune systems, persons with chronic illnesses, and seniors.

Households in poverty are also highly vulnerable due to a lack of financial resources to prepare for or respond to extreme heat conditions. According to the comments from community engagement efforts, many homes in San Carlos may lack air conditioning, and as a result, people living in these homes may be more susceptible to harm from extreme heat events. Community members also voiced concerns about a lack of cooling centers and the inability to cool homes or keep medications cooled if extreme heat events cause public safety power shutoffs (PSPSs).

Energy delivery services, and associated infrastructure, are highly vulnerable to extreme heat, as high temperatures can stress and overload the grid, causing power outages and damage to the transmission lines. Additional vulnerabilities include outdoor recreation, as people may be deterred from recreating outdoors in high temperatures, and aquatic and wetland habitats, which can experience decreases in water quality as temperatures increase.

Inland Flooding

Inland flooding can cause significant harm to buildings, people, and infrastructure. Floodwater can be deep enough to drown people and may move fast enough to carry people or heavy objects (such as cars) away. Flooding can be caused by heavy rainfall, long periods of moderate rainfall, or clogged drains during periods of rainfall. In rare instances, a break in a water pipe or water tank can also cause flooding. Storm drainage systems throughout the city collect stormwater runoff and convey water to prevent flooding, although these systems are typically designed based on winter storms recorded in the past and may not be designed to accommodate more intense storms.

According to the *County of San Mateo Hazard Mitigation Plan*, what is currently considered a 100-year flood, or a flood that has a 1 percent chance of occurring annually, may occur more often due to climate change. **Figure C-5 and C-6** (shown in the Sea Level Rise and Bayshore Flooding section) shows that the inland flood hazard areas are primarily located along the bayshore, Pulgas Creek, Cordilleras Creek, and Belmont Creek.

Several populations and assets face particularly high risks from flooding events. Persons experiencing homelessness, households in poverty, and linguistically isolated persons are severely vulnerable to flooding, as they may live in or near flood hazard areas, lack financial resources to protect their homes, or have difficulty receiving adequate evacuation notices due to language barriers. Persons with limited mobility and those without access to lifelines (persons without access to a car, transit, or communication systems) may have difficulty evacuating prior to a flooding event, and therefore are also highly vulnerable.

Transportation infrastructure, such as the San Carlos Airport, Caltrain station and line, electric vehicle charging stations, evacuation routes, and major roads and highways, which are essential for public transit access, solid waste removal, and other services, can be inundated, blocked, and damaged by floodwaters along the creeks.

Buildings and facilities on the east side of Highway 101, such as hazardous materials sites, commercial centers, and residential areas, are also highly vulnerable to flood events that can cause hazardous material release or cause mold and mildew to grow in buildings. Several major employers are on the east side of the city, and those who work or own businesses in the Aviation Museum, industrial or manufacturing, and other commercial centers may be negatively impacted by flood events. The wastewater treatment plants also lie within the 100-year flood zone, and therefore could be inundated and provide limited services during a flood event.

Human Health Hazards

Human health hazards include bacteria, viruses, parasites, and other organisms that can cause diseases and illness in people. Some of these diseases may only cause mild inconvenience, but others are potentially life threatening. These diseases can be and often are carried by animals such as mice and rats, ticks, and mosquitos. Warmer temperatures and high levels of precipitation can lead to increased populations of disease-carrying animals, creating a greater risk of disease and increased rates of infection. Other human health hazards can include poor air quality, including smoke from wildfires, which can affect respiratory systems of those expose for prolonged periods.

Populations most vulnerable to human health hazards are those who spend a disproportionate amount of time outdoors (such as outdoor workers or persons experiencing homelessness), those with fragile immune systems or existing illnesses (which may include persons with chronic illnesses and seniors), and those who may live in sub-standard housing or not have access to health insurance and medical care (households in poverty, low-income households, undocumented persons). These persons may be living in conditions that increase their chances of catching vector-borne illnesses or lack the ability to fight off infections that may occur. Many populations may also not have access to air purification systems that can filter out harmful particulate matter.⁶⁴

Emergency medical response services are also highly vulnerable to human health hazards, as they may not be able to provide adequate services if there is an influx of health-related emergencies.

Landslides and Debris Flows

Landslides occur when a hillside becomes unstable, causing soil and rocks to slide downslope. Landslides can include rock falls, deep failures of slopes, and shallow debris flows.⁶⁵ Landslides are most common on steep slopes and hillsides made up of loose soil or other material where excavation and grading, drainage alterations, or changes in vegetation have occurred.⁶⁶ The vulnerability assessment looks at landslides that are caused by precipitation, although earthquakes can also trigger landslides. Hillsides commonly absorb water, which increases instability of the slope and may increase the risk of slope failure. Steep slopes made up of loose or fractured material are more likely to slide. In some cases, the hillsides can become so saturated that slope failures can result in a mudslide (a mixture of soil and water moving downslope). As shown in **Figure C-7**, steeper slopes in the western part of the city are in high landslide susceptibility areas.

Landslides and mudslides can move fast enough to damage or destroy homes or other structures in their path, block roadways (including evacuation routes), and injure or kill people caught in them. The most vulnerable populations are those that may be unable to evacuate due to limited mobility,

lack of access to a vehicle, or language barriers that may prevent awareness of emergency notifications. Those living on single-access roadways in the hilly western portion of the city or those living in less resilient housing may lose access to their homes if roadways or the structures are damaged or destroyed by a landslide. Infrastructure, such as natural gas pipelines and water or wastewater infrastructure, can break or malfunction if the soil supporting them fails. This can lead to disruptions in energy delivery and water or wastewater services.

Sea level Rise and Bayshore Flooding

As global temperatures heat up, glaciers and other land ice near the north and south poles melt. The water flows into the ocean, increasing sea levels across the globe. Higher temperatures also cause water to expand in oceans, causing further rising of sea levels. Sea level rise is a gradual process, taking place over years or decades. In California, guidanceⁱⁱⁱ suggests that sea levels will increase in most places by 6 to 10 inches by 2030, 13 to 23 inches by 2050, and 41 to 83 inches by 2100.⁶⁷ However, it is possible that sea levels could rise faster than these projections.⁶⁸ Along the San Carlos bay shoreline, sea levels are projected^{iv} to rise approximately 24 inches by 2050 and 84 inches by 2100.⁶⁹

Eventually, sea level may increase enough to permanently flood low-lying areas in the eastern part of San Carlos along the bayshore. Sea level rise threatens important buildings and key pieces of infrastructure that support the main economic drivers in San Carlos, such as Highway 101, the San Carlos Airport, and the Silicon Valley Clean Water Wastewater Treatment Plant in Redwood City.⁷⁰ Homes and structures built above the increased sea level can still be harmed if the higher levels of water erode the rock or soil supporting the structures, potentially making them unsafe and at risk of collapse. This can cause bridges and roadways to become impassable, flood control infrastructure to not work effectively, and hazardous material facilities to increase the risk of accidentally releasing harmful substances. Natural systems, such as wetlands and tidal marshes, will be disrupted by higher tide levels. Many of the tidal marshes in eastern San Carlos are expected to convert to another habitat type, a process called “downshifting,” which will lead to different plant and animal species, and some features of wetlands may be altered or lost.^{71,72}

Rising sea levels can also cause the bay shoreline to flood more frequently and severely. Because ocean levels are higher during normal conditions due to sea level rise, shoreline floods, such as king tides and storm surge, can reach further onto land. For example, a storm that has a 1 in 10 chance of occurring in a given year (known as a 10-year storm), can create a temporary increase in sea levels of approximately 28 to 30 inches. This means that if sea levels rise by 24 inches during normal conditions, a 10-year storm event would create a temporary sea level rise of around 52 inches.⁷³ Bayshore flooding in 2050 is shown in **Figure C-5** and bayshore flooding in 2100 is

ⁱⁱⁱ The California Coastal Commission provided updated sea level rise projection ranges in 2018, which are slightly different than the National Research Council 2012 projections ranges used in the San Mateo County Sea Level Rise Assessment.

^{iv} The 2050 and 2100 projections are based on the March 2020 Adapting to Rising Tides report for the San Francisco Bay Area. This is consistent with the scenarios presented in the San Mateo County Sea Level Rise Assessment.



shown in **Figure C-6**. Higher sea levels can also give a “boost” to smaller floods that would not have been large enough to flood dry land during normal conditions, making shoreline flooding more frequent.

During strong storms and king tides (described above), bay shoreline flooding may damage or destroy homes and commercial buildings in low-lying areas in eastern San Carlos; disrupt transportation routes such as Highway 101, Industrial Road, Holly Street, Old County Road, and Brittan Avenue; and harm important economic assets, such as the Aviation Museum, industrial and manufacturing centers, biotechnology companies, and major employers. Essential infrastructure, such as the San Carlos Airport, bridges, electric vehicle charging stations, solid waste facilities, and water and wastewater infrastructure, may be frequently temporarily inundated, causing them and the community services they support to not function as needed.⁷⁴

Persons experiencing homelessness, persons without access to lifelines, or persons with limited income or access to resources, may be more likely to live in low-lying areas or less resilient structures, and therefore are highly vulnerable to bayshore flooding.

Severe Weather

Severe storms include windstorms, hail, lightning, thunderstorms, and heavy rainfall. Severe weather is usually caused by intense storm systems, although types of strong winds can occur without a storm. The connection between climate change and severe storms is not as well established as other exposures, but new evidence suggests that severe storms may occur more often and become more intense than in the past.⁷⁵ Severe winds, which are winds over 50 to 60 miles per hour, but can reach up to 100 miles per hour in some areas, can damage or destroy buildings and infrastructure.⁷⁶ Hail can damage buildings and plants (and in extreme cases injure people), and lightning can spark fires, injure people, or cause fatalities. Heavy rainfall, which is characterized by rainfall amounts that exceed normal levels, can lead to flooding in both the eastern and western portion of the city.⁷⁷ Strong winds and heavy rainfall are the most common types of severe weather in the city.

The most vulnerable to severe weather are persons experiencing homelessness; those who may live in less structurally resilient buildings, such as households in poverty and undocumented persons; and those who may have difficulty preparing or responding to severe weather due to mobility or language barriers. These populations include linguistically isolated populations, persons living on single-access roads, persons with chronic illnesses, and seniors living alone.

The energy delivery system is especially vulnerable to windstorms, which can damage transmission lines or cause PSPSs. Windstorms can also damage warehouses that hold harmful materials and prevent people from traveling to work, which can harm important economic drivers within the city.

Wildfire

Wildfires are a regular feature of the landscape in much of California. They can be sparked by lightning, malfunctioning equipment, vehicle crashes, or many other causes. Warmer temperatures, an increase in drought conditions, and extreme wind events, are likely to create more fuel for fires in natural and rural areas, leading to a greater chance that a spark will grow into a potentially dangerous blaze. Climate change is also expected to extend the fire season throughout much (or even all) of the year. **Figure C-8** shows the fire hazard severity zones in San Carlos, which include very high fire hazard severity zones in the western part of the city. Because wildfires burn the trees and other vegetation that help stabilize a hillside and absorb water, more areas burned by fire may also lead to an increase in landslides and debris flows.

Wildfires expose people and property to flames, increasing the risk of injury, death, and property damage or destruction. Homes and schools are especially vulnerable, as many are located within the very high fire hazard severity zone, as shown on **Figure C-8**.

The smoke from wildfires increases air pollution levels and creates a significant health risk in the region, particularly under weather conditions that prevent smoke from clearing, such as those during the lightning complex fires in 2020. Most of the populations within San Carlos are highly or severely vulnerable to wildfire and heavy smoke conditions. Planned PSPSs to prevent wildfires have already impacted persons who depend on electricity for air conditioning or their medically necessary equipment.

Essential roadways, such as evacuation routes and single-access roads, can be blocked by wildfire flames or debris, making it difficult for residents to evacuate and emergency personnel to reach certain areas of the city. The entire energy delivery system, including electric transmission lines and natural gas pipelines, can be damaged by wildfires.

Coastal scrub and oak woodlands, although somewhat adapted to wildfires, can be substantially harmed by more frequent and severe fires that do not let the ecosystems recover.

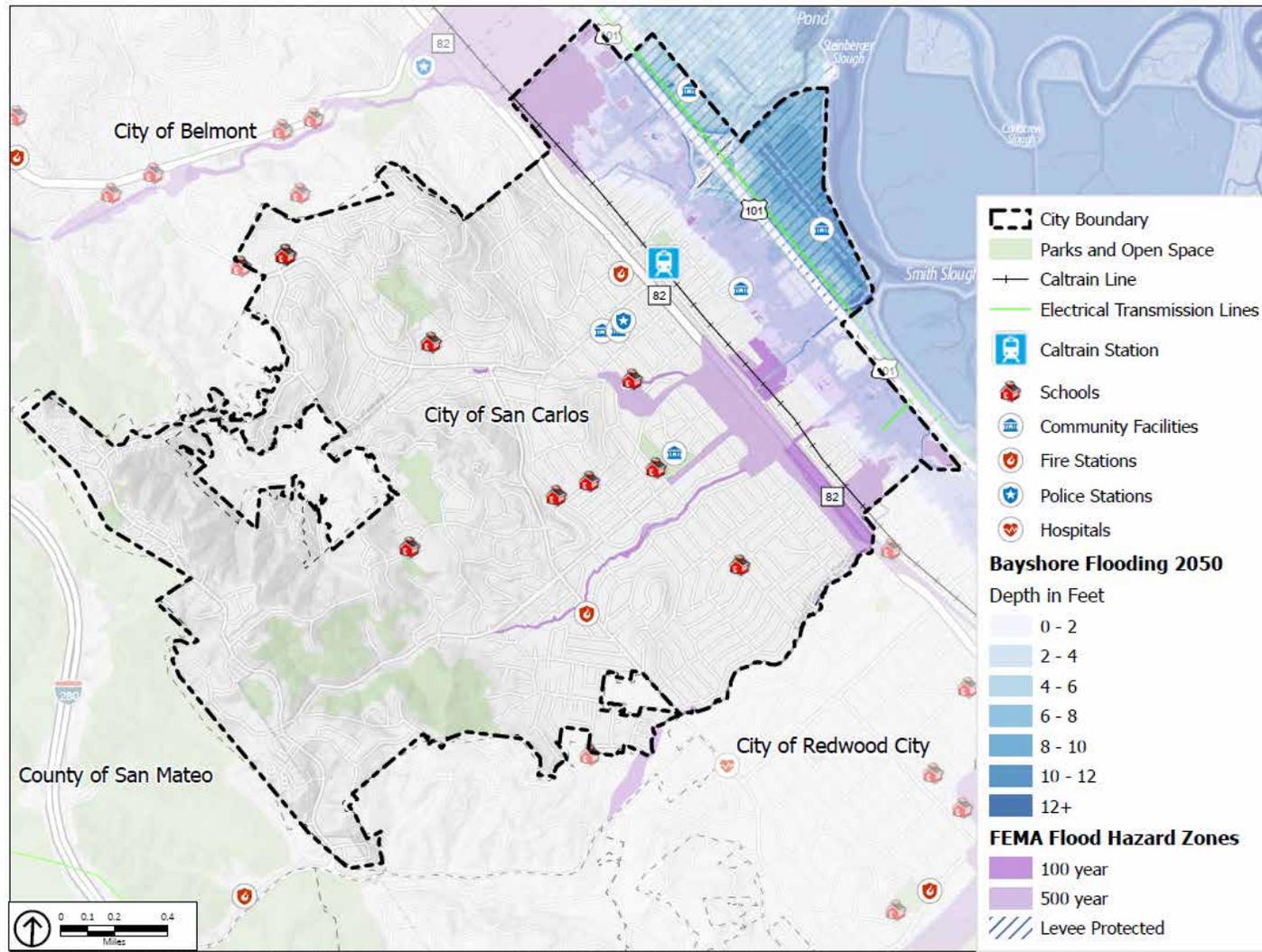
Conclusion

The vulnerability assessment identifies which hazards are expected to harm sensitive populations and assets, and which assets are most vulnerable to various hazards that are projected to intensify with climate change. A comprehensive set of results is located in Appendix C-1. Understanding how climate change will affect the community and identifying the vulnerable populations and assets will enable the City to implement effective GHG reduction measures and climate adaptation strategies to create a safer, sustainable, and healthier community.

As the climate continues to change and GHG emissions rise, climate change hazards will continue to harm populations, infrastructure and buildings, economic drivers, and key community services in San Carlos. The City's Climate Mitigation and Adaptation Plan and Safety Element Update will include goals, policies, and strategies that will help reduce GHG emissions within the city and increase resiliency through adaptation strategies that will reduce vulnerability throughout the city.



Figure C-5. 2050 Bayshore Flooding and Inland Flooding



Source: San Francisco Bay Conservation and Development Commission, 2017; Federal Emergency Management Agency, 2018.



Figure C-6. 2100 Sea Level Rise, Bayshore Flooding, and Inland Flooding

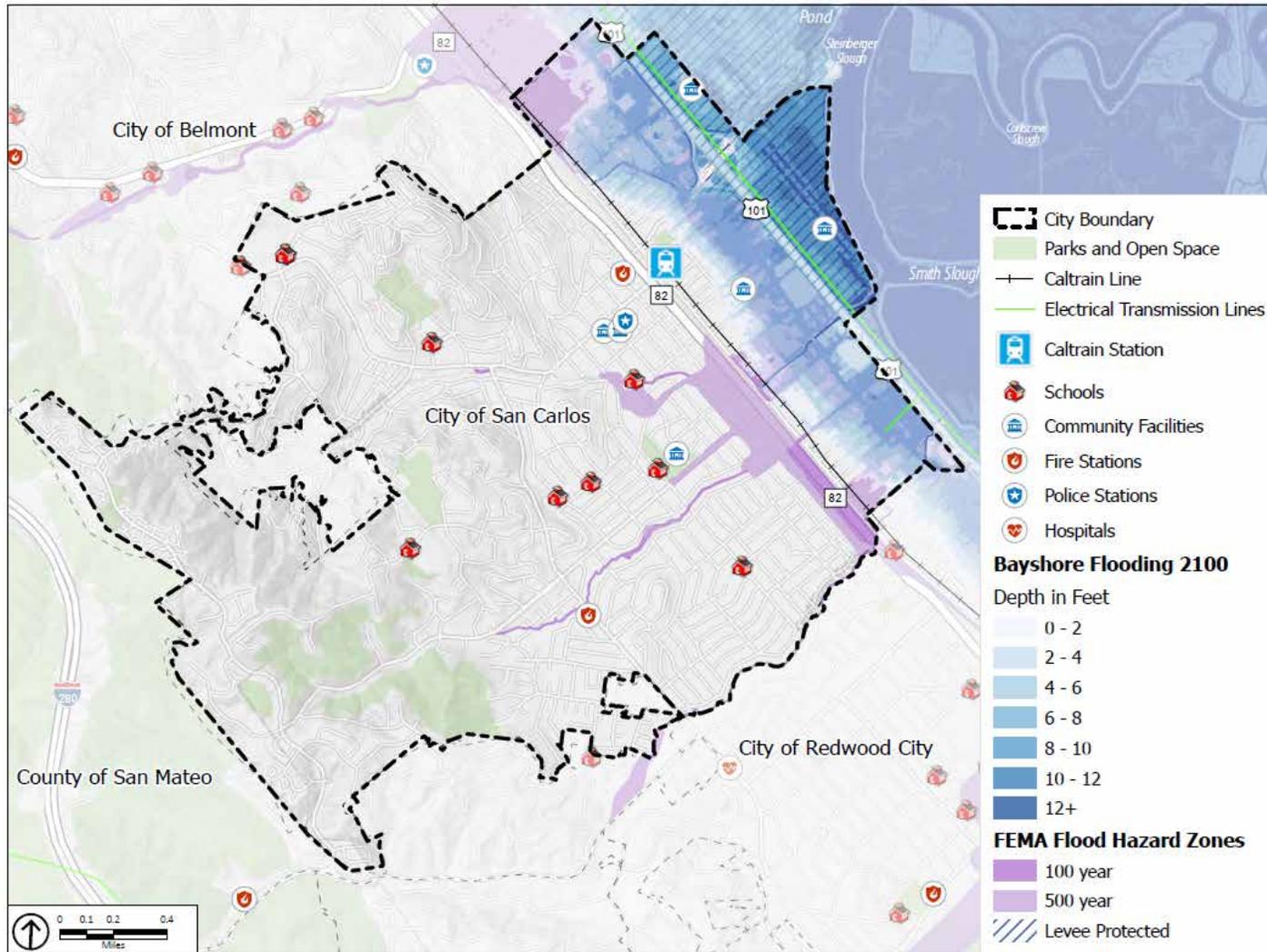




Figure C-7. Landslide Susceptibility Areas

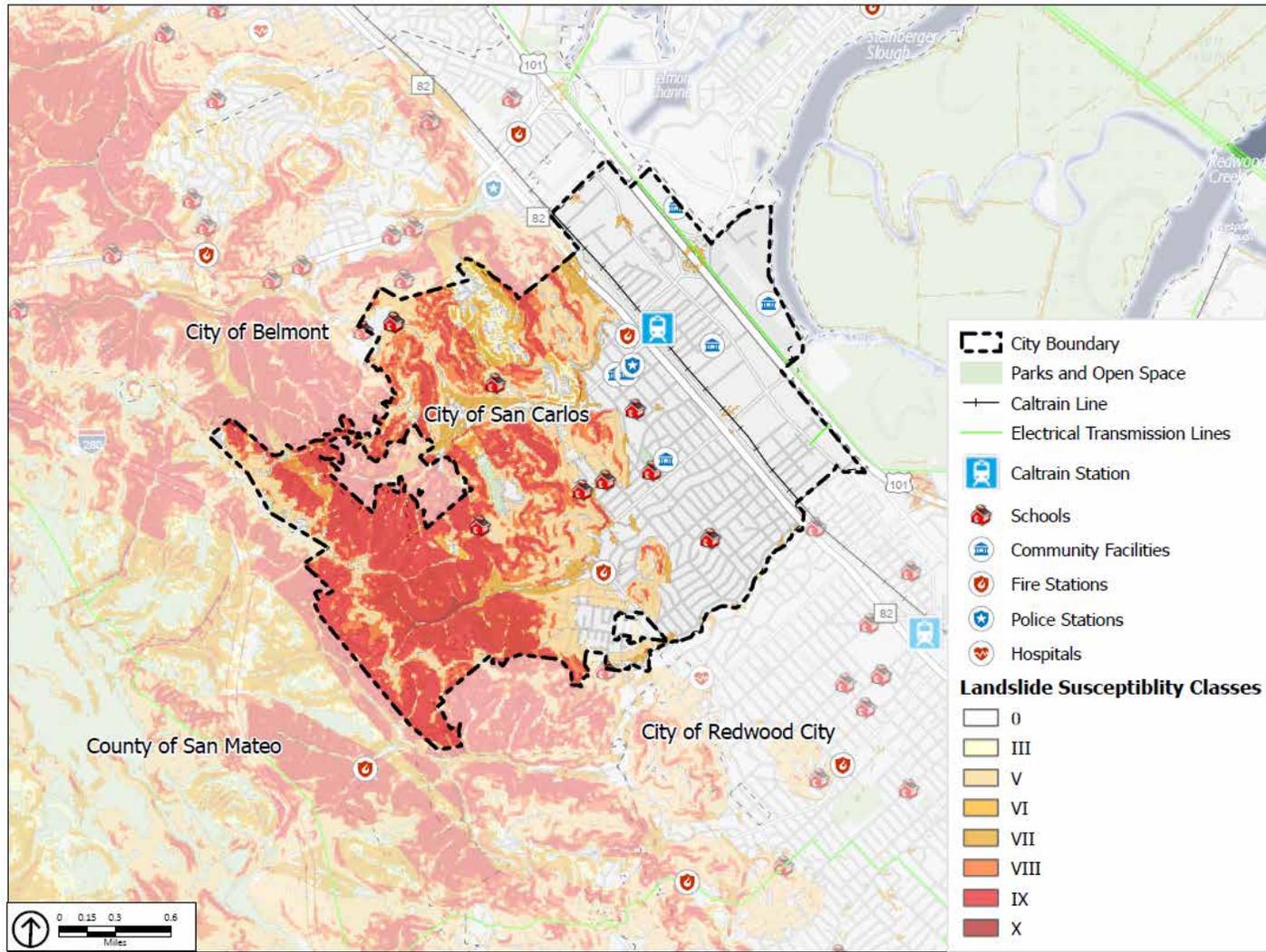
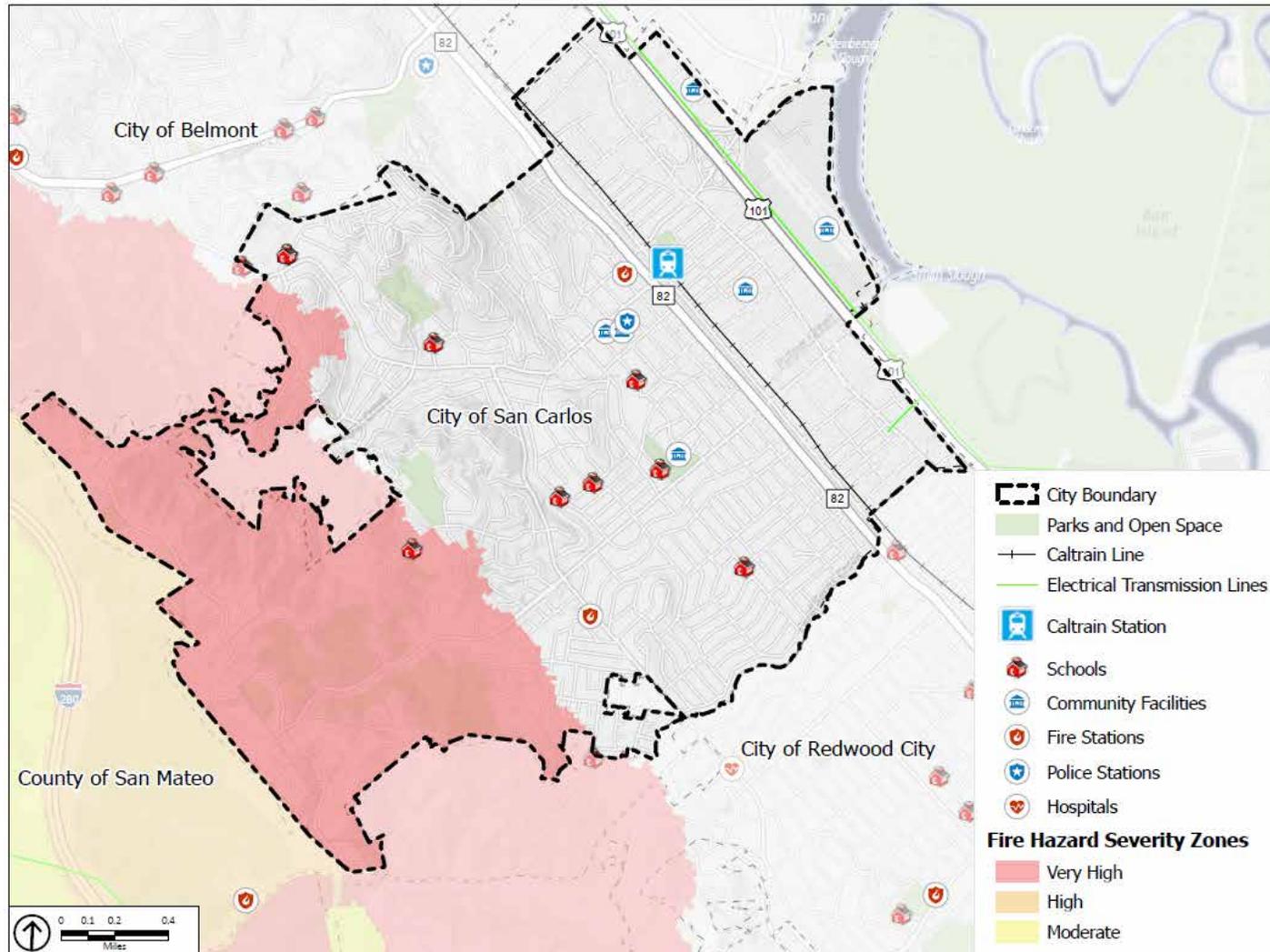


Figure C-8. Fire Hazard Severity Zones





Appendix C-1: Vulnerability Assessment Results Matrix

POPULATIONS AND ASSETS	BAYSHORE FLOODING	DROUGHT	EXTREME HEAT	INLAND FLOODING	HUMAN HEALTH HAZARDS	LANDSLIDES	SEA LEVEL RISE	SEVERE WEATHER	WILDFIRE
Populations									
Children (Under 10)	V3	-	V4	V3	V3	V4	-	V3	V3
Cost-burdened households	V3	V2	V2	V3	V2	V3	V3	V2	V3
Households in poverty	V4	V3	V5	V5	V5	V5	V4	V5	V5
Immigrants and refugees	V4	-	V3	V3	V3	V3	-	V3	V4
Linguistically isolated populations	V3	-	V3	V5	V3	V3	-	V4	V4
Low-income households	V3	V2	V3	V4	V4	V3	V3	V3	V4
Outdoor workers	-	-	V5	-	V4	-	-	V3	V4
Persons experiencing homelessness	V5	-	V5	V5	V5	-	V4	V5	V5
Persons living on single access roads	-	-	-	-	V2	V5	-	V4	V4
Persons with chronic illnesses	V3	-	V4	V3	V5	V2	-	V4	V4
Persons with disabilities	V2	-	V3	V2	V3	V3	-	V3	V4
Persons without access to lifelines	V4	-	V3	V4	V3	V3	-	V3	V4
Renters	V3	-	V3	V3	V2	V3	V2	V2	V3
Seniors (65+)	V2	-	V4	V3	V4	V4	-	V3	V5
Senior live alone	V3	-	V5	V4	V5	V5	-	V4	V5
Undocumented persons	V5	-	V4	V4	V5	V4	-	V4	V5
Infrastructure									
Airports	V5	-	V2	V5	-	-	V5	V3	-
Bridges	V4	-	-	V3	-	-	V4	V3	-
Caltrain station and line	V3	-	V3	V4	-	-	-	V3	-
Communication facilities	V3	-	V1	-	-	V3	V1	V2	-
Electrical substations and transmission lines	V3	-	V4	V3	-	-	V2	V4	V4
Electrical vehicle charging stations	V4	-	V3	V4	-	-	V3	V2	V1
Evacuation routes	V3	-	V2	V4	-	V5	V3	V3	V5
Flood control infrastructure	V4	-	-	V3	-	-	V4	V2	V2

POPULATIONS AND ASSETS	BAYSHORE FLOODING	DROUGHT	EXTREME HEAT	INLAND FLOODING	HUMAN HEALTH HAZARDS	LANDSLIDES	SEA LEVEL RISE	SEVERE WEATHER	WILDFIRE
Hazardous materials sites	V4	-	V2	V4	-	V2	V4	V3	V2
Major roads and highways	V5	-	V2	V4	-	V5	V5	V3	V3
Natural gas pipelines	V3	-	-	V3	-	V5	V2	-	V5
Parks and open space	V2	V3	V2	V2	-	V3	V1	V2	V3
Single access roads	-	-	V2	-	-	V5	-	V4	V5
Solid waste facilities and closed landfills	V4	-	-	V3	-	-	V3	V1	-
Transit stops	V3	-	-	V3	-	V3	V3	V2	V3
Water and wastewater infrastructure	V5	-	-	V5	-	V4	V5	V2	V3
Buildings									
Community centers	-	-	V1	-	-	-	-	V1	-
Commercial centers	V4	-	V2	V4	-	-	V3	V3	V2
Emergency shelters	-	-	V3	V1	-	-	-	V3	V3
Government buildings	-	-	V1	-	-	-	-	V1	-
Homes and residential structures	V5	-	V3	V5	-	V5	V4	V4	V4
Libraries	-	-	V2	-	-	-	-	V1	-
Medical and care facilities	V3	-	V2	V3	-	-	V3	V3	-
Public safety buildings	-	-	V1	-	-	V1	-	V2	V3
Schools	-	-	V3	V3	-	V3	-	V3	V4
Transit Centers	-	-	V2	-	-	-	-	V2	-
Important Economic Assets									
Aviation Museum	V4	-	-	V4	V2	-	V4	V1	-
Biotechnology	V3	-	-	V3	V3	-	V4	V3	-
Industrial/manufacturing centers	V4	-	-	V4	V3	-	V3	V4	-
Major employers	V4	-	-	V4	V3	-	V4	V3	-
Outdoor recreation	V2	V2	V4	V3	V2	V3	V2	V2	V4
Regional Parks	V2	V3	V3	V3	V2	V3	V3	V2	V3
Ecosystems and Natural Resources									
Aquatic habitat	V2	V5	V5	V2	-	-	V3	V1	-





POPULATIONS AND ASSETS	BAYSHORE FLOODING	DROUGHT	EXTREME HEAT	INLAND FLOODING	HUMAN HEALTH HAZARDS	LANDSLIDES	SEA LEVEL RISE	SEVERE WEATHER	WILDFIRE
Wetlands	V5	V4	V4	V1	-	-	V5	V2	-
Riparian habitats	-	V4	V2	V3	-	V3	-	V4	V4
Oak woodland	-	V3	V3	-	-	V3	-	V3	V5
Annual grassland	-	V3	V2	-	-	V2	-	V2	V3
Scrub	-	V3	V1	-	-	V3	-	V3	V4
Key Community Services									
Communication services	V2	-	V2	V1	-	V3	V2	V3	V1
Emergency medical response	V3	-	V3	V3	V4	V3	V3	V2	V3
Energy delivery	V3	V2	V4	V3	-	V4	V2	V5	V5
Government administration & community services	V1	-	V1	V1	V1	V1	V1	V1	V2
Public safety response	V3	-	V2	V3	V2	V3	V1	V2	V3
Public transit access	V4	-	V3	V4	V3	V3	V3	V3	V3
Solid waste removal	V5	-	V2	V4	V1	V3	V3	V3	V3
Water and wastewater	V5	V3	V2	V5	-	V4	V5	V3	V2



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ENDNOTES

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