Final

City of Watsonville Climate Action and Adaptation Plan

October 2021

FINAL

City of Watsonville
Climate Action and Adaptation Plan

October 2021

Prepared for:

City of Watsonville
Public Works & Utilities
250 Main Street
Watsonville, California 95076

Prepared by:

Harris & Associates

450 Lincoln Avenue, Suite 103
Salinas, California 93901

This page intentionally left blank.

Table of Contents

Figures

Tables

Appendices

This page intentionally left blank.

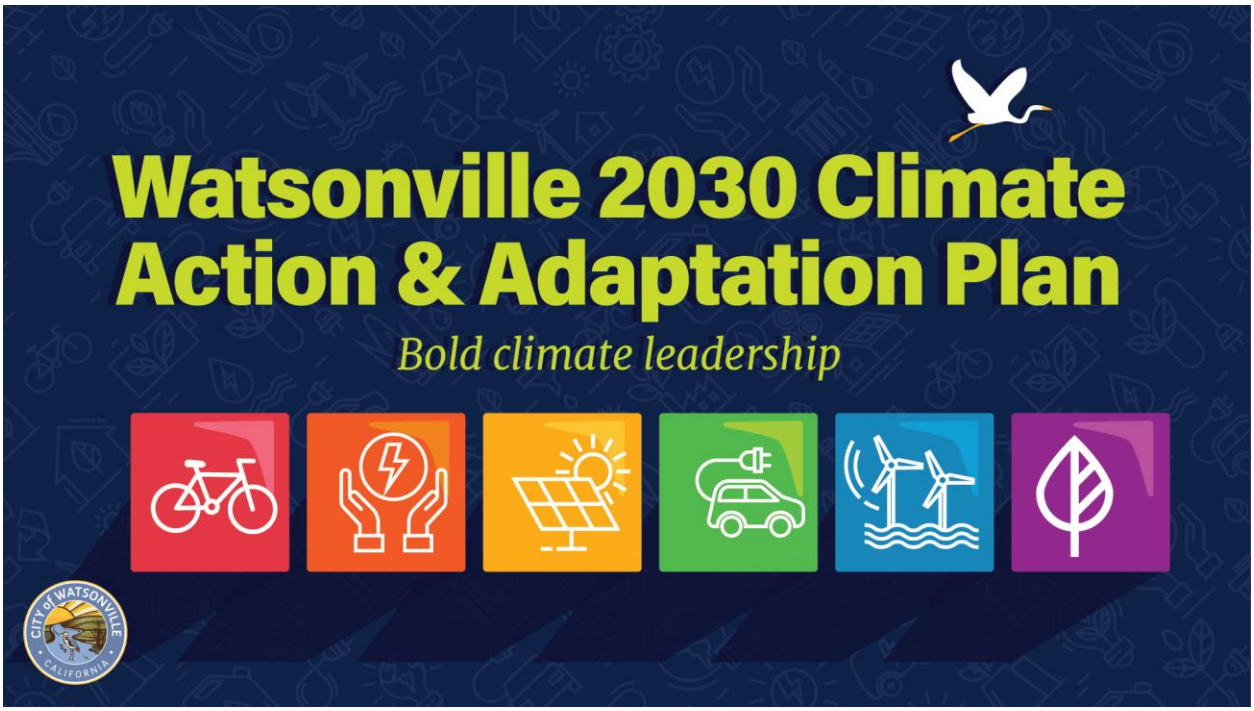
Acronyms and Abbreviations

2017 Scoping Plan	California's 2017 Climate Change Scoping Plan
3CE	Central Coast Community Energy
4C	Central Coast Climate Collaborative
AB	Assembly Bill
AMBAG	Association of Monterey Bay Area Governments
BAU	business-as-usual
BUG	backup generator
CAAP	Climate Action and Adaptation Plan
CAC	Community Advisory Committee
CARB	California Air Resources Board
CBTP	community-based travel planning
CEC	California Energy Commission
CEQA	California Environmental Quality Act
City or Watsonville	City of Watsonville
CO_2e	carbon dioxide equivalent
EO	Executive Order
EV	electric vehicle
General Plan Update	Draft Watsonville 2030 General Plan
GHG	greenhouse gas
LHMP	Local Hazard Mitigation Plan
MMBtu	metric million British thermal units
MPO	Metropolitan Planning Organization
MMT	million metric tons
MT	metric tons
MTP	Metropolitan Transportation Plan
PG&E	Pacific Gas and Electric Company
PSPS	public safety power shutoff
PVWMA	Pajaro Valley Water Management Agency
RCP	Representative Concentration Pathway
SB	Senate Bill
SCS	Sustainable Communities Strategy
VMT	vehicle miles traveled
Watsonville General Plan	Watsonville 2005 General Plan
ZEV	zero-emissions vehicle

This page intentionally left blank.

Executive Summary

This page intentionally left blank.



Cities are on the front lines when it comes to climate change and are leading the world in reducing carbon emissions through proactive policies and the adoption of clean technologies.

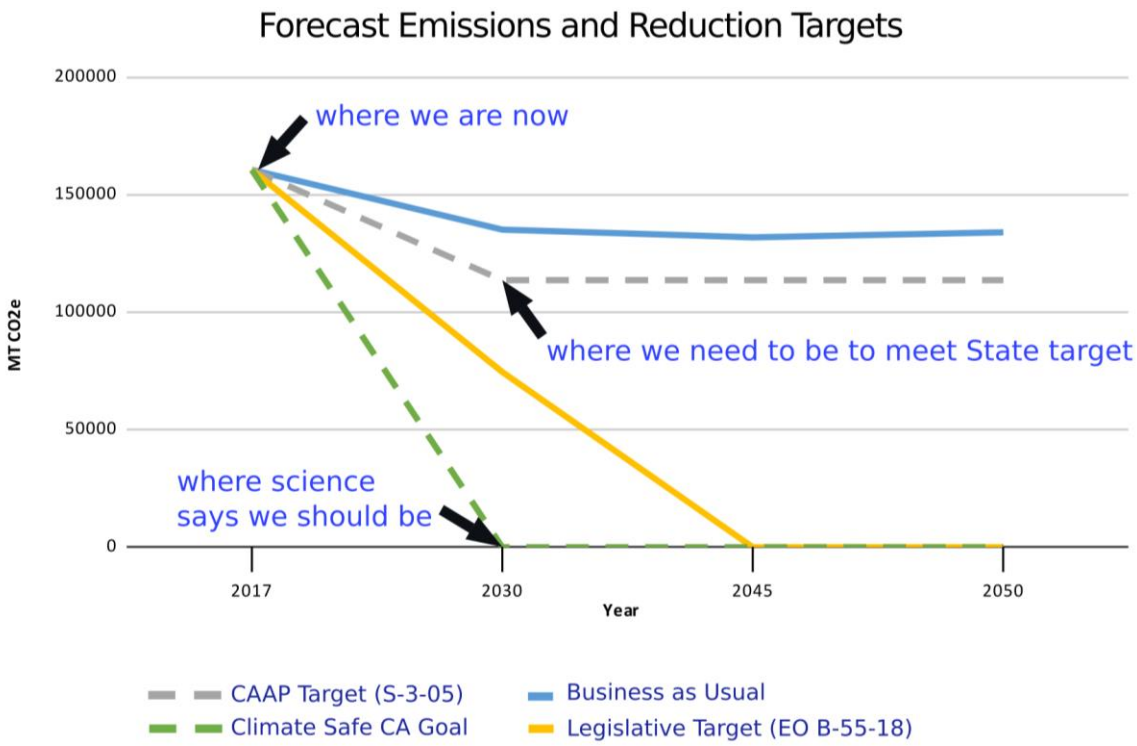
Reducing Emissions: Targets and Goals

The Climate Action and Adaptation Plan (CAAP) is designed to accomplish both a legal target and an aspirational goal.

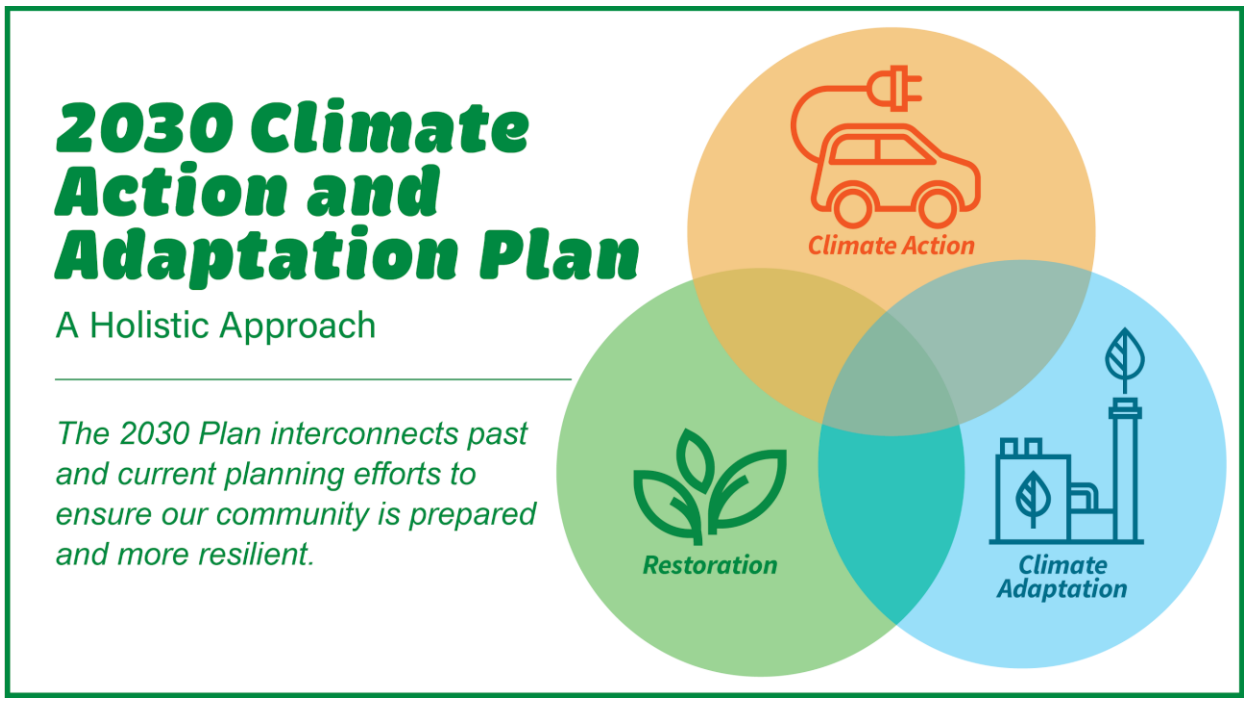
Legal Target. The CAAP sets in motion a suite of programs that are designed to reduce the community's greenhouse gas (GHG) emissions to 80 percent lower than levels in 1990 over the next 10 years, meeting a state-mandated legal target.

Climate Safe California Goal. On July 6, 2021, the Watsonville City Council voted unanimously to support the Climate-Safe California Campaign goal of net-negative emissions by 2030, setting an aspirational goal for the community of Watsonville to remove more GHGs than it emits by 2030.[1] The City Council and staff acknowledge that meeting this goal will be challenging. However, bold leadership is necessary to address the existential threat of climate change, and this goal sends a message to the State of California that its current goals and funding are insufficient to meet the demands of climate change and must be accelerated.

[1] The Climate Center website details the Climate-Safe California Campaign (https://theclimatecenter.org/climatesafeca/).



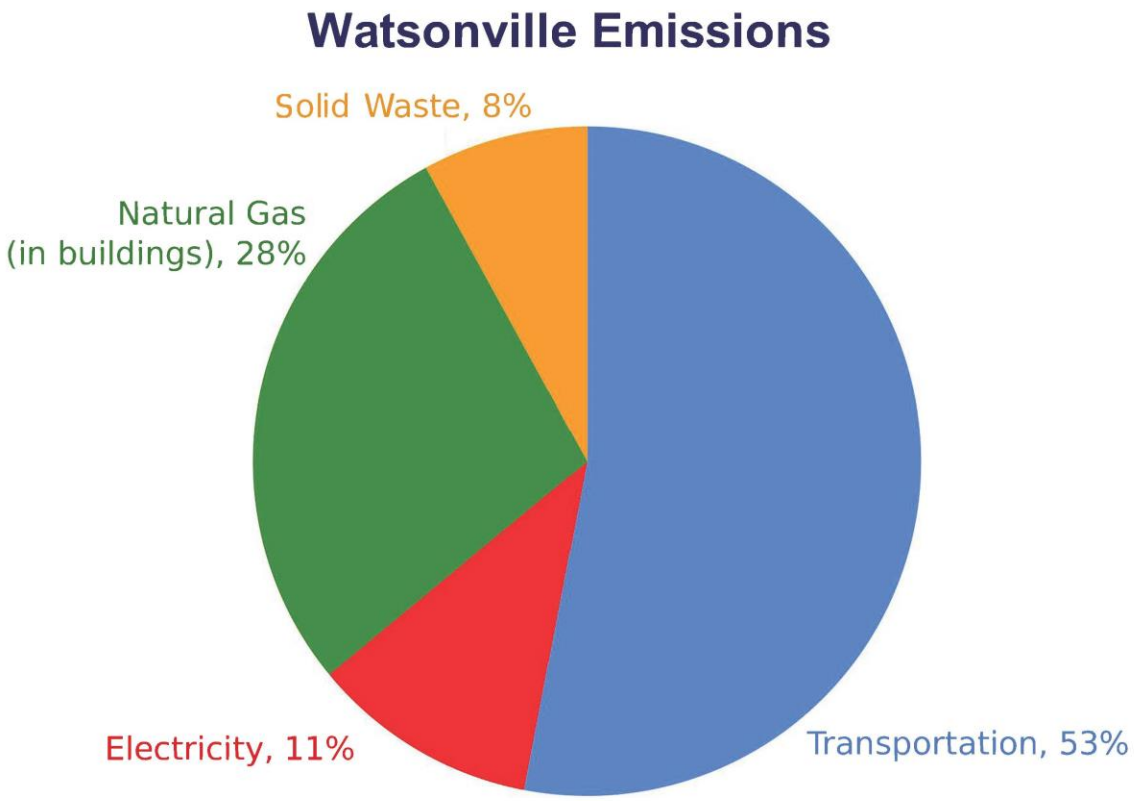
The City's goal of net-negative emissions by 2030 recognizes that climate change is an existential threat that must be addressed now.



The CAAP provides a roadmap to reduce the community's GHG emissions, combat the impacts of climate change, and explore carbon sequestration, habitat restoration, and repair of the natural world.

In order to meet the City's climate goals, the CAAP includes three types of initiatives:

- *Climate action, or mitigation,* refers to actions taken to reduce emissions. Examples include transitioning to low-carbon energy sources, such as solar or wind energy.
- *Climate adaptation*, on the other hand, refers to preparing for the impact climate change is already having on communities, such as increased droughts, wildfires, and flooding.
- *Climate restoration* consists of goals and actions that draw excess carbon out of the atmosphere and help restore balance to ecological systems, such as tree planting and regenerative agricultural practices.



Climate Action: Reducing Emissions

Watsonville's GHG emissions stem from four main sources:

- **Transportation:** Gas-powered cars and trucks
- **Natural Gas:** Heating buildings, cooking, and heating water
- **Electricity Use:** Generated from non-renewable energy sources, such as coal and gas
- **Food Waste Disposal:** Food waste that is sent to the landfill breaks down and creates methane (a GHG)

The majority of the CAAP is devoted to defining projects and programs that will reduce carbon emissions in these four sectors. The table below summarizes these programs.

Climate Action and Adaptation Plan Strategies and Programs

Strategies and Programs	% of Solution
Transportation	

• Facilitating electric vehicle (EV) infrastructure
  • EV Master Plan
  • Public-private partnerships
  • Charging station-friendly codes
• Getting people into EVs – equitably
  • Requires significant outside funding—state and federal grants
  • Partnerships with nonprofits and Central Coast Community Energy (3CE)
	22%

• Electrify City fleet	4%

• Active transportation
  • More walking and biking trails
  • Updates to the City-wide Bike & Trails Master Plan
  • Ebike Share Program
	2%

• Community trip reduction
  • Carpool programs (Green Business Program)
  • Promoting the use of mass transit
  • Smart Growth—Downtown Specific Plan
	8%

Building Electrification: Natural Gas Phaseout	
• All new buildings to be all-electric • Electric-only ordinance for new development	35%

• Retrofit existing buildings to be all-electric (add solar where possible)
  • Biggest program—will take 20–30 years
  • Requires significant state and federal funding
  • Next steps:
  • Develop Retrofit Master Plan
  • Inventory of existing buildings
  • Identify partners for implementation
	5%

Green Energy and Energy Efficiency	

• Shift more customers (50%) to 3CE Prime (100% renewable energy)
  • Advocacy and partnership with 3CE
  • Significant outreach effort
  • Request rates for those with low incomes
	10%

• Energy efficiency retrofits • With partners such as Central Coast Energy Services	<1%

Climate Action and Adaptation Plan Strategies and Programs

Strategies and Programs	% of Solution
Food Waste Program	
• Food waste collection from all residents and businesses • Backyard home composting program • Edible Food Redistribution Program • Reduces food wasted by stores and restaurants	12%

Climate Adaptation

Climate adaptation focuses on strategies for energy and agricultural resilience to address issues such as the strain on the electrical grid as a result of increasing temperatures and reduced agricultural productivity and food security due to droughts.

The climate adaptation component builds on the City's 2020 Local Hazard Mitigation Plan (LHMP), which outlines plans and programs for Watsonville to prepare for natural disasters and addresses the vulnerability of critical infrastructure through mitigation measures. Chapter 3 supplements the 2020 LHMP by considering additional regional impacts, including reduced capacity of the electrical grid, agricultural productivity, and food security. The adaptation strategies support the CAAP GHG reduction strategies and measures.

Climate Adaptation Measures

• Local Hazard Mitigation Plan (LHMP)
  • Preparing for flooding and wildfires
  • Preparing for extreme heat and sea-level rise

• Agricultural and Food Resilience
  • Buy-local programs
  • Community gardens

• Energy Resilience
  • Grid improvements
  • Power backups at critical City facilities
  • Microgrid at the City's Wastewater Treatment Plant

Climate Restoration

"Climate change is sometimes misunderstood as being about changes in the weather. In reality, it is about changes in our very way of life." – Paul Polman

In addition to reducing emissions, climate restoration is a necessary part of addressing climate change. Restoring natural systems facilitates the removal of carbon dioxide (CO_2) from the air, supports clean water and healthy soils, and acknowledges that humans are part of a global ecosystem that must be sustained for the survival of humans and many other forms of life.

Carbon sequestration on natural and working lands has been identified as a priority pathway for GHG reductions.

Reimagining the social and economic systems are also important to avoid practices that lead to climate change. Future CAAP updates will include additional strategies that the City will pursue to advance climate restoration.

Climate Restoration and Sequestration: Removing Carbon Dioxide from the Air

- Carbon sequestration
  - Tree planting
  - Regenerative agriculture practices
- Healthy ecosystems
  - Habitat restoration
  - Water quality programs
- Equitable green recovery
  - Green job creation (solar installation, building electrification jobs)
  - Green infrastructure (i.e., rain gardens, permeable pavement, green parking, and street trees)

CEQA Compliance

The CAAP will be assessed for impacts in accordance with the California Environmental Quality Act (CEQA), documented in an Initial Study and Negative Declaration.

General Plan Amendment

The General Plan will be updated with an amendment to include the goals of the CAAP in the City planning process, further strengthening the City's commitment to climate action.

Public Engagement

Stakeholder and community engagement was an essential part of the CAAP development process. The City developed a Public Engagement Plan to document how residents and stakeholders were engaged, and included the development of a Community Advisory Committee (CAC) to advise the City on how best to engage and solicit input from the public.

CAAP Implementation

The CAAP identifies a pathway for implementation. An interdepartmental team of City staff, in collaboration with the CAC, will be responsible for maintaining momentum and ensuring implementation of CAAP strategies, measures, and supporting efforts. Staff will provide annual implementation progress reports and a GHG inventory update every 2 years and CAAP updates at least every 5 years.

Clear Immediate Actions for 2022
• Building Electrification Ordinance (City Council and Planning Commission support)   • Reach out to developers and the public
• Electric Vehicle (EV) Infrastructure Master Plan   • Install 10 new EV charging stations
• Central Coast Community Energy (3CE) Prime: Increase participation by 10%
• Existing Building Electrification Master Plan
• Implement Food Waste Program for all residents
• Trails Master Plan Update
• CAAP also identifies areas for future growth and study: • Green jobs, regenerative agriculture, and microgrids

This CAAP is a call to action to residents, community organizations, and businesses to take an active part in Watsonville's transition to a low-carbon future. In this process, the City hopes to foster a vibrant economy, increase resiliency, and promote a sustainable community for future generations.

This CAAP is a call to action to residents, community organizations, and businesses to take an active part in Watsonville's transition to a low-carbon future. To find out how you can do your part, visit the Climate Action webpage.

This page intentionally left blank.

Chapter 1 Introduction

This page intentionally left blank.

Chapter 1 Introduction

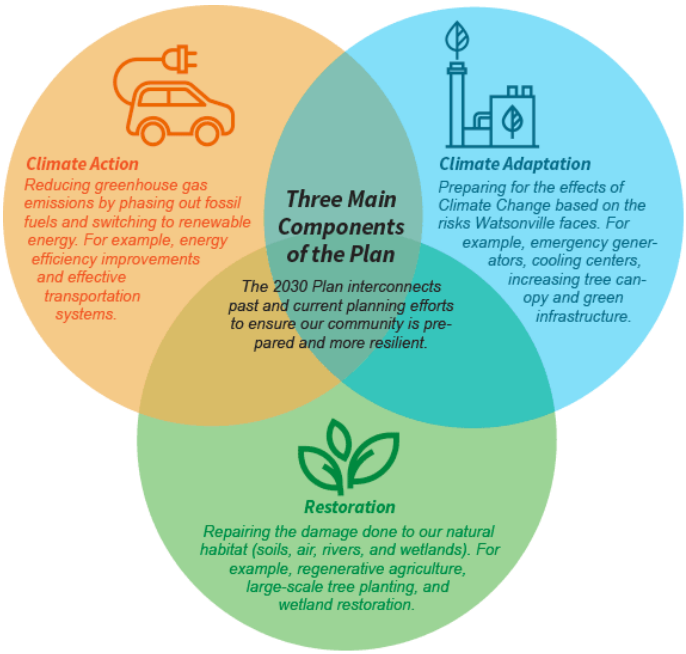
The City of Watsonville (City or Watsonville) is embarking on an important effort to chart a course for climate action, adaptation, and restoration over the next decade.

The City of Watsonville 2030 Climate Action and Adaptation Plan (CAAP) provides a framework and process for updating policies, programs, practices, and incentives for the City, including residents and businesses, to reduce the City's greenhouse gas (GHG) emissions, combat the impacts of climate change, and explore carbon sequestration, habitat restoration, and repair of the natural world.

The City's CAAP includes three types of initiatives in order to advance its desired climate resilience goals. *Climate action*, or *mitigation*, refers to actions taken to address the causes of climate change and to reduce the impact people have on the climate system. An example of mitigation includes transitioning to low-carbon energy sources, such as renewable energy. *Climate adaptation*, on the other hand, refers to adjusting behaviors, systems, and infrastructure to reduce the impact climate change has on communities. Updating building codes to address future climate conditions and extreme weather events is an example of climate adaptation. *Climate restoration* consists of goals and associated actions, such as tree planting programs and soil carbon sequestration, intended to return climate systems to the safe and healthy state in which the natural world evolved.

It is neither sufficient nor efficient to concentrate on only one of these objectives. Cities working to achieve climate resilience must pursue strategies that advance all of these objectives collectively (Figure 1-1, Climate Action, Adaptation, and Restoration).

Figure 1-1. Climate Action, Adaptation, and Restoration



Source: City of Watsonville 2021 adapted by Harris & Associates.

Many adaptation and mitigation strategies require significant planning and coordination to be designed and implemented effectively. Yet, typical stand-alone plans and reports are static and provide little more than an overview of what could be done to mitigate and adapt to climate change without a discussion of when, where, and how a project will be implemented. As a result, cities can get caught in a loop of expensive update cycles without seeing significant progress toward goals and objectives.

To ensure progress and streamline update efforts, the CAAP is structured in a way that prioritizes project implementation through City commitments and ongoing monitoring, as well as public engagement through the CAAP web application.

The web application will leverage maps, visualizations, and infographics to track CAAP progress and enhance stakeholder communication. This will result in a plan that regularly incorporates updated information and provides stakeholders and the public with a holistic understanding of how their actions contribute to community resilience.

In addition, the City will update its GHG inventory every 2 years to measure progress toward achieving the target and goal; and the City will update the CAAP at least every 5 years to incorporate new GHG reduction strategies, measures, and supporting efforts to make progress toward its ambitious climate goal of net-negative emissions by 2030 (i.e., remove more GHG than the City emits by 2030).

1.1 Draft General Plan Policy and Implementation Measure

The Watsonville 2005 General Plan (Watsonville General Plan) was adopted by City Council in 1994. The Draft Watsonville 2030 General Plan (General Plan Update) is the subject of ongoing litigation and has not replaced the Watsonville General Plan. However, the General Plan Update includes the following policy that expressly calls for the preparation of a Climate Action Plan following adoption of the General Plan Update:

> **Policy 11.5.2:** The City shall prepare and implement a Climate Action Plan within 24 months of adoption of the General Plan Update. The Climate Action Plan shall be a fully enforceable document that establishes emissions reductions targets and identifies and quantifies strategies and measures the City will undertake to reach its targets. The Climate Action Plan shall also include a climate change preparedness analysis to address City adaptation to climate change. The City shall monitor and report on progress toward the emissions reduction targets on a periodic basis. The Climate Action Plan shall be accompanied by a certified environmental document.

To implement this policy, the General Plan Update would have also set forth Implementation Measure 11.5.21 (Climate Action Plan) to develop a Climate Action Plan (and/or GHG Emissions Reduction Plan) to control and reduce GHG emissions, which includes the following steps:

- Conduct a baseline analysis (GHG emissions inventory) for 1990 or most appropriate baseline year
- Adopt an emissions reduction target
- Develop strategies and actions for reducing emissions
- Develop strategies and actions for adaptation to climate change
- Develop a local carbon offset program
- Implement strategies and actions identified in the Climate Action Plan
- Monitor emissions and verify results
- City operations and actions, as well as land use approvals, would have been required to be consistent with this plan

This CAAP implements Policy 11.5.2 and satisfies the requirements of Implementation Measure 11.5. 21, regardless of status of the General Plan Update.

1.2 Climate Action and Adaptation Plan General Plan Amendment

The CAAP includes a General Plan Amendment (GPA) to include Policy 11.5.2 and Implementation Measure 11.5.21 into the Watsonville General Plan. The policy and implementation measure have been revised to be relevant with this CAAP.

The Watsonville General Plan will be amended as detailed in the CAAP GPA (see CAAP GPA for full revisions to the Watsonville General Plan). The CAAP GPA would add the following section to Chapter 9, Environmental Resource Management, of the Watsonville General Plan.

Policy 9.K Climate Action and Adaptation

The City shall prepare and implement a Climate Action and Adaptation Plan (CAAP). The CAAP shall be a fully enforceable document that establishes emissions reductions targets and identifies and quantifies strategies and measures the City will undertake to reach its targets. The CAAP shall also include a climate change preparedness analysis to address City adaptation to climate change. The City shall monitor and report on progress toward the emissions reduction targets on a periodic basis, with updates to the inventory every two years and an update to the CAAP at least every five years. The CAAP shall be a California Environmental Quality Act (CEQA)-qualified GHG reduction plan pursuant to CEQA Guidelines Section 15183.5. Therefore, all strategies and GHG reduction measures must be fully enforceable and feasible to implement by the City.

Implementation Measures

9.K.1 Climate Action and Adaptation Plan – The CAAP shall include the following:

- Conduct a baseline analysis (GHG emissions inventory) using the best available baseline year;
- Adopt an emissions reduction target;
- Develop strategies and measures for reducing emissions;
- Develop strategies and actions for adaptation to climate change;
- Develop a local carbon offset program;
- Implement strategies and measures identified in the CAAP; and
- Monitor emissions and verify results.

The CAAP shall be a standalone document that implements the requirements set forth in Policy 9.K. Updates to the CAAP, including, but not limited to, inventory updates every two years and updates to the CAAP at least every five years, shall not require updates to the 2005 General Plan or revisions to this Chapter through subsequent General Plan Amendments.

The CAAP developed in 2021 satisfies the implementation efforts above. To ensure progress and streamline update efforts, the CAAP is structured in a way that prioritizes project implementation through City commitments and ongoing monitoring. The CAAP and progress made towards its implementation shall be posted on the City's website.

City operations and actions, as well as land use approvals, will be required to be consistent with the CAAP.

1.3 Regulatory Framework

The State of California supports local action on climate change by providing guidance for local jurisdictions to develop Climate Action Plans or plans to reduce GHG emissions for projects. As of 2015, California also requires climate change adaptation strategies to protect communities and critical infrastructure from climate impacts. In 2006, AB 32 was adopted and directed the state to reach 1990 GHG emissions levels by 2020. To meet this goal, the California Air Resources Board (CARB) approved the Climate Change Scoping Plan in 2008. Municipal governments were asked to reduce their emissions by at least 15 percent by 2020 compared with current levels (2008 levels or earlier). This prompted many cities to adopt community-wide emissions reduction targets of at least 15 percent below 2005 levels.

In June 2005, Executive Order (EO) S-3-05 established that GHG emissions should be reduced to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050.

In 2015, Governor Brown issued EO B-30-15 to set the 2030 emissions target (40 percent below 1990 levels by 2030). It was codified by SB 32. CARB followed up with an updated California's Climate Change Scoping Plan (2017 Scoping Plan) (CARB 2017). SB 32 would normally be the state legislative target required for the CAAP, which represents 40 percent below 1990 levels for the City. However, because the City has already achieved this target, the City has advanced the EO S-3-05 target of 80 percent below 1990 levels by 2050 as the 2030 target for the CAAP.

In September 2018, SB 100 was signed by Governor Brown and requires 100 percent use of zero-carbon electricity by 2045, and also in September 2018, Governor Brown issued EO B-55-18, setting the goal of achieving carbon neutrality as soon as possible (by 2045 at the latest) and maintaining net-negative emissions from that point forward.

To determine an equal reduction target at the local level, CARB's 2017 Scoping Plan recommends community-wide GHG reduction goals for local Climate Action Plans that will help the state achieve its 2030 target and longer-term 2050 goal (CARB 2017). These consist of reducing emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. CARB has not developed a plan to meet the new EO B-55-18 for carbon neutrality by 2045. The recent update to the Scoping Plan started in early 2021 and, at the time of this writing, is not complete. CARB is tasked to develop a framework for implementation and accounting toward carbon neutrality.

Governor Newsom signed EO N-79-20 in September 2020 to end sales of internal combustion passenger vehicles by 2035, which establishes a target for the transportation sector that helps put the state on a path to carbon neutrality by 2045.

On July 6, 2021, the Watsonville City Council unanimously endorsed the Climate-Safe California platform to support a path to net-negative emissions by 2030.[2] Endorsing Climate-Safe California means that the City agrees with the goal of achieving net-negative emissions and supports the policies to address the climate crisis. The CAAP provides a pathway to accelerate the City's historical success and ambitious goal of net-negative emissions by 2030. The City's goal of net-negative emissions accelerates the state's commitment to reach carbon neutrality no later than 2045 (EO B-55-18) recognizing that climate change is an existential threat that must be addressed now. Therefore, net-negative emissions by 2030 is the goal for the CAAP.

SB 375 directs the CARB to set regional targets for reducing GHG emissions. SB 375 further directs Metropolitan Planning Organizations (MPOs), Council of Governments, and local transportation planning agencies to address GHG emissions reduction targets by creating a Sustainable Communities Strategy (SCS) or Alternative Plan Strategy as a component of the agency's Regional Transportation Plan. The City is a member of the Association of Monterey Bay

[2] The Climate Center website details the Climate-Safe California Campaign (https://theclimatecenter.org/climatesafeca/).

Area Governments (AMBAG), the federally designated MPO for Monterey, San Benito, and Santa Cruz Counties.

On the adaptation side, SB 379 requires cities and counties to develop a vulnerability assessment and include resiliency strategies in the safety element of their General Plans to protect their community from climate impacts. AB 2140 authorizes local governments to adopt their Local Hazard Mitigation Plan (LHMPs) into the safety elements of their General Plans, allowing communities to use the LHMP as a vehicle to comply with state requirements for specific requirements of the Safety Element of the General Plan, such as SB 379. The City's 2020 LHMP Action Plan includes climate adaptation strategies in compliance with SB 379. Chapter 3 of the CAAP supplements the vulnerability assessment conducted as part of the City's 2020 LHMP and includes additional adaptation strategies.

1.4 CAAP Web Application

The City has been committed to ensuring the development of the CAAP is transparent and inclusive. To encourage engagement and participation in the implementation process, the City has developed a web application that allows residents to interact with the information presented in the CAAP in an online format. The web application provides transparent data that summarize the results of the climate action and adaptation analyses. The web application directs users to four focused CAAP web pages:

- **Climate Action.** This web page summarizes the GHG emissions baseline in easy-to-understand graphics to highlight sectors that need to be prioritized for mitigation actions.
- **Climate Adaptation.** This web page includes a web map with key climate hazard layers, including flood zones, hotspots, fire hazard areas, sea-level rise inundation and beach erosion, and socially vulnerable population data that can be overlaid to identify priority areas for adaptation investment.
- **Public Engagement.** This web page provides information on how the public was involved through the development of the CAAP and provides survey results for each of the two community surveys conducted.
- **Implementation.** This web page illustrates the City's progress on the implementation of mitigation and adaptation strategies of projects over time. Through the development of a web application, the CAAP supports the selection, monitoring, and implementation of local mitigation and adaptation strategies by providing transparent data and interactive maps that identify priority areas.

1.5 Organization of the CAAP

This CAAP includes the following chapters:

- **Executive Summary** provides an overview of the project.
- **Chapter 1, Introduction,** lists three types of initiatives to advance climate resilience, and the policy and framework for the CAAP.
- **Chapter 2, Climate Action,** summarizes the amount of GHGs emitted by Watsonville, the target to reduce emissions, and a goal to make progress toward net-negative emissions by 2030. Chapter 2 contains a list of strategies, measures, and supporting efforts to achieve the target and show progress toward the goal of net-negative emissions.
- **Chapter 3, Climate Adaptation,** focuses on climate adaptation strategies for energy resilience and justice and agricultural resilience and justice.
- **Chapter 4, Climate Restoration,** addresses the damage already done by climate change by focusing on carbon sequestration and equitable green recovery. Future CAAP updates will include specific strategies focused on restoration.
- **Chapter 5, Public Engagement,** describes the City's public outreach efforts and committee meetings that informed this CAAP.
- **Chapter 6, Implementation, Monitoring, and Funding,** is a plan for implementation of the CAAP, including GHG emissions inventory updates every 2 years to track progress toward meeting the target and goal and CAAP updates at least every 5 years to incorporate ongoing changes in legislation, technology, economy, policy, and human behaviors.
- **Chapter 7, References,** includes the documents and other references cited throughout this CAAP.

This page intentionally left blank.

Chapter 2 Climate Action

This page intentionally left blank.

Chapter 2 Climate Action

As discussed below, the CAAP is a plan to reduce GHG emissions to meet the state legislative target and provide a framework to ultimately achieve a goal of net-negative emissions. These are described in this chapter as the "target" and the "goal," respectively.

First, in Sections 2.1 through 2.6, this chapter provides the regulatory framework and the methods used for determining the City's existing emissions inventory, forecasted emissions without CAAP implementation (referred to as "business-as-usual [BAU]" or "no action taken"), and emissions reductions required to meet the City's target and goal.

Subsequently, this chapter identifies the specific strategies and enforceable GHG reduction measures to reduce GHG emissions compared to the BAU forecast. These strategies and measures are followed by supporting efforts. The measures are specific, measurable, and enforceable so that the City can demonstrate progress toward the target and the goal. The supporting efforts further reduce GHGs in support of the GHG reduction measures and position the City to adapt to climate change.

2.1 Inventory, Emissions, and Reduction Target and Goal

As described in greater detail in the following section, the City has set an aggressive target of 80 percent below 1990 levels (EO S-3-05) and a goal of net-negative emissions by 2030 (Climate-Safe California). The following sections outline the City's existing emissions inventory, forecasted emissions without CAAP implementation, and emissions reductions required to meet the City's target. As a point of reference, the state's carbon neutral goal by 2045 (EO B-55-18) and 80 percent below 1990 levels (EO S-3-05) compared with forecasted emissions for these years are also displayed below. However, the milestone year for the CAAP is 2030, whereby the CAAP shows how the City will achieve the target and make progress toward the goal.

2.2 2017 GHG Inventory

The Watsonville 2017 Community-Wide GHG Inventory was prepared by AMBAG and provided to the City in May 2020. This inventory is provided in Appendix A, Watsonville 2017 Community-Wide GHG Inventory.

The AMBAG inventory results for energy use, solid waste, and wastewater have been incorporated into the CAAP. However, inventory for transportation emissions is based on the Urban Footprint model to reflect traffic generation assumptions for existing and anticipated future land use development specific to the City of Watsonville. A detailed methodology for vehicle miles traveled (VMT) modeling is provided in Appendix B, Vehicle Miles Traveled Methodology. For consistency in methodology, the City's 2005 inventory transportation emissions were also updated using the Urban Footprint model. Additionally, the AMBAG inventory included emissions from airport fuel use. Airport departures and arrivals are subject to regional agreements, beyond the jurisdiction of

the City to take unilateral action in CAAP planning, and emissions from airport fuel use are not included in this CAAP because they are regulated by the Federal Aviation Administration. However, as a City facility, energy use, solid waste, and wastewater generation from operation of airport facilities are included in the baseline inventory and forecast.

In 2017, the City's inventoried emissions totaled 160,622 metric tons of carbon dioxide equivalent ($MTCO_2e$), or 3.01 $MTCO_2e$ per capita. Per-capita emissions are calculated by dividing total emissions by the AMBAG-estimated City population for the inventory year.

This represents an approximately 25 percent reduction from the revised 2005 Baseline Community-Wide GHG Inventory. It is important to note that, while analysis of GHG inventory data can identify the amount of change, this type of analysis does not specifically identify the factors that contribute to the changes and their level of contribution. Certain general factors that are able to be identified are noted below, but it should be understood that these are only general contributing factors and not the sole factors responsible for the total GHG changes. Table 2-1, Emissions by Sector – 2005 to 2017, shows the 2005 to 2017 GHG emissions by sector.

Table 2-1. Emissions by Sector – 2005 to 2017

Inventory Sector	2005	2017	% Change (2005–2017)
Transportation	92,017	86,044	−6%
Residential Energy	39,103	29,086	−26%
Commercial/Industrial Energy	61,185	32,699	−47%
Wastewater	942	488	−48%
Solid Waste	15,682	12,305	−22%
Total	**208,929**	**160,622**	**−23%**

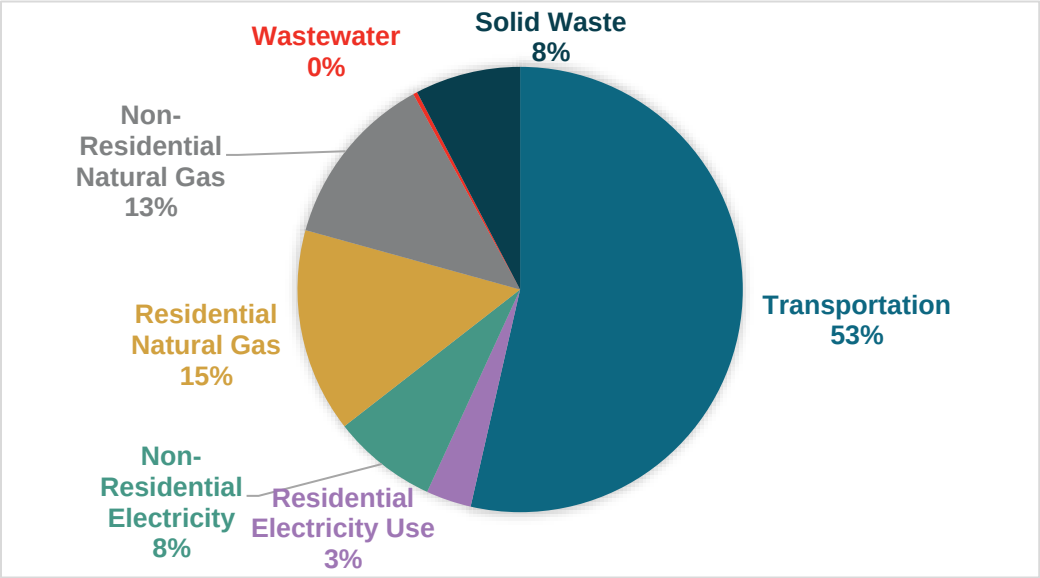
Source: Appendix A. Vehicle emissions adjusted with Urban Footprint and EMFAC2021 (Appendix B, Appendix D).

In the transportation sector, a 6 percent emissions reduction occurred from 2005 to 2017. During this period, there continued to be an increase in the state-required fuel efficiency standards. The residential energy sector achieved a 26 percent reduction from 2005 to 2017. This can be attributed, in part, by the specific composition of energy delivered by Pacific Gas and Electric Company (PG&E) to include both more renewable energy and energy generated from large hydroelectric operations in its energy mix. In the commercial and industrial energy sector there was a 47 percent reduction in emissions from 2005 to 2017. This can be attributed, in part, to decreases in the use of electricity and natural gas. In the wastewater sector, a 48 percent emissions reduction occurred. In the solid waste sector, a decrease in the actual tonnage of waste sent to the landfills yielded a 22 percent reduction in emissions.

The City emitted 160,622 $MTCO_2e$ in 2017. As shown on Figure 2-1, 2017 Emissions by Sector, 53 percent of emissions were from the transportation sector, specifically fuel use from travel on local roads. Emissions from electricity and natural gas usage in the residential sector generated 18 percent of emissions, while electricity and natural gas consumption in the commercial sector

generated 21 percent of emissions. The disposal of solid waste generated by residents and businesses in 2017 generated 8 percent of total emissions. The remaining less than 1 percent of emissions was generated from wastewater treatment processes.

Figure 2-1. 2017 Emissions by Sector



2.2.1 2017 Transportation Emissions

As mentioned previously, Watsonville's transportation sector generated 53 percent, or 86,044 $MTCO_2e$, of community-wide GHG emissions in 2017. The transportation sector analysis includes emissions from all vehicle use associated with the existing land use mix and population in the City, as calculated using the Urban Footprint model and City-specific data.

2.2.2 2017 Energy Emissions (Residential, Commercial, and Industrial)

Watsonville's built environment generated 39 percent, or 61,784 $MTCO_2e$, of community-wide GHG emissions in 2017. Emissions were calculated using 2017 electricity and natural gas consumption data provided by PG&E. Emissions from the residential sector were 29,086 $MTCO_2e$. Emissions from the commercial and industrial sector were 32,698 metric tons of CO_2e. Energy usage from the residential energy sector comprised 18 percent of total emissions, and commercial and industrial energy use comprised 21 percent of total emissions.

As mentioned previously, the wastewater sector accounted for less than 1 percent, or 488 $MTCO_2e$, of community-wide GHG emissions in 2017. This sector accounts for the operation of wastewater treatment facilities used to treat wastewater from Watsonville and three county districts. Wastewater coming from residences and businesses contains organic matter including nitrogen,

phosphorus, and carbon (along with other organic elements). As wastewater is collected, treated, and discharged/reused, certain treatment processes can lead to the creation and emissions of two potent GHGs: methane and nitrous oxide. Methane (or "biogas") is intentionally created in controlled conditions in heated and mixed tanks called "anaerobic digesters" at the City's wastewater treatment facility. The methane is captured and stored and is either used in a combined heat and power (also known as "cogeneration") system or flared. Therefore, nitrous oxide is the wastewater emission of concern for the City. Nitrous oxide is emitted from the City's wastewater treatment facility when the ammonia in wastewater is nitrified.

2.2.3 2017 Solid Waste Emissions

As mentioned previously, the solid waste sector accounted for 8 percent, or 12,305 $MTCO_2e$, of community-wide GHG emissions in 2017. Emissions from the solid waste sector are an estimate of methane generation from the anaerobic decomposition of organic wastes (e.g., paper, food scraps, plant debris, wood) deposited in a landfill. Transportation emissions generated from the collection, transfer, and disposal of waste and wastewater biosolids are included in transportation sector GHG emissions.

2.3 Future Emissions

The following section presents the results of the GHG emissions forecast for the City, including a summary of forecasted emissions, emissions reduction targets, and a gap analysis. A summary of the forecast methodology is included in Appendix C, Forecast Methodology.

Forecast emissions are estimated based on jobs, housing, and population growth estimates for the City provided by AMBAG. With the exception of transportation emissions, BAU GHG emissions are calculated based on the methodology, usage rates, and emissions factors consistent with the 2017 inventory.

Transportation emissions are calculated using the Urban Footprint model to estimate VMT and emissions factors from EMFAC2021 (Version 1.0.0) (CARB 2020). Additionally, the forecast years reflect the introduction of Central Coast Community Energy (3CE), which now provides clean energy to the majority (approximately 93 percent) of electricity customers in Watsonville, rather than continuing service from PG&E at existing emissions rates. Table 2-2, Business-as-Usual Greenhouse Gas Emissions Forecast, summarizes forecasted GHG emissions for the City, assuming BAU conditions based on 2017 data.

Table 2-2. Business-as-Usual Greenhouse Gas Emissions Forecast

Sector	Emissions ($MTCO_2e$)			
	2017		2030	
	Total	Per Capita	Total	Per Capita
Energy	61,784	1.16	49,157	0.86
Wastewater	488	0.01	513	0.01
Transportation	86,044	1.61	67,488	1.19
Solid Waste	12,305	0.23	17,997	0.32
Total	**160,622**	**3.01**	**135,155**	**2.38**

Source: Appendix D.

Notes: GHG= greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Figure 2-2, 2030 Emissions by Sector; Figure 2-3, 2045 Emissions by Sector; and Figure 2-4, 2050 Emissions by Sector, summarize emissions by sector for each forecast year. As shown on these figures, transportation emissions account for approximately half of total emissions in each forecast year. Natural gas use accounts for approximately 40 percent of remaining emissions. Electricity emissions account for less than 1 percent. The reduction in electricity emissions is due primarily to the service provider change to 3CE.

Figure 2-2. 2030 Emissions by Sector

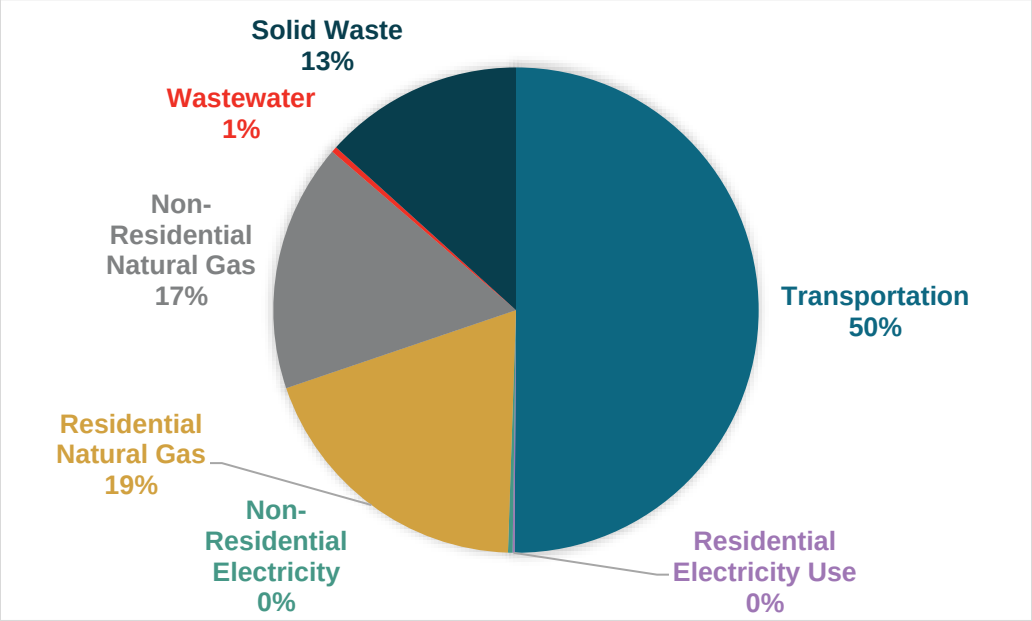


Figure 2-3. 2045 Emissions by Sector

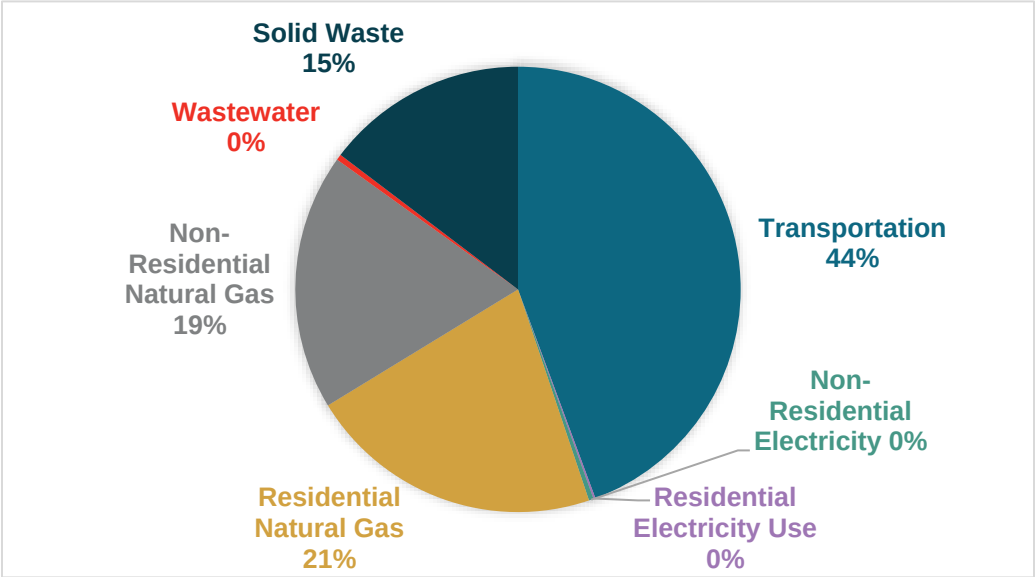
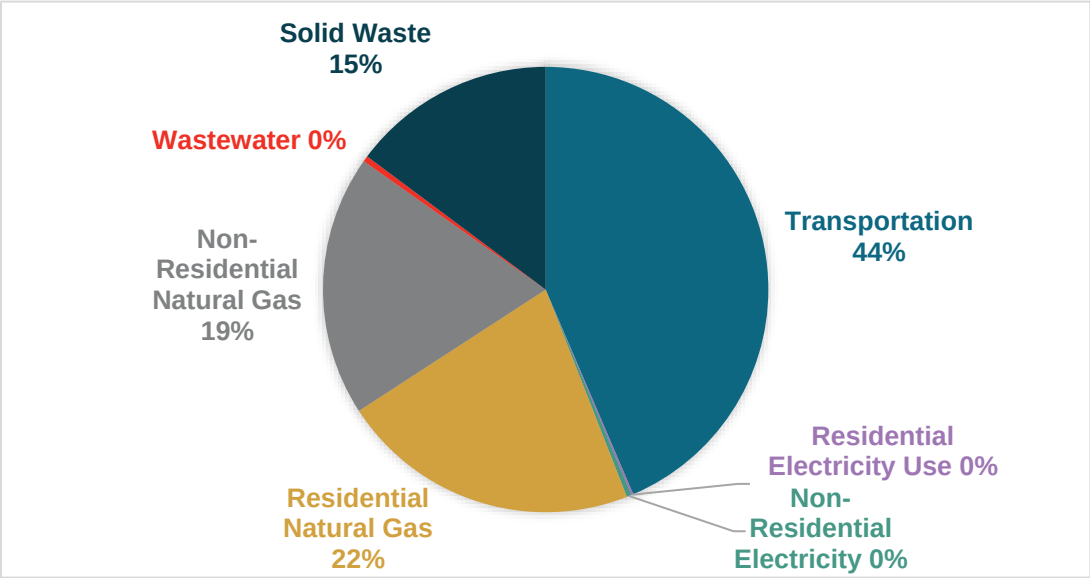


Figure 2-4. 2050 Emissions by Sector



2.4 Forecast Emissions with State Efforts

There are ongoing state efforts to reduce GHG emissions across California that would also reduce GHG emissions in Watsonville. The Forecast Emissions with State Efforts scenario estimates future emissions if the CAAP were not adopted, but assumes implementation of state requirements that may be quantified at this time. This scenario assumes emissions reductions from EO N-79-20 and the 2019 Title 24 Building Energy Efficiency Standards.

EO N-79-20 mandates that 100 percent of in-state sales of new passenger cars and trucks be zero-emissions by 2035. The CARB Draft 2020 Mobile Source Strategy estimates implementation of the EO to achieve 85 percent partial hybrid electric/zero-emissions vehicles (ZEV) light duty vehicles by 2045.

The 2019 Title 24 Building Energy Efficiency Standards went into effect on January 1, 2020. The updated building standards include new requirements for solar power generation, battery storage, and electric vehicle (EV) charging infrastructure. The California Energy Commission (CEC) estimates that single-family residences built under the 2019 standards will use approximately 7 percent less energy due to energy efficiency measures versus those built under the 2016 standards. Once rooftop solar electricity generation is factored in, residences built under the 2019 standards will use approximately 53 percent less energy than those built under the 2016 standards. Non-residential buildings are estimated to use approximately 30 percent less energy due mainly to lighting upgrades.

Emissions reductions are gained from the Renewables Portfolio Standard, which sets continuously escalating renewable energy procurement requirements for energy providers. Because the City is primarily served by 3CE, a Community Choice Energy agency established by local communities to source clean and renewable electricity, reductions exceed Renewables Portfolio Standard. Therefore, Renewables Portfolio Standard consistency is already reflected in the BAU scenario, and additional reductions were not included in this state efforts scenario.

An update to the 2019 Title 24 Building Energy Efficiency Standards is currently underway and would likely result in additional energy savings.

CARB is currently preparing the 2022 Scoping Plan, which will provide an updated strategy for the state to meet statewide emissions reduction targets and carbon neutrality. The 2022 Scoping Plan will likely identify new pathways to achieve emissions reductions. Therefore, the following forecast is likely conservative, and legislations and programs available through the state will provide additional reductions without CAAP implementation. The CAAP will be updated at least every 5 years and can take account of new or revised Scoping Plan measures.

Table 2-3, Forecast Emissions and State Efforts, summarizes forecasted BAU GHG emissions for the City, assuming implementation of state efforts. EO N-79-20 would result in a substantial decrease in GHG emissions from the transportation sector by 2045, and the 2019 Title 24 Building Energy Efficiency Standards would result in energy reductions compared to BAU starting in 2030. Transportation emissions would be reduced from half of total emissions to approximately one-third of total emissions with EO N-79-20.

Table 2-3. Forecast Emissions and State Efforts

Sector	GHG Emissions ($MTCO_2e$)	
	2030	
	Total	Per Capita
Transportation	67,488	1.19
Energy	48,925	0.86
Wastewater	513	0.01
Solid Waste	17,997	0.32
Total	**134,923**	**2.37**

Source: Appendix D.
Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

2.5 Emissions Reduction Targets

The state has established statewide emissions reduction targets of 40 percent below 1990 levels by 2030 in accordance with SB 32, carbon neutrality by 2045 in accordance with EO B-55-18, and 80 percent below 1990 levels by 2050 in accordance with EO S-3-05.

CARB's 2017 Scoping Plan, which outlines the state strategy for meeting these reduction targets, includes recommendations for local Climate Action Plans (CARB 2017). CARB recommends statewide targets of no more than 6 $MTCO_2e$ per capita by 2030 and no more than 2 $MTCO_2e$ per capita by 2050. As stated in the 2017 Scoping Plan, these targets apply at the plan level because they take into account all emissions sectors in the state. The statewide emissions reduction targets include all sources in the state, including major stationary sources, power plants, ships, and other sources that contribute to the statewide emissions inventory but are not present in Watsonville.

The 2 $MTCO_2e$ per-capita goal is also consistent with EO S-3-05, EO B-30-15, and global emissions reduction goals, including the Under 2 Memorandum of Understanding and the Paris Agreement. The 2 $MTCO_2e$ per-capita limit represents California's "fair share" of global emissions. As stated on page 100 of the 2017 Scoping Plan, per-capita targets also better recognize that population and economic growth must be accommodated in the state.

Therefore, target emissions levels of 6 $MTCO_2e$ per capita by 2030 and 2 $MTCO_2e$ per capita by 2050 would put the City on track to achieve its fair share of legislated emissions reduction goals.

However, the City has achieved emissions levels of less than 6 $MTCO_2e$ per capita since its 2005 inventory, and pending state legislation has been proposed to accelerate the 80 percent below 1990 emissions level target to 2030.

Additionally, on July 6, 2021, the Watsonville City Council voted unanimously to support the Climate-Safe California Campaign goal of net-negative emissions by 2030. Reductions that are more aggressive would be required by 2030 for the City to achieve this goal.

Therefore, the City has established an aggressive target of 2 $MTCO_2e$ per capita by 2030 (required by 2050) to achieve consistency with statewide emissions reduction legislation, with an additional reduction goal to achieve net-negative emissions by 2030 in accordance with the Climate-Safe California Campaign. The more aggressive reduction target and goal would also achieve the existing legislated target of 80 percent below 1990 emissions levels by 2050 and carbon neutrality by 2045. The emissions reduction targets are summarized in Table 2-4, Emissions Reduction Targets.

Table 2-4. Emissions Reduction Targets

Forecast Target and Goal	Year	Target/Goal	Emissions By 2030 ($MTCO_2e$)
Legislative Target	2030	80% below 1990	113,658[1]
Climate-Safe California Platform Goal	2030	Net-Negative Emissions	0

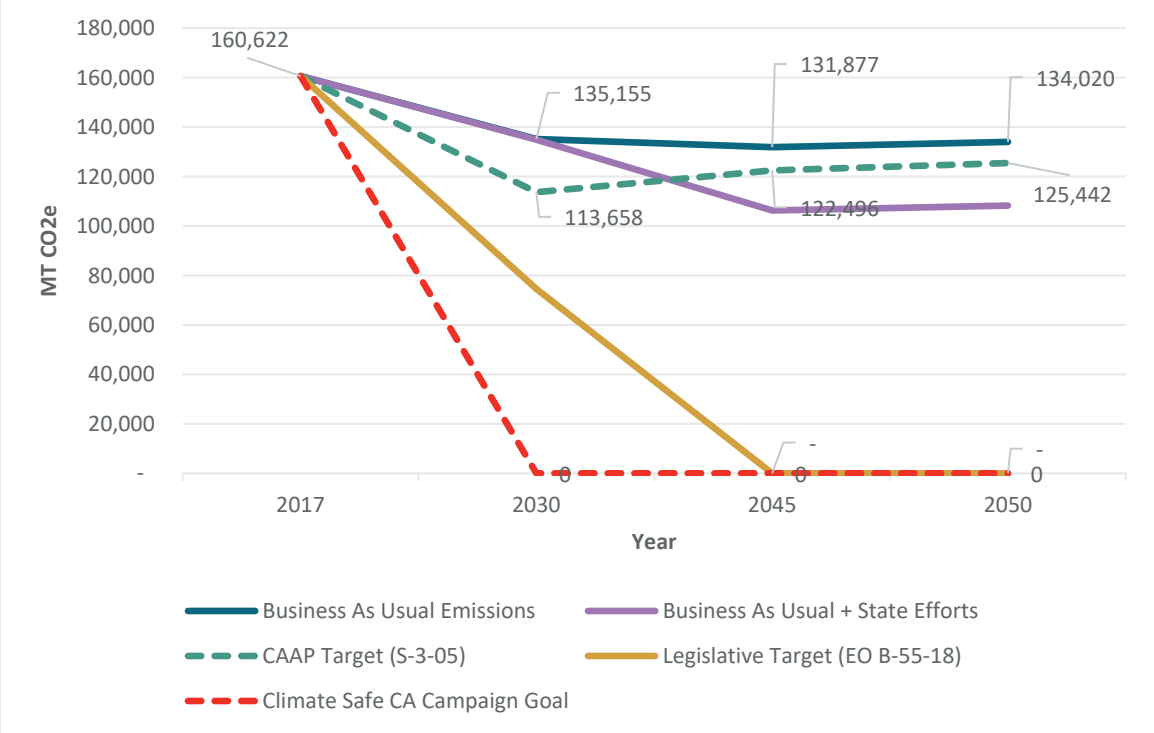
Source: Appendix D.

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent

[1] Calculated using the target of 2 $MTCO_2e$ per capita and the projected 2030 population of 56,826.

Figure 2-5, Forecast Emissions and Reduction Targets, displays BAU emissions trends compared to the selected emissions reduction targets. With implementation of state efforts, the City's BAU emissions would be below the state's 2050 target by 2045. The SB 32 target for 2030 is not shown on Figure 2-5 because the City has already achieved this legislative target. However, state measures are not anticipated to be sufficient to achieve the CAAP target of 2 $MTCO_2e$ per capita or Climate-Safe California Campaign goal of net-negative emissions. The City's emissions would be approximately 2.37 MT per capita by 2030 without CAAP implementation.

Figure 2-5. Forecast Emissions and Reduction Targets



With implementation of the GHG reduction measures outlined in the following section, the City would be on track to achieve the aggressive target of 113,658 $MTCO_2e$ by 2030, or 2 $MTCO_2e$ per capita.

A summary of emissions by sector with implementation of the CAAP is provided in Table 2-5, City of Watsonville Emissions with Implementation of CAAP Reduction Measures. The specifics of individual reduction measures, including GHG reductions associated with each strategy, are provided in the following section.

As shown in Table 2-5, the reduction measures are anticipated to reduce City emissions to 111,483 $MTCO_2e$, which would exceed the 2030 target.[3] The City would also meet the EO S-3-05 goal for 2050. However, the City would not achieve the Climate-Safe California goal of net-negative emissions by 2030. An additional reduction of 111,483 $MTCO_2e$ would be required to meet net-negative emissions goals.

Although it is anticipated that additional reductions may be achieved through the proposed support measures and future state efforts that are not calculated in this CAAP, it is likely that carbon offsets and sequestration projects would be required to meet the net-negative goal. Use of offsets as part of CAAP implementation is outlined in Reduction Strategy NW-2 in the following section.

Table 2-5 also shows forecasted emissions for 2045 and 2050 with implementation of the CAAP and state efforts for informational purposes to show the anticipated long-term impact of the CAAP reduction strategies. However, because the scope of the CAAP target is 2030, the following section reports only measure impacts on impact year 2030. Calculated individual reduction measure impacts on forecast years 2045 and 2050 are available in Appendix D, GHG Forecast and Reduction Measures.

[3] As discussed in Section 2.2, 2017 GHG Inventory, aviation fuel emissions are not included in the CAAP inventory or forecast. However, Appendix D, GHG Forecast and Reduction Measures, includes 2030 emissions with CAAP implementation with the addition of aviation fuel use for informational purposes. As shown in Appendix D, with the inclusion of aviation fuel use, the City would continue to meet the target of 2 $MTCO_2e$ per capita.

Table 2-5. City of Watsonville Emissions with Implementation of CAAP Reduction Measures

Sector	Emissions ($MTCO_2e$)								
	2030			2045			2050		
	BAU Total	Total With CAAP	Total Per Capita With CAAP	BAU Total	Total With CAAP	Total Per Capita With CAAP	BAU Total	Total With CAAP	Total Per Capita With CAAP
Transportation	67,488	58,836	1.04	58,290	26,209	0.43	58,186	26,010	0.41
Energy	49,157	36,999	0.65	53,650	38,622	0.63	55,404	39,283	0.63
Wastewater	513	513	0.01	552	552	0.01	566	566	0.01
Solid Waste	17,997	15,211	0.27	19,386	16,385	0.27	19,863	16,788	0.27
New Green Space	—	(76)	—	—	(234)	—	—	(287)	—
Total	**135,155**	**111,483**	**1.96**	**131,877**	**81,533**	**1.33**	**134,020**	**82,359**	**1.31**
CAAP Target Emissions	—	*113,658*	*2.0*	—	—	—	—	—	—
Reduction Gap	—	**(2,153)**	**(0.04)**	—	—	—	—	—	—

Source: Appendix D.

Notes: BAU = business-as-usual; CAAP = Climate Action and Adaptation Plan; $MTCO_2e$ = metric tons of carbon dioxide equivalent

2.6 GHG Reduction and Co-Benefits

This section provides 19 strategies, 33 implementation measures, and 61 supporting efforts to help the City achieve the selected aggressive target of 80 percent below 1990 levels and the goal of net-negative emissions by 2030 (Climate-Safe California). As previously described, SB 32's target of 40 percent below 1990 by 2030 is the applicable legislative target for the CAAP. However, the City already achieved this target. Therefore, the reduction strategies are not required for SB 32 compliance.

In addition to reductions in GHG emissions, the CAAP strategies, measures, supporting efforts, and adaptation strategies have tangible co-benefits to the City and residents of Watsonville. Co-benefits are listed under each strategy and measure below and may include but are not limited to the following:

- **Air Quality Improvements:** Residents can breathe cleaner air
- **Habitat Improvement:** Ecosystems can improve for plants and animals
- **Recreation Opportunities:** Improvement of residents' health and quality of life
- **Cost Savings:** Reduced energy costs and fuel savings
- **Health Benefits:** Fewer cases of asthma or illnesses
- **Job Creation:** Additional green jobs
- **Water Quality Protection:** Ensuring that the City's drinking water continues to meet all regulatory requirements and supports the health of local ecosystems

Co-benefits are not required for implementation of strategies and measures or for the City to reach its target and goal. However, they represent the important secondary benefits of addressing climate change. The co-benefits are listed under each strategy and measure with the following emblems.

2.6.1 CEQA-Qualified Plan and Enforceability

The CAAP evaluates GHG emissions and reductions by sector: transportation and land use, energy, and solid waste. The CAAP also addresses natural and working lands.

Each sector details GHG reduction measures that are actionable and enforceable. Because the CAAP is a CEQA-qualified GHG reduction plan pursuant to CEQA Guidelines, Section 15183.5, these GHG reduction measures have the same effect as mitigation measures under CEQA (i.e., they must be enforceable and feasible). Therefore, each strategy below details the enforceable action, timing, and responsible department to implement the relevant GHG reduction measures. Each GHG reduction measure is designed to be feasible and fully enforceable by the City.

In addition to GHG reduction measures, each strategy contains supporting efforts, which represent additional actions that support each of the strategies and GHG reduction measures. Only those GHG reduction measures that are actionable and enforceable are quantified for taking reductions in this CAAP. The supporting efforts are not quantified because there is not enough information or evidence to reasonably predict that those efforts can be implemented or enforced to ensure reductions. However, these supporting efforts are critical to combat climate change and will likely achieve additional GHG reductions beyond those quantified in this document. Because the CAAP will be updated at least every 5 years, the City can commit to supporting efforts when the CAAP is amended should they become actionable and enforceable.

GHG Reduction Measures	Supporting Efforts
• Actionable and enforceable • Same effect as CEQA mitigation measures	• Not quantified because not enforceable

This section also identifies relevant portions of the Climate-Safe California platform to highlight how the City is supporting this campaign beyond specific emissions reductions.

2.6.2 Timeframe and Cost

Each set of GHG reduction measures has an associated timeframe if there is an action to implement and cost to implement. Measures estimated to result in a low cost to the City include existing programs and would be paid through existing private development fees. Medium cost measures are anticipated to require substantial staff time but would not require physical or capital improvements. High cost measures are anticipated to involve substantial staff time and physical or capital improvements (Table 2-6, Timeframe and Cost).

Table 2-6. Timeframe and Cost

Criterion	Timeframe
Timeframe	**Short Term:** 0–1 year **Medium Term:** 1–2 years **Long Term:** 2–5 years
Cost	**Low:** $ **Medium:** $$ **High:** $$$

Transportation and Land Use Sector

Goal: The purpose of this sector is to reduce vehicle miles traveled from traditional gasoline vehicles.

The transportation and land use-related strategies and measures aim to reduce emissions by reducing the number and length of fossil-fueled vehicle trips through initiating smart growth concepts, implementing multimodal transportation (including active transportation), incorporating parking management strategies, improving public transit, implementing commute options, creating community-based travel options, and expanding EV use.

Strategy T1: Incorporate Smart Growth Concepts

The focus of this strategy is to incorporate various smart growth concepts through smart land use patterns, expanded employment opportunities, and higher density housing options. This strategy can be quantified by Measure T1-A.

Measure T1-A: Smart Growth Principles

Based on AMBAG growth projections, the City is projected to experience an approximately 10 percent increase in jobs and housing by 2030 compared to existing conditions, which would necessarily lead to an increase in jobs and housing density in Watsonville. Increased density would reduce VMT by locating people in closer proximity to workplaces and other destinations. The support measures below outline how this future growth would be accommodated in line with smart growth principles.

Anticipated Reductions from Strategy T1

Strategy Effects	Impact in 2030
Total VMT Reduction	(951,128)
% Passenger/Light Duty VMT Reduction from BAU	0.70%
Total GHG Reduction ($MTCO_2e$)	(293)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T1 Implementation

Measure	Responsibility	Timeframe	Cost
T1-A	Community Development; Public Works & Utilities; Parks and Community Services	Medium Term	$

Supporting Efforts

No.	Description
Supporting Effort T1-S1	Include and advance transit-oriented development, active transportation connections, and smart growth concepts in the Downtown Watsonville Specific Plan.
Supporting Effort T1-S2	Continue and expand smart growth strategies, such as high-density development centered on transit and commerce at nodes throughout Watsonville.
Supporting Effort T1-S3	Amend the Watsonville General Plan to create a new jobs-housing policy and sync with the next update to the Housing Element to provide more employment opportunities and an expanded range of housing options for all income levels.
Supporting Effort T1-S4	Address overcrowding and cost-burdened households in the next update to the Housing Element in accordance with state law.

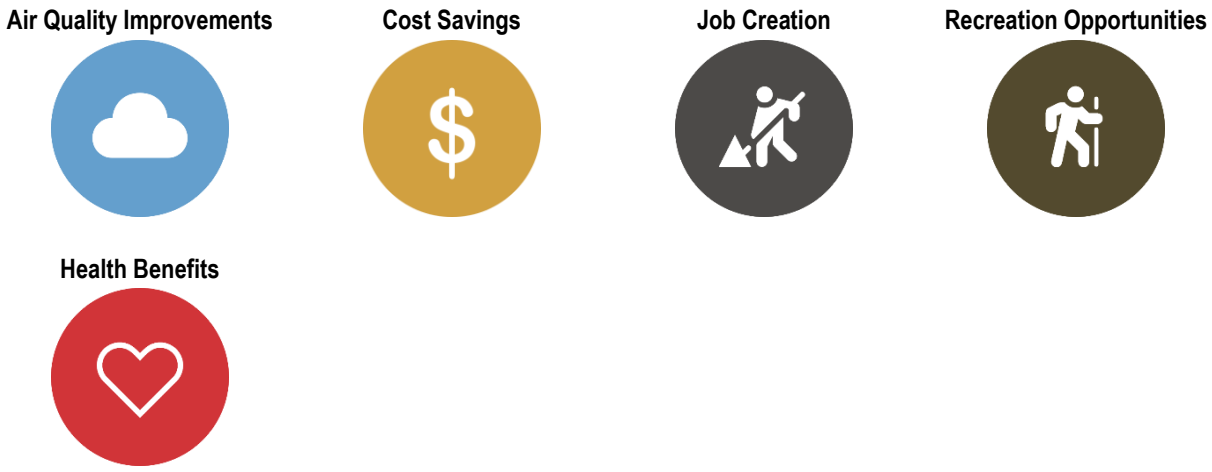
Supporting Efforts

No.	Description
Supporting Effort T1-S5	Incorporate affordable housing requirements in the Downtown Watsonville Specific Plan.
Supporting Effort T1-S6	Restructure existing development impact fees to incentivize compact development. For public works and parks, impose impact fees per square footage.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits



Strategy T2: Increase Multimodal Transportation Facilities

The focus of this strategy is to support the use of alternative non-motorized modes of transportation, such as walking and bicycling. This includes implementing infrastructure improvements to promote active transportation and assist travelers in using the infrastructure for transit, walking, and bicycling. This strategy can be quantified by Measures T2-A, T2-B, and T2-C.

Measure T2-A: New Pedestrian Improvements

Require new development projects, residential and non-residential, to provide pedestrian improvements along street frontages; and strongly encourage connection to the nearest existing pedestrian facilities, such as sidewalks or trails. Developments shall also include internal pedestrian connections between all uses.

Measure T2-B: Pedestrian and Cyclist Multimodal Enhancements

Improve roadway segments, intersections, and bikeways to implement multimodal enhancements for pedestrian and cyclist comfort and safety along City-maintained public roads by improving five centerline miles of roadway segments and 100 intersections by 2030.

Projects may include but not be limited to the following projects identified for Watsonville in the AMBAG 2040 Metropolitan Transportation Plan (MTP)/SCS:

- Traffic calming and greenway features on 2nd Street/Maple Avenue and 5th Street from Lincoln Street to Walker Street
- Bike lane improvements to Rodriguez Street (Main Street to Riverside Drive)
- Addition of sharrows to Union/Brennan (Freedom Boulevard to Riverside Drive)
- Improvement to the crosswalks on Union Street/Brennan Street
- Pedestrian and bicycle enhancements on Main Street (Freedom Boulevard to Riverside Drive) and Freedom Boulevard (Green Valley Road to Davis Avenue)
- Exploration of implementing universal streets in the Downtown Area
- Complete streets improvements to Main Street (East Beach Street to Freedom Boulevard)
- Construction of pedestrian/bicycle bridge over Highway 1
- Installation of a roundabout to replace the currently signalized intersection at Main Street (Highway 152)/Freedom Boulevard with safety considerations for bike/pedestrian improvements
- Freedom Boulevard reconstruction (Alta Vista Avenue to Green Valley Road) for pedestrian improvements

Measure T2-C: Trails and Bicycle Master Plan

New pedestrian and bicycle infrastructure may include, but not be limited to: Coastal Rail Trail Segments 17 and 18, Lee Road Trail, Pajaro Valley High School Connector Trail, Pajaro River Levee Trail, and projects identified in the AMBAG 2040 MTP/SCS. Additionally, there may be bicycle improvements for Harkins Slough Road, Green Valley Road, State Route 129, and State Route 152. Pedestrian improvements may include sidewalk infill on Harkins Slough Road and Main Street, pedestrian bridge over Highway 1 to Pajaro Valley High School, and various intersection improvements.

Anticipated Reductions from Strategy T2

Strategy Effects	Impact in 2030
Total VMT Reduction	(1,704,110)
% VMT Reduction from BAU	1.25%
Total GHG Reduction $MTCO_2e$)	(525)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T2 Implementation

Measure	Responsibility	Timeframe	Cost
T2-A	Public Works & Utilities	Short Term	$
T2-B	Public Works & Utilities	Long Term	$$$
T2-C	Public Works & Utilities	Medium Term	$$$

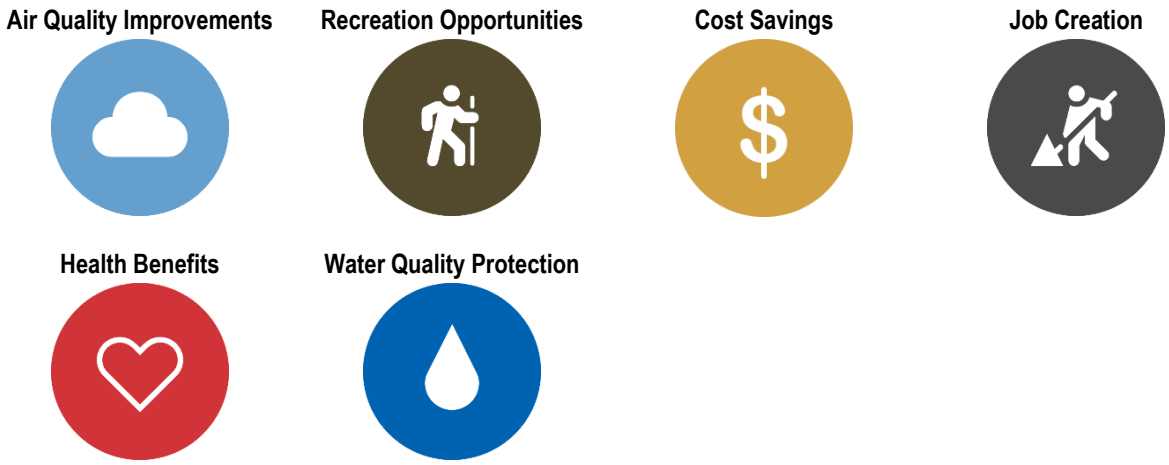
Supporting Efforts

No.	Description
Supporting Effort T2-S1	Create regularly scheduled open street events in Watsonville. Several streets would be closed to vehicle traffic for a community event that focuses on promoting alternative transportation and other sustainability programs.
Supporting Effort T2-S2	Determine barriers to creation of a pedestrian and bike path to Pajaro Dunes beach access and work with the County of Santa Cruz to implement a solution and Rail Trail Segment 17.
Supporting Effort T2-S3	Conduct existing conditions assessments necessary to apply for grant funding to improve active transportation infrastructure.
Supporting Effort T2-S4	Coordinate with the Santa Cruz County Regional Transportation Commission and the California Department of Transportation to identify feasible pedestrian and bicycle improvements to State Route 129 and State Route 152 for implementation in subsequent State Highway Operation and Protection Program funding cycles.
Supporting Effort T2-S5	Identify key corridors or planning areas for conducting transportation studies (e.g., Freedom Boulevard, former rail station) and develop a Multimodal Transportation Plan for identified key corridors or planning areas.
Supporting Effort T2-S6	Coordinate with the Santa Cruz County Regional Transportation Commission to implement proposed local trail projects.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits

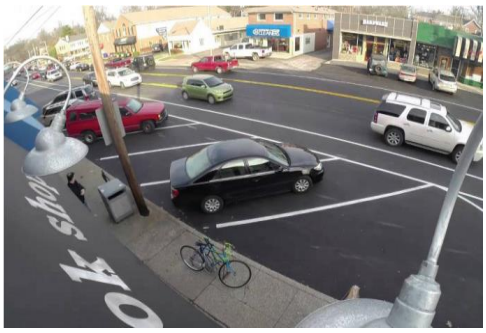


Strategy T3: Implement Parking Management

The focus of this strategy is to encourage use of alternative transportation by de-emphasizing parking availability. This strategy can be quantified by Measure T3-A.

Measure T3-A: Downtown Watsonville Specific Plan Parking Strategies

Implement a parking program in the Downtown Area to encourage alternative modes of transportation when visiting Downtown. Expand the Downtown Parking District and incorporate parking management strategies in the Downtown Watsonville Specific Plan to eliminate free parking.



Anticipated Reductions from Strategy T3

Strategy Effects	Impact in 2030
Total VMT Reduction	(46,446)
% VMT Reduction from BAU	0.04%
Total GHG Reduction ($MTCO_2e$)	(15)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T3 Implementation

Measure	Responsibility	Timeframe	Cost
T3-A	Police Department; City Manager	Medium Term	$

Supporting Efforts

No.	Description
Supporting Effort T3-S1	Explore feasible parking management strategies, such as reducing minimum parking requirements, setting maximum parking requirements, requiring car-share parking, unbundling parking, or requiring developments to provide transit passes.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits

Air Quality Improvements **Recreation Opportunities** **Health Benefits**

Strategy T4: Prioritize Transit Movement

The focus of this strategy is to encourage the use of public transit by expanding transportation mode options and improving transit service. This strategy can be quantified by Measure T4-A.

Measure T4-A: Transit-Supportive Treatments

Implement transit-supportive treatments on 25 percent of transit routes in Watsonville. Transit-supportive treatments will incorporate a mix of roadway infrastructure improvements and/or traffic signal modifications to prioritize transit movement over vehicle movement and to improve transit travel times and reliability to increase convenience and reduce wait times between services.

Anticipated Reductions from Strategy T4

Strategy Effects	Impact in 2030
Total VMT Reduction	(28,509)
% VMT Reduction from BAU	0.02%
Total GHG Reduction ($MTCO_2e$)	(9)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T4 Implementation

Measure	Responsibility	Timeframe	Cost
T4-A	Public Works & Utilities	Long Term	$$$

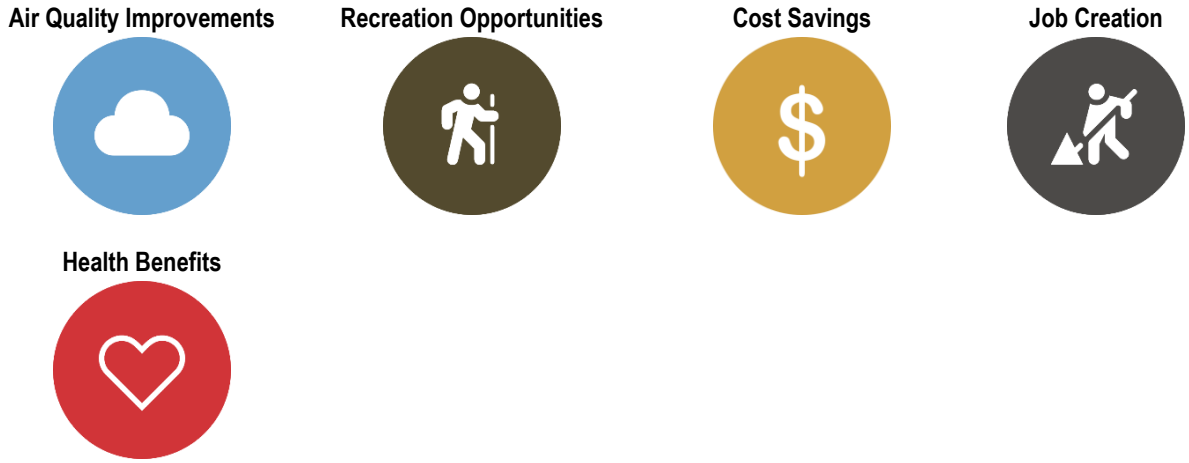
Supporting Efforts

No.	Description
Supporting Effort T4-S1	Increase use of transit, ride-share, bicycles, and pedestrian facilities by providing regional connections through supporting implementation of the Metropolitan Transportation Plan/ Sustainable Communities Strategy (MTP/SCS), including transit connections from the City of Santa Cruz and City of Hollister to Watsonville, and the Watsonville Transit Hub project to expand transportation mode options. The City supports developing the proposed Monterey Bay Sanctuary Scenic Trail Network or "Rail Trail" in a manner that is compatible with passenger rail service as previously supported by the Watsonville City Council through approval of Resolution No. 112-20 (CM) and Resolution No. 141-14 (CM).
Supporting Effort T4-S2	Coordinate with Santa Cruz Metropolitan Transit District to improve transit service.
Supporting Effort T4-S3	Coordinate with the Transportation Agency for Monterey County and Monterey County to support implementation of and to ensure multi-modal access to the planned rail station in Pajaro.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits



Strategy T5: Increase Community Commute Trip Reduction

The focus of this strategy is to provide incentives for existing and future business employees to commute through various ride-sharing options and to incentivize the use of bicycles as an alternative to single-occupancy vehicles. This strategy can be quantified by Measures T5-A and T5-B.

Measure T5-A: Commute Trip Reduction Programs

Update the City's Green Business Program to include commute trip reduction programs. Provide incentives and education to existing and future employers to participate in the program, particularly to implement commute trip reduction programs. The City shall track participating businesses to achieve a 20 percent participation City-wide. Commute trip reduction programs may include but not be limited to ride-sharing programs, subsidized transit, vanpool/shuttles, and alternative work schedules.

Measure T5-B: End-of-Trip Facilities

Update Watsonville Municipal Code, Section 14-17.113, to require new non-residential development to provide end-of-trip facilities for employee use in addition to bicycle parking. End-of-trip facilities will include bike parking, bike lockers, showers, and personal lockers to the extent feasible.

Anticipated Reductions from Strategy T5

Strategy Effects	Impact in 2030
Total VMT Reduction	(709,059)
% VMT Reduction from BAU	−0.52%
Total GHG Reduction ($MTCO_2e$)	(218)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T5 Implementation

Measure	Responsibility	Timeframe	Cost
T5-A	Public Works & Utilities	Medium Term	$$
T5-B	Community Development	Short Term	$

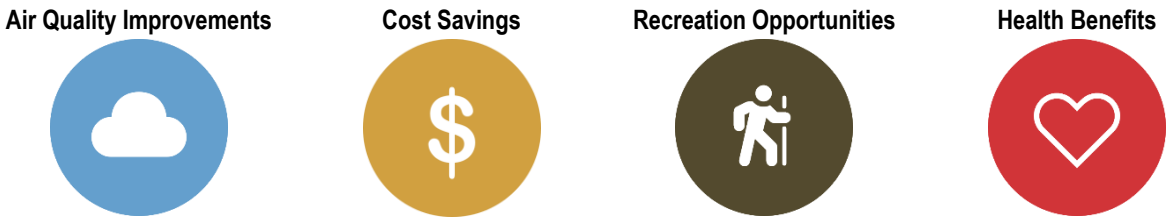
Supporting Efforts

No.	Description
Supporting Effort T5-S1	Participate in regional efforts to promote telecommuting.
Supporting Effort T5-S2	Support efforts to develop City-wide broadband access.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits



Strategy T6: Increase Community Trip Reduction

The focus of this strategy is to offer more ride-sharing and local shopping options to the community and to educate the community on these different opportunities. This strategy can be quantified by MeasuresT6-A, T6-B, T6-C, T6-D, T6-E, T6-F, and T6-G.

Measure T6-A: Car-Sharing Programs

Permit and support car-sharing programs such that one shared car is available per every 2,000 residents.

Measure T6-B: Mobility Devices

Promote short-term and monthly rental or purchase of bicycles, ebikes, cargo bikes, and similar mobility devices, including 100 shared or short-term rental devices in the Downtown Area. This measure may be accomplished fully or in part through implementation of the proposed Santa Cruz County Regional Bicycle Share Program.

Measure T6-C: Community-Based Travel Planning

Implement community-based travel planning (CBTP) that targets at least 50 percent of residences by 2030. The CBTP is a residential-based outreach that will provide households with customized information about available routes and destinations, available incentives and discounted fare programs, and availability of support infrastructure such as bike or scooter sharing, to encourage the use of transportation alternatives in place of single-occupancy vehicles. The CBTP would involve teams of trained travel advisors visiting all households within a targeted geographic area, having tailored conversations about residents' travel needs, and educating residents about the various transportation options available to them.

Measure T6-D: School Ride-Sharing Program

Create or facilitate a ride-sharing program for school-aged children. The program would match parents to transport students to public or private schools, particularly schools where students would find it difficult to walk or bike and would otherwise not be able to use a school bus. The City will promote and track the program to achieve 16 percent City-wide student participation by 2030.

Measure T6-E: School Bus Services

Promote school bus services to achieve a 10 percent increase in school bus use compared to existing use by 2030.

Measure T6-F: Active Transportation Routes to School

Continue to implement the Complete Streets to Schools Plan to improve active transportation routes to schools to increase use of active transportation for school commutes by 5 percent by 2030. Proposed improvements include but are not limited to new sidewalks, improved signage and street markers, sidewalk improvements, lighting improvements, and crosswalk improvements.

Measure T6-G: Local Shopping

Provide a variety of opportunities and incentives to encourage local shopping, with the goal of reducing average household grocery trip length by 1 mile. Programs will include identifying and removing barriers to urban agriculture to encourage residents to grow food and/or raise chickens and to expand and diversify alternative food access points (e.g., community-supported agriculture, community gardens, farmers markets). The City will identify vacant City-owned land suitable for growing food, establish community gardens where suitable, and make City-owned parking lots and public gathering spaces available for farmers markets and community-supported agriculture pick-up locations.

Anticipated Reductions from Strategy T6

Strategy Effects	Impact in 2030
Total VMT Reduction	(4,490,496)
% VMT Reduction from BAU	3.30%
Total GHG Reduction ($MTCO_2e$)	(1,383)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T6 Implementation

Measure	Responsibility	Timeframe	Cost
T6-A	Public Works & Utilities; Community Development	Medium Term	$
T6-B	Public Works & Utilities	Medium Term	$
T6-C	Public Works & Utilities	Long Term	$$
T6-D	Public Works & Utilities	Medium Term	$$
T6-E	Public Works & Utilities	Short Term	$$
T6-F	Public Works & Utilities	Short Term	$$
T6-G	Public Works & Utilities	Long Term	$$

Supporting Efforts

No.	Description
Supporting Effort T6-S1	Develop and implement recommended project-level mitigation measures to reduce vehicle miles traveled (VMT) through implementation of the California Environmental Quality Act (CEQA), in accordance with Senate Bill (SB) 743 and Governor's Office of Planning and Research Technical Guidance.
Supporting Effort T6-S2	Promote local preference purchasing policies for private companies, public schools, etc.
Supporting Effort T6-S3	Implement Lawn to Food program or Lawn to Natives program.
Supporting Effort T6-S4	Work with local partners to host ongoing do-it-yourself workshops for residents and to create a flea market (market place or fair) for used and locally made goods, and conservation learning opportunities.
Supporting Effort T6-S5	Update the Municipal Code to increase bicycle parking requirements for commercial and residential development, where appropriate.
Supporting Effort T6-S6	Launch an "Eat Local" initiative to inform public, restaurants, and local businesses of benefits to sourcing locally grown food, collaborate with Farm Bureau and/or Chamber of Commerce.

Relevant Adaptation Strategies

Objective	Action
Objective F.2: The community is educated and empowered to produce, distribute, and access healthy food.	**Action F.2.3:** Promote agro-eco literacy with focus on local agricultural production and stewardship stories in K–12 education, with focus on local agricultural production and stewardship stories.
	Action F.2.4: Explore partnerships with local businesses and restaurants to educate the public on the benefits of eating locally and promote the sourcing of locally produced food.

Co-Benefits

Air Quality Improvements

Cost Savings

Recreation Opportunities

Job Creation

Health Benefits

Strategy T7: Expand Electric Vehicle Use

The focus of this strategy is to encourage more EV use in Watsonville to shift toward a cleaner and renewable energy to power vehicles. This strategy can be quantified by Measures T7-A and T7-B.

Measure T7-A: Accelerated Vehicle Retirement Program

Participate in an accelerated vehicle retirement program, such as the EV Purchase Guidance Program through Ecology Action, to replace at least 1,500 locally registered light-duty, gasoline- or diesel-powered vehicles with ZEVs by 2030. Replacement vehicle eligibility would be determined by program requirements. In the event that requirements are to be established by the City, cars eligible for replacement shall be at least 10 years old at the time of program implementation.

Measure T7-B: Public Electric Vehicle Charging Stations

Create at least 20 EV charging facilities in public parking areas (City-owned lots and parking spaces) by 2030.

Anticipated Reductions from Strategy T7

Strategy Effects	Impact by 2030
Total Gasoline VMT Reduction	(13,830,350)
% Passenger/Light Duty VMT Reduction from BAU	12%
Vehicle GHG Reduction ($MTCO_2e$)	(5,239)
Additional GHG from Energy Use ($MTCO_2e$)	13
Net Decrease in GHG Emissions ($MTCO_2e$)	(5,226)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T7 Implementation

Measure	Responsibility	Timeframe	Cost
T7-A	Public Works & Utilities	Long Term	$$$
T7-B	Public Works & Utilities	Medium Term	$$$

Supporting Efforts

No.	Description
Supporting Effort T7-S1	Explore Low-Carbon Fuel Standard Credits generated by electric vehicle (EV) charging.
Supporting Effort T7-S2	Participate in programs to bring electric vehicle (EV) charging infrastructure to existing multi-family and low-income households.
Supporting Effort T7-S3	Support state or federal efforts to explore commercial use of electric aircraft.
Supporting Effort T7-S4	Explore electric charging stations at Watsonville Municipal Airport for electric aircraft.

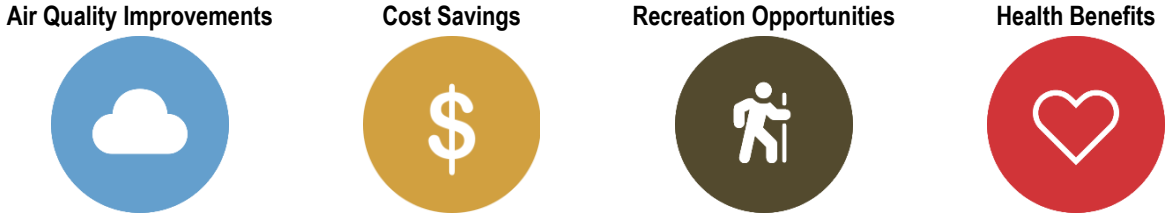
Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.2:** Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe California 4.a.iii	Ensure significantly greater GHG-free transportation and mobility, including no new internal combustion vehicles licensed by 2030.

Co-Benefits



Strategy T8: Establish Municipal Commute Reduction

The focus of this strategy is to reduce City employee VMT by offering commute reduction programs and opportunities to work remotely. This strategy can be quantified by Measures T8-A and T8-B.

Measure T8-A: City Employee Commute Reduction Program

Create a comprehensive, monitored City employee commute reduction program that will, at a minimum, include an incentivized carpool program. It shall be the goal of the City that at least 20 percent of employees for whom work from home is not an option will participate in the program.

Measure T8-B: City Employee Telecommuting

Continue to allow City staff to work from home at least 1 day per week, with the goal of at least 10 percent staff participation in the program.

Anticipated Reductions from Strategy T8

Strategy Effects	Impact in 2030
Total VMT Reduction	(143,475)
% VMT Reduction from BAU	−0.11%
Total GHG Reduction ($MTCO_2e$)	(44)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T8 Implementation

Measure	Responsibility	Timeframe	Cost
T8-A	City Manager	Medium Term	$$
T8-B	Public Works & Utilities; City Manager	Short Term	$

Supporting Efforts

No.	Description
None.	None.

Relevant Adaptation Strategies

Objective	Action
None.	None.

Co-Benefits

Strategy T9: Electrify Fleet Vehicles

The focus of this strategy is to reduce fossil-fueled VMT be replacing the City's fleet vehicles with ZEVs. This strategy can be quantified by Measure T9-A.

Measure T9-A: Zero-Emissions Vehicle Fleet

Continue to implement the City's Green Vehicle Policy to purchase or lease low-emissions passenger vehicles and trucks and low-emissions heavy-duty vehicles as well when possible. Strengthen the policy to require ZEVs for passenger vehicles and trucks, with the goal of replacing all light-duty vehicles with ZEVs by 2030.

Anticipated Reductions from Strategy T9

Strategy Effects	Impact in 2030
Total VMT Reduction	(2,430,345)
% VMT Reduction from BAU	1.37%
Total Vehicle GHG Reduction ($MTCO_2e$)	(926)
Additional GHG from Energy Use ($MTCO_2e$)	2
Net Decrease in GHG Emissions ($MTCO_2e$)	(924)

Notes: BAU = business-as-usual; GHG = greenhouse gas; $MTCO_2e$ = metric of carbon dioxide equivalent; VMT = vehicle miles traveled

Strategy T8 Implementation

Measure	Responsibility	Timeframe	Cost
T9-A	Public Works & Utilities	Short Term	$$$

Supporting Efforts

No.	Description
Supporting Effort T9-S1	Reduce municipal fossil-fueled vehicle miles traveled (VMT) by eliminating biosolids hauling through future use of biochar at the City's wastewater treatment facility and creating a circular carbon economy in the Pajaro Valley.

Relevant Adaptation Strategies

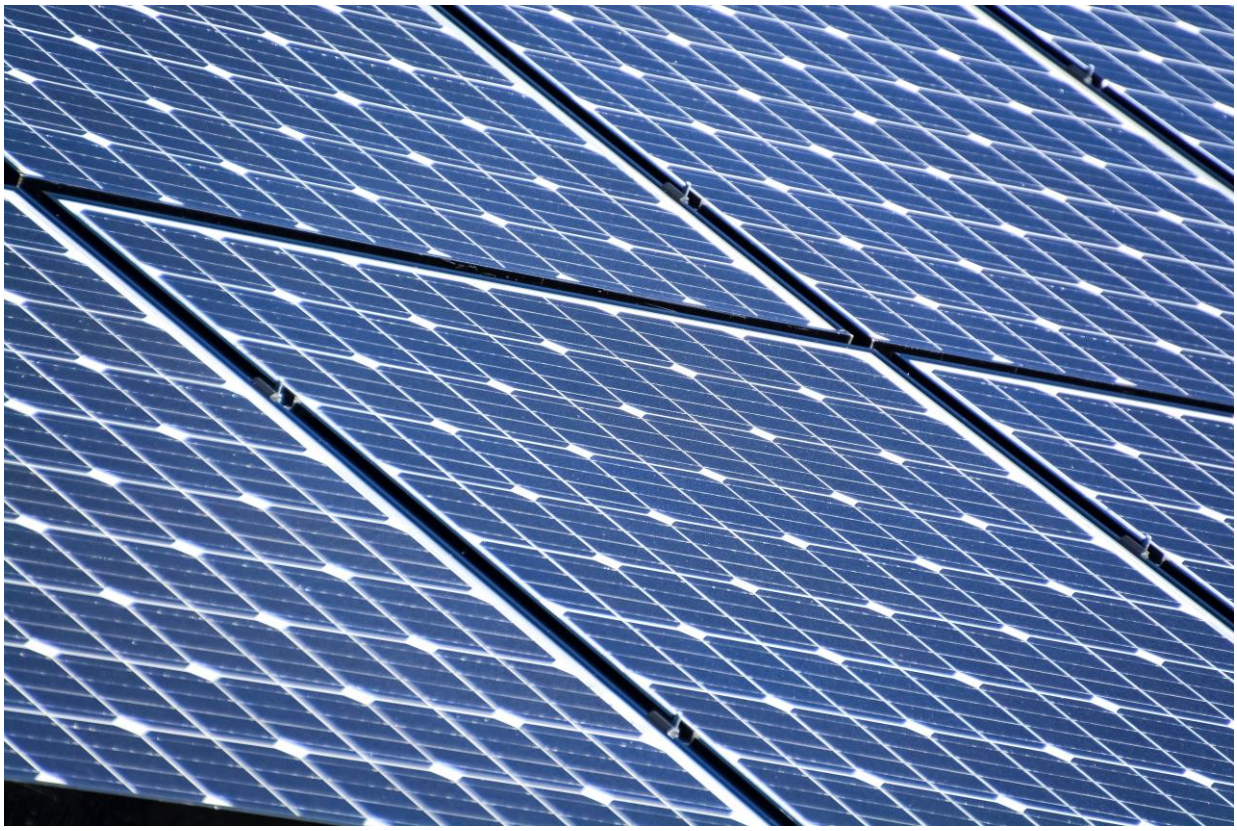
Objective	Action
None.	None.

Co-Benefits

Air Quality Improvements

Health Benefits

Energy Sector



Goal: The purpose of this sector is to increase energy efficiency and reduce demand from GHG-generating energy sources.

The energy-related strategies and measures proposed under this sector aim to reduce energy use, as well as promote use of and provide additional sources of carbon-free sources of energy.

Strategy E1: Reduce Natural Gas Use

The focus of this strategy is to reduce reliance on natural gas by encouraging new and existing development to shift toward all-electric energy use. As a fossil fuel, and because Watsonville is already served by a clean electricity provider, natural gas is a substantive source for GHG emissions from the City. This strategy can be quantified by Measures E1-A and E1-B.

Measure E1-A: Natural Gas Reduction in New Development

Require a 50 percent reduction in natural gas consumption compared to BAU in all new development through electric-only development and installation of electric or more efficient natural gas home heating and cooling systems, appliances, or water heaters. Explore implementation of an all-electric ordinance to achieve all-electric new development by 2030.

Measure E1-B: Appliance Retrofits

Incentivize retrofits of gas appliances such as home heating and cooling systems, cooking appliances, dryers, and water heaters with electric equivalents by 2030, with a target natural gas use reduction of 30 percent by 2030. The City shall work with 3CE or other funding sources to accomplish this measure.

Anticipated Reductions from Strategy E1

Strategy Effects	Impact in 2030
	Net Change ($MTCO_2e$)
Non- Residential Electricity	7
Residential Electricity Use	130
Non-Residential Natural Gas	(446)
Residential Natural Gas	(7,879)
Total Net GHG Reduction ($MTCO_2e$)	(8,187)

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E1 Implementation

Measure	Responsibility	Timeframe	Cost
E1-A	Community Development; Public Works & Utilities	Short Term	$
E1-B	Public Works & Utilities	Medium Term	$$

Supporting Efforts

No.	Description
Supporting Effort E1-S1	Promote equitable electrification policies with Central Coast Community Energy (3CE).
Supporting Effort E1-S2	Lobby the state for a statewide ordinance and explore implementation of an ordinance requiring new construction to be all-electric.
Supporting Effort E1-S3	Support Central Coast Community Energy's (3CE's) efforts to increase community preparedness for power outages by developing educational materials and conducting outreach.
Supporting Effort E1-S4	Investigate updates to the City's Building Regulations (Municipal Code Title 8) to accelerate anticipated changes to green building criteria in the California Green Building Standards Code concerning building electrification, electric vehicle (EV) parking/charging, or other measures.
Supporting Effort E1-S5	Encourage the state to ensure that electric infrastructure will be adequate to support the conversion to all-electric.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.1:** Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.
	Action E.1.2: Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
	Action E.1.4: Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.
Objective E.2: Critical facilities have solar + battery backup for protection.	**Action E.2.1:** Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.
	Action E.2.2: Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe California 4.a.v	Ensure significantly greater GHG reduction in buildings, including 100 percent electric building requirements for all new buildings established by 2023.

Co-Benefits

Strategy E2: Retrofit Existing Buildings

The focus of this strategy is to increase existing building efficiency by promoting retrofits of residential and commercial buildings in Watsonville. This strategy can be quantified by Measure E2-A.

Measure E2-A: Existing Building Retrofits

Facilitate and promote funding programs to retrofit 25 percent of existing (pre-2020) commercial spaces and residential units by 2030 to achieve 10 percent or greater energy efficiency compared to existing energy use. Example retrofits may include but are not limited to Energy Star appliance replacements or boiler replacements.

Anticipated Reductions from Strategy E2

Strategy Effects	% Energy Reduction	Annual Demand Reduction (MMBtu)	GHG Reduction ($MTCO_2e$)
Non-Residential Electricity	2.50%	(10,861)	(9)
Residential Electricity Use	2.50%	(4,684)	(4)
Non-Residential Natural Gas	2.50%	(9,617)	(512)
Residential Natural Gas	2.50%	(11,190)	(595)
		Total ($MTCO_2e$)	**(1,120)**

Notes: GHG = greenhouse gas; MMBtu = metric million British thermal units; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E2 Implementation

Measure	Responsibility	Timeframe	Cost
E2-A	Public Works & Utilities	Medium Term	$$

Supporting Efforts

No.	Description
Supporting Effort E2-S1	Create an Existing Building Decarbonization Plan to expand the potential to reduce existing building energy use.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.1:** Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.
	Action E.1.2: Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
	Action E.1.4: Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.
Objective E.2: Critical facilities have solar + battery backup for protection.	**Action E.2.1:** Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.
	Action E.2.2: Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.

Co-Benefits

Strategy E3: Increase 3CE Prime Participation

The focus of this strategy is to move the City toward greater involvement in 3CE Prime. 3CE is a Community Choice Energy agency established by local communities to source clean and renewable electricity while retaining the utility provider's traditional role delivering power and maintaining electric infrastructure. The goal of 3CE is to reduce GHG emissions through local control of utility scale renewable electricity generation provided at competitive rates and the implementation of innovative energy programs that facilitate the electrification of the transportation and built environments. The 3CE Prime option provides carbon-free electricity. This strategy can be quantified by Measures E3-A and E3-B.

Measure E3-A: 3CE Customer Participation

Increase participation in 3CE Prime, with the goal of 50 percent of all residential and non-residential customers choosing 3CE Prime by 2030.

Measure E3-B: City 3CE Prime Participation

Switch all City electricity accounts to 3CE Prime, including Watsonville Municipal Airport.

Anticipated Reductions from Strategy E3

Strategy Effects	Impact in 2030
Reduced Total GHG Emissions (City Facilities) ($MTCO_2e$)	(21)
Reduced Total GHG Emissions (Non-Res) ($MTCO_2e$)	(1,629)
Reduced Total GHG Emissions (Residential) ($MTCO_2e$)	(922)
Total GHG Reduction ($MTCO_2e$)	(2,573)

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E3 Implementation

Measure	Responsibility	Timeframe	Cost
E3-A	Public Works & Utilities	Short Term	$
E3-B	Public Works & Utilities	Short Term	$$

Supporting Efforts

No.	Description
Supporting Effort E3-S1	Collaborate with Central Coast Community Energy (3CE) to develop an outreach program to encourage and incentivize switching to 3CE Prime.

Relevant Adaptation Strategies

Objective	Action
Objective E.4: The City and residents have greater influence over how energy is produced and distributed, and benefit from shared profits returning to the community.	**Action E.4.1:** Ensure the City is represented on the Community Advisory Committee (CAC) for the Central Coast Community Energy (3CE) to ensure that the City receives representative investments based on the proportion of disadvantaged and low-income residents.
	Action E.4.2: Research and explore opportunities to partner with local nonprofits to pilot a community-owned solar project wherein local leaders and residents initiate and steward projects in their own communities.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe California 4.a.iv	Secure 100 percent clean, distributed, resilient electricity and storage, including mobile assets, such as electric vehicles (EVs), by 2030.

Co-Benefits

Strategy E4: Incorporate Cool Roof Technology

The focus of this strategy is to implement cool roof technology to reflect sunlight and absorb less heat to keep buildings cool, thereby reducing energy usage. This strategy can be quantified by Measure E4-A.

Measure E4-A: Cool Roofs for New Development

Require installation of cool roof technology for new commercial, municipal, and multi-family residential projects to achieve at least 50 percent cool roofs in new development. A cool roof treatment, green space, or photovoltaic panels would qualify for compliance with this measure.

Anticipated Reductions from Strategy E4

Development	Strategy Effects	Impact in 2030
Non-Residential	Total Energy Savings (MMBtu)	(205)
	GHG Reduction	(0.15)
Residential	Total Energy Savings (MMBtu)	(255)
	GHG Reduction	(0.19)
Total GHG Reduction ($MTCO_2e$)	—	(0.34)

Notes: GHG = greenhouse gas; MMBtu = metric million British thermal units; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E4 Implementation

Measure	Responsibility	Timeframe	Cost
E4-A	Community Development;, Public Works & Utilities	Short Term	$

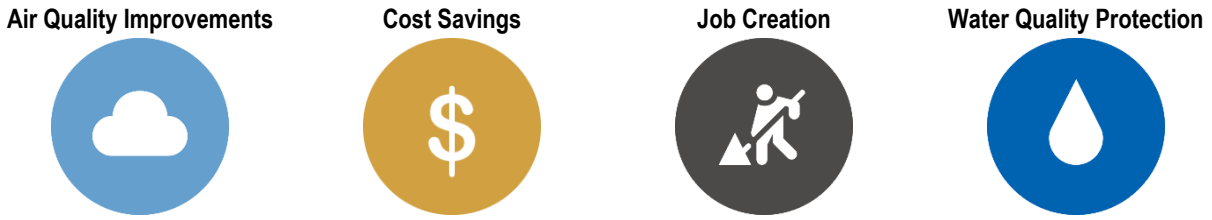
Supporting Efforts

No.	Description
Supporting Effort E4-S1	As part of the Watsonville Urban Greening Plan, install cool roof technology or use current best practices when City buildings' roofs need to be repaired, including Watsonville Municipal Airport.
Supporting Effort E4-S2	Explore implementation of an ordinance requiring installation of cool roof technology for new commercial, municipal, and multi-family residential projects.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.3:** Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
Objective E.4: The City and residents have greater influence over how energy is produced and distributed, and benefit from shared profits returning to the community.	**Action E.4.1:** Ensure the City is represented on the Community Advisory Committee (CAC) for the Central Coast Community Energy (3CE) to ensure that the City receives representative investments based on the proportion of disadvantaged and low-income residents.
	Action E.4.2: Research and explore opportunities to partner with local nonprofits to pilot a community-owned solar project wherein local leaders and residents initiate and steward projects in their own communities.

Co-Benefits



Strategy E5: Install Solar Retrofits

The focus of this strategy is to promote increased solar generation in Watsonville to support regional clean energy generation capacity. This strategy can be quantified by Measure E5-A.

Measure E5-A: Existing Building Solar Retrofits

Provide incentives and/or promote available funding programs to retrofit 15 percent of existing residences and commercial space with solar panels with battery storage to provide at least 50 percent of individual building energy demand. Incentives may include removal of administrative barriers, removing fees, improving permitting process to provide online and same-day approval.

Anticipated Reductions from Strategy E5-A

Strategy Effects	All Forecast Years
Non-Residential Electricity GHG Reduction ($MTCO_2e$)	(27)
Residential Electricity GHG Reduction ($MTCO_2e$)	(21)
Total GHG Reduction ($MTCO_2e$)	(48)

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E5 Implementation

Measure	Responsibility	Timeframe	Cost
E5-A	Public Works & Utilities	Medium Term	$$

Supporting Efforts

No.	Description
Supporting Effort E5-S1	Participate in programs that promote solar, storage, and energy improvements for City residents and businesses.
Supporting Effort E5-S2	Assess solar and storage potential for critical and community-serving facilities.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.1:** Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.
	Action E.1.2: Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
	Action E.1.4: Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.

Relevant Adaptation Strategies

Objective	Action
Objective E.2: Critical facilities have solar + battery backup for protection.	**Action E.2.1:** Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.
	Action E.2.2: Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.
Objective E.3: The City and its community have a greater capacity to respond to and withstand power disruptions.	**Action E.3.1:** Appoint a staff person to accomplish the work of assessing how solar + storage could provide power protection to community-serving and critical facilities.
	Action E.3.2: Conduct community preparedness outreach to ensure residents are well prepared for power outages and know how to respond in the event of a power outage.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe CA 4.c.i.2	Establish clean energy community microgrids and battery storage linked to electric transportation, empowering communities to keep the lights on for critical facilities, such as fire stations and hospitals, during planned or unplanned outages.

Co-Benefits

Strategy E6: Reduce Municipal Energy

The focus of this strategy is to implement previously identified projects to reduce municipal energy demand. This strategy can be quantified by Measure E6-A.

Measure E6-A: Municipal Energy Projects

Implement recommendations from the Energy Projects Assessment and Development prepared by Sage Renewables (October 2018) to reduce energy use at City Hall, the police station, Fire Station I, and other City facilities.

Anticipated Reductions from Strategy E6

Strategy Effects	Impact in 2030
Reduced GHG Emissions (Electricity) ($MTCO_2e$)	(0.08)
Reduced GHG Emissions (Natural Gas) ($MTCO_2e$)	(14)
Total GHG Reduction ($MTCO_2e$)	(14)

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E6 Implementation

Measure	Responsibility	Timeframe	Cost
E6-A	Public Works & Utilities	Short Term	$$

Supporting Efforts

No.	Description
None.	None.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.1:** Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.
	Action E.1.2: Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
	Action E.1.4: Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.

Relevant Adaptation Strategies

Objective	Action
Objective E.2: Critical facilities have solar + battery backup for protection.	**Action E.2.1:** Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.
	Action E.2.2: Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.
Objective E.3: The City and its community have a greater capacity to respond to and withstand power disruptions.	**Action E.3.1:** Appoint a staff person to accomplish the work of assessing how solar + storage could provide power protection to community-serving and critical facilities.
	Action E.3.2: Conduct community preparedness outreach to ensure residents are well prepared for power outages and know how to respond in the event of a power outage.

Co-Benefits

Strategy E7: Increase Wastewater Treatment Plant Energy Efficiency

The focus of this strategy is to reduce off-site energy demand from the Watsonville Wastewater Treatment Facility. This strategy can be quantified by Measure E7-A.

Measure E7-A: Wastewater Treatment Plant Energy Efficiency

Reduce off-site electricity demand at the Watsonville Wastewater Treatment Facility by 50 percent by 2030. The plant is currently undergoing an audit through the PG&E program RAPIDS Wastewater Treatment Optimization program that will identify projects that will reduce energy demand. Alternatively, possibilities to increase on-site electricity production include alternate uses of biogas to improve energy production and reduce emissions (such as replacing existing cogeneration system with a fuel cell system) or additional solar panels.

Anticipated Reductions from Strategy E7

Strategy Effects	Impact in 2030
Energy Reduction (MMBtu)	(5,864)
GHG Reduction ($MTCO_2e$)	(5)

Notes: GHG = greenhouse gas; MMBtu = metric million British thermal units; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy E7 Implementation

Measure	Responsibility	Timeframe	Cost
E7-A	Public Works & Utilities	Medium Term	$$

Supporting Efforts

No.	Description
Supporting Effort E7-S1	Reduce water usage throughout Watsonville to save on water supply energy use.
Supporting Effort E7-S2	Explore the Drought-Ready Construction Model Ordinance and dual plumbing guidance documents for potential implementation into the Watsonville Municipal Code.

Relevant Adaptation Strategies

Objective	Action
Objective E.1: Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	**Action E.1.1:** Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.
	Action E.1.2: Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.
	Action E.1.3: Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.
	Action E.1.4: Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.
Objective E.2: Critical facilities have solar + battery backup for protection.	**Action E.2.1:** Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.
	Action E.2.2: Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.
Objective E.3: The City and its community have a greater capacity to respond to and withstand power disruptions.	**Action E.3.1:** Appoint a staff person to accomplish the work of assessing how solar + storage can provide power protection to community-serving and critical facilities.
	Action E.3.2: Conduct community preparedness outreach to ensure residents are well prepared for power outages and know how to respond in the event of a power outage.

Co-Benefits

Air Quality Improvements

Cost Savings

Water Quality Protection

Habitat Improvements

Solid Waste Sector

Goal: The purpose of this sector is to reduce GHG emissions from waste disposal by diverting waste from landfills.

The solid waste-related strategies and measures proposed under this sector aim to reduce GHG emissions from waste disposal by diverting waste from landfills.

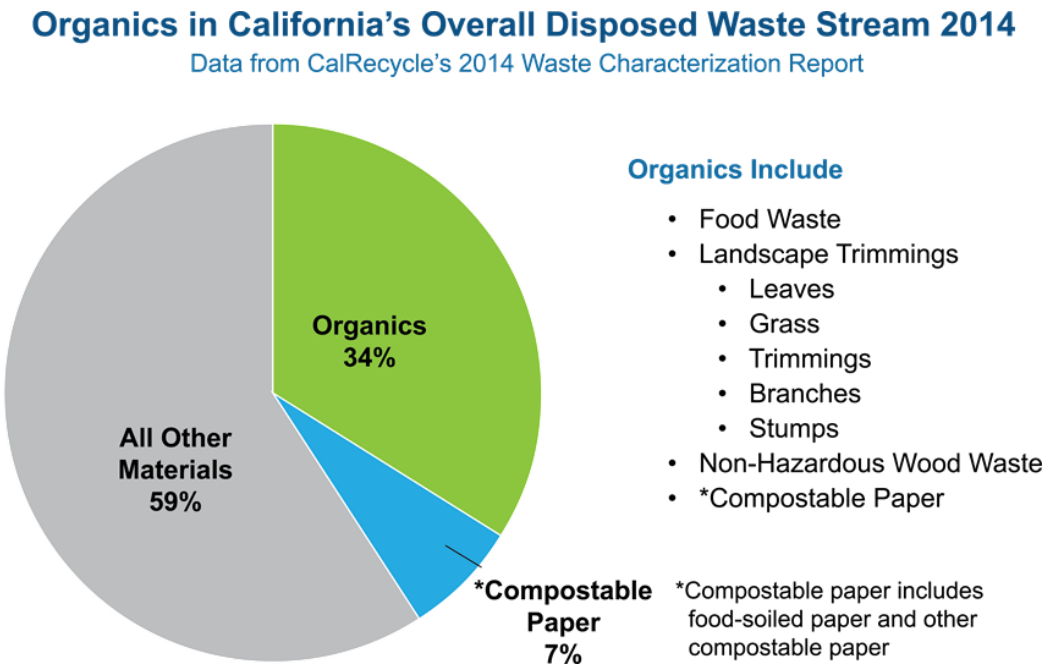
Strategy SW1: Divert Organic Waste

The focus of this strategy is to expand diversion from regional landfill disposal. This strategy can be quantified by Measure SW1-A. The City's Solid Waste Division currently provides a full range of services, such as residential and commercial trash, recycling, and yard waste collection. The City has operated a food scraps (organics) collection program for businesses and schools since 2016 for compliance with state regulations to reduce methane gas emissions. The City is on track to comply with the following requirements by 2022:

- Collect organic waste from everyone, including residents, businesses, City facilities, schools, and large events.
- Establish an Edible Food Recovery Program to prevent "wasting edible food" from stores, restaurants, schools, etc. to be used for human consumption.
- Conduct outreach and provide information to all residents and businesses about these new regulations.
- Purchase products made from organic waste, such as compost, mulch, and renewable natural gas.
- Implement City ordinances to enforce and ensure everyone is following these new rules.

This strategy focuses on organic waste, consistent with state-wide priorities. According to a waste study conducted by the state in 2014, 34 percent of waste is organic (Figure 2-6, Organics in California's Overall Disposed Waste Stream 2014).

Figure 2-6. Organics in California's Overall Disposed Waste Stream 2014



Measure SW1-A: Organic Waste Diversion

Continue to expand and promote local composting and food waste diversion programs in accordance with SB 1383 to achieve 75 percent diversion of all organic waste by 2030. An example program to achieve this measure would be creation of a residential and commercial organics recycling program.

Anticipated Reductions from Strategy SW1

Strategy Effects	Impact in 2030
Annual Solid Waste Reduction (Tons)	(7,084)
Total Emissions Reduction ($MTCO_2e$)	(2,786)

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy SW1 Implementation

Measure	Responsibility	Timeframe	Cost
SW1-A	Public Works & Utilities	Short Term	$

Supporting Efforts

No.	Description
Supporting Effort SW1-S1	Work with the California Department of Resources Recycling and Recovery to use the City's home composting program as an alternative to food waste collection for residents who want to opt out and get a service waiver.
Supporting Effort SW1-S2	Support programs that reduce plastic use in agriculture and collaborate in regional efforts to implement a plastic take-back program.
Supporting Effort SW1-S3	Eliminate single-use plastics and prioritize reuse in food preparation, distribution, and sale.
Supporting Effort SW1-S4	Explore alternate management of biosolids from the wastewater treatment plant, such as conversion to biochar—a stable, non-toxic, charcoal substance that is useful as a soil amendment.

Relevant Adaptation Strategies

Objective	Action
Objective F.1: Regional stakeholders understand climate impacts and are organized and equipped to implement climate-smart agricultural practices throughout the Pajaro Valley.	**Action F.1.1:** Publicize resources, programs, and grant opportunities that could assist local farmers to access technical assistance and funding to implement climate-smart initiatives.
	Action F.1.2: As part of advocating for a Regional Climate Action Plan, include the development of a regional agricultural climate plan through active involvement in the Central Coast Climate Collaborative (4C) and representation from the agricultural community
	Action F.1.3: Partner with community-based organizations to provide resources to farmers, farmworkers, and the community about the impacts of climate change on agriculture.

Co-Benefits

Air Quality Improvements

Job Creation

Water Quality Protection

Habitat Improvements

Natural and Working Lands Section

Goal: The purpose of this section is to increase local carbon sequestration and ecosystem health.

Strategy NW1: Increase Local Greenspace

The focus of this strategy is to increase greenspace in Watsonville. This strategy can be quantified by Measures NW1-A and NW1-B.

Measure NW1-A: Green Space

Preserve or restore an additional 5 acres of green space within City limits by 2030. The goal will, in part, be accomplished by implementing a 100-foot development buffer around all sloughs within City limits and implementing watershed improvements and habitat enhancements for sloughs, storm culverts, and open channels.

Measure NW1-B: Tree Planting

Continue to implement the Watsonville Urban Greening Plan, with the goal of planting 300 trees per year.

Anticipated Reductions from Measure NW1

	2030
GHG Reduction NW1-A ($MTCO_2e$)	(2)
GHG Reduction NW1-B ($MTCO_2e$)	(74)
Total GHG Emissions Reduction Per Year ($MTCO_2e$)	(76)

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent

Strategy NW1 Implementation

Measure	Responsibility	Timeframe	Cost
NW1-A	Community Development	Medium Term	$
NW1-B	Public Works & Utilities	Short Term	$

Supporting Efforts

No.	Description
Supporting Effort NW1-S1	Promote eco-literacy with a focus on local agriculture.
Supporting Effort NW1-S2	Incentivize tree planting on public and private property (sequester carbon, provide shade, and restore habitat).
Supporting Effort NW1-S3	Develop a tree ordinance to protect existing trees.
Supporting Effort NW1-S4	Implement an "Adopt a Tree" program.
Supporting Effort NW1-S5	Develop and implement a Green Infrastructure Plan, including a combination of stormwater features, habitat, trees, and other greenery.
Supporting Effort NW1-S6	Identify strategies for grassroots implementation of green infrastructure and restoration by City residents.
Supporting Effort NW1-S7	Coordinate meeting series with Indigenous people, such as the Amah Mutsun Tribal Band/Pajaro Indian Council, to discuss best practices on restoration strategies and actions.
Supporting Effort NW1-S8	Promote the California Conservation Corps and similar programs for Watsonville youth.
Supporting Effort NW1-S9	Work with existing landowners to replace missing landscaping to increase green space.
Supporting Effort NW1-S10	Implement a seedling program that provides residents with free trees.
Supporting Effort NW1-S11	Modify park impact fees to support additional tree planting.

Relevant Adaptation Strategies

Objective	Action
Objective F.1: Regional stakeholders understand climate impacts and are organized and equipped to implement climate-smart agricultural practices throughout the Pajaro Valley.	**Action F.1.1:** Publicize resources, programs, and grant opportunities that could assist local farmers to access technical assistance and funding to implement climate-smart initiatives.
	Action F.1.2: As part of advocating for a Regional Climate Action Plan, include the development of a regional agricultural climate plan through active involvement in the Central Coast Climate Collaborative (4C) and representation from the agricultural community
	Action F.1.3: Partner with community-based organizations to provide resources to farmers, farmworkers, and the community about the impacts of climate change on agriculture.
Objective F.2: The community is educated and empowered to produce, distribute, and access healthy food.	**Action F.2.1:** Review and update City ordinances that reduce barriers and actively support community food production.
	Action F.2.2: Develop a resolution that establishes a food procurement policy that gives preference for food that is local, sustainably produced, and adheres to animal welfare and labor standards.
	Action F.2.3: Promote agro-eco literacy with a focus on local agricultural production and stewardship stories in K–12 education.
	Action F.2.4: Explore partnerships with local businesses and restaurants to educate the public on the benefits of eating locally and promote the sourcing of locally produced food.

Relevant Adaptation Strategies

Objective	Action
	Action F.2.5: Work with non-profits to expand and diversify alternative food access points, such as farmers markets and community-supported agriculture, and other healthy and local food distribution models.
Objective F.3: The community is able to access food when supply chains are interrupted during an emergency.	**Action F.3.1:** Assess and increase the development and use of community gardens to support local food production through partnerships.
	Action F.3.2: Encourage local and regional organizations to strengthen local food supply chains, including charitable/emergency food supply for future crises.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe CA 4.b.i	Protect and increase natural carbon sequestration from the atmosphere to secure an additional ~100+ million metric tons (MMT) CO_2e annually by 2030 through major investments in healthy soils and improved agricultural practices; forest, wetland, and other habitat and vegetation protection and management; and climate-smart habitat restoration at scale in California starting no later than 2022.

Co-Benefits

Strategy NW2: Reduce Emissions through Carbon Offsets and Sequestration

The focus of this strategy is to offset carbon emissions through new offset and sequestration programs. This strategy can be quantified by Measure NW2-A.

Measure NW2-A: Local Carbon Offset and Sequestration Program

Develop a local carbon offset and sequestration program to meet the City's GHG reductions toward meeting the goal of net-negative emissions by 2030. General Plan Implementation Measure 9.K.1 (Climate Action and Adaptation Plan) requires inclusion of a local carbon offset program as part of the CAAP. The City will implement local carbon offset and sequestration projects, such as use of a local organic waste composting facility, use of local woody organic waste, or conversion of biosolids to biochar for energy generation, soil enrichment, and develop new projects in Watsonville by 2030. Current and future carbon offset and sequestration projects shall be tracked and verified by the City, be located in Watsonville, and support adaptation strategies of grid vulnerability and energy resilience and agricultural vulnerability and food resilience. The local carbon offset and sequestration program will focus on transitioning to green jobs and just transition to climate mitigation, adaptation, and restoration. Should there be a need as a last resort to develop and implement local carbon offset and sequestration projects outside of Watsonville, they shall be focused within Santa Cruz County and, lastly, within California.

Evaluate and report on the local carbon offset program and replace the use of carbon offsets with future GHG reduction measures as those become available due to technological, economic, social, behavioral, and policy changes whenever possible. This is a measure of last resort to help the City make progress toward the net-negative goal and shall not be used to meet the reduction target by 2030.

Evaluate and update the City's existing Carbon Fund Ordinance as necessary to identify additional funding to fund the local carbon offset and sequestration program.

Strategy NW2 Implementation

Measure	Responsibility	Timeframe	Cost
NW2-A	Community Development; Public Works & Utilities	Long Term	$$$

Supporting Efforts

No.	Description
Supporting Effort NW2-S1	Identify the City's role in promoting and supporting climate-smart agricultural practices in partnership with the Pajaro Valley Water Management Agency (PVWMA) and Resource Conservation District of Santa Cruz County.
Supporting Effort NW2-S2	Explore a pilot project to promote regenerative agriculture on City farm land.
Supporting Effort NW2-S3	Explore natural resource protection (specifically native plants) and invasive species management policies.
Supporting Effort NW2-S4	Quantify the sequestration (removal of carbon dioxide [CO_2]) provided by the slough system.

Relevant Adaptation Strategies

Objective	Action
Objective F.1: Regional stakeholders understand climate impacts and are organized and equipped to implement climate-smart agricultural practices throughout the Pajaro Valley.	**Action F.1.1:** Publicize resources, programs, and grant opportunities that could assist local farmers to access technical assistance and funding to implement climate-smart initiatives.
	Action F.1.2: As part of advocating for a Regional Climate Action Plan, include the development of a regional agricultural climate plan through active involvement in the Central Coast Climate Collaborative (4C) and representation from the agricultural community
	Action F.1.3: Partner with community-based organizations to provide resources to farmers, farmworkers, and the community about the impacts of climate change on agriculture.

Relevant Climate-Safe California Strategies

Strategy	Description
Climate-Safe CA 4.b.i	Protect and increase natural carbon sequestration from the atmosphere to secure an additional ~100+ million metric tons (MMT) CO_2e annually by 2030 through major investments in healthy soils and improved agricultural practices; forest, wetland, and other habitat and vegetation protection and management; and climate-smart habitat restoration at scale in California starting no later than 2022.

Co-Benefits

This page intentionally left blank.

Chapter 3 Climate Adaptation

This page intentionally left blank.

Chapter 3 Climate Adaptation

Chapter 2 addresses climate change mitigation (i.e., GHG reduction measures) that aim to reduce the amount of GHG emissions to meet the City's target and make progress toward the goal. This chapter focuses on climate change adaptation to address the impacts of climate change on the City (Figure 3-1, Mitigation and Adaptation).

Figure 3-1. Mitigation and Adaptation

Adapted from the California Office of Emergency Services, Adaptation Planning Guide Brochure by Harris & Associates in 2021.

This chapter provides a supplemental climate adaptation assessment. Climate adaptation plans typically feature a vulnerability assessment that provides an overview of the entity's climate-driven risks due to local, singular hazard events, such as extreme precipitation or wildfire events. The City's LHMP identifies potential local natural hazards and then identifies and prioritizes vulnerable areas in the City. The purpose of the LHMP is to help communities be prepared in case of natural disasters and other hazards, as well as to prepare for the recovery after such events. An LHMP can help protect the public and city infrastructures and it allows cities to apply for the California Office of Emergency Services and Federal Emergency Management grants.[4] The City's LHMP functions as the City adaptation plan; however, it does not cover compounding, regional vulnerabilities. To address this gap, the City prepared this supplemental climate adaptation chapter that assesses potential climate impacts on the City's electrical grid and agricultural productivity. Therefore, the two subject areas assessed in this chapter include the following:

- Grid Vulnerability and Energy Resilience (Section 3.1)
- Agriculture Vulnerability and Food Resilience (Section 3.2)

[4] The City conducted a climate vulnerability assessment and developed adaptation strategies to address local, singular hazard events in the 2020 Local Hazard Mitigation Plan (https://www.cityofwatsonville.org/1858/Local-Hazard-Mitigation-Plan).

Each subject area assessment includes the following four sections:

- **Introduction:** This section includes an overview of the subject area and summarizes key vulnerabilities and resiliency and justice strategies.
- **Regulatory Setting and Existing Conditions:** This section discusses existing efforts, regulations, programs, and funding sources that the City may leverage to implement resiliency strategies for each subject area.
- **Vulnerability Assessment:** This section discusses existing and potential climate risks and impacts on Watsonville residents. The City reviewed existing plans and reports and consulted with regional and local stakeholders to understand and summarize sector vulnerabilities.
- **Resilience and Justice:** This section includes strategies, with specific objectives and supporting actions, which the City will pursue to achieve climate resilience and justice in relation to the subject area. The objectives and actions were developed based on the findings of the vulnerability assessment and with input from stakeholders and the CAC.

The assessments in Sections 3.1 and 3.2 are summarized below. In response to these findings, the City developed objectives and actions (or strategies) that promote local energy and food resilience and justice. Refer to the tables presented at the end of each section (Tables 3-3 and 3-5).

Grid Vulnerability and Energy Resilience

The following are key findings of the electrical grid vulnerability assessment in Section 3.1:

- Extreme heat and wildfires pose a significant threat electricity generation capacity and reliability.
- Increases in energy demand due to wide-scale electrification and increases in air conditioning use as temperatures rise will further stress the electrical grid.
- The City will likely experience more power outages in the future, which pose a high risk to vulnerable residents.

In response, the City will explore off-grid alternatives, including solar and battery systems that will promote energy resilience.

Agricultural Vulnerability and Food Resilience

The following are key findings of the agricultural vulnerability assessment in Section 3.2:

- Climate change will pose a significant risk to agricultural productivity, which may disrupt the local economy by impacting businesses dependent on the agricultural supply chain and limiting employment opportunities.
- This vulnerability warrants the development of a regional framework or plan that provides guidance on how to effectively coordinate the wide-scale adoption of climate-smart agricultural strategies.

In light of existing regional vulnerabilities, the City will pursue strategies that will increase the local food resilience of the community by removing barriers to local production, distribution, and access to healthy food.

3.1 Grid Vulnerability and Energy Resilience

3.1.1 Introduction

Access to reliable electricity is essential to residents and businesses in Watsonville. For vulnerable populations, it can have a significant impact on lives and livelihoods. People with disabilities, especially those who rely on powered medical equipment, are especially at risk from power outages. Low-income households are less able to absorb lost income associated with blackouts, including temporary business closures and spoiled food replacement. Moreover, emergency response services and key infrastructure that lose power may become unable to adequately serve these vulnerable groups, putting lives at risk.

The centralized electrical grid on which the City depends is becoming increasingly vulnerable due to several contributing factors:

- As temperatures rise and wildfires increase in frequency and intensity, disruptions in electrical infrastructures are likely to become more common. Higher temperatures, for example, can decrease the capacity of grid components (power plants, substations, and transmission lines).
- As heatwaves become more prevalent, the rise in electricity demand due to increased use of air conditioning can further strain the electrical grid.
- As the City works toward wide-scale (carbon-free) electrification (i.e., building electrification, EVs) consistent with regional and state trajectories, significant increases in electricity demand could threaten the reliability of the electrical grid.

When electrical grids fail, blackouts can result, increasing the public health and economic toll. In October 2019, tens of thousands of local PG&E customers[5] lost power due to a public safety power shutoff (PSPS) amid high wildfire risk conditions.

The reduced capacity of the electrical grid to provide reliable electricity under climate change conditions could further hamper the City's ability to meet GHG emissions reduction targets and to keep residents safe. Consistent with regional and state priorities, the City seeks to pursue wide-scale electrification to chart a course toward a clean energy future. Greater gains in energy efficiency and investment in renewable energy at a local, regional, and state scale will be necessary to meet growing demand for electricity that results from the transition away from fossil fuels.

The following sections provide context and justification for adaptation strategies that the City will pursue through implementation of the CAAP to achieve energy resilience and energy justice. Energy resilience refers to the City's goal of withstanding and recovering from climate impacts to ensure the provision of power to all its residents. Energy justice refers to the City's goal of achieving equity in both the social and economic participation in the energy system while also remediating social, economic, and health burdens on those disproportionately harmed by the energy system (Baker et al. 2019). Energy justice also involves working to ensure that residents, especially lower-income residents, and vulnerable communities do not shoulder the costs (i.e., through utility rate increases or cost associated with purchasing electric appliances) of the transition away from fossil fuels.

3.1.2 Regulatory Setting and Existing Conditions

PG&E maintains the electrical grid for the region. Recognizing the significant vulnerabilities of large utilities to provide reliable energy under future climate conditions, the CEC has begun actively supporting jurisdictions in improving local energy resilience. In 2016, the CEC updated its Existing Building Energy Efficiency Action Plan, which includes strategies for enhancing the energy efficiency of existing residential, commercial, and public buildings. Through the Electric Program Investment Charge, the CEC funds microgrid demonstration projects for critical facilities. For example, the CEC administered $1.8 million in grant funding for the City of Fremont to install solar emergency microgrid systems at three fire stations in Fremont, California (CEC 2020). Each of the microgrid systems consists of an energy management system, a parking lot solar photovoltaic canopy system, and a battery storage system. The system provides energy cost savings when connected to the grid and at least 4 to 6 hours of clean renewable power during a utility power outage, which might be caused by natural disasters (i.e., wildfire or earthquake). As part of its strategy for enhancing grid reliability, the CEC also funds the deployment of energy storage and EV charging stations.

[5] Monterey Bay Community Power customers were not immune to the PSPS event because customers still relied on PG&E's infrastructure to receive energy.

Similarly, the California Department of Community Services and Development provides funding for energy efficiency, rooftop and community solar, and weatherization projects for low-income and farmworker households in disadvantaged communities (Georgetown Climate Center 2021). The Low-Income Weatherization Multi-Family Energy Efficiency and Renewables Program saves participating properties an average of 30 percent on energy bills. The department has committed $5 million of allocated funding to serve properties housing agricultural workers (CHP 2019).

At a regional level, the City is part of 3CE, a Community Choice Energy agency established by local communities to source clean and renewable electricity for Monterey, San Benito, and Santa Cruz Counties and parts of San Luis Obispo and Santa Barbara Counties. By controlling utility scale renewable electricity generation and implementing energy programs that facilitate the electrification of transportation, buildings, and agricultural operations, 3CE is reducing GHG emissions throughout the Central Coast. Since March 2018, 3CE has returned $17.1 million in estimated cost savings to the communities it serves and has invested $18 million in local energy programs like EV incentives, EV charging stations, and solar for affordable housing to date. 3CE is an important stakeholder and potential revenue source for the City to pursue wide-scale electrification and energy resilience strategies outlined in the CAAP.

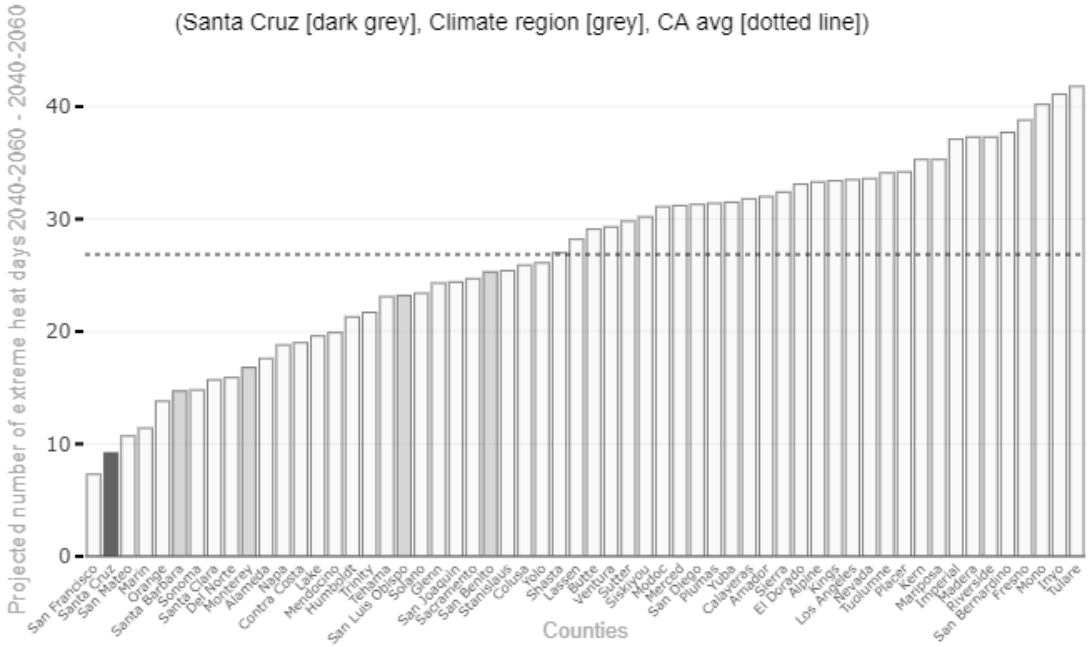
3.1.3 Vulnerability Assessment

Watsonville is likely to experience the impacts of climate change to a lesser degree than other parts of the county, state, and country. Below is an assessment of Watsonville's exposure to climate impacts relative to other parts of the county and state.

3.1.3.1 Extreme Heat

Watsonville is comparably less exposed to rising temperatures and extreme heat than many parts of the state (Figure 3-2, Projected Number of Extreme Heat Days 2040–2060 for California Counties). Its proximity to the coast will keep it relatively cooler than inland areas that are projected to experience more intense extreme heat events.

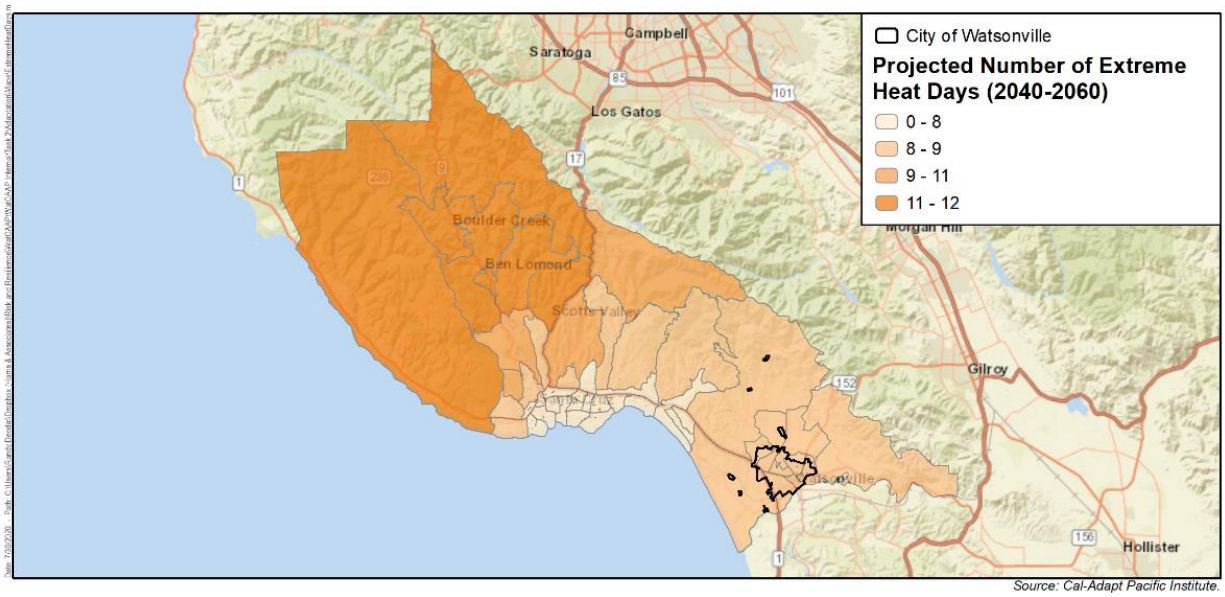
Figure 3-2. Projected Number of Extreme Heat Days 2040–2060 for California Counties



Source: CDPH 2021.

The City's proximity to the coast will result in relatively less heat impacts (i.e., heat-related illness, power outages) compared to the Central Valley (Figure 3-3, Projected Number of Extreme Heat Days 2040–2060 for Santa Cruz County).

Figure 3-3. Projected Number of Extreme Heat Days 2040–2060 for Santa Cruz County



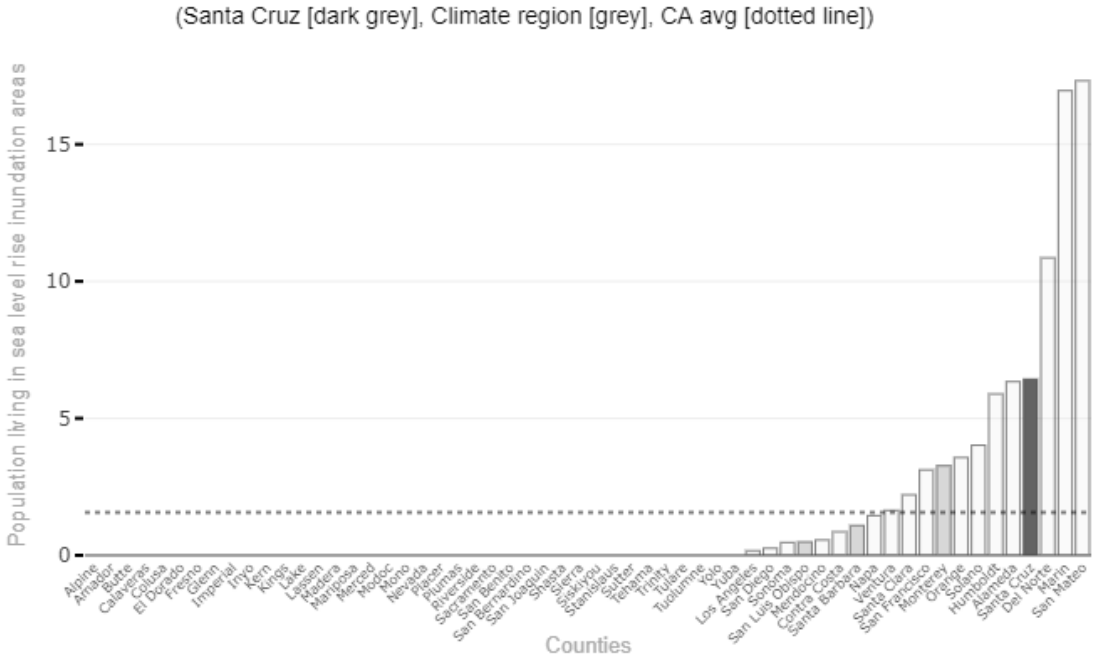
3.1.3.2 Sea-Level Rise

Santa Cruz County is the fourth most vulnerable county in California with respect to sea-level rise exposure, defined here as the percentage of population in the inundation zone at 4.6 feet of sea-level rise with a 100-year flood (Figure 3-4, Population Living in Sea-Level Rise Inundation Areas for California Counties). Unlike heat, which has regional impacts, sea-level rise affects specific low-lying coastal areas. Some parts of the City are projected to be significantly impacted at 4.6 feet of sea-level rise combined with a 100-year storm. Affected census tracts have up to 39 percent of the population residing in the sea-level rise inundation area under this scenario.

In the nearby City of Santa Cruz, affected census tracts have up to 55 percent of residents living in the inundation area at 4.6 feet. These areas are not only more exposed but also more populated, creating conditions that may lead movement inland.

The City is also higher than many low-lying beach communities like the City of Santa Cruz that will be more directly and severely impacted by sea-level rise (the lowest point inside Watsonville is approximately 14 feet above sea level, with Downtown Watsonville having an elevation of approximately 30 feet above sea level).

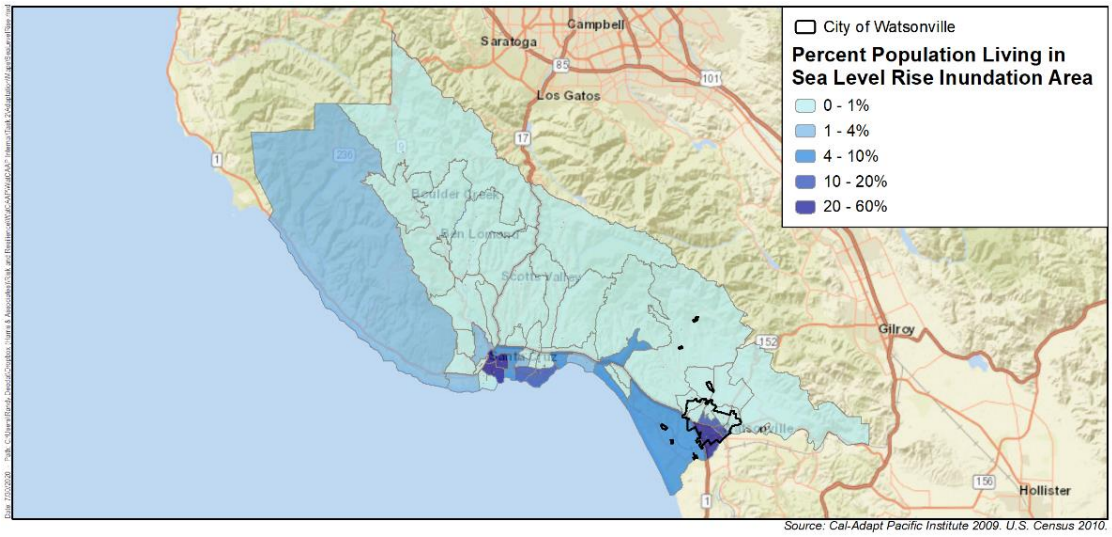
Figure 3-4. Population Living in Sea-Level Rise Inundation Areas for California Counties



Source: CDPH 2021.

Most of the County of Santa Cruz, however, is not at risk to sea-level rise, so it should not be assumed that residents impacted by sea-level rise will leave the county (Figure 3-5, Population Living in Sea-Level Rise Inundation Areas for Santa Cruz County).

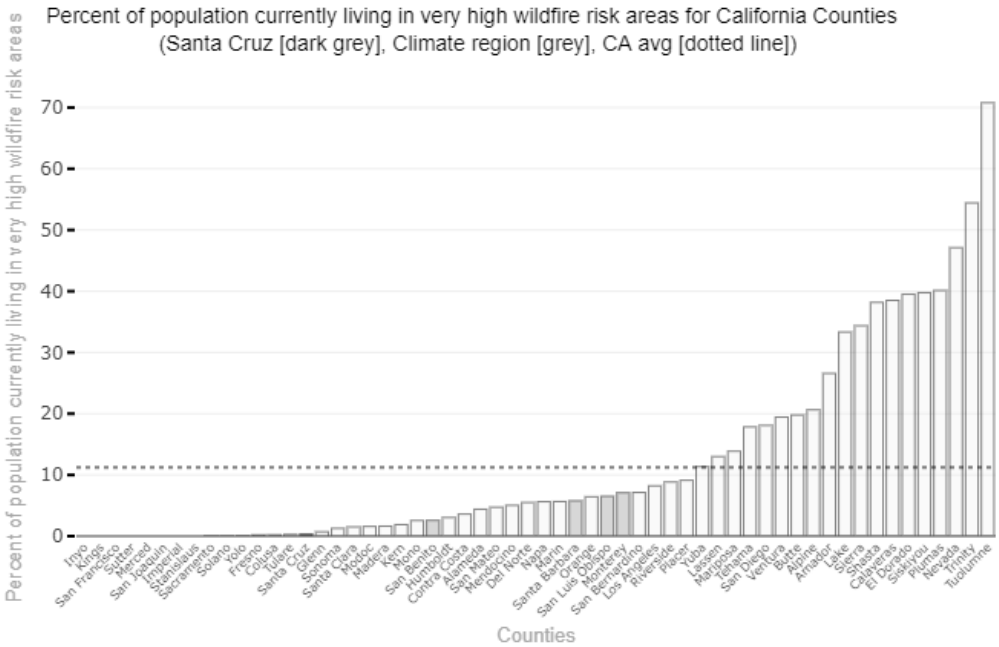
Figure 3-5. Population Living in Sea-Level Rise Inundation Areas for Santa Cruz County



3.1.3.3 Wildfire

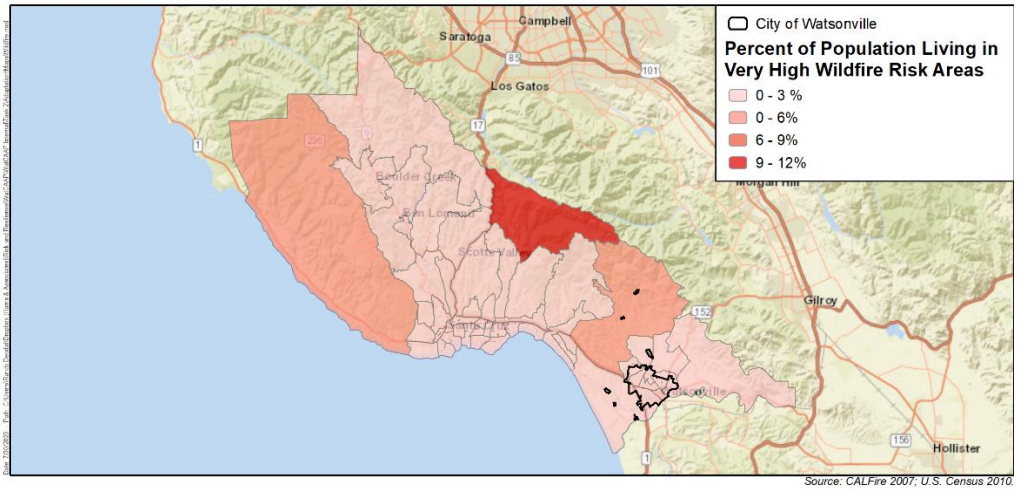
Santa Cruz County is much less exposed to wildfire risk than other parts of the state—only 0.35 percent of the population lives in a very high wildfire risk area compared to the state average of 11.23 percent (Figure 3-6, Population Living in Very High Wildfire Risk Areas for California Counties). Although a low percent of Watsonville residents currently live in very high wildfire risk areas, the City is surrounded by areas with high wildfire risk (Figure 3-7, Population Living in Very High Wildfire Risk Areas for Santa Cruz County).

Figure 3-6. Population Living in Very High Wildfire Risk Areas for California Counties



Source: CDPH 2021.

Figure 3-7. Population Living in Very High Wildfire Risk Areas for Santa Cruz County



3.1.3.4 Electricity Generation

Electricity is critical during an emergency. In addition to maintaining the City's emergency response centers and other critical facilities, electricity is needed to run its pumps (stormwater, flood control, wastewater, drinking water wells) and to maintain communication. The City's substations provide electricity through a networked grid. If one component fails, cascading consequences could occur throughout the grid, even though some redundancy exists within the overall grid.

Numerous studies have highlighted the impact of climate change on energy infrastructure in the California context, which, in turn, impacts electricity availability to the City. In 2012, the CEC published Estimating Risk to California Energy Infrastructure from Projected Climate Change, which summarizes the negative climate change impacts on the electrical grid. Key impacts include risk of damaged assets due to increased wildfire frequency or severity and sea-level encroachment on power plants and substations, as well as impacts from higher temperatures on power plant capacity, electricity generation, transmission lines, substation capacity, and peak electricity demand (CEC 2012).

The City's 2020 LHMP identifies three energy facilities within the 100- and 500-year floodplains. Rising sea levels at the end of the century could affect coastal power plants and substations. At 4.6 feet of sea-level rise, combined with a 100-year storm, the Buena Vista and Watsonville cogeneration power plants could be at risk of inundation, threatening power supply to the region if not addressed (CEC 2012). No energy facilities are in a fire hazard severity zone, although some transmission lines run through a fire hazard severity zone. Climate change will likely increase transmission line exposure to wildfires (CEC 2012).

Increased wildfire risk due to climate change poses a particular risk to electric utility companies. Utility regulators have estimated that utility equipment has been the cause of approximately 2,000 fires from 2017 through 2019years (Luna 2019). High winds can blow branches into wires and break critical parts of transmission towers. Damage from the wildfires that swept through Northern California during the 2017–2018 fire season resulted in financial liabilities of over $30 billion, causing PG&E to file for bankruptcy in 2019 (Luna 2019).

In response, utility companies have opted to turn off electricity to customers to reduce fire risk during gusty winds and dry weather conditions. While no single factor will automatically initiate intentional blackouts, or PSPS events, some factors include a National Weather Service Red Flag Warning, low humidity levels, forecasted sustained winds above 25 miles per hour and wind gusts in excess of 45 miles per hour, and the condition of dry fuel or vegetation on the ground. PG&E resorted to PSPS events during the fall 2019 fire season. Over the course of seven events, PG&E cut power to as many as 941,000 customers across 38 counties. The average duration of each outage was as high as 55 hours, but some customers reported being out of power for several days (CPUC 2020). The City experienced two PSPS events in 2019. Some areas of Watsonville were without power for up to 44 hours during the October 9, 2019, PSPS event.

The impacts of climate change vary across climate zones and locations in the state. Cal-Adapt (https://cal-adapt.org/) uses Representative Concentration Pathways (RCPs), which depict two different future emissions scenarios recognizing the uncertainty in future GHG emissions. One RCP is RCP 4.5, which represents an emissions scenario where communities attempt to reduce GHG emissions. RCP 8.5 represents a high emissions scenario, or BAU scenario, where GHG emissions continue to increase through the end of the 21st century. The projected percent increase in electricity demand for each climate zone that intersects the City by RCP scenario for the year 2050 from historical climate conditions (2002–2010) is listed in Table 3-1, Increase in Electricity Demand by Climate Zone and Representative Concentration Pathway.

Table 3-1. Increase in Electricity Demand by Climate Zone and Representative Concentration Pathway

Watsonville Climate Zones	RCP	Percent Increase in 2050 from Baseline
4	4.5	1.7
	8.5	2.8
5	4.5	1.6
	8.5	2.5

Note: RPC = Representative Concentration Pathway

Electricity demand is estimated to increase by only approximately 2 to 3 percent by 2050 in the City's climate zones based on increases in average and peak temperatures associated with climate change (CEC 2019a).[6] However, wide-scale electrification and phaseout of fossil fuels would likely result in significant increases in electricity demand throughout the state. A CEC study estimated that under an "aggressive energy efficiency + electrification"[7] scenario, electricity demand in California would increase by 75 percent from 2016 to 2050 (CEC 2019b). The increases in electricity demand due to rising temperatures indicate that a greater investment in renewable energy is required to meet GHG emissions reduction goals under projected population growth and growing demand scenarios.

As climate change intensifies, especially through increased severity and frequency of wildfire events, PG&E may have less capacity to deliver reliable power to City customers. Secondly, there are likely to be more severe and more frequent power disruptions to the City as regional transmission infrastructure is impacted by climate change and utilities continue to conduct PSPS events during extreme weather events. Therefore, the City is committed to building local energy resilience to provide reliable and clean energy to its residents.

3.1.4 Energy Resilience and Justice

3.1.4.1 Energy Resilience

As climate change continues to expose vulnerabilities of a centralized grid system, the City seeks to chart a new path toward energy resilience by implementing strategies that improve the ability of the City to provide reliable and carbon-free energy for the community through the promotion and implementation of decentralized, off-grid alternatives.

Backup generators (BUGs), often gasoline or diesel fueled, are becoming an increasingly popular solution to prepare for grid outages. The City has 33 diesel BUGs to provide backup power to critical water facilities and assets, including wells, water/wastewater booster stations, and reservoirs (City of Watsonville 2019a). However, fossil-fueled BUGs raise a suite of safety concerns, including the potential for carbon monoxide poisoning, fire hazards, and air pollution (CPSC 2018; CPUC 2016).

[6] The report did not consider increases due to population growth, increased use of electricity due to GHG reduction strategy, or other factors.

[7] This scenario assumes aggressive building energy efficiency, clean electricity, partial electrification of building and industrial heating, partial electrification of the transportation sector, and low-carbon biofuels.

The City is committed to providing backup power to critical infrastructure and community facilities to ensure critical public services are reliable; however, the City also recognizes the limitations of BUGs and is interested in exploring safer alternatives to backup power. One safer, off-grid alternative features a combination of distributed solar power and battery storage (solar + battery). This alternative can protect customers from the impacts of outages without relying on high-emissions-emitting BUGs. To determine where deployment of the solar + battery alternative is most beneficial, the City has assessed critical asset types, systems, and facilities that are vulnerable to power outages. Alternative BUG fuels, such as biodiesel or bioethanol, are also being pursued as a viable substitute to gasoline or diesel fuels.

During emergencies, people evacuating from an impacted area rely on functional streets to move to safe places. Streetlights and stoplights are typically connected to the electrical grid, and some stoplights can only last for a few hours on backup battery power. Nearly all City street lights have been converted to LED, and two are powered by solar. However, no street lights currently have a backup battery. By migrating to the solar + battery alternative, the City of Watsonville can improve reliability while saving money.[8] Implementation of solar + battery systems for streetlights along evacuation corridors and at high-priority intersections can ensure streets remain functional during emergencies.

The City also seeks to promote energy resilience by exploring opportunities and grant programs to support the implementation of solar + battery systems for individual buildings, including residences, businesses, schools, and critical facilities. While solar power has become common in California, and even mandatory for many new residences beginning in 2020 (CEC 2018a), a typical distributed solar system shuts down during a power outage. To provide power during outages, a system must be able to disconnect from the grid while still powering the building. It can then continue supplying power to the building when the sun is out or with a battery that can store power for use after dark. By installing a battery alongside a solar system, customers can maintain backup power during power outages and potentially save money by reducing demand charges by shifting consumption from on-peak (night-time) to off-peak times (daytime).[9]

The City also recognizes the opportunity that schools represent in efficiently providing resilient solar to the community. In addition to providing backup power to a critical community facility, implementing solar + battery systems at schools have the extra benefit of community education about the benefits of solar + battery systems. The voter-approved Clean Energy Jobs Act (Proposition 39) K–12 Program allocated more than $1.5 billion over 5 years to 2,189 local educational agencies across the state to improve facilities and to help lower energy bills. The Pajaro

[8] The solar + battery alternative also cuts installation costs by eliminating the need for electrical grid connections (VoteSolar 2020).
[9] On-peak periods are priced higher than off-peak times.

Valley Unified School District was allotted over $4 million in funds between fiscal years 2015–2017, with 26 schools in Watsonville receiving funds (CEC 2018b). Proposition 39 also supported the installation of 65 battery storage systems at schools throughout the state. While Proposition 39 funds have been exhausted, some schools are installing batteries on their own for both the financial and resilience benefits described above. The City intends to work with the Pajaro Valley Unified School District to identify future opportunities for solar + storage deployment.

The City will work to ensure all critical facilities have reliable power. Critical facilities provide emergency services and create serious public safety disruptions if they fail. The City currently has solar systems installed on three City facilities—City Hall, the Municipal Services Center, and the Water Resources Center—providing a total of 574.16 kilowatts of energy and an opportunity to add battery storage to ensure the community has access to reliable power in the event of a PSPS or other emergency.

3.1.4.2 Energy Justice

In addition to pursuing energy resilience, the City will pursue adaptation and resiliency strategies that promote energy justice. Energy justice explicitly centers the concerns of communities at the frontline of pollution and climate change (frontline communities), working class people, and those historically disempowered by racial and social inequity. Energy justice aims to make energy accessible, affordable, clean, and democratically managed for all communities. It is the City's vision to restructure energy procurement in a way that maximizes community control and local, equitably distributed wealth.

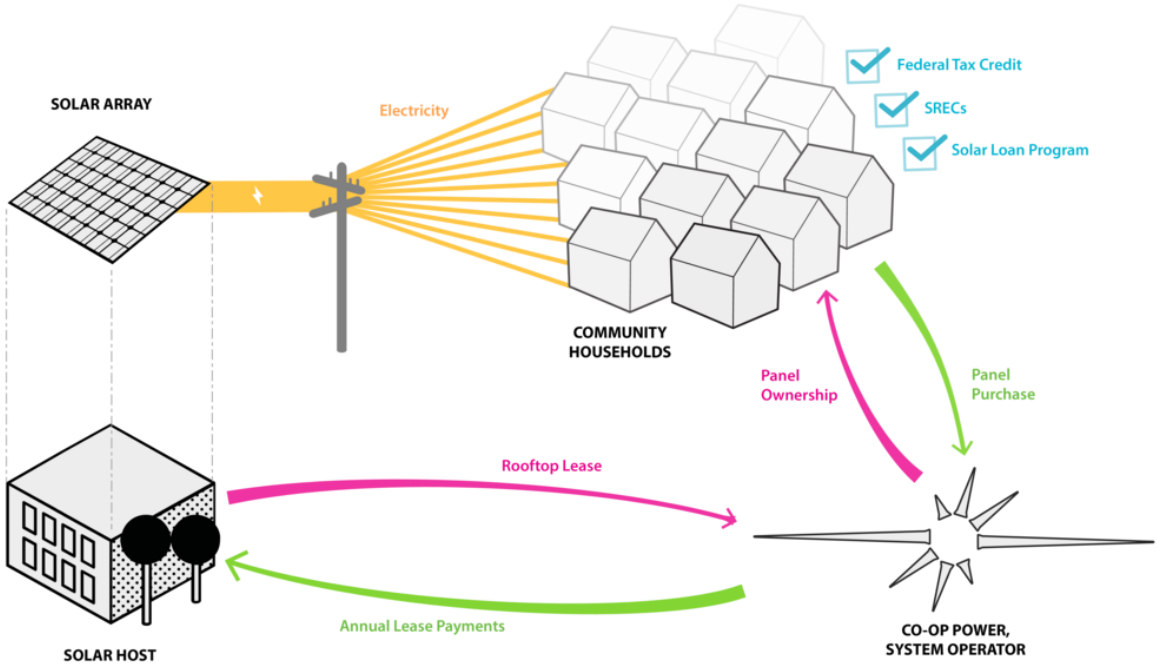
Deprivatization (or re-municipalization) is one key practice the City has and will continue to pursue that promotes energy justice. Electric utility re-municipalization is the movement to create publicly owned and operated utilities (as opposed to private utilities). By transitioning from a privately owned utility (PG&E) to a publicly owned utility (3CE) or community-owned energy model, communities can democratize the decision-making process, eliminate the overriding goal of profit maximization, and quickly transition away from fossil fuels (IEJ 2021).

In California, the transition to a publicly owned utility is similar to the formation of a community choice aggregation, also known as "municipal aggregation," which is a program that allows local governments to procure power on behalf of their residents, businesses, and municipal accounts from an alternative supplier while still receiving transmission services from their existing utility. The City joined the 3CE community choice aggregation in 2018. The City is committed to being an active advisor for 3CE to ensure future programs and policies benefit frontline and disadvantaged communities in Watsonville. Surplus revenues from 3CE's 2018–2019 budget,

estimated to be over $228 million, are expected to fund reserves, local programs, and customer rebates, directly benefiting local communities (MBCPA 2018). For example, 3CE allocated $25 million to create the Uninterruptible Power Supply Fund to accelerate the adoption of reliable backup power for eligible public and private customers operating critical facilities. The program funds battery energy storage systems, solar photovoltaic, and wind in addition to fossil-fuel BUGs. This aligns with energy justice values, specifically providing reliable access to clean energy and redistributing wealth in a community.

Community-owned energy models are also gaining traction as an alternative to privately owned utilities. Community solar allows people to go solar even if they do not own property/roof, making it an attractive option for renters or those who live in shared buildings. In a community solar model, community members purchase panels and put them on a community building or private residence that agrees to be the solar host. Participants receive the federal tax credit and virtual net metering credits[10] from electricity produced, which are applied to participants' electricity bills. The benefits of ownership include the right to have a say in the management of the project and access shared profits. The City is interested in supporting further research of community-owned energy models and exploring opportunities to pilot community solar projects in Watsonville to advance energy justice objectives (Figure 3-8, Community-Owned Energy Model).

Figure 3-8. Community-Owned Energy Model



Source: Co-Op Power adapted by Harris & Associates.

[10] Net metering allows solar customers to sell excess energy back to the grid at or near a retail rate.

3.1.4.3 Adaptation and Resiliency Strategies

Table 3-2, Strategy Criteria and Rating Scale, provides a list of intended outcomes and corresponding actions the City will pursue in the implementation of the CAAP to achieve its goals of promoting energy resilience and justice. Climate adaptation strategies were assessed for criteria listed in Table 3-2. The rating scale was developed to identify priority strategies. All criteria scores are summed to assign the strategy a priority score. Higher criteria scores yield higher priority scores. Any strategy for which the criteria scores sum to a score of 10 or higher is considered a high-priority strategy.

Table 3-2. Strategy Criteria and Rating Scale

Criteria	Rating Scale
Impact	1 = low impact, 3 = high impact
Feasibility	1 = many barriers, 3 = few to no barriers
Timeframe	1 = over 6 years, 3 = 0–2 years
Cost to Implement	1 = high cost, 3 = low cost
Priority	**Low = 0–7, Medium = 7–9, High = 10+**

Climate adaptation strategies listed in Table 3-3, Energy Resilience and Justice Strategies, supplement adaptation strategies that were developed as part of the 2020 LHMP. The 2020 LHMP adaptation strategies focus primarily on protecting critical infrastructure, while these strategies are primarily aimed at enhancing community resilience.

Table 3-3. Energy Resilience and Justice Strategies

#	Objective	Action	Lead	Impact	Feasibility	Timeframe	Cost	Priority
E.1.1	Achieve widespread deployment of solar, storage, and energy efficiency projects in the community.	Implement policies to advance the deployment of solar with storage as a resilient power application for community-serving facilities.	Public Works & Utilities	1	2	2	3	Medium
E.1.2		Work with community partners to identify, prioritize, and apply to grant programs, such as the Central Coast Community Energy's (3CE's) Uninterruptible Power Supply Program, and other programs that fund energy resilience initiatives.	Public Works & Utilities	1	3	3	3	High
E.1.3		Pilot a "resilience hub"—a community solar project paired with energy storage on a community-serving facility that could also serve as an emergency shelter.	Public Works & Utilities	2	2	3	1	Medium
E.1.4		Work with Pacific Gas and Electric Company (PG&E) to underground transmission lines in fire risk areas.	Public Works & Utilities	2	2	3	2	High
E.2.1	Critical facilities have solar + battery backup for protection.	Assess and inventory power backup requirements at critical facilities. Determine suitability for solar + battery deployment.	Public Works & Utilities	2	3	3	2	High
E.2.2		Develop site-specific designs for the implementation of solar + battery deployment at high-priority critical facilities.	Public Works & Utilities	3	2	2	2	Medium

Table 3-3. Energy Resilience and Justice Strategies

#	Objective	Action	Lead	Impact	Feasibility	Timeframe	Cost	Priority
E.3.1	The City and community has a greater capacity to respond to and withstand power disruptions.	Appoint a staff person to accomplish the work of assessing how solar + storage can provide power protection to community-serving and critical facilities.	Public Works & Utilities	2	2	3	2	Medium
E.3.2		Conduct community preparedness outreach to ensure residents are well prepared for power outages and know how to respond in the event of a power outage.	Public Works & Utilities	2	2	2	2	Medium
E.4.1	The City and residents have greater influence over how energy is produced and distributed, and benefit from shared profits returning to the community.	Ensure the City is represented on the Community Advisory Committee (CAC) for the Central Coast Community Energy (3CE) to ensure that the City receives representative investments based on the proportion of disadvantaged and low-income residents.	Public Works & Utilities	2	3	3	3	High
E.4.2		Research and explore opportunities to partner with local nonprofits to pilot a community-owned solar project wherein local leaders and residents initiate and steward projects in their own communities.	Public Works & Utilities	2	1	2	1	Low

3.2 Agricultural Vulnerability and Food Resilience

3.2.1 Introduction

Watsonville is located in the Pajaro Valley region of California's Central Coast. The Pajaro Valley's mild coastal climate offers favorable conditions for vegetable and berry crops, which has contributed to the development of a multimillion dollar agricultural sector with crop yields valued at over $800 million in 2011 (Garza-Díaz et al. 2019). Because agriculture relies directly on natural resource availability, the sector is highly vulnerable to changes in climate. Though the region has a relatively small amount of cropland, it ranks fifth in the state for total agricultural production (PVWMA 2014). Therefore, effective adaptation of the agricultural sector to climate change is not only important to the Pajaro Valley but also to the millions of people throughout the state who rely on the region's food production.

In addition to contributing to the state's food supply, the City's economy is heavily reliant on agriculture. Nearly 6 percent of the City's labor force works in the agricultural sector (City of Watsonville 2020a).[11] In 2012, the food and beverage processing industry added $65 million (directly) and $57 million (indirectly) to the City's economy and employed approximately 1,846 people (California League of Food Processors 2015). Though the City's economy has diversified to include light manufacturing, economic conditions remain heavily influenced by the agricultural and food processing industry (City of Watsonville 2019b). Weather extremes associated with climate change threaten not only the City's economy via agricultural impacts that indirectly impact the food processing industry, but also the health and well-being of farmworkers responsible for growing and harvesting the food that fuels the local economy.

The COVID-19 pandemic has exposed vulnerabilities in national and global food systems and poses potentially significant challenges to the agricultural and food processing economy of the region, including disruptions in supply chains and localized outbreaks of the virus (at times targeting food processing and distribution centers). The COVID-19 pandemic highlights the need for additional investment in local supply chains to ensure the community is resilient in the face of widespread agricultural disruptions, which are likely to become increasingly frequent due to climate change. During emergencies, local food supply can play a pivotal role in ensuring that there is fresh food available for and accessible to the community. The global health crisis of COVID-19 showcases the critical role local food systems have in building a more resilient community.

[11] This percentage could be higher due to the number of undocumented workers in Watsonville.

The City developed the following assessment to provide context and justification for adaptation strategies the City will pursue to promote regional agricultural resilience and local food resilience and justice. Agricultural resilience involves equipping farmers and farmworkers to withstand and recover from shocks and stresses to their agricultural production and livelihoods. A resilient local food system is able to withstand and recover from disruptions in a way that ensures food is accessible for all community members. Food justice refers to the ability of people and communities to grow, sell, and eat healthy food.[12]

3.2.2 Regulatory Setting and Existing Conditions

Increasing awareness of the agricultural industry's contributions to global GHG emissions, as well as the potential impacts climate change can have on agricultural yields, food prices, reliability, and food quality, has contributed to the growth of the local food movement. New state laws have created incentives and opportunities for the City to promote local food production and distribution, which will become increasingly important as climate change threatens regional, large-scale agricultural productivity:

- **Assembly Bill (AB) 1616 (2012): California Homemade Food Act –** Allows for small-scale commercial food processing in a home kitchen so long as foods produced for sale are "not potentially hazardous."[13]
- **AB 551 (2013): Urban Agriculture Incentive Zones Act14 –** Allows local jurisdictions to choose to create tax incentives for urban land dedicated to urban agriculture for 5 or more years. Several local jurisdictions have used this law to create tax incentives for urban agriculture.
- **AB 1990 (2014): An Act to Amend the California Food and Agriculture Code –** Asserted that very small-scale California farmers, which are referred to as "community food producers," do not need to register with a regulatory agency in most cases.
- **AB 234 (2015): An Act to Amend Sections of the California Health Safety Code –** Set food safety standards for urban farms, community gardens, school gardens, culinary gardens, backyard gardeners, and gleaners who sell or donate food to the public. Previously, there was confusion around what food safety laws applied to such farms and gardens, if any, which caused further confusion around whether produce grown at these farms and gardens was eligible to be sold.
- **AB 1348 (2017): Farmer Equity Act –** Directed the California Department of Food and Agriculture to take additional steps to make sure that its resources, policies, and programs are more inclusive of "socially disadvantaged farmers," including farmers of color, Native American farmers, and urban farmers.

[12] The City considers healthy food to be fresh, nutritious, affordable, culturally appropriate, and locally grown with the consideration for the well-being of land, laborers, and animals.
[13] The law allows home-production of low-risk food products, such as breads, pies, tortillas, jams, and numerous dried goods, including dried fruits, dried vegetables, and other dried foods, like herbs, spices, and teas.
[14] Renewed in 2017 (AB 465).

3.2.3 Vulnerability Assessment

Regional agricultural productivity is important not only to the City's local economy but also to the region and state's food supply. Supporting the safety of farmworkers, many of whom are Watsonville residents, is important not only insofar as it affects agricultural productivity, but also is important in promoting overall community health and well-being. The following section summarizes the potential impacts of climate change on agricultural productivity and farmworkers.

3.2.3.1 Climate Risks to Agricultural Productivity

Extremes in water availability (droughts and floods), changes in temperature, sea-level rise, and increased prevalence of pests due to climate change pose a threat to regional agricultural productivity.

Drought

Drought is the primary threat to agriculture in the region. City residents depend on an overdrafted groundwater basin and could be vulnerable to changes that exacerbate those overdraft conditions (City of Watsonville 2016). The Pajaro Valley groundwater basin covers a surface area of 311 square kilometers and has a total storage capacity of 9,584 million square meters (CADWR 2006). The basin recharges through rainfall, irrigation water, and streamflow from Pajaro River and its tributaries. Because of increased drought conditions, regional water supplies are expected to decline. In total, 85 percent of the Pajaro Valley's water use directly supports its agricultural industry, and over 98 percent of water demands are met with groundwater resources (PVWMA 2014).[15] Adapting to the potential for decreased water for irrigation will likely necessitate elements of increased water conservation practices, continued efforts to reduce groundwater overdraft and saltwater intrusion, additional water supply development, and changes in farming practices.

Flooding and Extreme Precipitation

The Pajaro River Watershed, which includes the Pajaro River, Salsipuedes Creek, and Corralitos Creek, has a history of flooding that has resulted in significant economic damages to the agricultural areas surrounding the City. The March 1995 storm resulted in $67 million in agriculture-related flood damages (City of Watsonville 2020b).

The agricultural sector is particularly vulnerable to floods, which can inundate farmlands and cause major damages to crops and may carry away topsoil's essential nutrients. The frequency and intensity of floods have increased in recent years as a consequence of climate change (City of Watsonville 2020b). Although precipitation events offer opportunities to replenish groundwater and flush salt from the soil, severe precipitation events could damage crops and reduce yields, cause late

[15] Surface water supplies are insufficient and the area is not connected to the state water project.

harvesting of some crops along the Central Coast (Pathak et al. 2018), and make management of erosion, disease and pests, and water capture more difficult (CDFA and CSA 2020).

Temperature

Warming temperatures throughout the state will result in a decline of winter chill hours, increased water demand by crops, and the promotion of various pests, all contributing to overall lower productivity (CDFA 2013). Even when water is not limited, high summer temperatures can have direct impacts on the yield of many crop species (Hatfield et al. 2008). On the other hand, warming temperatures in the region may increase the suitability to grow certain other crops. Therefore, the appropriate selection of crops may be an effective adaptation strategy, as discussed in the Agricultural Resilience and Food Justice section below.

Sea-Level Rise

Sea-level rise may exacerbate challenges on coastal farms where saltwater intrusion overflowing from coastal sloughs and drainages is compromising soil. The County of Santa Cruz assessed the vulnerability of agricultural land uses under different sea-level rise scenarios, which is consistent with California Coastal Commission and state guidance. As many as 15,293 acres of agricultural land in the lower Pajaro Valley are less than 10 feet above the current mean sea-level elevation, making it vulnerable to the combined hazards of sea-level rise and coastal flooding. By 2030,[16] 92 acres of agricultural fields are projected to routinely flood as higher tides reduce discharge capacity of tide gates, leading to an increase in base water elevation in these drainages, and 1,272 acres of agricultural fields are predicted to periodically flood during winter storm events. The potential loss of agriculturally productive land will likely put greater pressure on other inland farms to produce greater quantities to meet local, regional, and statewide demands.

Pests

Climate change will also likely affect the timing and type of threats from agricultural pests. Insects tend to eat more when plants are grown in elevated levels of carbon dioxide (Coviella and Trumble 2000). Warm and dry conditions could promote mite infestations, and overall average warmer temperatures could promote powdery mildew (USDA 2016).

3.2.3.2 Climate Risks to Farmworkers

Watsonville is home to many low-income, migrant farmworkers. In 2017–2018, Regeneración: Pájaro Valley Climate Action (Regeneración) developed a survey to better understand how the farm working community in Pajaro Valley is being affected by climate change and other environmental issues. With the support of the Environmental Studies Program at the California State University, Monterey Bay, Regeneración prepared a report that examines responses among

[16] By 2030, it is projected that the County will experience 0.3 foot of sea-level rise under a medium emissions scenario.

those who classified themselves as farmworkers, and identifies potential solutions that support the wants and needs of the community (Barrera et al. 2019).

The report found that over one-third of the farmworker population in the Pajaro Valley reported experiencing extreme temperatures, and one-quarter experienced heat waves in times of the year that are abnormal for extreme heat (Barrera et al. 2019). The physical effects of increased temperature specific to farmworkers include heat exhaustion, dehydration, and health impacts associated with poor air quality (e.g., asthma) and pesticide exposure. Heat exhaustion is a result of overworking in conditions of extreme or intense heat. As days of extreme heat become more frequent with a changing climate, the region may face a public health crisis among farmworkers. According to Regeneración's survey, three-quarters of the farmworker population have experienced symptoms from extreme heat working in the fields (Barrera et al. 2019). Dehydration and fainting are direct consequences of working in these conditions.

As described previously, the agricultural sector is highly vulnerable to climate change. This vulnerability increases pressure on farmworkers to work as much as possible when they can, further discouraging taking breaks that can prevent heat illness. Although California has a heat illness prevention policy that requires employers to provide adequate water, shade, and breaks to employees, farmworkers can be reluctant to take breaks because their wages are linked to productivity (quantity picked as opposed to an hourly wage). As a result, emergency room visits by farmworkers are increasing from heat illness; however, field reports of heat illness remain low (Guidi 2018). In addition, farmworkers may not report heat illness for fear of deportation (Baptiste 2018). Both production pressures and the immigration status of some farmworkers create a disincentive to report heat illness, which proves to be detrimental to farmworker health and safety.

In addition to the threat of extreme heat days on farmworkers' health, increasing temperatures fuel longer and more intense wildfire seasons, exposing millions of farmworkers to poor air quality. Harmful particulates can be carried hundreds of miles away from a single wildfire. Short-term health consequences from wildfire smoke for farmworkers include asthma attacks, sore throats, and chest pain. Long-term exposure to particulate matter (which is carcinogenic) from wildfire smoke can be permanently damaging to human health. Some long-term health impacts include cardiovascular harm (e.g., heart attacks, strokes, heart disease, congestive heart failure), respiratory harm (e.g., worsened asthma, inflammation), risk of developing cancer, and developmental and reproductive harm (USEPA 2009). These health impacts are expected to increase with the projections of wildfire regimes under climate change conditions.

Increased temperatures and drier conditions are also anticipated to increase pesticide exposure because chemicals will become airborne more frequently and persist longer in the air (Noyes et al. 2009). In areas with increased drought, airborne toxins are expected to persist longer in the air and, therefore, increase risk. In areas with increased precipitation, some pesticides are expected to become

greater sources of pollution in runoff, increasing the risk of water contamination. According to Regeneración's survey, 43 percent of farmworkers and 44 percent of other community residents are concerned about water contamination in the Pajaro Valley, and more than half (52 percent) of all respondents said that they currently buy water because of concerns related to pesticide exposure in the water (Barrera et al. 2019). Some pesticide use by farmers may also increase with changing climate conditions, further exacerbating potential exposure and health effects.

3.2.4 Agricultural Resilience and Food Justice

The Pajaro Valley needs transformative, adaptive practices to sustain stable food systems currently and into the future. A suite of farming practices, collectively referred to as "climate-smart agriculture" holds the potential for delivering multiple benefits ranging from building soil health to reducing GHGs that contribute to climate change and strengthening climate resilience. Climate-smart agricultural practices include composting, riparian restoration and other perennial plantings, cover cropping, reduced tillage, and several others (SDFSA 2017). The primary beneficiaries of climate-smart agriculture implementation are farmers. However, City residents would also benefit from climate-smart agriculture adoption through, for example, reduced exposure to synthetic fertilizers and pesticides.

Farmers in the region are currently testing some of these innovative strategies on their farms; however, the Pajaro Valley currently lacks a regional framework that would provide guidance on how to effectively coordinate the implementation of climate-smart agricultural practices across the region and sector. The development of a sector-specific adaptation plan at the county or regional scale would provide opportunities to better understand climate impacts on agriculture in the Pajaro Valley and improve coordination and communication between stakeholders, increasing the region's capacity to adapt effectively to short-term shocks and long-term stress associated with climate change. Because the agricultural sector and climate impacts cross jurisdictional boundaries, the City recognizes the potential benefits of a regional agricultural plan that promotes adoption of climate adaptation strategies through coordinated efforts in the agricultural sector. Therefore, the City will actively advocate at the regional level for and participate in the development of a regional agricultural plan to preserve agricultural land, facilitate the adoption of climate-smart agricultural practices, and protect farmworkers.

In addition to supporting regional planning and advocating for technical and monetary resources to facilitate the adoption of climate-smart agriculture, the City seeks to promote local food resilience and justice for its residents. In a future where the regional agricultural sector is threatened by climate change and greater demand increases the cost of produce, it is critical that the City provide its residents education and opportunities to produce and distribute some of their own food. The City can accomplish this objective by removing barriers to and actively investing in urban agriculture and

community/residential gardens. Community/residential gardens have the potential to provide various ecosystem services, increase stormwater retention, reduce GHG emissions, and sequester carbon (Clarke et al. 2019). By providing a common, public space, community gardens also facilitate social connections and cohesion, which is a critical component to resilience.

3.2.4.1 Adaptation and Resiliency Strategies

Table 3-4, Strategy Criterion and Rating Scale, provides a list of intended outcomes and corresponding actions the City will pursue in the implementation of the CAAP to achieve its goals of promoting agricultural resilience and food justice. Climate adaptation strategies were assessed for criteria listed in Table 3-4. The rating scale was developed to identify priority strategies. All criterion scores are summed to assign the strategy a priority score. Higher criterion scores yield higher priority scores. Any strategy for which the criterion scores sum to a score of 10 or higher is considered a high-priority strategy.

Climate adaptation strategies listed in Table 3-5, Agricultural Resilience and Food Justice Strategies, supplement adaptation strategies that were developed as part of the 2020 LHMP. The LHMP adaptation strategies focused primarily on protecting critical infrastructure, while these strategies primarily are aimed at enhancing community resilience.

Table 3-4. Strategy Criterion and Rating Scale

Criterion	Rating Scale
Impact	1 = low impact, 3 = high impact
Feasibility	1 = many barriers, 3 = few to no barriers
Timeframe	1 = over 6 years, 3 = 0–2 years
Cost to Implement	1 = high cost, 3 = low cost
Priority	**Low = 0–7, Medium = 7–9, High = 10+**

Table 3-5. Agricultural Resilience and Food Justice Strategies

#	Objective	Action	Lead	Impact	Feasibility	Timeframe	Cost	Priority
F.1.1	Regional stakeholders understand climate impacts and are organized and equipped to implement climate-smart agricultural practices throughout the Pajaro Valley.	Publicize resources, programs, and grant opportunities that could assist local farmers to access technical assistance and funding to implement climate-smart initiatives.	Public Works & Utilities	2	1	3	3	Low
F.1.2		As part of advocating for a Regional Climate Action Plan, include the development of a regional agricultural climate plan through active involvement in the Central Coast Climate Collaborative (4C) and representation from the agricultural community	City Manager	1	1	1	2	Low
F.1.3		Partner with community-based organizations to provide resources to farmers, farmworkers, and the community about the impacts of climate change on agriculture.	Public Works & Utilities	2	1	3	2	Medium
F.2.1	The community is educated and empowered to produce, distribute, and access healthy food.	Review and update City ordinances that reduce barriers and actively support community food production.	Community Development	1	2	3	3	Medium
F.2.2		Develop a resolution that establishes a food procurement policy that gives preference for food that is local, sustainably produced, and adheres to animal welfare and labor standards.	Community Development	2	1	1	3	Low
F.2.3		Promote agro-eco literacy with focus on local agricultural production and stewardship stories in K–12 education.	Public Works & Utilities	1	3	2	2	Medium

Table 3-5. Agricultural Resilience and Food Justice Strategies

#	Objective	Action	Lead	Impact	Feasibility	Timeframe	Cost	Priority
F.2.4		Explore partnerships with local businesses and restaurants to educate the public on the benefits of eating locally and promote the sourcing of locally produced food.	Public Works & Utilities	1	2	3	3	Medium
F.2.5		Work with non-profits to expand and diversify alternative food access points, such as farmers markets and community-supported agriculture, and other healthy and local food distribution models.	Public Works & Utilities	2	2	1	2	Medium
F.3.1	The community is able to access food when supply chains are interrupted during an emergency.	Assess and increase the development and use of community gardens to support local food production through partnerships.	Public Works & Utilities	2	2	2	2	Medium
F.3.2		Encourage local and regional organizations to strengthen local food supply chains, including charitable/emergency food supply for future crises.	Public Works & Utilities	2	2	2	2	Medium

Chapter 4 Climate Restoration

This page intentionally left blank.

Chapter 4 Climate Restoration

Traditionally, Climate Action Plans have focused on mitigation (GHG reductions). Only recently, in response to growing frequency and severity of natural hazards throughout the state and state mandates, have Climate Action Plans begun to incorporate discussion of climate impacts and adaptation. However, even this expanded scope does not adequately address the need for ecological healing to restore the environment from damages inflicted over the last several hundred years. The CAAP acknowledges that addressing carbon emissions is only part of the solution and that the Watsonville community (and all communities) need to begin the process of reversing the ecological destruction we have wrought on the planet. Accordingly, this chapter discusses carbon sequestration and equitable green recovery.

4.1 Carbon Sequestration

Sequestration is the process of removing excess carbon from the air and returning it to the soil (or some other place) where it will remain for a long time. This process happens naturally when plants grow, die, and return to the soil. The City is interested in pursuing sequestration strategies in the CAAP through the following activities:

- Tree planting (on City property, private property, and public right-of-way)
- Wetland protections and expansion (wetlands sequester carbon through natural processes)
- Regenerative agriculture
- Watershed protections
- Biochar (the conversion of organic waste to a charcoal-like substance that can be used as a soil amendment)
- Biogas (the creation and capture of methane gas from either wastewater treatment, or decomposition of organic matter)

The inclusion of this section of the CAAP marks a shift from a focus on emissions reductions to a re-envisioning of the way we live. This plan marks a beginning of the process of ecological healing by re-assessing assumptions about good living. Future CAAP updates will address objectives and actions to promote climate restoration.

4.2 Equitable Green Recovery

The City is committed to pursuing and implementing equitable and green economic recovery wherever and whenever possible.

The concept of an equitable green economic recovery is that government response to the COVID-19 pandemic can serve as an opportunity to drive the transition to a new socioeconomic model that is climate-neutral, resilient, sustainable, and inclusive. As state and federal funding becomes available to local governments to stimulate local economies in response to the pandemic, investments should target projects, enterprises, and initiatives that reduce GHG emissions and build local resilience to climate impacts.

The City recognizes the necessity of additional funding streams to support the implementation of the CAAP and is committed to pursuing equitable green economic recovery wherever possible. The City promotes Green Tech career paths; advocates at the federal, state, and county level to address climate issues; supports and utilizes public banking; and supports responsible investment policies.

The supporting efforts listed in the Natural and Working Lands section of Chapter 2 are relevant to achieve an equitable green recovery.

Supporting Efforts

No.	Description
Supporting Effort NW1-S1	Promote eco-literacy with a focus on local agriculture.
Supporting Effort NW1-S2	Incentivize tree planting on public and private property (sequester carbon, provide shade, and restore habitat).
Supporting Effort NW1-S3	Develop a tree ordinance to protect existing trees.
Supporting Effort NW1-S4	Implement an “Adopt a Tree” program.
Supporting Effort NW1-S5	Develop and implement a Green Infrastructure Plan, including a combination of stormwater features, habitat, trees, and other greenery.
Supporting Effort NW1-S6	Identify strategies for grassroots implementation of green infrastructure and restoration by City residents.
Supporting Effort NW1-S7	Coordinate meeting series with Indigenous people, such as the Amah Mutsun Tribal Band/Pajaro Indian Council, to discuss best practices on restoration strategies and actions.
Supporting Effort NW1-S8	Promote the California Conservation Corps and similar programs for Watsonville youth.
Supporting Effort NW1-S9	Work with existing landowners to replace missing landscaping to increase green space.
Supporting Effort NW1-S10	Implement a seedling program that provides residents with free trees.
Supporting Effort NW1-S11	Modify park impact fees to support additional tree planting.

Chapter 5 Public Engagement

This page intentionally left blank.

Chapter 5 Public Engagement

This chapter summarizes the strategies the City used to engage the public and other stakeholders in the preparation of the CAAP. This chapter also summarizes goals and guiding principles for public engagement and lists specific outreach methods used during the CAAP planning process.

The City worked to actively involve residents (community) and local and regional agencies and organizations (stakeholders) in developing the CAAP. Engaging the community in the planning process to solicit meaningful input is essential to ensuring that CAAP measures and adaptation strategies are feasible, equitable, and can be effectively implemented with support from the community. Effective climate action planning engages diverse stakeholders from multiple agencies, business stakeholders, community stakeholders, and the public. Such processes encompass an array of perspectives and interests, both within the City government and the larger community. This helps to ensure that the plan is relevant, reflecting on-the-ground needs and community goals with broad-based support for strategy or project implementation. Robust community and stakeholder engagement can also generate ownership, encourage cross-sectoral and regional collaboration, increase awareness, and build adaptive capacity.

The CAAP's public engagement process aimed to (1) raise awareness of the CAAP, (2) provide education on the basic science of climate change and the need for proactive climate action and adaptation planning, (3) provide opportunities for input and to influence decision-making on the CAAP update, and (4) provide a public process following environmental review. The rationale for each of these goals is as follows:

- **Awareness –** Stakeholders must be aware of the CAAP planning process to participate.
- **Education –** Stakeholders must be knowledgeable about the issue of climate change and how it will impact the community to participate effectively.
- **Input and Decision-Making –** Stakeholders' knowledge and perspectives help the planning team verify or expand on available information, and better determine the appropriateness or effectiveness of proposed strategies.
- **Public Process –** As stated in CEQA Guidelines, Section 15183.5 (b)(1)(F), a "qualified" GHG Reduction Plan must be adopted in a public process following environmental review. Once adopted, the updated CAAP would represent a qualified plan for reduction of GHG emissions, consistent with the requirements set forth in the CEQA Guidelines section referenced above, and would support tiering of future development projects for purposes of CEQA review and GHG impacts. Committing to a transparent process by which the public can participate, review, and comment on the draft CAAP will result in a better document that can be used later to streamline CEQA analysis and compliance for many projects.

To effectively execute the public engagement process, the City assigned staff to fulfill the roles of the outreach coordinator and program manager for the CAAP. The outreach coordinator served as a central contact for the public and stakeholders for the CAAP. The project manager participated in and helped coordinate the implementation of the public engagement process.

Outreach Coordinator
Cristy Cassel, Conservation Program Manager
Public Works & Utilities
cristy.cassel@cityofwatsonville.org
(831) 768-3166

Project Manager
Alex Yasbek, Environmental Projects Manager
Public Works & Utilities
alex.yasbek@cityofwatsonville.org
(831) 768-3160

5.1 Stakeholder Outreach

Establishing functional collaboration between agencies, organizations, and jurisdictions can be the greatest impediment to project progress, especially with complex concepts like climate change. The Central Coast Regional Climate Collaborative and AMBAG have the ability to bring local agencies together to consider regional approaches and strategies that efficiently provide climate adaptation and mitigation benefits.

The City invited the following agencies and organizations to attend a regional collaboration meeting and be engaged throughout the development of this CAAP:

- **Amah Mutsun Land Trust** is a Native American land trust that is using science to help bring Indigenous stewardship back to the lands of the Amah Mutsun and to protect Indigenous cultural and natural resources within the traditional territories of indigenous Mutsun and Awaswas people.
- **AMBAG** is a joint powers authority that represents Monterey, San Benito, and Santa Cruz Counties. AMBAG serves as both a federally designated MPO and council of government. AMBAG performs metropolitan-level transportation planning on behalf of the region. Among its many duties, AMBAG manages the region's transportation demand model and prepares regional housing, population, and employment forecast that are used in a variety of regional plans.
- **Bike Santa Cruz County** is a regional organization that promotes bicycling through advocacy, education, and community building. Their goal is for people of all ages and abilities to feel comfortable using their bikes for daily trips.

- **Cabrillo College** is a public community college located in Aptos, California with a secondary campus located within the City.
- **Community Action Board of Santa Cruz County, Inc.,** is a regional organization working to eliminate poverty and create social change through advocacy and essential services.
- **Community Bridges** is a nonprofit that delivers fundamental resources for the people of Santa Cruz County. They offer 10 programs across 20 different sites. Their mission is to deliver essential services, provide equitable access to resources, and advocate for health and dignity across every stage of life.
- **County of Monterey.**
- **County of Santa Cruz.**
- **City of Santa Cruz.**
- **Central Coast Regional Climate Collaborative** is a membership organization fostering a network of local and regional community leaders throughout six Central Coast counties to address climate change mitigation and adaptation. The collaborative involves representatives from local and regional government, business and agriculture, academia, and diverse community groups to share information and best practices, leverage efforts and resources, and identify critical issues and needs. The collaborative will engage all communities throughout the region to help ensure a resilient and low-carbon Central Coast is prepared for the impacts of climate change.
- **Ecology Action** is a recognized statewide leader in the effort to create a thriving environment and low-carbon economy. It designs effective programs, successfully activates communities, forges mutually beneficial partnerships, and influences policy to advance equitable, climate-smart initiatives.
- **Greenpower** is a nongovernmental organization dedicated to creating a carbon-free Central Coast through the adoption of Climate Action Plans in various cities throughout California.
- **Land Trust of Santa Cruz County** is a nonprofit organization dedicated to protecting, caring for, and connecting people to the extraordinary lands that make Santa Cruz special.
- **LandSea Science** is an organization that seeks to bridge science, policy, stakeholder, and practitioner knowledge to create comprehensive, innovative, and workable environmental solutions. LandSea Science works with designers, engineers, environmental lawyers, environmental policy specialists, farmers, fishermen, Indigenous people, ranchers, PhD scientists, and other innovators and entrepreneurs to solve problems and move toward environmental health and cohesive, healthy communities.
- **Monterey Bay Economic Partnership** is a regional member-supported nonprofit organization consisting of public, private, and civic entities located throughout the Monterey, San Benito, and Santa Cruz Counties. Founded in 2015, its mission is to improve the economic health and quality of life in the region.

- **Pajaro Valley Community Health Trust** is a nonprofit healthcare foundation with a mission to foster a healthy and equitable community for all in the Pajaro Valley through leadership in advocacy, collaboration, and wellness.
- **PVWMA** is a state-chartered water management district formed to efficiently and economically manage existing and supplemental water supplies to prevent further increase in, and to accomplish continuing reduction of, long-term overdraft. The PVWMA also works to provide and ensure sufficient water supplies for present and future anticipated needs within its boundaries, generally the greater coastal Pajaro Valley.
- **Pajaro Valley Chamber of Commerce and Agriculture** actively works to improve the business community through networking opportunities, representing businesses to government, and creating a strong local economy.
- **Resource Conservation District of Santa Cruz County** is a resource conservation district that facilitates stewardship projects to address water quality, biodiversity, ecosystem health, and water quantity.
- **Regeneración** is a local nonprofit that works with community partners to inspire everyone in the Pajaro Valley to respond locally to the global challenge of a changing climate. They are a key stakeholder in providing insight to priority climate solutions for communities that are most at risk from climate impacts.
- **Salud Para La Gente** is a nonprofit healthcare organization with clinics in Santa Cruz County and North Monterey County. Salud's mission is to provide high quality, comprehensive, and cost effective healthcare that is responsive to the needs of the communities they serve.
- **Santa Cruz County Regional Transportation Commission** is an autonomous regional transportation planning agency headquartered in Downtown Santa Cruz. It was created by the State of California in 1972 to carry out transportation responsibilities that cross city-county boundaries in Santa Cruz County.
- **Watsonville Airport** is a regional general aviation airport serving the business aviation requirements and recreational facilities of the City.
- **Watsonville Community Hospital** is a community healthcare provider. It is a 106-bed facility that offers a comprehensive portfolio of medical and surgical services to the culturally diverse tri-county area along the Central Coast.
- **Watsonville Wetlands Watch** is a local nonprofit dedicated to the protection, restoration, and fostering of appreciation of the wetlands of the Pajaro Valley, especially involving members of the Watsonville community and the students of the Pajaro Valley Unified School District.

The City invited each of the stakeholders listed above, as well as others, to participate in the planning process. In addition to inviting them to participate in a stakeholder workshop, the City invited stakeholders to review relevant draft materials and provide input in the strategy development phase.

This ensured that selected strategies are realistic, creative, and consistent with regional efforts and have the backing of agencies that have a role in implementing the strategies successfully.

5.2 Community Outreach

In addition to traditional stakeholder outreach, the City worked to ensure City residents had an opportunity to provide input on the CAAP. The City prepared two community surveys.

The goal of the first survey was to educate the community on basic information about climate change and to get a sense of their concerns in regards to climate change. The survey featured questions that helped the City understand the level of education residents have with respect to the issues at hand as well as overarching community priorities.

The second survey offered the community an opportunity to provide feedback on and prioritize strategies the City is considering for adoption in the CAAP. Although outreach was limited due to the pandemic, the City received over 1,300 survey responses. Outreach efforts included social media, online ads, website, City newsletter, emails, online presentations to high school classes, in-person surveys at the farmers market, food distribution sites, and stations outside the library. Results of both surveys can be found on the public engagement page of the web application (https://www.cityofwatsonville.org/1764/Learn-About-Climate-Action-Plan).

In addition to developing community surveys, the City established and convened a Community Advisory Committee (CAC). The CAC is composed of 16 community representatives, members, and activists; community-based organizations; public health officials; and other groups that have a history of under-representation in civic proceeding and local decision-making processes. The CAC was formed through the first climate survey where people were asked if they would like to participate in the CAC; City staff then followed up with an application process. The CAC helped maximize involvement in planning processes and was involved in strategy prioritization. The City hosted two CAC meetings during the development of the CAAP:

1. **CAC Meeting #1:** The first CAC meeting was to introduce participants to the purpose and role of the CAC in the CAAP planning process. During this meeting, CAC members learned about the CAAP update process, and advised City staff on how to get more meaningful and representative community participation in voicing, engaging, and improving the process of environmental planning and community development.

   CAC Agenda – September 23, 2020

   a. Welcome and Introductions
   b. Zoom Logistics and Meeting Norms, 4:00 p.m.

c. Purpose of Community Advisory Committee, 4:30 p.m.
d. CAAP Overview, 4:40 p.m.
e. Improving Community Engagement, 4:50 p.m.
f. Climate Action Strategy Choices, 5:05 p.m.
g. Group Sharing and Discussion, 5:15 p.m.
h. Next Steps and Closing, 6:00 p.m.

2. **CAC Meeting #2:** During the second CAC meeting, City staff presented the second survey results and how community input helped shape the final draft CAAP strategies. The CAC also received a presentation on the CAAP strategies and provided feedback on how to communicate this information to the public and City Council in an accessible way. After the presentation, they were provided a survey to identify the strategies and areas of the plan that each member is most interested in and would like to focus on to form smaller working groups.

   CAC Agenda – February 24, 2021

   a. Welcome and Introductions
   b. Zoom Logistics and Meeting Norms, 5:00 p.m.
   c. Review Purpose of CAC, 5:15 p.m.
   d. Review Second Climate Results, 5:30 p.m.
   e. CAAP Draft Strategies Presentation, 6:00 p.m.
   f. Breakout Groups for Feedback, 6:15 p.m.
   g. Group Sharing and Discussion, 6:30 p.m.
   h. Next Steps and Closing

Chapter 6 Implementation, Monitoring, and Funding

This page intentionally left blank.

Chapter 6 Implementation, Monitoring, and Funding

6.1 Implementation

Implementation of the CAAP includes a combination of regulations and requirements for new development; infrastructure improvements; updates to City plans, programs, and ordinances; continuation or expansion of existing plans or programs; incentives and rebates for residents; and outreach and education. Chapter 2 identifies the GHG measures and supporting efforts that will be implemented by the City, including responsible department (e.g., Public Works), estimated timeframe, and estimated cost. Chapter 3 identifies additional adaptation strategies that will position the City to adapt to climate change. Many of these strategies will have the added benefit of reducing GHGs. GHG measures and supporting efforts will be implemented by the City over the next decade.

Chapter 2 identifies the GHG measures and supporting efforts that will be implemented by the City, including the responsible department (e.g., Public Works & Utilities), estimated timeframe, and estimated cost. Chapter 3 identifies additional adaptation strategies that will position the City to adapt to climate change. Many of these strategies will have the added benefit of reducing GHG emissions. GHG measures and supporting efforts will be implemented by the City over the next decade.

Because the CAAP is a CEQA-qualified GHG Reduction Plan pursuant to CEQA Guidelines, Section 15183.5, the GHG reduction measures in Chapter 2 have the same effect as mitigation measures under CEQA (i.e., they must be enforced by the City and be feasible).

6.2 Monitoring

The CAAP's success will depend on the ability of the City to achieve the GHG reductions required by each measure listed in Chapter 2. The supporting efforts will also help reduce GHGs and may be converted to measures in future CAAP updates.

To monitor progress toward achieving the target and the goal, the City will report on CAAP progress through the CAAP web application and on the City's website. This will ensure that the public can monitor the progress made by the City to reduce GHG emissions.

The City will conduct GHG inventory updates every 2 years to quantify progress toward the target and the goal. Additionally, the City will update the CAAP at least every 5 years to respond to new legislation, changes in technology, market changes, behavioral changes, and policy changes to further GHG reductions. The CAAP updates ensure the City can remain flexible to respond to these changes.

6.3 Funding

The City has a Carbon Fund in place that can be used by the City "to implement priority projects that reduce GHG emissions as prioritized in the City of Watsonville Climate Action Plan." As stated in the Carbon Fund Ordinance, projects that meet the following criteria are eligible for use of the Carbon Fund:

- Projects proposed by Public Works, Planning, and other departments are eligible for funds.
- Projects proposed must have a direct or indirect GHG emissions reduction identified.
- Projects proposed should be aligned with the priorities identified in the Climate Action Plan.

All actions proposed in the CAAP meet the above criteria; therefore, the City may use Carbon Fund dollars to implement actions of the CAAP. The City may also use existing fees, create new fees, apply for grant funding, or use the City's general fund to implement the CAAP.

Chapter 7 References

This page intentionally left blank.

Chapter 7 References

Baker, Shalanda, Subin DeVar, and Shiva Parkash. 2019. The Energy Justice Workbook. Initiative for Energy Justice. Accessed September 2021. https://iejusa.org/wp-content/uploads/2019/12/The-Energy-Justice-Workbook-2019-web.pdf.

Baptiste, Nathalie. 2018. "Farmworkers are Dying from Extreme Heat: There's a New Push to Force the Government to Stop the Problem." Mother Jones. August 24. Accessed September 2021. https://www.motherjones.com/food/2018/08/farmworkers-are-dying-from-extreme-heat/.

Barrera, Caitlin, Kianni Ledexma, Dr. Victoria Derr, and Nancy Faulstich. 2019. How a Changing Climate is Affecting Farmworkers in the Pajaro Valley. May.

California League of Food Processors. 2015. The Economic Impact of Food and Beverage Processing in California and Its Cities and Counties. January.

CADWR (California Department of Water Resources). 2006. Basin Boundary Description: Pajaro Valley Groundwater Basin.

CARB (California Air Resources Board). 2017. California's 2017 Climate Change Scoping Plan. November.

CARB. 2020. EMFAC2021 Web Database, Version 1.0.0.

CDFA (California Department of Food and Agriculture). 2013. Climate Change Consortium for Specialty Crops: Impacts and Strategies for Resilience. Accessed September 2021. https://www.cdfa.ca.gov/oefi/climate/docs/CCC_Report.pdf.

CDFA and CSA (California Department of Food and Agriculture and Climate Science Alliance). 2020. Climate Change Impacts for Specialty Crops: Southern California Region. Prepared by Pairis L. Jasperse. Accessed September 2021. https://drive.google.com/file/d/1XMiUlE35ntYNzi25uPU3Q0ytSfxkJfC8/view.

CDPH (California Department of Public Health). 2021. "Welcome to the CCHVIz." California Building Resilience Against Climate Effects Project. Accessed September 2021. https://skylab.cdph.ca.gov/CCHVIz/.

CEC (California Energy Commission). 2012. Estimating Risk to California Energy Infrastructure from Projected Climate Change. Report No. CEC 500 2012 057.

CEC. 2018a. "Energy Commission Adopts Standards Requiring Solar Systems for New Homes, First in Nation." Press Release. May 9. Accessed September 2021. https://www.energy.ca.gov/news/2018-05/energy-commission-adopts-standards-requiring-solar-systems-new-homes-first.

CEC. 2018b. Proposition 39 K–12 Snapshot. Revised September.

CEC. 2019a. Building a Climate Change-Resilient Electricity System for Meeting California's Energy and Environmental Goals. Final Project Report. CEC-500-2019-015. Energy Research and Development Division. February. Accessed September 2021. https://ww2.energy.ca.gov/2019publications/CEC-500-2019-015/CEC-500-2019-015.pdf.

CEC. 2019b. Building a Healthier and More Robust Future: 2050 Low-Carbon Energy Scenarios for California. CEC-500-2019-033. Energy Research and Development Division. March. Accessed September 2021. https://ww2.energy.ca.gov/2019publications/CEC-500-2019-033/CEC-500-2019-033.pdf.

CEC. 2020. Electric Program Investment Charge 2019 Annual Report. CEC-500-2020-009. Energy Research and Development Division. February. Accessed September 2021. https://ww2.energy.ca.gov/2020publications/CEC-500-2020-009/CEC-500-2020-009.pdf.

CHP (California Housing Partnership). 2019. California's Cap-and-Trade-Funded Low-Income Weatherization Program Multifamily: Impact Report. March. Accessed September 2021. https://1p08d91kd0c03rlxhmhtydpr-wpengine.netdna-ssl.com/wp-content/uploads/2019/03/LIWP_PolicyBrief_PRINT_HiRes-1.pdf.

City of Watsonville. 2015. City of Watsonville Climate Action Plan. April 9.

City of Watsonville. 2016. City of Watsonville 2015 Urban Water Management Plan. Department of Public Works & Utilities. June. Accessed September 2021. https://www.cityofwatsonville.org/DocumentCenter/View/2046/2015-Urban-Water-Management-Plan-Chapters-1-10-PDF.

City of Watsonville. 2019a. Emergency Response Plan.

City of Watsonville. 2019b. Comprehensive Annual Financial Report for the Fiscal Year Ended June 30, 2019. Finance Department. Accessed September 2021. https://www.cityofwatsonville.org/DocumentCenter/View/13219/Comprehensive-Annual-Financial-Report-for-FY-18-19.

City of Watsonville. 2020a. "Labor Force." Economic Development Department. Data from Applied Geographic Solutions. Accessed September 2021. https://www.cityofwatsonville.org/1441/Demographics.

City of Watsonville. 2020b. City of Watsonville Local Hazard Mitigation Plan. July.

City of Watsonville. 2021. "Watsonville 2030 Climate Action & Adaptation Plan." Accessed September 2021. https://www.cityofwatsonville.org/1764/Learn-About-Climate-Action-Plan.

Clarke, Maysha, M. Davidson, M. Egerer, E. Anderson, N. Fouch. 2019. "The Underutilized Role of Community Gardens in Improving Cities' Adaptation to Climate Change: A Review." People, Place and Policy: 12/3. 241–251. doi: 10.3351/ppp.2019.3396732665.

Coviella, C., and J. Trumble. 2000. "Effect of Elevated Atmospheric Carbon Dioxide on the Use of Foliar Application of Bacillus Thuringiensis." BioControl 45: 325–336. https://doi.org/10.1023/A:1009947319662.

CPSC (U.S. Consumer Product Safety Commission). 2018. Incidents, Deaths, and In-Depth Investigations Associated with Non-Fire Carbon Monoxide from Engine-Driven Generators and Other Engine-Driven Tools, 2005–2017. Prepared by Matthew V. Hnatov. September. Accessed September 2021. https://www.cpsc.gov/s3fs-public/Generators%20and%20OEDT%20Fatalities%202018%20FINAL.pdf?EHbNEzxP3czGisZg9_BY2b7wPgMJltZu.

CPUC (California Public Utilities Commission). 2016. "Portable Generators and Carbon Monoxide Poisoning." Presentation at the SAE Small Engine Technology Conference.

Prepared by Janet Buyer. U.S. Consumer Product Safety Commission. Charleston, South Carolina. November 16. Accessed September 2021. https://www.cpsc.gov/s3fs-public/PresentationSAE_SETC.pdf.

CPUC. 2020. Public Safety Power Shutoff Overview. Prepared by Anthony Noll. Accessed September 2021. https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/resiliency-and-microgrids/resiliency-and-microgrids-events-and-materials/3_background_cpuc-safety-and-enforcement-division.pdf.

Garza-Díaz, L.E., A.J. DeVincentis, S. Sandoval-Solis, M. Azizipour, J.P. Ortiz-Partida, J. Mahlknecht, M. Cahn, J. Medellin-Azuara, D. Zaccaria, and I. Kisekka. 2019. "Land-Use Optimization for Sustainable Agricultural Water Management in Pajaro Valley, California." Journal of Water Resources Planning and Management 2019, 145 (12): 05019018.

Georgetown Climate Center. 2021. "Summary of State Agency Action." Georgetown Climate Center. Accessed September 2021. https://www.georgetownclimate.org/adaptation/state-information/california/adaptation-plan-status.html.

Guidi, Ruxandra. 2018. "Farmworkers Face Illness and Death in the Fields." High Country News. August 20. Accessed September 2021. https://www.hcn.org/issues/50.14/agriculture-californias-farmworkers-face-illness-and-death-in-the-fields.

Hatfield, J., K. Boote, P. Fay, L. Hahn, C. Izaurralde, B.A. Kimball, T. Mader, J. Morgan, D. Ort, W. Polley, A. Thomson, and D. Wolfe. 2008. "Agriculture." In The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity in the United States. Prepared by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. Washington, DC.

IEJ (Institute for Energy Justice). 2021. "The Energy Justice Workbook." Accessed September 2021. https://iejusa.org/section-1-defining-energy-justice/.

Luna, Taryn. 2019. "California Utility Equipment has Sparked Over 2000 Fires in Three Years." Los Angeles Times. January 28.

MBCPA (Monterey Bay Community Power Authority). 2018. Proposed Operating Budget 2018–2019. Accessed September 2021. https://3cenergy.org/wp-content/uploads/2019/05/MBCP-FY2018-19-Budget-with-5-Year-Projection-Original.pdf.

Noyes, P.D., M.K. McElwee, H.D. Miller, B.W. Clark, L.A. Van Tiem, K.C. Walcott, and E.D. Levin. 2009. "The Toxicology of Climate Change: Environmental Contaminants in a Warming World." Environment International 35(6): 971–986.

Pathak, T., M. Maskey, J. Dahlberg, F. Kearns, K. Bali, and D. Zaccaria. 2018. "Climate Change Trends and Impacts on California Agriculture: A Detailed Review." Agronomy 8(3): 25. doi: 10.3390/agronomy8030025.

PVWMA (Pajaro Valley Water Management Agency). 2014. Basin Management Plan Update. Final.

SDFSA (San Diego Food System Alliance). 2017. Linking Climate-Friendly Farming Practices to San Diego County's Climate Action Plan: An Opportunity Analysis of Carbon Farming in the Unincorporated County. Prepared by Batra Ecological Strategies. November. Accessed

September 2021. https://static1.squarespace.com/static/54b30bbae4b0fc4c2291385e/t/5abd7f018a922d8e6e1db76a/1522368261607/CarbonFarminginSDC.9Nov17.SDFSA%2BBatra+%286%29.pdf.

USDA (U.S. Department of Agriculture). 2016. Crop Fact Sheet Series. February 13.

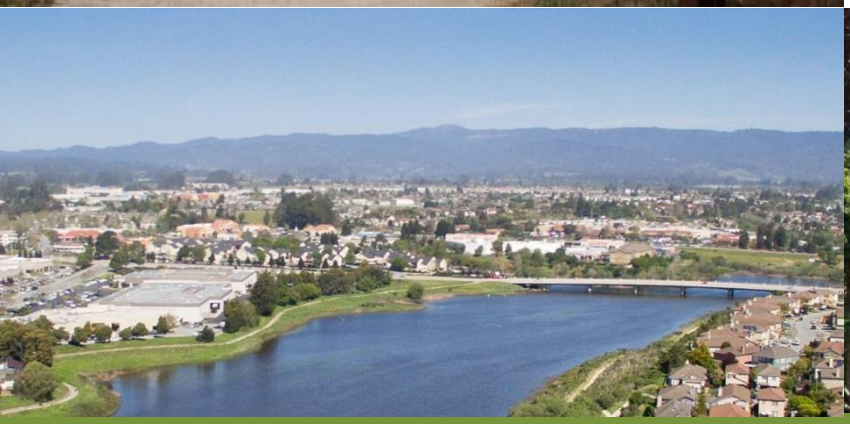
USEPA (U.S. Environmental Protection Agency). 2009. Integrated Science Assessment for Particulate Matter. EPA 600/R-08/139F. December.

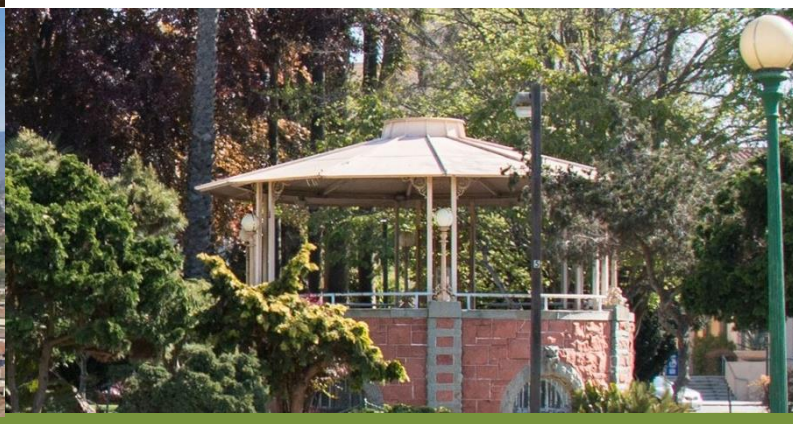
Vote Solar. 2020. Resilient Clean Energy for California. February. Accessed September 2021. https://votesolar.org/files/8115/8203/7723/Resilient_Clean_Energy_for_California-REPORT.pdf.

Appendix A. Watsonville 2017 Community-Wide GHG Inventory

This page intentionally left blank.

City of Watsonville





DRAFT 2017 Community wide Greenhouse Gas Inventory

CITY OF WATSONVILLE 2017 COMMUNITY WIDE GREENHOUSE GAS INVENTORY

PREPARED FOR:

The City of Watsonville

275 Main St, Suite 400, Watsonville, CA, 95076

Phone: 831.768.3040

PREPARED BY:

The Association of Monterey Bay Area Governments | Energy Watch

24580 Silver Cloud Court, Monterey, CA 93940

PO Box 2453 Seaside, CA 93955

Phone: 831.883.3750

Fax: 831.883.3755

MAY 2020

Executive Summary

Watsonville's 2017 Community-wide GHG Inventory totals 123,163 metric tons of carbon dioxide equivalent (CO_2e). This represents a 30 percent reduction from the 2005 Baseline Community-wide GHG Inventory. This decrease is the result of emission reductions across four sectors primarily. It is important to note that while analysis of GHG inventory data can identify the amount of change; this type of analysis does not specifically identify the factors that contribute to the changes and their level of contribution. Certain general factors that are able to be identified are noted below, but it should be understood that these are only general contributing factors and not the sole factors responsible for the total GHG changes. Figure 1 shows the 2005 to 2017 GHG emissions by sector.

In the transportation sector emission, reductions of 19 percent occurred from 2005 to 2017. During this period there continued to be an increase in the required fuel efficiency standards. The residential sector achieved a 26 percent reduction from 2005 to 2017. This can be attributed, in part, by the specific composition of energy delivered by Pacific Gas & Electric Company (PG&E) to include both more renewable energy and energy generated from large hydro operations in their energy mix during this time period. In the solid waste sector, a decrease in the actual tonnage of waste sent to the landfills yielded a 22 percent reduction in emissions. In the commercial and industrial sector there was a 47 percent reduction in emissions from 2005 to 2017. This can be attributed, in part, to decreases in the use of electricity and natural gas.

Figure 1:

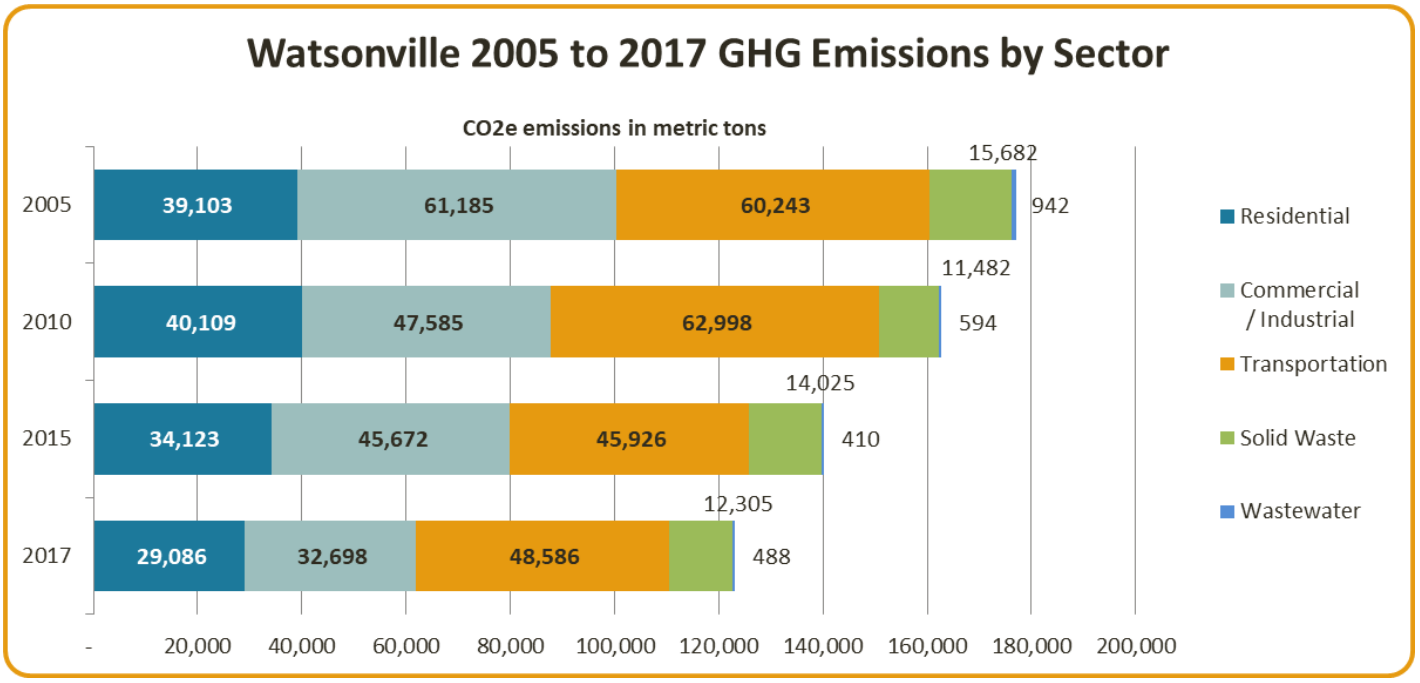


Table 1 summarizes the results of the 2005 Baseline Community-wide GHG Inventory, 2010, 2015 and 2017 Community-wide GHG Inventory broken out by sectors. The percentage change from the 2005 inventory to the 2017 inventory is a reduction of 30 percent.

Table 1:

Community CO2e Emissions by Sector	Residential	Commercial / Industrial	Transportation	Solid Waste	Wastewater	Total
2005	39,103	61,185	60,243	15,682	942	177,155
2010	40,109	47,585	62,998	11,482	594	162,768
2015	34,123	45,672	45,926	14,025	410	140,156
2017	29,086	32,698	48,586	12,305	488	123,163
% change 2005- 2017	-26%	-47%	-19%	-22%	-48%	-30%

2017 Community-wide GHG Inventory Report

Introduction

A Community-wide GHG emissions inventory is an accounting of the GHG emissions that occur within the community of Watsonville in a given year. GHG inventories can be used to determine the largest sources of GHG emissions within a community, set GHG emission reduction targets and understand how GHG emissions evolve across inventory years. The City of Watsonville completed its 2005 Baseline Community-wide GHG Inventory as part of an Association of Monterey Bay Area Governments (AMBAG) regional effort to develop the 2005 baseline GHG inventory reports for all AMBAG jurisdictions. Subsequently, the 2010, 2015 and 2017 community-wide GHG inventories for all 21 jurisdictions have also completed by AMBAG.

The 2005 Baseline, 2010, 2015 and 2017 City of Watsonville Community-Wide GHG inventories were completed by following the US *Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* per the California Air Resources Board (CARB) 2017 Scoping Plan. The ICLEI ClearPath tool suite was used to perform the emissions calculations for all inventories in accordance with guidance from the Governor's office of planning and research. The methodology used in this 2017 Community-wide GHG Inventory is included in Appendix A.

California's Climate Change mandates

The State of California has adopted bold goals to reduce GHG emissions and address climate change. In order to meet these goals, the state supports local action on climate change by providing guidance for local jurisdictions to develop GHG emissions inventories and climate action plans. Local jurisdictions are required in many instances, and incentivized in others, to address greenhouse gas emissions under the California Environmental Quality Act (CEQA), AB 32 (California Global Warming Solutions Act of 2006), SB 375 (Sustainable Communities and Climate Protection Act of 2008), SB 32 (California Global Warming Solutions Act of 2006: emissions limit, 2016) and various California Executive orders, regulations, and programs.

A part of the effort to address climate change, the California Legislature has laid out clear GHG emissions reduction targets. AB 32 established a target of reducing GHG emissions back to 1990 levels by 2020, which corresponds to a 15% reduction from 2005 level. SB 32 set a GHG emissions reduction target of 40 percent below 1990 levels by 2030. Finally, Executive Order B-55-18, issued in 2018 by Jerry brown, established a goal of reaching carbon neutrality by 2045 and maintaining negative emissions in subsequent years.

2017 Community-wide GHG Emissions by Sector

Many local governments find a sector-based analysis most relevant to policymaking and project management, as it assists in formulating sector-specific reduction measures and climate action plan components. This inventory evaluates community emissions from the following sectors:

- Residential
- Commercial and Industrial
- Transportation
- Solid Waste
- Wastewater

The city of Watsonville emitted 123,163 metric tons of CO_2e in 2017. As visible in Figure 2 and Table 2, 39.4 percent of emissions are from the transportation sector, and were generated by fuel use from travel on local roads as well as fuel use at the Watsonville municipal airport. Emissions from electricity and natural gas usage in the residential sector generated 23.6 percent of emissions, while electricity and natural gas consumption in the commercial sector generated 26.5 percent of emissions. The disposal of waste generated by residents and businesses in 2017 generated 10 percent of total emissions. The remaining 0.4 percent of emissions was generated from wastewater treatment processes.

Figure 2:

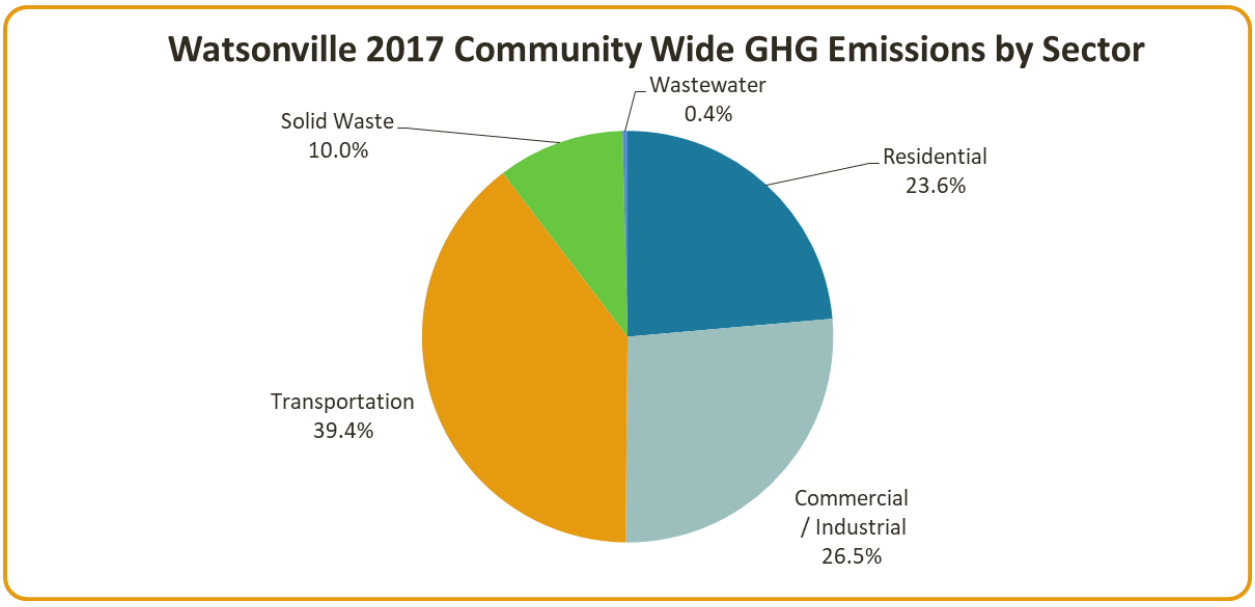


Table 2:

2017 Community Emissions by Sector	Residential	Commercial / Industrial	Transportation	Solid Waste	Wastewater	Total
CO2e (metric tons)	29,086	32,698	48,586	12,305	488	123,163
% of Total CO2e	23.6%	26.5%	39.4%	10%	0.4%	100%

Built environment: Residential, Commercial and Industrial Sector

Watsonville's built environment generated 50.1 percent of community-wide GHG emissions in 2017 or 61,784 metric tons of CO2e. Emissions were calculated using 2017 electricity and natural gas consumption data provided by PG&E.

Emissions from the residential sector were 29,086 metric tons of CO2e and only include emissions arising from the consumption of energy in residential buildings. Emissions from the Commercial and Industrial sector were 32,698 metric tons of CO2e and include emissions arising from the consumption of energy in both commercial and industrial buildings. PG&E was not able to provide a breakdown between commercial and industrial energy consumption due to the California Public Utilities Commission's (CPUC) 15/15 rule[1].

Figure 3 and Table 3 show the breakdown of natural gas to electricity emissions in Watsonville's built environment. Natural gas usage comprised 38% percent of emissions of the residential sector and 33% of emissions of the Commercial and Industrial sectors.

Figure 3:

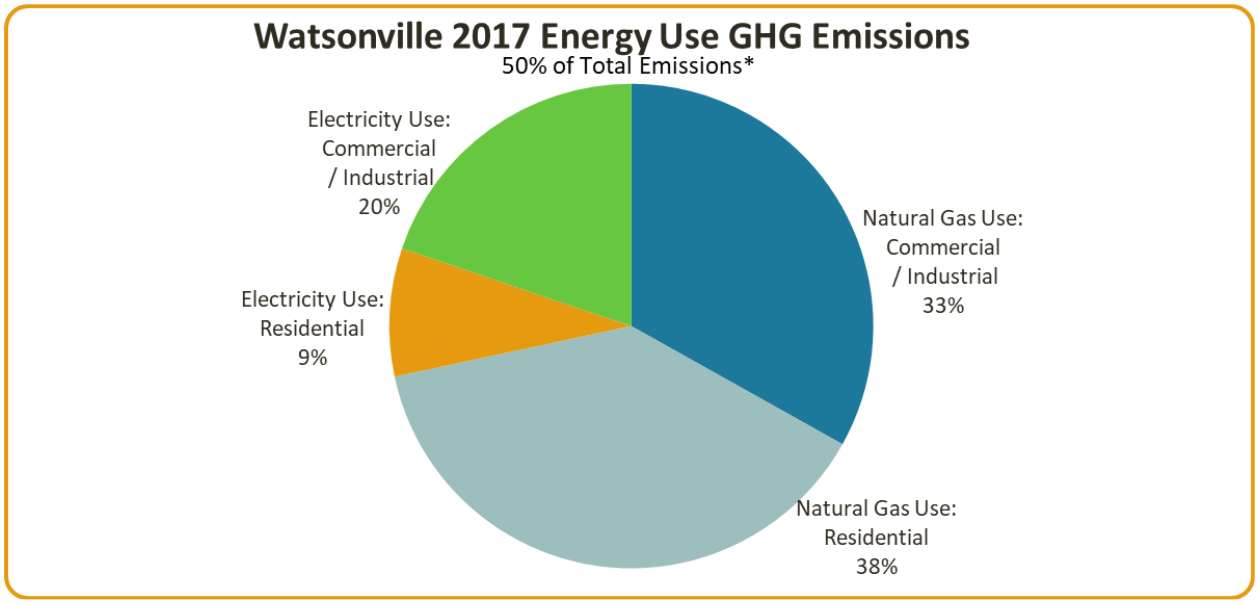


Table 3:

Natural Gas Use Emissions (CO2e):		Electricity Use: Emissions (CO2e):	
Commercial/Industrial	Residential	Commercial/Industrial	Residential
20,458	23,807	5,279	12,240

[1] The 15/15 Rule was adopted by the CPUC in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15 percent of the total data, categories must be combined before the information is released.

Transportation Sector

As mentioned previously, Watsonville's transportation sector generated 39.4 percent of community-wide GHG emissions in 2017, or 48,586 metric tons of CO2e. The transportation sector analysis includes emissions from all vehicle use on local roads within Watsonville's jurisdictional boundaries. The transportation sector also includes the emissions generated from air travel at the Watsonville Municipal Airport. However emissions from air travel of Watsonville's residents are not included in the transportation sector analysis.

Solid Waste Sector

As mentioned previously, the solid waste sector accounted for 10 percent of community-wide GHG emissions in 2017 or 12,305 metric tons of CO2e. Emissions from the solid waste sector are an estimate of methane generation from the anaerobic decomposition of organic wastes (such as paper, food scraps, plant debris, wood, etc.) that are deposited in a landfill. Transportation emissions generated from the collection, transfer and disposal of solid waste are included in transportation sector GHG emissions.

Wastewater Sector

As mentioned previously, the wastewater sector accounted for 0.4 percent of community-wide GHG emissions in 2017 or 488 metric tons of CO2e. This sector accounts for the operation of wastewater treatment facilities used to treat wastewater from Watsonville.

Wastewater coming from homes and businesses is rich in organic matter and has a high concentration of nitrogen and carbon (along with other organic elements). As wastewater is collected, treated, and discharged, chemical processes can lead to the creation and emission of two greenhouse gases: methane and nitrous oxide. Methane is generated under anaerobic conditions, which could occur at centralized facilities or septic tanks; however, many centralized treatment facilities utilize aerobic processes, for which methane is not a significant concern. Nitrous oxide is emitted at facilities that utilize nitrification and denitrification of wastewater.

Conclusion

The City of Watsonville has taken steps toward reducing its impact on the environment by quantifying its 2005 baseline community-wide GHG emissions and regularly updating the inventory in 2010, 2015 and 2017. Staff and policymakers have chosen to take a leadership role in addressing climate change by joining MBCP and by adopting Watsonville's first climate action plan. This leadership has allowed the City of Watsonville to meet the 2020 GHG emissions reduction mandate 3 years early. This inventory will now allow the city to look ahead and help create their Climate Action and Adaption Plan update, to meet the 2030 statewide GHG emissions reduction target as well as the 2045 carbon neutrality goal.

This inventory provides an important foundation for the City of Watsonville to continue implementing their comprehensive approach to reducing the greenhouse gas emissions in its community. Specifically, this inventory serves to:

- Establish a guideline for setting future emissions reductions targets.
- Identify the largest sources of communitywide emissions.
- Track changes to community emissions over time.
- Evaluate progress towards emission reduction goals.
- Support the development, implementation and evaluation of strategies to reduce emissions

Appendix A: Inventory Methodology by Sector

This appendix, describes in detail the data sources and processes used to calculate emissions in this community-wide GHG inventory.

Overview of Inventory Contents and Approach

The community inventory describes emissions of the major greenhouse gases from the residential, commercial and industrial, transportation, solid waste, and wastewater sectors. As explained in Appendix A, emissions are calculated by multiplying activity data—such as kilowatt hours or VMT —by emissions factors, which provide the quantity of emissions per unit of activity. Activity data is typically available from electric and gas utilities, planning and transportation agencies and air quality regulatory agencies. Emissions factors are drawn from a variety of sources, including PG&E, the Community protocol, and air quality models produced by the California Air Resources Board (CARB).

Built Environment Methodology: Residential, Commercial and Industrial Sectors

Data on electricity and natural gas sold by Pacific Gas and Electric to customers was provided by PG&E. Bundled PG&E electricity emissions were calculated in ICLEI's ClearPath software using PG&E-specific emissions factors provided by PG&E. All natural gas emissions were calculated in ClearPath with default emissions factors from the community protocol.

Transportation Sector Methodology

On-road transportation emissions were derived from local jurisdiction vehicle miles traveled (VMT) data and regional vehicle and travel characteristics. Observed VMT on non-state facilities (referred to in the inventory as "local roads") was obtained from Caltrans' Highway Performance Monitoring System reports.

The EMFAC 2017 model developed by CARB was used to calculate emissions from these VMT figures. EMFAC defaults for each county include regionally-specific information on the mix of vehicle classes and model years, as well as ambient conditions and travel speeds that determine fuel efficiency. The model estimates carbon dioxide, methane, and nitrous oxide emissions from these factors as well as from inputted vehicle activity data.

For purposes of this inventory, AMBAG Energy Watch staff ran the model for each of AMBAG's three counties (Monterey, Santa Cruz, and San Benito), leaving all CARB default values in place (including VMT). Staff then used the EMFAC output to calculate local fleet mix and emissions factors for each vehicle type. Different emissions factors were calculated for CO_2, CH_4 and N_2O. The total VMT was then distributed among the various EMFAC-defined vehicle types according to percentages derived from the EMFAC output. The appropriate emissions factor for each

vehicle type was then applied for these greenhouse gases. Finally, global warming potentials were factored in and the total emissions from each vehicle type were summed to reach the total CO_2e emissions from the transportation sector. AMBAG staff also collected fuel sales data of kerosene and aviation gasoline from the Watsonville Municipal Airport and included them in the inventory.

Solid Waste Sector Methodology

Emissions from solid waste were captured by estimating future emissions from decomposition of waste generated in the inventory year ("community-generated solid waste").

Community-generated solid waste emissions were calculated in ClearPath using waste disposal data obtained from the California Department of Resources Recycling and Recovery (CalRecycle) Disposal Reporting System, which records tonnages of municipal solid waste and alternative daily cover by local jurisdiction. Emissions from the City of Watsonville Landfill, which is operated by the city and therefore falls within its operational boundaries, were also included in this inventory, using CalRecycle data as well.

As some types of waste (e.g., paper, plant debris, food scraps, etc.) generate methane within the anaerobic environment of a landfill and others do not (e.g., metal, glass, etc.), it is important to characterize the various components of the waste stream. Waste characterization for community generated solid waste was estimated using the CalRecycle 2003, 2008 and 2014 California statewide waste characterization study.[2]

Most landfills in the bay area capture methane emissions either for energy generation or for flaring. EPA estimates that 60 percent to 80 percent[3] of total methane emissions are recovered at the landfills to which City of Watsonville sends its waste. Following the recommendation of the community protocol, AMBAG adopted a 75 percent methane recovery factor and a 10% oxidation rate.

Recycling and composting programs are reflected in the emissions calculations as reduced total tonnage of waste going to the landfills. The model, however, does not capture the associated emissions reductions in "upstream" energy use from recycling as part of the inventory.[4] This is in-line with the "end-user" or "tailpipe" approach taken throughout the development of this inventory. It is important to note that recycling and composting programs can have a significant impact on greenhouse gas emissions when a full lifecycle approach is taken. Manufacturing

[2] CalRecycle Waste Characterization Studies available at https://www2.calrecycle.ca.gov/WasteCharacterization/Study

[3] AP 42, section 2.4 Municipal Solid Waste, 2.4-6, http://www.epa.gov/ttn/chief/ap42/index.html

[4] "Upstream" emissions include emissions that may not occur in your jurisdiction resulting from manufacturing or harvesting virgin materials and transportation of them.

products with recycled materials avoids emissions from the energy that would have been used during extraction, transportation and processing of virgin material.

Wastewater Sector Methodology

Wastewater coming from homes and businesses is rich in organic matter and has a high concentration of nitrogen and carbon (along with other organic elements). As wastewater is collected, treated, and discharged, chemical processes can lead to the creation and emission of two greenhouse gases: methane and nitrous oxide.

Emissions from wastewater treatment were calculated by first assessing the treatment steps used to transform Watsonville's wastewater. Staff then used the ClearPath tool and a population based method to estimate treatment process emissions, in accordance with the methodology delineated in the US Community protocol. Fugitive nitrous oxide emissions from effluent discharge were estimated using nitrogen load data provided by the city of Watsonville.

Appendix B: Glossary

This Appendix provides a brief description of technical terms used in the inventory.

Activity Data:
Data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time. Data on energy use, metal production, land areas, management systems, lime and fertilizer use and solid waste production are examples of bodata.

Baseline year:
A specific year against which emissions are tracked over time. For this inventory, the baseline year is 2005.

Boundaries:
GHG accounting and reporting boundaries can have several dimensions, i.e., jurisdictional, operational or geopolitical. The inventory boundary determines which emissions are accounted and reported.

Carbon Dioxide Equivalent:
A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as metric tons of carbon dioxide equivalents ($MTCO_2e$). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP. See appendix A.

Community-wide GHG Inventory:
A calculation of GHG emissions generated as a result of activities within a community.

Consistency:
Consistency means that an inventory should be internally consistent in all its elements over a period of years. An inventory is consistent if the same methodologies are used for the base and all subsequent years and if consistent data sets are used to estimate emissions or removals from sources or sinks.

Direct GHG emissions:
Emissions from sources that occur within a jurisdiction's operational or geopolitical boundaries are called direct GHG emissions.

Emissions Factor:
A unique value for scaling emissions to activity data in terms of a standard rate of emissions per unit of activity (e.g., grams of carbon dioxide emitted per kWh of electricity use or per therms of natural gas use).

Fugitive emissions:
Emissions that are not physically controlled but result from the intentional or unintentional releases of GHGs. They commonly arise from the production, processing transmission storage and use of fuels and other chemicals, often through joints, seals, packing, gaskets, etc.

Global Warming Potential:
A measure of the total energy that a gas absorbs over a particular period of time (usually 100 years), compared to carbon dioxide.

Greenhouse gases (GHGs):
Gases which when released in the atmosphere have a warming impact. The GHG's considered in this inventory are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O).

Indirect emissions:
Emissions that are a consequence of activities inside a jurisdiction, but occur from sources outside of the inventory boundaries, e.g., as a result of the import of electricity, heat, or steam.

Intergovernmental Panel on Climate Change:
The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. Leading experts on climate change and environmental, social, and economic sciences have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue.

Methane (CH_4):
A hydrocarbon that is a greenhouse gas with a global warming potential estimated at 25 times that of carbon dioxide (CO_2). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition of

animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. The GWP is from the IPCC's Fourth Assessment Report (AR4).

Nitrous Oxide (N_2O):
A powerful greenhouse gas with a global warming potential of 298 times that of carbon dioxide (CO2). Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, manure management, fossil fuel combustion, nitric acid production, and biomass burning. The GWP is from the IPCC's Fourth Assessment Report (AR4).

Process emissions:
Emissions from industrial processes involving chemical transformations other than combustion.

This page intentionally left blank.

Appendix B. Vehicle Miles Traveled Methodology

This page intentionally left blank.

Harris & Associates

VMT METHODOLOGY

Population, housing unit, and employment estimates for 2017 was provided by AMBAG (2020b). AMBAG also provided forecast data for 2030 and 2040 through the 2018 Regional Growth Forecast (AMBAG 2018). Compound annual growth rates (CAGR) were calculated for the periods between 2017 to 2030 and 2017 to 2040 for each growth sector. The CAGR from 2017 to 2040 was applied to the years beyond 2040 to estimate population, housing units, and employment in 2045 and 2050 as indicated below:

Unit	2017	2030	2045	2050
Population	53,419	56,829	61282	62860
Housing	14,225	15,614	16972	17536
Employment	22,979	25,200	27718	28697

Using Urban Footprint's VMT module, The Team will run Baseline (2017) VMT numbers after correcting Urban Footprint's land use data to get as close as possible to the 2017 demographic numbers from AMBAG. Urban Footprint's current numbers for 2017 are as follows:

- Population: 48,903
- Housing: 13,776
- Employment: 22,757

Changing the land use data in Urban Footprint is how the demographic numbers can be manipulated. Below is the methodology for correcting Urban Footprint's numbers for each year.

1. Correct land use designations in Urban Footprint to be consistent with the City's projects list with the status of "Done", provided on pages 8 from the City's 8/19/2020 Land use Presentation to Public Works.
2. Update land use designations in areas to be consistent with projects in construction or are approved for construction, from the City's projects list with the status of "Not constructed", "Not entitled", "Under construction", and "Approved Projects", provided on pages 7 and 8 from the City's 8/19/2020 Land use Presentation to Public Works.
3. Update land use designations to be consistent with projects that are under review with the assumption that they will be approved from page 7 from the City's 8/19/2020 Land use Presentation to Public Works.
4. Update recognized underutilized and vacant parcels in areas of growth to match the numbers from the 2004 projections on page 14 of the City's 8/19/2020 Land use Presentation to Public Works, focusing on infill areas first, starting with the downtown area.
5. Update areas along Freedom Blvd. in order to match projected growth.
6. Update areas along East Lake Ave. in order to match projected growth.

7. Update areas along West Beach Ave. in order to match projected growth.
8. Update areas of new growth starting with Manabe-Ow in order to match projected growth.
9. Update Atkinson area
10. Update Buena Vista area.

This approach will be used for all subsequent years from AMBAG's table.

Watsonville_VMT: Transportation Report

Annual VMT, miles / year (millions)

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Annual Total VMT	161.83	171.05	177.15	184.55	187.43

Per Capita Annual Residential VMT, miles / year / person

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Annual Residential VM	3,194.63	3,144.06	3,043.28	2,941.11	2,909.37

Per Household Annual Residential VMT, miles / year / household

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Annual Residential VM	11,726.89	11,470.57	10,808.98	10,195.18	9,987.93

Travel Mode Share

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Auto	81%	81%	81%	81%	80%
Transit	3%	3%	3%	3%	4%
Walk or Bike	16%	16%	16%	16%	16%
Total	100%	100%	100%	100%	100%

MXD Total Vehicle Trips Daily, trips / day

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Daily MXD Total Vehicle Trips	187,244.32	198,975.40	221,868.33	248,446.18	255,868.30

MXD Total Vehicle Trips Annual, trips / year (millions)

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Annual MXD Total Vehicle Trips	65.54	69.64	77.65	86.96	89.55

MXD Vehicle Trips Daily Per Capita, trips / day / person

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Daily MXD Vehicle Trip	1.18	1.16	1.11	1.05	1.02

MXD Vehicle Trips Daily Per Household, trips / day / household

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Daily MXD Vehicle Trip	4.34	4.24	3.93	3.62	3.51

MXD Vehicle Trips Annual Per Capita, trips / year / person

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Annual MXD Vehicle T	413.50	407.04	387.68	365.75	357.92

MXD Vehicle Trips Annual Per Household, trips / year / household

	2005 Scenario	2017 Base	2030 Projection	2045 Projection	2050 Projection
Average Annual MXD Vehicle T	1,517.88	1,485.01	1,376.94	1,267.86	1,228.76

Exported from UrbanFootprint

This document contains tabular results for key metrics from the Ur

Project:	Watsonville_VMT
Report:	Transportation
Date exported:	2021-Mar-29
Time exported:	1:39 PM PDT

Name	Description
2005 Scenario	Clone of Base Scenario
2017 Base	Clone of Base Scenario
2030 Projection	Clone of 2017 Base
2045 Projection	Clone of 2045 Projection
2050 Projection	Clone of 2030 Projection

Appendix C. Forecast Methodology

This page intentionally left blank.

Harris & Associates

MEMORANDUM

To: Alex Yasbek, PE, City of Watsonville, Public Works & Utilities Department
From: Sharon Toland, Harris & Associates
RE: City of Watsonville Climate Action and Adaptation Plan Greenhouse Gas Emissions Forecast Summary
Date: August 20, 2021
CC: Darin Neufeld, AICP, Harris & Associates

The following presents a summary of the City of Watsonville 2030 Climate Action and Adaptation Plan forecast methodology.

Growth Forecasts

Baseline population, housing unit, and employment data for 2017 was provided by the Association of Monterey Bay Area Governments (AMBAG) (2020b). AMBAG also provided forecast data for 2030 and 2040 through the 2018 Regional Growth Forecast (AMBAG 2018). Compound annual growth rates (CAGRs) were calculated for the periods from 2017 to 2030 and 2017 to 2040 for each growth sector. The CAGR for the 2017 to 2040 period was applied to years beyond 2040 to estimate population, housing units, and employment in 2045 and 2050.

Transportation

As discussed previously, future on-road transportation emissions are calculated based on City of Watsonville (City or Watsonville)-specific vehicle miles traveled (VMT) for each forecast year estimated using the Urban Footprint VMT module. Consistent with the methodology of the 2017 emissions inventory, the EMFAC2021 model developed by the California Air Resources Board was used to calculate emissions from these VMT figures (CARB 2021). EMFAC2021 defaults for each county include regionally specific information for the mix of vehicle classes and model years and ambient conditions and travel speeds that determine fuel efficiency. The model estimates carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) emissions from these factors, as well as from inputted vehicle activity data. The EMFAC2021 output for the County of Santa Cruz for each forecast year, assuming all California Air Resources Board default values are in place (including VMT), is assumed to calculate local fleet mix and emissions factors for each vehicle type. The total VMT calculated for Watsonville was then distributed among the various EMFAC2021-defined vehicle types according to percentages from the EMFAC2021 output. The appropriate emissions factor for each vehicle type was then applied for these GHGs. Finally, global warming potentials (GWPs) were factored in, and the total emissions from each vehicle type were summed to reach the total carbon dioxide equivalent (CO_2e) emissions from the on-road transportation sector. EMFAC2021 assumes implementation of statewide emissions standards. Therefore, the business-as-usual scenario assumes increased fuel efficiency in compliance with statewide emissions standards, including those for beyond year 2025 included in California's Clean Air Act waiver.

Energy

Energy sources include electricity and natural gas demand. Central Coast Community Energy (3CE), a clean energy provider, is the primarily electricity supplier to the City, and Pacific Gas and Electric Company (PG&E), a traditional utility provider, provides the remaining electricity. PG&E also provides natural gas service. Future residential electricity and natural gas demands are estimated from the 2017 emissions inventory for each forecast year using the CAGR for population. Future non-residential electricity and natural gas demands are estimated from the 2017 emissions inventory for each forecast year using the CAGR for employment. Consistent with the 2017 emissions inventory, it is assumed that the energy sector includes embedded energy in the treatment and transport of potable water. A separate potable water sector is not included in the forecasts.

It is assumed that 93 percent of future residential and non-residential electricity demand would be provided by 3CE based on the current enrollment rate provided by 3CE, formerly Monterey Bay Community Power (2020). Future emissions factors for electricity and natural gas were obtained from PG&E (2021) and 3CE (2021). The appropriate emissions factor and GWP were applied to estimated energy demand, and emissions were summed to reach the total CO_2e emissions from the residential and non-residential sectors.

Wastewater

GHG emissions from wastewater treatment and effluent discharge are estimated using the assumptions and equations consistent with the 2017 emissions inventory and U.S. Community Protocol WW.12 (ICLEI 2013). The future demand for wastewater was estimated using the CAGR for population. An industrial and commercial multiplier, or 1.25, is assumed to account for non-residential emissions, which is consistent with the assumptions of the 2017 emissions inventory. Total effluent discharge is estimated using the CAGR for population and assumes that discharge would increase proportionally to population increase. The GWP was applied to N_2O emissions, and both sources were summed to reach total CO_2e emissions from wastewater.

Solid Waste

GHG emissions from disposal at the City landfill and other surrounding area landfills are estimated using the assumptions and equations consistent with the 2017 emissions inventory and U.S. Community Protocol SW4.1 (ICLEI 2013). Solid waste generation for forecast years is estimated using the CAGR for population and assumes that disposal would increase proportionally to population increase. Consistent with the 2017 emissions inventory, a 75 percent CH_4 recovery factor and a 10 percent oxidation rate are assumed. The waste composition was obtained from ClearPath for the 2017 emissions inventory and is assumed for the forecast years. The appropriate emissions factor and GWP were applied, and emissions were summed to reach the total CO_2e emissions from solid waste disposal.

References

3CE (Central Coast Community Energy). 2021. Personal communication via telephone. May.

AMBAG (Association of Monterey Bay Area Governments). 2018. 2018 Growth Forecast Technical Documentation. June 13.

AMBAG. 2020a. City of Watsonville 2017 Community-Wide Greenhouse Gas Inventory. May.

AMBAG. 2020b. Email from Amaury Berteaud (Special Projects Manager, AMBAG Energy Watch, Energy Efficiency & Climate Planning Programs). June 12.

CARB (California Air Resources Board). 2021. EMFAC2021 Web Database, Version 1.0.0.

ICLEI (ICLEI – Local Government for Sustainability USA). 2013. "Appendices C–I Detailed Sector Accounting Guidance." In U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions. Version 1.1 July.

MBCP (Monterey Bay Community Power). 2020. Email from J.R. Killigrew (Director of Communications & Outreach). July 7.

PG&E (Pacific Gas and Electric Company). 2021. PG&E Greenhouse Gas Emissions Factors Fact Sheet.

Appendix D. GHG Forecast and Reduction Measures

This page intentionally left blank.

Growth Rates

Inventory Year: 2017

Unit	2017	2030	2040	2045	2050
Population	53,419	56,829	59,743	61214	62721
Housing	14,225	15,614	16,426	16948	17486
Employment	22,979	25,200	26,772	27676	28611

Data Sources:
Population, housing, and employment provided by AMBAG by email June 12, 2020
2030 and 2040 Forecasts from 2018 Regional Growth Forecast (AMBAG)
Assumption Notes:
CAGR from 2017-2040 applied to forecast years 2045 and 2050

Unit	Annual Growth Rate	
	2017-2030	2017-2040
Population	0.005	0.005
Housing	0.007	0.006
Employment	0.007	0.007

Number of Periods		
2017-2030	2017-2045	2017-2050
13	28	33

Watsonville Municipal Airport

Data Source	Unit	Annual Operations		CAGR
Watsonville Municipal Airport Aircraft Operations Data (February 1, 2013 – January 31, 2018)	**Date Range**	**2013/2014**	**2017/2018**	
	Annual Operations (Aircraft Other Than Jet)	45,006	52,128	0.0502
	Annual Operations (Jet)	1,276	1,366	0.0230
Master Plan Aviation Forecast (Revised April 2010)	**Date Range**	**1995**	**2005**	
	Total Aircraft (Historical)	106600	126890	0.0176
	Date Range	**2010**	**2025**	
	Local (Forecast)	52650	62985	0.0120
	Jet Engine (Forecast)	11	15	0.0209
Master Plan (2001-2020)	**Date Range**	**1977**	**2000**	
	Historical Airport Operations (Local)	33000	49156	0.0175
	Date Range	**1990**	**2000**	
	Annual Demand	129050	122890	-0.0049
			Average General	**0.0201**
			Average Jet	**0.0148**

Transportation

Inventory Results			
Inventory Record	**CO2e MT**	**Activity Data**	**Units**
Aggregated On-Road Transportation	86,044	171,050,764	VMT
Airport Fuel Emissions (Av Gas)	522	150,091.16	Fuel use in Gallons
Airport Fuel Emissions (Jet "A")	897	54,043.39	Fuel use in Gallons
Total Airport Emissions	*1418.90*		

Inventory Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.
Transportation Source: See Attachment 3

On-Road Transportation

	2017	2030	2045	2050
Vehicle Miles Traveled	171,050,764	177,154,803	184,548,545	187,429,391
MT CO2	84,151.05	66,501.13	57,578.75	57484.1153
MT N2O	6.28	3.36	2.51	2.492498272
MT CH4	8.17	3.48	1.59	1.494177463
Total MT CO2e	**86,044.17**	**67,488.00**	**58,289.64**	**58,186.46**

*See EMFAC Calculation spreadsheets (Att 3) and Urban Footprint Output (Att 4)

Aviation (Annual Operations)

Inventory Record	**2017**	**2030**	**2045**	**2050**
General Aviation	150,091.16	194,383	261,962	289,355
Jets	54,043.39	65,424	81,565	87,786
MT CO2	1,390.28	1,756.83	2,304.41	2,523.29
MT N20	0.03	0.04	0.05	0.05
MT CH4	0.75	0.98	1.31	1.45
Emissions from Fuel Use (MT CO2e)	**1,418.90**	**1,793.49**	**2,353.22**	**2,576.99**

Input/Assumptions Summary

Applicable Growth Rate: VMT Calculated using Urban Footprint
Annual operations for aviation
Assume fuel use increases at the same CAGR as flight operations

US Community Protocol Reference TR.6.B

Aviation Fuel EF			
CO2 EF	8.31	kg/gallon	
CH4 EF	7.04	g/gallon	Source: AMBAG 2020
N20 EF	0.11	g/gallon	
Local Attribution	0.7		
Jet fuel EF			
CO2 EF	9.57	kg/gallon	
CH4 EF	0.27	g/gallon	
N20 EF	0.31	g/gallon	Source: AMBAG 2020

Energy

Iventory Results

Iventory Record (PG&E Rate Code)	CO2e MT	Activity Data	Units	Convert to MMBtu
Electricity				
Residential County Electricity	4.1	42,930.0	kWh	146.5192314
Residential City Electricity	0.0	453.0	kWh	1.54607994
Residential Non Government Electricity	5,274.6	54,855,337.0	kWh	187,220.17
Subtotal Residential	*5,278.8*	*54,898,720.0*	kWh	187,368.23
Commercial County Electricity	69.4	721,453.0	kWh	2462.30466
Commercial City Electricity	805.7	8,379,177.0	kWh	28597.96352
Commercial District Electricity	410.5	4,269,225.0	kWh	14570.77954
Commercial Non Government Electricity	10,807.8	112,400,018.0	kWh	383619.0134
Agricultural City Electricity	146.6	1,524,252.0	kWh	5202.241591
Subtotal Commercial/Industrial	*12,239.9*	*127,294,125.0*	kWh	434452.3027
Total Electricity	*17,518.7*	*182,192,845.0*	kWh	621820.5361
Natural Gas				
Residential County Gas	0.2	36.0	Therms	3.60
Residential City Gas	6.4	1,205.0	Therms	120.50
Residential Non Government Gas	23,800.2	4,474,849.0	Therms	447,484.90
Subtotal Residential	*23,806.8*	*4,476,090.0*	Therms	447,609.00
Commercial County Gas	160.7	30,211.0	Therms	3,021.10
Commercial City Gas	470.3	88,419.0	Therms	8,841.90
Commercial District Gas	697.6	131,165.0	Therms	13,116.50
Commercial Non Government Gas	18,084.7	3,400,248.0	Therms	340,024.80
Industrial City Natural Gas	1,045.0	196,902.0	Therms	19,690.20
Subtotal Commercial/Industrial	*20,458.3*	*3,846,945.0*	Therms	384,694.50
Total Natural Gas	*44,265.1*	*8,323,035.0*	Therms	832,303.50

Inventory Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

*Note: Includes GHG emissions from the treatment and transport of potable water

Input/Assumptions Summary

Applicable Growth Rate:	Housing for Residential Jobs for commercial/industrial	
kWh to MMBtu Conversion Factor:	0.003413	MMBTU/kwh
therm to MMBtu Converstion Factor	0.1	MMBTU/therm
MMBtu to Mwh Conversion Factor	3.409510641	MMBtu/Mwh
MT to lbs conversion factor:	2204.62	pounds/MT

	2017/2018	2030+	
3CE EF	0.0044	0.003	MT CO2e/MWh
3CE EF Converted to MT/MMBtu	0.001	0.0009	MT CO2e/MMBTU
3CE Opt Out Rate	0.07	0.07	

3CE EF Source: AMBAG. Personal communication, May 2021. PCL Method

PG&E Emissions Factors	2017	2019+
	MT/Mmbtu	
Electricity		
CO2	0.02791	0.0004
CH4	4.3858E-06	4.3858E-06
N2O	5.3161E-07	5.3161E-07
Total	***0.028173679***	***0.0006***
Natural Gas		
CO2	0.05302	
CH4	0.000005	
N2O	0.0000001	
Total	***0.0531865***	

Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

Source (2019 PG&E Rate): PG&E. Greenhouse Gas Emissions Factors. 2021.

Energy

Forecast Energy Use (MMBTu)

Sector	2017	2030	2045	2050
Electricity				
Residential	187,368.2	205,663.8	223,233	230,325
Commercial/Industrial	434,452.3	476,443.6	523,258	540,928
Natural Gas				
Residential	447,609.00	491,315.8	533,287	550,229
Commercial/Industrial	384,694.50	421,876.6	463,329	478,976

Electricity Emissions	**2030**		**2045**		**2050**	
Sector	**PG&E**	**3CE**	**PG&E**	**3CE**	**PG&E**	**3CE**
Residential						
CO2	5.07		5.50		5.67	
CH4	0.06		0.07		0.07	
N2O	0.01		0.01		0.01	
Subtotal Residential (MT CO2e)	8.86	168.29	9.62	182.67	9.93	188.47
Commercial/Industrial						
CO2	11.74		12.89		13.33	
CH4	0.15		0.16		0.17	
N2O	0.02		0.02		0.02	
Subtotal Commercial/Industrial (MT CO2e)	20.53	389.87	22.55	428.18	23.31	442.64
Total (MT CO2e)		587.56		643.02		664.35

Natural Gas

Sector	2030	2045	2050
Residential			
CO2	26,049.56	28,274.87	29,173.13
CH4	2.46	2.67	2.75
N2O	0.05	0.05	0.06
Subtotal Residential (MT CO2e)	26,131.37	28,363.66	29,264.75
Commercial/Industrial			
CO2	22,367.90	24,565.71	25,395.28
CH4	2.11	2.32	2.39
N2O	0.04	0.05	0.05
Subtotal Commercial/Industrial (MT CO2e)	22,438.14	24,642.85	25,475.03
Total (MT CO2e)	48,569.50	53,006.51	54,739.78

Wastewater

2017 Inventory Results

Inventory Record	CO2e MT	Activity Data	Units
Process N2O Emissions from wastewater treatment	63.133	59,559.00	population based (Watsonville population + freedom + pajaro)
Process N2O emissions from effluent discharge	425.2541439	559.68	Total kg N/day

Inventory Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

*GHG emissions from the treatment and transport of potable water is included in energy emissions

	Activity Data		
Future Wastewater Records	**2030**	**2045**	**2050**
Wastewater treatment (population + industrial multiplier)	71,036	76,517	78,401
Effluent discharge (Total kg N/day)	595	641	657

Wastewater Emissions (MT CO2e)

Sector	2030	2045	2050
Emissions from wastewater treatment	60.24	64.89	66.48
Emissions from effluent discharge	452	487	499
Total (MT CO2e)	**513**	**552**	**566**

Input/Assumptions Summary

Applicable Growth Rate:	Population	
Assumes effluent load increases proportional to population		
Wastewater Treatment		
Industrial/Commercial multiplier	1.25	(AMBAG 2020/ Protocol WW.12)
EF:	3.2	g N2O/person (Protocol WW.12)
Effluent Discharge		
EF:	0.005	kg N2O/kg N in effluent (Protocol WW.12)
Molecular weight ratio of N20 to N2:	1.57	(Protocol WW.12)
N2O to Effluent Emissions conversion:	Annual N2O emissions = (N-Load *EF* 365.25 * 0.001* Molecular weight ratio) * GWP (Protocol WW.12)	

Solid Waste

2017 Inventory Results

Inventory Record	CO2e MT	Activity Data	Units
Other Waste Rollup	2809.824827	9821	Tons of waste
City of Watsonville Landfill	9495.497014	33189	Tons of waste

Inventory Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

	Activity Data		
Future Tons of Waste	**2030**	**2045**	**2050**
Other Waste Rollup	10,448	11,254	11,531
City of Watsonville Landfill	35,308	38,032	38,968

Solid Waste Emissions (MT CO2e)

Sector	2030	2045	2050
Other Waste Rollup	4,110	4,427	4,536
City of Watsonville Landfill	13,888	14,959	15,328
Total (MT CO2e)	17,997	19,386	19,863

Input/Assumptions Summary

Applicable Growth Rate:	Population	
Methane Recovery Factor:	75%	Source: AMBAG 2020
Oxidation Rate	10%	Source: AMBAG 202o
US Protocol Equation SW4.1 Methane Emissions:	CH4 emissions = GWP*(1-Recovery Factor)*(1-Oxidation Rate)*Total Mass*Sum(Mass fraction of waste type*EF for waste type)	

Assume no change in waste composition in future years

Waste Composition		EF (MT CH4/t	%*EF	Source
Percent Newspaper	*1.44*	0.042862	0.000617213	AMBAG 2020
Percent Office Paper	*0.73*	0.20286	0.001480878	
Percent Corrugated Cardboard	*3.13*	0.12	0.003756	
Percent Coated Paper	*12.1*	0.048562	0.005876002	
Percent Food Waste	*18.12*	0.0776	0.01406112	
Percent Grass	*1.84*	0.038095	0.000700948	
Percent Leaves	*3.52*	0.012861	0.000452707	
Percent Branches	*3.27*	0.061913	0.002024555	
Percent Lumber	*11.91*	0.06049	0.007204359	
Percent Textiles	*5.85*	0.072575	0.004245638	
Percent Diapers	*4.29*	0.072575	0.003113468	
Percent Construction and Demolition Waste	*2.31*	0.012096	0.000279418	
Percent Medical Waste	*0.11*	0.045359	4.98949E-05	
Percent Sludge and Manure	*0.57*	0.01512	0.000086184	
Remainder	30.81	0.06	0.018486	US Protocol Equation SW4.1
		Sum:	*0.062434384*	

Emissions Summary

Sector	Emissions (MT CO2e)											
	2017			2030			2045			2050		
	Total	Per Capita	Percent of Scope 1 T	Total	Per Capita	Percent of Scope 1	Total	Per Capita	Percent of Scope 1	Total	Per Capita	Percent of Scope 1 Total
Transportation	86,044.2	1.61	54%	67,488	1.19	50%	58,290	0.95	44%	58,186	0.93	43%
Transportation (Airport)	1,418.9	0.03	1%	1,793	0.03	1%	2,353	0.04	2%	2,577	0.04	2%
Residential Electricity Use	5,278.8	0.10	3%	177	0.00	0%	192	0.00	0%	198	0.00	0%
Non-Residential Electricity	12,239.9	0.23	8%	410	0.01	0%	451	0.01	0%	466	0.01	0%
Residential Natural Gas	23,806.8	0.45	15%	26,131	0.46	19%	28,364	0.46	22%	29,265	0.47	22%
Non-Residential Natural Gas	20,458.3	0.38	13%	22,438	0.39	17%	24,643	0.40	19%	25,475	0.41	19%
Wastewater	488.4	0.01	0%	513	0.01	0%	552	0.01	0%	566	0.01	0%
Solid Waste	12,305.3	0.23	8%	17,997	0.32	13%	19,386	0.32	15%	19,863	0.32	15%
Total (Scope 1 and 2)	**160,622**	3.01		**135,155**	2.38		**131,877**	2.15		**134,020**	2.14	
Total (Scope 1, 2, 3)	**162,041**	**3.03**		**136,949**	**2.41**		**134,231**	**2.19**		**136,597**	**2.18**	

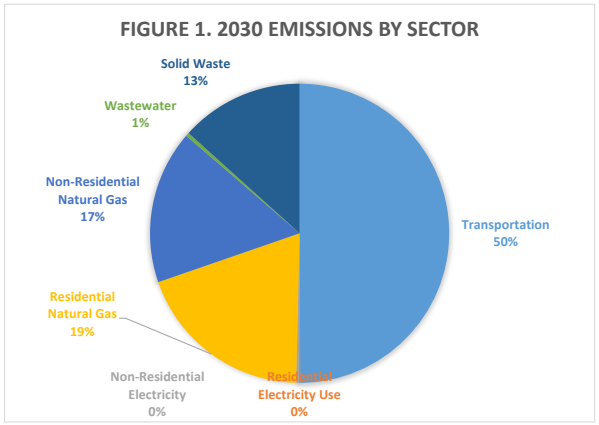
Forecast Goal	Target Year	Goal	Target Per Capita	Target Emissions	
Climate Safe CA	2030	Carbon Neut	0	0	
CAAP Target	2030	80% Below 1	2 MT	113,658	
B-55-18	2045	Carbon Neutrality		-	
	2030	40% Below 1	6 MT	340,974	
Legislation Targets	2050	80% Below 1	2 MT	125,442	

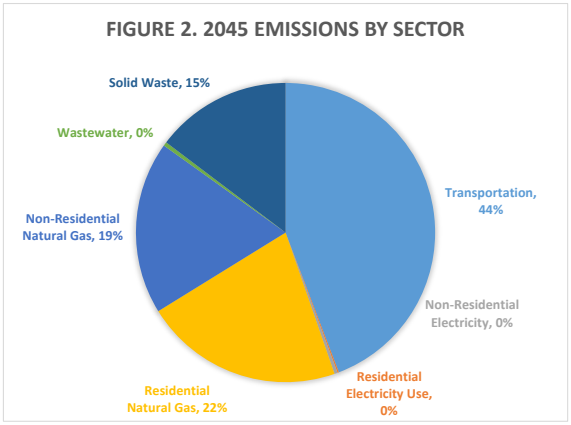
Previous Inventory Results	MT CO2e	Population	Per Capita
Watsonville 2005 Emissions (Revised with Urban Footprint VMT, airport removed)	208,929	44,571	4.7
1990 Emissions (15% Below 2005 Emissions)	177,590	31,099	5.7

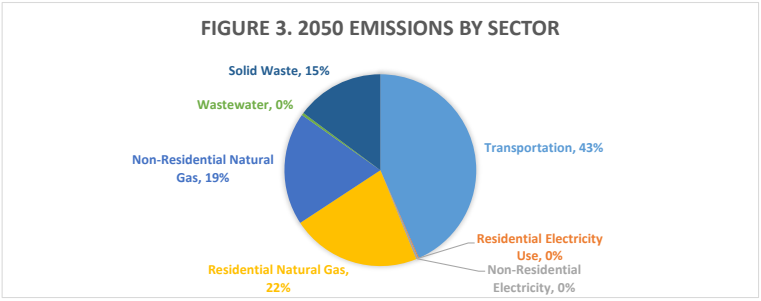
Source: AMBAG. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

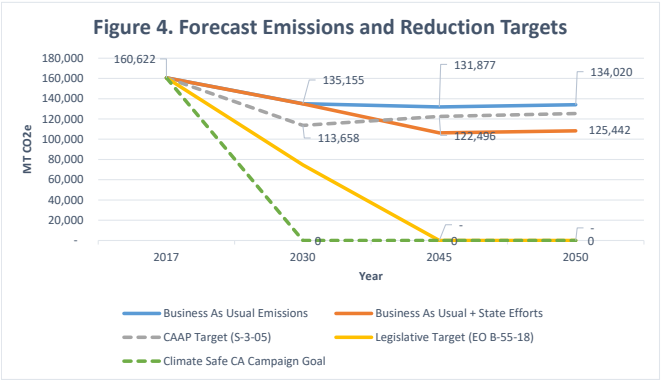
Graph Input Summary

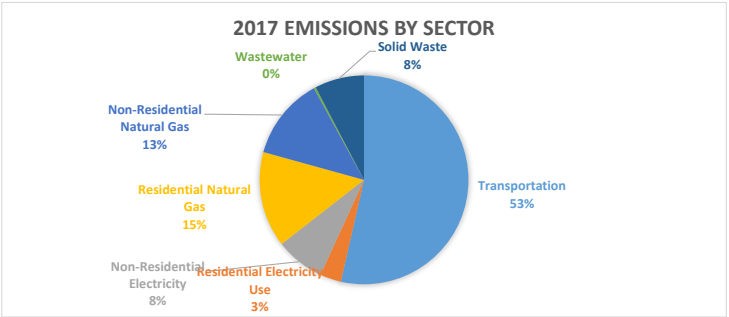
Year	Business As	Business As	CAAP Target (S-3-05	Legislative Target (	Climate Safe CA Campaign Goal
2017	160,622	160,622	160,622	160,622	160,622
2030	135,155	134,923	113,658	74,574	0
2045	131,877	106,272	122,496	-	0
2050	134,020	108,236	125,442	-	0











General Assumptions

Conversion Factors	
1000	kg/metric ton
365.25	days/year
0.00341298	MMBtu/kWh
0.1	MMBtu/therm
1,000,000	g/metric ton
0.293	Mwh/MMBtu
2204.62	pounds/MT

Global Warming Potentials	
CH4	28
N2O	265

Source: IPCC 2014

PG&E EF Conversion

	2019+	
PG&E Provided EF	2.68	lbs/ CO2e/MWH
PG&E EF	0.0012	MT CO2e/MWh
3CE EF Converted to MT/MMBtu	0.00035	MT CO2e/MMBTU

Source: PBG&E. 2021. PG&E Greenhouse Gas Emission s Factors

Forecast Sources:

3CE (Central Coast Community Energy). 2021. Personal communication via telephone. May 2021.

American Aviation Professionals Inc. 2019. Watsonville Municipal Airport Aircraft Operations Data. January 14, 2019

Association of Monterey Bay Area Governments (AMBAG). 2020. Personal communication with Amaury Berteaud, Special Projects Manager, AMBAG Energy Watch, Energy Efficiency & Climate Planning Programs via email. June 12. 2020

Association of Monterey Bay Area Governments (AMBAG). 2020. City of Watsonville 2017 Community Wide Greenhouse Gas Inventory. May 2020.

Association of Monterey Bay Area Governments (AMBAG). 2018. 2018 Growth Forecast Technical Documentation. June 13, 2018.

California Air Resources Board (CARB). 2020. "Local Government Actions for Climate Change". https://ww2.arb.ca.gov/our-work/programs/local-actions-climate-change/local-government-actions-climate-change Accessed July 13, 2020.

California Air Resources Board (CARB). 2017. California's 2017 Climate Change Scoping Plan. November 2017.

California Air Resources Board (CARB). EMFAC2017 Web Database (Version 1.0.2)

California Air Resources Board (CARB). OFFROAD2017 Web Database (Version 1.0.1)

ICLEI - Local Government for Sustainability USA. 2013. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendices C-I Detailed Sector Accounting Guidance. Version 1.1 July 2013.

International Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report.

Monterey Bay Community Power. 2020. Personal communication with J.R. Killigrew, Director of Communications & Outreach via email. July 7, 2020.

PG&E (Pacific Gas and Electric Company). 2021. PG&E Greenhouse Gas Emissions Factors Fact Sheet.

Statewide Energy Efficiency Collaborative (SEEC). 2010. Quick Start Guide for Setting a Greenhouse Gas Reduction Target. November.

Watsonville Municipal Airport. 2020. Email from Rayvon Williams (Municipal Airport Director). June 11.

Watsonville Municipal Airport. 2010. Watsonville Municipal Airport Master Plan, Chapter 3 - Aviation Forecasts. Revised April 2010.

Watsonville Municipal Airport. 2003. Watsonville Municipal Airport Master Plan 2001-2020. June 24, 2003.

U.S. Environmental Protection Agency. 2018. Emissions Factors for Greenhouse Gas Emissions Inventories. Last Modified March 9, 2018.

Implementation of Executive Order N-79-20

Executive Order N-79-20 mandates that 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035.

Assumptions: CARB Draft 2020 Mobile Source Strategy estimates implementation can achieve 85% PHEV/ZNE light duty vehicles by 2045. Sales of new EVs expected to increase from 75% ZEV/25% PHEV in 2030 to 90/10 in 2045. Ratio of 75/25 conservatively assumed, so that the 2045 vehicle mix assumed to include 64% ZNE and 21% PHEV.

Data Inputs

	2030	2045	2050	Source	Notes
BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961		
BAU Passenger/Light Duty Emissions (MT CO2e)	41,842	38,344	38,535	EMFAC	
BAU % Passenger/Light Duty VMT from gasoline:	90%	88%	87%	EMFAC	
BAU % Passenger/Light Duty from diesel:	0%	0%	0%	EMFAC	
BAU % Passenger/Light Duty PHEV:	3%	3%	3%	EMFAC	
BAU % Passenger/Light Duty from ZEV:	7%	9%	9%	EMFAC	
BAU % PHEV VMT that is Electric	*55%*	*59%*	*59%*	EMFAC	
BAU gasoline VMT:	**124,349,019.81**	**126,677,886.01**	**128,271,005.30**		
BAU diesel VMT:	**422,572.72**	**226,259.99**	**223,706.79**		
BAU electric VMT:	**11,103,879.45**	**15,397,732.02**	**15,832,249.09**		
N-79-20 % Passenger/Light Duty VMT from gasoline:	90%	15%	15%		
N-79-20 % Passenger/Light Duty from diesel:	0%	0%	0%		Assume Diesel stays constant
N-79-20 % Passenger/Light Duty PHEV:	3%	21%	21%		
N-79-20 % Passenger/Light Duty from ZEV:	7%	64%	64%		CARB 2021
VMT from gasoline with N-79-20:	**124,349,019.81**	**33,312,869.64**	**33,786,941.61**		
VMT from diesel with N-79-20:	**422,572.72**	**284,603.76**	**288,653.92**		Assume Diesel stays constant
VMT from electric with N-79-20:	**11,103,879.45**	**108,704,404.61**	**110,251,365.65**		
Cumulative EV VMT Impact	-	93,306,672.59	94,419,116.55		
Cumulative Gas VMT Impact	-	(93,365,016.36)	(94,484,063.68)		

Measure Impact

	2030	2045	2050
Total Gas VMT Reduction	**-**	**(93,365,016)**	**(94,484,064)**
% Gasoline VMT Reduction from BAU	**0.00%**	**-65.61%**	**-65.47%**
Total GHG Reduction (MT CO2e)	**-**	**(25,158)**	**(25,227)**

Cumulative Energy Impact

Data Inputs

	Input	Unit	Notes	Service Proportion
Utility Carbon Intensity	0.000879892	MT CO2e/MMBTU	3CE	0.93
	0.000615636	MT/Mmbtu	PG&E	0.07
Fuel Efficiency	32	kwh/100 miles	US DOE	
	0.10921536	MMBTU/100 miles		
	0.001092154	MMBTU/mile		
Net Increase EV VMT	-	Miles	2030	
	93,306,672.59	Miles	2045	
	94,419,116.55	Miles	2050	
Net Increase MMBtu	101,905.22		2045	
	103,120.18		2050	

Additional MT CO2e from Energy Use	2030	2045	2050
3CE	-	83.39	84.38
PG&E	-	4.39	4.44
Total	**-**	**87.78**	**88.83**

Title 24 Building Energy Efficiency Standards

The 2019 Building Energy Efficiency Standards went into effect on January 1, 2020. The updated building standards include new requirements for solar power generation, battery storage, and electric vehicle charging infrastructure. The California Energy Commission estimates that single-family homes built with the 2019 standards will use about 7 percent less energy due to energy efficiency measures versus those built under the 2016 standards. Once rooftop solar electricity generation is factored in, homes built under the 2019 standards will use about 53 percent less energy than those under the 2016 standards. Nonresidential buildings are estimated to use about 30 percent less energy due mainly to lighting upgrades.

Assumptions: 7% energy reduction is assumed for natural gas and multi-family energy efficiency reduction. 53% electricity reduction assumed for new single family residences. 30% electricity reduction assumed for new commercial development. At the time of CAAP preparation, the 2022 Building Energy Efficiency Standards have not been finalized and 2019 building standards are applied to development beyond 2023.

Measure Impact With CAAP Implementation

Review Defaults

Data Needed	Input
Electricity EF (MT CO2e/MMBtu)	0.0009
Natural Gas EF (MT CO2e/MMBtu)	0.05

Data Inputs

Data Needed		Input			Unit	Source of Data
	2017	2030	2045	2050		
SF of Non-Residential Building	11,013,144	11,773,402	12,765,426	13,059,444		UF Data
Number of Dwelling Units	14,225	15,614	16,948	17,486		Growth Rates Tab
Proportion of total housing that is multi-family housing	25%	33%	39%	42%		UF Data
Cumulative New Non Residential Construction (2020+)		643,295	1,635,319	1,929,337	SF	
Cumulative New Residential Construction (2020+)		1,175	2,509	3,048	Units	
Proportion of new housing that is multi-family		90%	90%	90%		UF Data
Cumulative New SF Housing		118	251	305	Units	
Cumulative New MF Housing		1,058	2,258	2,743	Units	
Electricity Demand per SF (MMBtu) (Annual)	0.039	0.041	0.043	0.044	MMBtu	Linked to E1
Electricity Demand per DU (MMBtu) (Annual)	13.1718	14.0330	15.2035	15.6254	MMBtu	Linked to E1
Natural Gas per SF (MMBtu) (Annual)	0.03	0.04	0.03	0.03	MMBtu	Linked to E1
Natural Gas per DU (MMBtu) (Annual)	31.47	30.61	29.43	29.01	MMBtu	Linked to E1
New Growth Electricity Demand Non-Res (MMBtu) (Annual)	--	26,491	70,426	84,666	MMBtu	
New Growth Electricity Demand SF Res (MMBtu) (Annual)	--	1,649	3,815	4,762	MMBtu	
New Growth Electricity Demand MF Res (MMBtu) (Annual)		14,844	34,333	42,857	MMBtu	
New Growth Natural Gas Non-Res (MMBtu) (Annual)	--	22,593	55,961	66,010	MMBtu	
New Growth Natural Gas Res (MMBtu) (Annual)	--	35,970	73,856	88,418	MMBtu	
% Reduction In Commercial Electricity Use	--	30%	30%	30%		
% Reduction in SF Electricity Use		53%	53%	53%		
% Reduction in MF Electricity Use		7%	7%	7%		
% Reduction Natural Gas Use		7%	7%	7%		

Measure Impact

	2030			2045			2050		
	Net Change in Demand (MMBtu)	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**
Non-Residential Electricity	(7,947.22)	0.0009	(7)	(21,127.82)	0.0009	(18)	(25,399.70)	0.0009	(22)
Residential Electricity Use	(1,913)	0.0009	(2)	(4,425)	0.0009	(4)	(5,524)	0.0009	(5)
Non-Residential Natural Gas	(1,581.52)	0.0532	(84)	(3,917.27)	0.0532	(208)	(4,620.69)	0.0532	(246)
Residential Natural Gas	(2,517.93)	0.0532	(134)	(5,169.90)	0.0532	(275)	(6,189.27)	0.0532	(329)
		Total:	***(227)***			***(505)***			***(602)***

Measure Impact With BAU

Review Defaults

Data Needed	Input
Electricity EF (MT CO2e/MMBtu)	0.0009
Natural Gas EF (MT CO2e/MMBtu)	0.0531865

Data Inputs

Data Needed		Input			Unit	Source of Data
	2017	2030	2045	2050		
SF of Non-Residential Building	11,013,144	11,773,402	12,765,426	13,059,444		UF Data
Number of Dwelling Units	14,225	15,614	16,948	17,486		Growth Rates Tab
Proportion of total housing that is multi-family housing	25%	33%	39%	42%		UF Data
Cumulative New Non Residential Construction (2020+)		643,295	1,635,319	1,929,337	SF	
Cumulative New Residential Construction (2020+)		1,175	2,509	3,048	Units	
Proportion of new housing that is multi-family		90%	90%	90%		UF Data
Cumulative New SF Housing		118	251	305	Units	
Cumulative New MF Housing		1,058	2,258	2,743	Units	
Electricity Demand per SF (MMBtu) (Annual)	0.039	0.040	0.041	0.041	MMBtu	
Electricity Demand per DU (MMBtu) (Annual)	13.1718	13.1718	13.1718	13.1718	MMBtu	
Natural Gas per SF (MMBtu) (Annual)	0.03	0.04	0.04	0.04	MMBtu	
Natural Gas per DU (MMBtu) (Annual)	31.47	31.47	31.47	31.47	MMBtu	
New Growth Electricity Demand Non-Res (MMBtu) (Annual)	--	26,033	67,032	79,914	MMBtu	
New Growth Electricity Demand SF Res (MMBtu) (Annual)	--	1,548	3,305	4,014	MMBtu	
New Growth Electricity Demand MF Res (MMBtu) (Annual)		13,933	29,745	36,128	MMBtu	
New Growth Natural Gas Non-Res (MMBtu) (Annual)	--	23,051	59,355	70,761	MMBtu	
New Growth Natural Gas Res (MMBtu) (Annual)	--	36,983	78,954	95,896	MMBtu	
% Reduction In Commercial Electricity Use	--	30%	30%	30%		
% Reduction in SF Electricity Use		53%	53%	53%		
% Reduction in MF Electricity Use		7%	7%	7%		
% Reduction Natural Gas Use		7%	7%	7%		

Measure Impact

	2030			2045			2050		
	Net Change in Demand (MMBtu)	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**
Non-Residential Electricity	(7,809.82)	0.0009	(7)	(20,109.63)	0.0009	(17)	(23,974.21)	0.0009	(21)
Residential Electricity Use	(1,796)	0.0009	(2)	(3,834)	0.0009	(3)	(4,656)	0.0009	(4)
Non-Residential Natural Gas	(1,613.58)	0.0532	(86)	(4,154.85)	0.0532	(221)	(4,953.30)	0.0532	(263)
Residential Natural Gas	(2,588.79)	0.0532	(138)	(5,526.76)	0.0532	(294)	(6,712.70)	0.0532	(357)
		Total:	***(232)***			***(536)***			***(645)***

		GHG Reduction		
Measure	**Summary**	**2,030**	**2,045**	**2,050**
State				
ST1	EO N-79-20 (Reduction in Fossil Fuel VMT)	-	(25,158)	(25,227)
ST1	EO N-79-20 (Additional Electricity Demand)	-	88	89
ST2	Building Energy Efficiency Standards (Residential Electricity)	(2)	(3)	(4)
	Building Energy Efficiency Standards (Non-Residential Electricity)	(7)	(17)	(21)
	Building Energy Efficiency Standards (Residential Natural Gas)	(138)	(294)	(357)
	Building Energy Efficiency Standards (Non-Residential Natural Gas)	(86)	(221)	(263)
Sector Total:		**(232)**	**(25,605)**	**(25,783)**

Emissions Summary

	Emissions (MT CO2e)											
	2030				2045				2050			
Sector	**BAU Total**	**BAU Per Capita**	**Reduced Total**	**Reduced Per Capita**	**BAU Total**	**BAU Per Capita**	**Reduced Total**	**Reduced Per Capita**	**BAU Total**	**BAU Per Capita**	**Reduced Total**	**Reduced Per Capita**
Transportation (Vehicles)	*67,488*	*1.19*	**67,488**	**1.19**	*58,290*	*0.95*	**33,132**	**0.54**	*58,186*	*0.93*	**32,959**	**0.53**
Residential Electricity Use	*177*	*0.00*	**176**	**0.00**	*192*	*0.00*	**277**	**0.00**	*198*	*0.00*	**283**	**0.00**
Non-Residential Electricity	*410*	*0.01*	**404**	**0.01**	*451*	*0.01*	**433**	**0.01**	*466*	*0.01*	**445**	**0.01**
Residential Natural Gas	*26,131*	*0.46*	25,994	**0.46**	*28,364*	*0.46*	28,070	**0.46**	*29,265*	*0.47*	28,907.72	**0.46**
Non-Residential Natural Gas	*22,438*	*0.39*	22,352	**0.39**	*24,643*	*0.40*	24,422	**0.40**	*25,475*	*0.41*	25,212	**0.40**
Wastewater	*513*	*0.01*	513	**0.01**	*552*	*0.01*	552	**0.01**	*566*	*0.01*	565.79	**0.01**
Solid Waste	*17,997*	*0.32*	17,997	**0.32**	*19,386*	*0.32*	19,386	**0.32**	*19,863*	*0.32*	19,863	**0.32**
Total (Scope 1 and 2)	*135,155*	*2.38*	**134,923**	**2.37**	*131,877*	*2.15*	**106,272**	**1.74**	*134,020*	*2.14*	**108,236**	**1.73**
Target Emissions			113,658				0				125,442	125,442
Reduction Gap			**21,265**				**106,272**				**(17,206)**	**None**
Transportation (Airport)	*1,793*	*0.03*	*1,793*	*0.03*	*2,353*	*0.04*	*2,353*	*0.04*	*2,577*	*0.04*	*2,577*	*0.04*
Total (Scope 1, 2, and 3)	*136,949*	*2.41*	*136,717*	**2.41**	*134,231*	*2.19*	*108,625*	**1.77**	*136,597*	*2.18*	*110,813*	**1.77**

T1: Incorporate Smart Growth Concepts		CAPCOA Reference	
Reduction Measure T1-A:	Smart Growth Principles	LUT-1	

Default Assumptions

	Input	Unit
T1-A	0.07	elasticity of VMT

Data Input

Applicable Measure	Data Needed	Input			Notes
		2030	2045	2050	
T1-A	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	Fleet VMT Removed (T9)
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	Linked to ST1
	% Change in Housing Units from Existing	10%	21%	23%	Calculated using UrbanFootprint/US Census Data
	% Change in Jobs from Existing	10%	21%	26%	Housing Selected because more conservative

Measure Impact

	2030	2045	2050
T1-A VMT Reduction	0.70%	1.47%	1.60%
Total VMT Reduction	**(951,128)**	**(2,091,838)**	**(2,316,211)**
Total GHG Reduction (MT CO2e)	**(293)**	**(194)**	**(214)**

T2. Multimodal Transportation Facilities

		CAPCOA Reference	
Reduction Measure T2-A	**New Pedestrian Improvements**	SDT-1	
Reduction Measure T2-B:	**Pedestrian and Cyclist Multi-Modal Improvements**	SDT-2	
Reduction Measure T2-C:	**Trails & Bicycle Master Plan**	SDT-5	

Default Assumptions

	Estimated VMT Reduction	Extent of Pedestrian Accommodations	Context
T2-A	2%	Within Project Site and Connecting Off-Site	Urban/Suburban
	1%	Within Project Site	Urban/Suburban
	<1%	Within Project Site and Connecting Off-Site	Rural

		% of Streets With Improvements						
		6%	10%	12%	25%	50%	75%	100%
		VMT % Reduction						
T2-B	6%	0.05%	0.06%	0.07%	0.15%	0.16%	0.40%	0.41%
	7%	**0.05%**	0.07%	0.08%	0.15%	0.17%	0.40%	0.42%
	12%	0.07%	**0.09%**	0.10%	0.17%	0.20%	0.42%	0.45%
	14%	0.08%	0.10%	**0.11%**	0.18%	0.21%	0.43%	0.46%
	25%	0.15%	0.17%	0.17%	0.25%	0.25%	0.5%	0.5%
	50%	0.16%	0.19%	0.20%	0.25%	0.5%	0.5%	0.75%
	75%	0.40%	0.42%	0.42%	0.5%	0.5%	0.75%	0.75%
	100%	0.41%	0.44%	0.45%	0.5%	0.75%	0.75%	1%
	Note: Italicized values interpolated based on CAPCOA default values. Bold values apply to measure T2-B.							

T2-C	0.075%	Per Mile, Per 100,000 Residents	

Data Input

Applicable Measure	Data Needed	Input			Notes
		2030	2045	2050	
	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	
	Cumulative Reduced VMT	134,924,344	140,210,040	142,010,750	Linked to Measure T1.
T2-A	VMT Reduction (Select Default Above)	1%	1%	1%	Within project site assumed
T2-B	Total City Centerline Miles	84	84	84	
	Total City Intersections	1,418	1,418	1,418	
	Centerline Miles to be Improved	5	5	5	
	Intersections to be Improved	100	100	100	
	% Centerline Miles Improved	6%	6%	6%	
	% Intersections Improved	7%	7%	7%	
	% VMT Reduction (from Defaults Above)	0.05%	0.09%	0.11%	
T2-C	*Assumed New Bikes Lanes (Miles)*	*5*	*5*	*5*	
	Population (100,000 Residents)	*0.57*	*0.61*	*0.63*	

Measure Impact

	2030	2045	2050
T2-A	1%	1%	1%
T2-B	0.05%	0.09%	0.11%
T2-C	0.21%	0.23%	0.24%
Total % VMT Reduction	**1.26%**	**1.32%**	**1.34%**
Total VMT Reduction	**(1,704,110)**	**(1,845,267)**	**(1,900,423)**
% VMT Reduction from BAU	**-1.25%**	**-1.30%**	**-1.32%**
Total GHG Reduction (MT CO2e)	**(525)**	**(171)**	**(175)**

T3. Implement Parking Management		CAPCOA Reference	
Reduction Measure T3-A:	**Strategies**	PDT-3	

Default Assumptions

T3-A	Default Value	Unit
	0.11	Elasticity

Data Input

Applicable Measure	Data Needed	Input				Unit	Notes
		2017	2030	2045	2050		
	BAU Passenger/Light Duty VMT	128,796,844	135,875,472	142,301,878	144,326,961		
	Cumulative VMT	--	133,220,233	138,364,774	140,110,327		Linked to Measure T1-T2
	Passenger/Light Duty Emissions with N-79-20	51,689	41,842	13,186	13,308		
	Downtown Non-Residential Development	1,700,000	1,864,311	2,073,730	2,148,640	square feet	Watsonville Downtown Parking Plan 2017, Assumes jobs growth rate
	Average Trip Rate per 1,000 KSF	--	41	41	41	square feet	From CalEEMod Users Guide Appendix D Table 4.3 (stip mall, average daily)
	Average Trip Length	--	7.3	7.3	7.3	square feet	From CalEEMod Users Guide Appendix D Table 4.2 for Santa Cruz County
	Affected VMT		4,967,456	5,525,454	5,725,050		
	Increase in parking cost		25%	25%	25%		Range is 25-50%. Low end assumed
T3-A	Proportion of Public Parking in Downtown		34%	34%	34%		Watsonville Downtown Parking Plan 2017

Measure Impact

	2030	2045	2050
T3-A	0.94%	0.94%	0.94%
Total % Affected VMT Reduction	**0.94%**	**0.94%**	**0.94%**
Total VMT Reduction	**(46,446)**	**(51,663)**	**(53,529)**
% VMT Reduction from BAU	**-0.04%**	**-0.04%**	**-0.04%**
Total GHG Reduction (MT CO2e)	**(15)**	**(5)**	**(5)**

T4. Prioritize Transit Movement

		CAPCOA Reference	
Reduction Measure T4-A:	Transit Supportive Treatments	--	

Default Assumptions

	Default Value	Unit	Context
T4-A	10%	Change in transit travel time due to treatments	
	0.4	Transit Rider Elasticity	
	58%	Statewide mode shift factor	Source: SMAQMD 2021

Data Inputs

Applicable Measure	Data Needed	Input			Source of Data/Notes
T4-A		2030	2045	2050	
	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	
	Cumulative Reduced VMT	133,173,788	138,313,111	140,056,798	Linked to Measures T1-T4
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	
	Existing Transit Mode Share	3%	3%	4%	UrbanFootprint Data
	Existing Vehicle Mode Share	81%	81%	80%	UrbanFootprint Data
	% Routes that receive treatments	25%	25%	25%	

Measure Impact

	% GHG Reduction		
	2030	2045	2050
T4-A	0.02%	0.02%	0.03%
Total VMT % Reduction	**0.02%**	**0.02%**	**0.03%**
Total VMT Reduction	**(28,509)**	**(29,609)**	**(40,476)**
% VMT Reduction from BAU	**-0.02%**	**-0.02%**	**-0.03%**
Total GHG Reduction (MT CO2e)	**(9)**	**(3)**	**(4)**

T5. Community Commute Trip Reduction **CAPCOA Reference**

Reduction Measure T5-A:	Commute Trip Reduction Programs	TRT-1		
Reduction Measure T5-B:	End-of-trip Facilities			

Default Assumptions

T5-A	Area Type	VMT% Reduction			
	Low Density Suburb	5%			
	Suburban Center	5%			
	Urban Location	6%			
T5-B			Facility Type	Adjustment Factor	Source
			Parking Only	1.78	
	Bike Mode Adjustment Factor		Parking with showers, bike lockers, and personal lockers	4.86	SMAQMD 2021

Data Input

Applicable Measure	Data Needed		Input			Source of Data/Notes
		2017	2030	2045	2050	
	BAU Passenger/Light Duty VMT		135,875,472	142,301,878	144,326,961	
	Cumulative VMT		133,145,278	138,283,501	140,016,321	Linked to Measures T1-T4
	Commute Trip VMT		58,583,923	60,844,741	61,607,181	Home-Work Proportion Assumed
	Commute Trip VMT w/o Municipal		56,101,651	58,362,469	59,124,909	Linked to Measure T8
	Passenger/Light Duty Emissions with N-79-20		41,842	13,186	13,308	
	Proportion of VMT for Home-Shop		18.8%	18.8%	18.8%	
	Proportion of VMT for Home-Work		44%	44%	44%	From CalEEMod Users Guide (Version 2020.4.0) Appendix D Table 4.2 for Santa Cruz County
	Proportion of VMT for Home-Other		37.2%	37.2%	37.2%	
	Total Employment	22,979	25,200	27,676	28,611	
	Existing Employment (through 2023)	23,833				
	Cumulative New Employment (2023+)		1,367	3,843	4,777	
	Annual VMT/Job		2,325	2,198	2,153	
	Commute VMT from Existing w/o City		52,924,242	49,914,110	48,837,622	
	Commute VMT from Future		3,177,409	8,448,359	10,287,288	
T5-A	VMT Reduction (Select Default Above)		5%	5%	5%	Low-density suburb
	% Employees Eligible		20%	20%	20%	
	Applicable Commute VMT %		100%	100%	100%	Existing and future
T5-B	Selected Bike Mode Adjustment Factor		1.78	1.78	1.78	SMAQMND 2021, Bicycle parking only is assumed
	Existing Bicycle Trip Length (miles)		2.8	2.8	2.8	SMAQMD 2021
	Existing Vehicle Trip Length (miles)		10.8	10.8	10.8	CalEEMod Users Guide (Version 2020.4.0) Appendix D Table 4.2 for Santa Cruz County
	Existing Bicycle Mode Share		16.0%	16.0%	16.0%	Urban Footprint Data
	Existing Vehicle Mode Share		81.0%	81.0%	81.0%	Urban Footprint Data
	Applicable Commute VMT %		6%	14%	17%	

Measure Impact

	2030	2045	2050
T5-A	1.04%	1.04%	1.04%
T5-B	0.23%	0.58%	0.70%
Total % Affected VMT Reduction	**1.26%**	**1.61%**	**1.73%**
Total VMT Reduction	**(709,059)**	**(940,931)**	**(1,021,552)**
% VMT Reduction from BAU	**-0.52%**	**-0.66%**	**-0.71%**
Total GHG Reduction (MT CO2e)	**(218)**	**(87)**	**(94)**

T6. Community Trip Reduction		CAPCOA Reference	
Reduction Measure T6-A:	Car-sharing programs	TRT-9	
Reduction Measure T6-B:	Mobility devices	--	
Reduction Measure T6-C:	Community-based Travel Planning	--	
Reduction Measure T6-D	School Ride Sharing Program	TRT-10	
Reduction Measure T6-E	School Bus Services	TRT-13	
Reduction Measure T6-F:	Active Transportation Routes to School	--	
Reduction Measure T6-G:	Local Shopping	--	

Default Assumptions

	Assumptions	Input	Notes
T6-A	Urban	1000	Project Setting
	Suburban	2000	
	% reduction in car-share member annual VMT	37%	
	number of car share members per shared car	20	
T6-B	Trips Per Device per day	2	Source: UCLA Institute of Transportation Studies
	Average Trip Length (Miles)	1	
	Percent of trips that replace vehicle trip	35%	US DOT 2019
T6-C	Percent of targeted residences that participate	19%	SMAQMD 2021
	Percent vehicle trip reduction by participating resid	12%	
T6-D	Moderate Implementation:	16%	Family Participation
	Aggressive Implementation:	35%	Family Participation
	adjustments to convert from participation to daily VMT to annual school VMT	45%	
	U.S. Population	330,067,972	US Census (Feb 2020)
	U.S. K-12 Population	56,400,000	NCES (2020 Data)
	% Population K-12 Student	17%	
T6-E	adjustments to convert from participation to schoo	75%	

Data Inputs

Applicable Measure	Data Needed	Input			Source of Data/Notes
		2030	2045	2050	
	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	
	Cumulative Reduced VMT	74,561,356	77,438,761	78,409,140	Linked to Measures T1-T5 (Commute VMT Removed)
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	
T6-A	Select Urban or Suburban	2,000	2,000	2,000	
T6-B	New Bikes/Scooters	100	100	100	
T6-C	Residential Units	15,614	16,948	17,486	
	Residences Targeted with CBTP	7,807	8,474	8,743	
T6-D	Population	56,829	61,214	62,721	
	Population K-12 Students	9,711	10,460	10,717	
	Trip Rate Per Student	1.54	1.54	1.54	CalEEMod (Version 2020.4.0) Appendix D Table 4.3 (Average for K-12)
	Trip Length	9.5	9.5	9.5	CalEEMod (Version 2020.4.0) Appendix D Table 4.2 (CW for Santa Cruz County)
	Annual School Days	180	180	180	Pajaro Valley USD
	Annual School VMT	25,571,875	27,545,008	28,223,198	
	% of BAU VMT from School Trips	18.82%	19.36%	19.56%	
	% Participation	16%	16%	16%	Moderate Selected
T6-E	Increase in Bus Participation	10%	10%	10%	
T6-F	Current % of Students Active Commuting	16%	16%	16%	Urban Footprint, Assume Community % for Walk/Bike
	Target % Increase	5%	5%	5%	Complete Streets to School Plan 2020
	Additional % Active Commuting	0.8%	0.8%	0.8%	Ecology Action (Personal Communication)
T6-G	Average grocery trips/wk/household	1.6	1.6	1.6	Statista 2020
	Average Shopping Trip Length	7.30	7.30	7.30	From CalEEMod Users Guide Appendix D Table 4.2 for Santa Cruz County
	VMT from Grocery Shopping Trips	9,483,319	10,293,439	10,620,453	
	% VMT Attributable to Grocery Shopping	12.7%	13.3%	13.5%	
	Target Shopping Trip Length	6.30	6.30	6.30	
	Reduction in Trip Length	14%	14%	14%	

Measure Impact

	2030	2045	2050
T6-A	0.4%	0.4%	0.4%
T6-B	0.0001%	0.0001%	0.0001%
T6-C	1.1400%	1.1400%	1.1400%
T6-D	1.36%	1.39%	1.41%
T6-E	1.41%	1.45%	1.47%
T6-F	0.15%	0.15%	0.16%
T6-G	1.74%	1.82%	1.86%
Total % Affected VMT Reduction	**6.02%**	**6.18%**	**6.24%**
Total VMT Reduction	**(4,490,496)**	**(4,783,262)**	**(4,892,036)**
% VMT Reduction from BAU	**-3.30%**	**-3.36%**	**-3.39%**
Total GHG Reduction (MT CO2e)	**(1,383)**	**(443)**	**(451)**

T7. Expand Electric Vehicle Use		CAPCOA Reference	Notes
Reduction Measure T7-A:	**Accelerated Vehicle Retirement Program**	--	
Reduction Measure T7-B:	**Public Electric Vehicle Charging Stations**		

Data Inputs

		2030	2045	2050	Source/Notes
	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	
	Cumulative Reduced VMT	127,802,248	132,415,833	133,959,257	Linked to Measures T1-T6, T8
	Cumulative Reduced VMT %	6%	7%	7%	
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	Linked to Measure ST1
	% Passenger/Light Duty VMT from gasoline:	90%	88%	87%	
	% Passenger/Light Duty from diesel:	0%	0%	0%	
	% Passenger/Light Duty from PHEV	3%	3%	3%	
	% Passenger/Light Duty from electric:	7%	9%	9%	EMFAC202x/Linked to Measure ST1
	BAU % PHEV VMT that is Electric	*55%*	*59%*	*59%*	
	Community gasoline VMT:	**116,960,655.05**	**117,877,276.41**	**119,056,678.23**	
	Community diesel VMT:	397,464.99	210,541.17	207,636.85	
	Community electric VMT:	10,444,127.47	14,328,015.49	14,694,942.02	
	Average Annual BAU VMT Per Pre-2019 LD Gas/Diesel Vehicles	9,652			EMFAC2021/Average age of cars on road is 12 years (Reuters 2021). Model 2018 or earlier assumed for 2030.
	Average Annual VMT Per Pre-2019 LD Gas/Diesel Vehicles with Reduction Measures	9,079			Accounting for Measures T1-T6, T8
	Vehicles Replaced	1,500			Ecology Action (Personal Communication)
	Cumulative EV VMT Impact	13,617,770.10			
	Cumulative Gas VMT Impact	(13,617,770.10)			
	Average MT CO2e/mile Pre-2019 LD Gas/Diesel Vehicles	0.00038196			EMFAC 2021
T7-A	Annual GHG Reduction MT CO2e	(5,201.44)			
	VMT Per Public Charging Space Per Year	4,704			Santa Clara County 2018
	New Chargers in Public Lots	20			
	Gas VMT Reduction for Chargers Per Year	(94,080)			
T7-B	% Reduction in Gas VMT	-0.08%			

Measure Impact

	Annual - All Forecast Years	
	% MT CO2e	% Gasoline VMT
T7-A	-12%	-12%
T7-B	-0.08%	-0.08%
Total % Reduction	**-13%**	**-12%**
% Gas VMT Reduction from BAU + N-79-20		**(13,830,350)**
Total GHG Reduction (MT CO2e)	**(5,239)**	

Cumulative Energy Impact

	Input	Unit	Notes	Service Proportion
Utility Carbon Intensity	0.000879892	MT CO2e/MMBTU	3CE	0.93
	0.000615636	MT/Mmbtu	PG&E	0.07
Fuel Efficiency	32	kwh/100 miles	US DOE	
	0.10921536	MMBTU/100 miles		
	0.001092154	MMBTU/mile		
Net Increase EV VMT	13,830,349.56	Miles	2030	
Net Increase MMBtu	15,104.87		2030	

Additional MT CO2e from Energy Use	Annual - All Forecast Years
3CE	12.36
PG&E	0.65
Total	**13.01**

T8. Municipal Commute Reduction

		CAPCOA Reference
Reduction Measure T8-A:	**City Employee Commute Trip Reduction Program**	TRT-2
Reduction Measure T8-B:	**City Employee Telecommuting**	

Default Assumptions

T8-A	% shift in vehicle mode share of commute trips	21%

Data Input

Applicable Measure	Data Needed	Input			Notes
		2030	2045	2050	
	BAU Passenger/Light Duty VMT	135,875,472	142,301,878	144,326,961	
	Cumulative VMT	133,145,278	138,283,501	140,016,321	Linked to Measures T1-T4
	Commute Trip VMT	58,583,923	60,844,741	61,607,181	Home-Work Proportion Assumed
	Passenger/Light Duty Emissions with N-79-20	41,842	13,186	13,308	
	Proportion of VMT for Home-Shop	18.8%	18.8%	18.8%	
	Proportion of VMT for Home-Work	44%	44%	44%	CalEEMod Users Guide (Version 2020.4.0) Appendix D Table 4.2 for Santa Cruz County
	Proportion of VMT for Home-Other	37.2%	37.2%	37.2%	
	City Staff	442	442	442	383 full-time and 118 part-time. Part time staff assumed to have half the commute days of full time.
	Average Commute Trip Length	10.80	10.80	10.80	CalEEMod Users Guide (Version 2020.4.0) Appendix D Table 4.2 for
	Average Total Annual Municipal Commute VMT	2,482,272	2,482,272	2,482,272	Assumes 260 Working days
	Average Annual VMT (Work from Home Eligible)	248,227	248,227	248,227	10% of staff assumed to be able to work from home
	Average Annual VMT (Other Staff)	2,234,045	2,234,045	2,234,045	
T8-A	Applicable Municipal VMT %	90%	90%	90%	
	% Employees Eligible	20%	20%	20%	
T8-B	% Days/Week Telecommute	20%	20%	20%	
	Applicable Municipal VMT %	10%	10%	10%	

Measure Impact

	2030	2045	2050
T8-A	3.78%	3.78%	3.78%
T8-B	2.00%	2.00%	2.00%
Total % Affected VMT Reduction	**5.8%**	**5.8%**	**5.8%**
Total VMT Reduction	**(143,475)**	**(143,475)**	**(143,475)**
% VMT Reduction from BAU	**-0.11%**	**-0.10%**	**-0.10%**
Total GHG Reduction (MT CO2e)	**(44)**	**(13)**	**(13)**

T9. Electrify Fleet Vehicles

Reduction Measure T9-A:	**Zero Emissions Vehicle Fleet**

Data Inputs

		Source:
Annual Light Duty Fuel Use 2019 (gallons/year)	109,475	
Average Age of Fleet Vehicle	14.7	
Average Fuel Efficiency for 2007 LDT (CAFE Standard) (MPG)	22.2	Burea of Transportation Statistics 2021
Fleet VMT	2,430,345	

	2030	2045	2050	Source
Light Duty Fleet VMT	2,430,345	2,430,345	2,430,345	
BAU VMT	177,154,803	184,548,545	187,429,391	
BAU Vehicle Emissions (MT CO2e)	67,488	58,290	58,186	
% Fleet VMT Converted to ZEV	100%	100%	100%	
VMT from gasoline with N-79-20:	-	-	-	
VMT from electric with N-79-20:	2,430,345.00	2,430,345.00	2,430,345.00	
Cumulative EV VMT Impact	2,430,345.00	2,430,345.00	2,430,345.00	
Cumulative Gas VMT Impact	(2,430,345.00)	(2,430,345.00)	(2,430,345.00)	

Measure Impact

	2030	2045	2050
Total Gas VMT Reduction	**(2,430,345)**	**(2,430,345)**	**(2,430,345)**
% Gasoline VMT Reduction from BAU	**-1.37%**	**-1.32%**	**-1.30%**
Total GHG Reduction (MT CO2e)	**(926)**	**(768)**	**(754)**

Cumulative Energy Impact

Data Inputs

	Input	Unit	Notes	Service Proportion
Utility Carbon Intensity	0.000879892	MT CO2e/MMBTU	3CE	0.93
	0.000615636	MT/Mmbtu	PG&E	0.07
Fuel Efficiency	32	kwh/100 miles	US DOE	
	0.10921536	MMBTU/100 miles		
	0.001092154	MMBTU/mile		
Net Increase EV VMT	2,430,345.00	Miles	2030	
	2,430,345.00	Miles	2045	
	2,430,345.00	Miles	2050	
Net Increase MMBtu	2,654.31		2030	
	2,654.31		2045	
	2,654.31		2050	

Additional MT CO2e from Energy Use	2030	2045	2050
3CE	2.17	2.17	2.17
PG&E	0.11	0.11	0.11
Total	**2.29**	**2.29**	**2.29**

E1. Reduce Natural Gas Use **CAPCOA Reference**

Reduction Measure E1-A:	**Natural Gas Reduction in New Development**		
Reduction Measure E1-B:	**Appliance Retrofits**	--	

Default Assumptions

	Input	Unit	Notes
3CE EF	0.0009	MT CO2e/MMBtu	
PG&E EF Electricity)	0.0006	MT CO2e/MMBtu	
PG&E EF (Natural Gas)	0.0532	MT CO2e/MMBtu	Emissions Factors
BAU 3CE Opt-out Rate	0.0700		

Data Input

Data Needed		Input			Source of Data
	2017	2030	2045	2050	
SF of Non-Residential Building	11,013,144	11,773,402	12,765,426	13,059,444	UrbanFootprint Data
Number of Dwelling Units	14,225	15,614	16,948	17,486	Growth Rates Tab
Cumulative Non Residential Growth (SF)		760,258	1,752,282	2,046,300	
Cumulative Residential Growth (Units)		1,389	2,723	3,261	
Cumulative New Non-Residential Construction (2023+)	--	467,851	1,459,875	1,753,893	Assume CAAP Reqs wont apply to 2018-2022 growth
Cumulative New Residential Construction (2023+)	--	855	2,189	2,727	
BAU Electricity Demand per SF (MMBtu) (Annual)	0.03945	0.04047	0.04099	0.04142	
BAU Electricity Demand per DU (MMBtu) (Annual)	13.17	13.17	13.17	13.17	
BAU Natural Gas per SF (MMBtu) (Annual)	0.03	0.04	0.04	0.04	
BAU Natural Gas per DU (MMBtu) (Annual)	31.47	31.47	31.47	31.47	
New Growth Electricity Demand Non-Res (MMBtu) (Annual)	--	18932.90	59840.62	72647.04	
New Growth Electricity Demand Res (MMBtu) (Annual)	--	11258.81	28827.81	35919.71	
New Growth Natural Gas Non-Res (MMBtu) (Annual)	--	16764.52	52987.08	64326.78	
New Growth Natural Gas Res (MMBtu) (Annual)	--	26896.48	68867.54	85809.57	
% of New Development that is Electric Only	--	50%	50%	50%	
Non Res Energy Converted from NG to Elec (MMBtu) (Annual)		8382.26	26493.54	32163.39	
Res Energy Converted from NG to Elec (MMBtu) (Annual)		13448.24	34433.77	42904.78	

Convert Existing Residences (Pre-2023 Development)

Number of Dwelling Units (Pre-2023)	14,759				
Electricity Use (MMBtu) Annual	194,404.99				
Natural Gas Use (MMBtu) (Annual)	464,419				
% Existing residences Retrofitted with Electric Cooking/laundry Appliances and Water Heaters		50%	50%	50%	
% of Natural Gas attributable to appliances/water heaters		58%	58%	58%	2009 California Residential Appliance Saturation Survey (Reported by DNV GL 2019)
% Reduction in Existing Residential Natural Gas Use		29%	29%	29%	
Res Energy Converted from NG to Elec (MMBtu) (Annual)		134,681.60	134,681.60	134,681.60	

Measure Impact

	2030			2045			2050		
	Net Change in Demand (MMBtu)	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**	**Net Change in Demand (MMBtu)**	**Emission Factor (MT CO2e/MMBtu)**	**Net Change (MT CO2e)**
Non-Residential Electricity	8,382	0.0009	7	26,494	0.0009	23	32,163	0.0009	28
Residential Electricity Use	148,130	0.0009	130	169,115	0.0009	149	177,586	0.0009	156
Non-Residential Natural Gas	(8,382.26)	0.0532	(446)	(26,494)	0.0532	(1,409)	(32,163.39)	0.0532	(1,711)
Residential Natural Gas	(148,129.84)	0.0532	(7,879)	(169,115)	0.0532	(8,995)	(177,586.38)	0.0532	(9,445)
		Total:	***(8,187)***			***(10,232)***			***(10,972)***

E2. Retrofit Existing Buildings

		CAPCOA Reference	
Reduction Measure E2-A:	Existing Building Retrofits	--	

Default Assumptions

	Input	Unit	Notes
3CE EF	0.0009	MT CO2e/MMBtu	
PG&E EF Electricity)	0.0006	MT CO2e/MMBtu	
PG&E EF (Natural Gas)	0.0532	MT CO2e/MMBtu	Emissions Factors
BAU 3CE Opt-out Rate	0.0700		

Data Input

Data Needed	Input	Source of Data	
	2017		
SF of Non-Residential Building (Pre 2020)	11,130,106	UF Data	
Number of Dwelling Units (Pre 2020)	14,439		Assume CAAP Reqs wont apply to 2018-2022 growth
Electricity Demand per SF (MMBtu) (Annual)	0.039		
Electricity Demand per DU (MMBtu) (Annual)	12.98		
Natural Gas per SF (MMBtu) (Annual)	0.03		
Natural Gas per DU (MMBtu) (Annual)	31.00		
% of Buildings Eligible for Retrofit	25%		
% Reduction Compared to Existing Demand	10%		

Measure Impact

	% Energy Reduction	**Reduction (MMBtu)**	**GHG Reduction (MT CO2e)**
Non-Residential Electricity	2.50%	(10,861.31)	(9.36)
Residential Electricity Use	2.50%	(4,684.21)	(4.03)
Non-Residential Natural Gas	2.50%	(9,617.36)	(511.51)
Residential Natural Gas	2.50%	(11,190.23)	(595.17)
		Total (MT CO2e):	***(1,120.07)***

E3. Increase 3CE Prime Participation **CAPCOA Reference**

Reduction Measure E3-A	**3CE Customer Participation**		
Reduction Measure E3-B	**City 3CE Prime Participation**		

Default Assumptions:

		Default Value	**Unit**
Emissions Factors	3CE EF	0.0009	MT CO2e/MMBtu
	PG&E EF	0.0006	MT CO2e/MMBtu
	3CE Prime	0	MT CO2e/MMBtu
3CE Opt Out Rate		0.07	
BAU City Average Annual Electricity Demand (2018-2020)		36,146.30	MMBtu

Data Input:

	Input	2030	2045	2050	Unit	Notes
BAU Use and Emissions	BAU Electricity Emissions	587.56	643.02	664.35		
	Total BAU Electricity Demand (Non-Res)	476,444	523,258	540,928	MMBtu	
	Total BAU Electricity Demand (Residential)	205,664	223,233	230,325		
Cumulative Electricity Demand	Cumulative Electricity Demand (Non-Res)	429,871.05	481,615.82	500,684.11	MMBtu	Linked to Measures ST2,E1,E2,E5/City Facilities Removed
	Cumulative Electricity Demand (Residential)	323,393.81	359,436.39	373,900.61	MMBtu	
	Cumulative City Electricity Demand	24,326.84	24,326.84	24,326.84		Linked to E6, E7
Target Use	Target Opt-in Rate	0.5	0.5	0.5		
	Future Opt-in Energy Demand (Non-Res)	214,935.52	240,807.91	250,342.05	MMBtu	
	Future Opt-in Energy Demand (Residential)	161,696.90	179,718.20	186,950.31	MMBtu	

Measure Impact:

	2030	2045	2050
Energy Moved to 3CE Prime (City facilities)	24,326.84	24,326.84	24,326.84
Energy Moved to 3CE Prime (Non-Res)	214,935.52	240,807.91	250,342.05
Energy Moved to 3CE Prime (Residential)	161,696.90	179,718.20	186,950.31
Reduced Total GHG Emissions (City facilities) (MT CO2e)	(21.40)	(21.40)	(21.40)
Reduced Total GHG Emissions (Non-Res) (MT CO2e)	(1,629.11)	(2,044.92)	(2,210.05)
Reduced Total GHG Emissions (Residential) (MT CO2e)	(922.01)	(1,138.99)	(1,232.50)
Total GHG Reduction (MT CO2e)	**(2,572.53)**	**(3,205.31)**	**(3,463.95)**

E4. Incorporate Cool Roof Technology **CAPCOA Reference**

Reduction Measure E4-A:	Cool Roofs for New Development		

Review Defaults

Data Needed	Input	Source of Data	
Utility EF (MT CO2e/MMBtu)	0.000861394		
SF Affected			
ElecSavings (Cooling Energy)	20%	US EPA	
% Total Energy for Cooling (Residential)	16%		
% Total Energy for Cooling (Non-Residential)	12%	US EIA	

Emissions Factors	3CE EF	0.0009	MT CO2e/MMBtu
	PG&E EF	0.0006	MT CO2e/MMBtu
	PG&E Opt Out Rate	0.5000	Linked to E3

Data Inputs

Data Needed		Input			Unit	Source of Data
	2017	2030	2045	2050		
SF of Non-Residential Building	11,013,144	11,773,402	12,765,426	13,059,444		UF Data
Number of Dwelling Units	14,225	15,614	16,948	17,486		Growth Rates Tab
Proportion of total housing that is multi-family housing	25%	33%	39%	42%		UF Data
Cumulative New Non-Residential Construction (2023+)	--	467,851	1,459,875	1,753,893		Linked to E1
Cumulative New Residential Construction (2023+)	--	855	2,189	2,727		
Proportion of new housing that is multi-family		90%	90%	90%		UF Data
Cumulative Electricity Demand (Non-Residential)	434,452	429,871	481,616	500,684	MMBtu	Linked to Measures ST2,E1,E2
Cumulative Electricity Demand (Residential)	187,368	323,394	359,436	373,901	MMBtu	Linked to Measures ST2,E1,E2
Demand Attributable to Cooling (Non-Res)	52,134.28	51,584.53	57,793.90	60,082.09	MMBtu	
Demand Attributable to Cooling (Residential))	29,978.92	51,743.01	57,509.82	59,824.10	MMBtu	
Cooling Electricity Demand per SF (MMBtu) (Annual)	0.004733823	0.004381446	0.004527377	0.004600662		
Cooling Electricity Demand per DU (MMBtu) (Annual)	2.107481008	3.313885542	3.393342552	3.421206772		
Cooling Electricity Demand Non-Res (MMBtu) (Annual)	52,134.28	2,049.86	6,609.41	8,069.07		
Cooling Electricity Demand Res (MMBtu) (Annual)	29,979	2,832.61	7,426.70	9,329.72		
% Development Implementing/Retrofit Cool Roofs	0%	50%	50%	50%		

Measure Impact

		2030	2045	2050
Non-Residential	Retrofit Existing Cooling	-	-	-
	New Development	(204.99)	(660.94)	(806.91)
	Total Energy Savings (M	(204.99)	(660.94)	(806.91)
	GHG Reduction	**(0.15)**	**(0.49)**	**(0.60)**
Residential	Retrofit Existing Cooling	-	-	-
	New Development	(254.93)	(668.40)	(839.67)
	Total Energy Savings (M	(254.93)	(668.40)	(839.67)
	GHG Reduction	**(0.19)**	**(0.50)**	**(0.63)**
Total GHG Reduction		**(0.34)**	**(0.99)**	**(1.23)**

E5. Solar Retrofits **CAPCOA Reference**

Reduction Measure E5-A:	**Existing Building Solar Retrofits**		

Review Defaults

Data Needed	Input	
Combined Utility EF (MT CO2e/MMBtu)	0.0009	

Data Inputs

Data Needed		Unit	Source of Data
	2017		
SF of Non-Residential Building	11,013,144		UF Data
Number of Dwelling Units	14,225		Growth Rates Tab
Existing Commercial SF (Pre-2020)	11,130,106		
Existing Units (Pre-2020)	14,439		
Cumulative New Non-Residential Construction (2020+)	--		Linked to E1
Cumulative New Residential Construction (2020+)	--		
Cumulative Existing (Pre-2020) Non-Res Electricity Demand	423,591	MMBtu	Linked to E2
Cumulative Existing (Pre-2020) Res Electricity Demand	317,366	MMBtu	Linked to E1 (2030 Assumption)/E2
% Units Installing PV System	15%		
% Energy Demand Generated by On-site Solar (Annual Average)	50%		
Non Residential Electricity Removed from Grid	31,769	MMBtu	
Residential Electricity Demand Removed from Grid	23,802	MMBtu	

Measure Impact

		All Forecast Years
E5-A	Non-Residential Electricity	(27)
	Residential Electricity	(21)
	GHG Reduction	**(48)**

		CAPCOA Reference	
Reduction Measure E6-1	**Municipal Energy Projects**		

Default Assumptions:

		Default Value	Unit
Electricity Emissions Factors	3CE EF	0.0009	MT CO2e/MMBtu
	PG&E EF	0.0006	MT CO2e/MMBtu
Natural Gas Emissions Factor	PG&E EF	0.0531865	MT CO2e/MMBtu
3CE Opt Out Rate		0.07	
BAU City Average Annual Electricity Demand (2018-2020)		36,146.30	MMBtu

Data Input:

Facility	Estimated Electricity Savings (kwH/year)	Estimated Natural Gas Savings (therms/year)	Source:
City Hall	6,623	937	
Police Station	18,381	1,630	
Fire Station I	1,713	-	Sage Renewables 2018
Total Net Decrease	26,717	2,567	
Convert to MMBtu	91	257	

Measure Impact:

	2030	2045	2050
Net Change in Existing Electricity	(91.18)	(91.18)	(91.18)
Net Change in Existing Natural Gas	(256.70)	(256.70)	(256.70)
Reduced Total GHG Emissions (Electricity) (MT CO2e)	(0.08)	(0.08)	(0.08)
Reduced Total GHG Emissions (Natural Gas) (MT CO2e)	(13.65)	(13.65)	(13.65)
Total GHG Reduction (MT CO2e)	**(13.73)**	**(13.73)**	**(13.73)**

E7. Wastewater Treatment Plant Energy Efficiency

Reduction Measure WW1-A	**Wastewater Treament Plant Energy Efficiency**

Default Assumptions:

		Default Value	Unit
Electricity Emissions Factors	3CE EF	0.0009	MT CO2e/MMBtu
	PG&E EF	0.0006	MT CO2e/MMBtu
Natural Gas Emissions Factor	PG&E EF	0.0531865	MT CO2e/MMBtu
3CE Opt Out Rate		0.07	
BAU City Average Annual Electricity Demand (2018-2020)		36,146.30	MMBtu

Data Input:

Facility	Estimated Electricity Savings (kwH/year)	
Existing WWTP Energy Use from Grid	3,436,373	
Convert to MMBtu	11,728.27	
Reduction Target	2030	50%
	2045	50.00%
	2050	50%

Measure Impact:

	2030	2045	2050
Net Change in Existing Electricity	(5,864.14)	(5,864.14)	(5,864.14)
Reduced GHG Emissions (MT CO2e)	**(5.05)**	**(5.05)**	**(5.05)**

SW1. Organic Waste Diversion **CAPCOA Reference**

Reduction Measure SW1-A:	**Organic Waste Diversion**	SW-1	

Default Assumptions

Methane Recovery Factor:	75%
Oxidation Rate	10%

Data Inputs

Applicable Measure	Data Needed	Input				Source of Data
		2030	2045	2050	EF	
	BAU Tons of Waste (City Landfill)	35,308	38,032	38,968		
	BAU Emissions (City)	13,888	14,959	15,328		
	BAU Methane Recovery Rate	0.75	0.75	0.75		
	BAU Oxidation Rate	0.10	0.10	0.10		
BAU Waste Composition	% of Waste Attributable to Food waste	18%	18%	18%	0.08	(MT CH4/wet short ton)
	% of Waste Attributable to Grass	2%	2%	2%	0.04	(MT CH4/wet short ton)
	% of Waste Attributable to Leaves	4%	4%	4%	0.01	(MT CH4/wet short ton)
	% of Waste Attributable to Branches	3%	3%	3%	0.06	(MT CH4/wet short ton)
	Tons of Waste Potentially Diverted	9,445	10,174	10,424	0.06	
	% Diverted	75%	75%	75%		

Measure Impact

	2030	2045	2050
Solid Waste Reduction (Tons)	7,083.59	7,630.16	7,818.03
% Waste Reduction	0.20	0.20	0.20
Total Emissions Reduction (MT CO2e)	(2,786.24)	(3,001.22)	(3,075.12)

NW1: Local Greenspace

		CAPCOA Reference	
Reduction Measure NW1-A:	**Green Space**	V-2	
Reduction Measure NW1-B:	**Tree Planting**		

Default Assumptions

	Default Value	Unit	Context
V1-A	0.0354	Default annual CO2 accumulation per tree (MT COe2)	Miscellaneous species class
	14.3	Default annual CO2 accumulation per acre (MT COe2)	Forest Land - Trees
	111	Default annual CO2 accumulation per acre (MT COe2)	Forest Land - Shrub
	6.9	Default annual CO2 accumulation per acre (MT COe2)	Cropland
V1-B	4.31	Default annual CO2 accumulation per acre (MT COe2)	Grassland

Data Inputs

Applicable Measure	Data Needed	Input		
		2030	2045	2050
V1-A	Acres of new/preserved greenspace	5	5	5.00
	Years Between Horizon and Inventory Yea	13	28	33
V1-B	Year Program is in Place (2023+)	7	22	27
	Trees Per Year	300	300	300
	Number of Trees	2,100	6,600	8,100

Measure Impact

	GHG Reduction (MT CO2e)		
	2030	2045	2050
V1-B	(74.34)	(233.64)	(286.74)
V1-A	(1.66)	(0.77)	(0.65)
Emissions Reduction Per Year	(76.00)	(234.41)	(287.39)

		GHG Reduction		
Measure	**Summary**	**2,030**	**2,045**	**2,050**
State				
ST1	EO N-79-20 (Reduction in Fossil Fuel VMT)	-	(25,158)	(25,227)
ST1	EO N-79-20 (Additional Electricity Demand)	-	88	89
ST2	Building Energy Efficiency Standards (Residential Electricity)	(2)	(4)	(5)
	Building Energy Efficiency Standards (Non-Residential Electricity)	(7)	(18)	(22)
	Building Energy Efficiency Standards (Residential Natural Gas)	(134)	(275)	(329)
	Building Energy Efficiency Standards (Non-Residential Natural Gas)	(84)	(208)	(246)
Sector Total:		**(227)**	**(25,575)**	**(25,740)**
Transportation				
T1	Implement Smart Growth Strategies	(293)	(194)	(214)
T2	Support Non-motorized Transportation	(525)	(171)	(175)
T3	Parking Management Strategies	(15)	(5)	(5)
T4	Support Transit Use	(9)	(3)	(4)
T5	Commute reduction programs	(218)	(87)	(94)
T6	Community Trip Reduction	(1,383)	(443)	(451)
T7	EV Infrastructure	(5,239)	(5,239)	(5,239)
T8	Municipal Commute	(44)	(13)	(13)
T9	Fleet Vehicles	(926)	(768)	(754)
Sector Total:		**(8,652)**	**(6,923)**	**(6,950)**
Energy (Residential Electricity)				
E1	Future Growth is Electric Only	130	149	156
E2	Retrofit existing buildings for energy efficiency	(4)	(4)	(4)
E3	Increase 3CE Prime participation	(922)	(1,139)	(1,232)
E4	Cool roofs on new development	(0)	(0)	(1)
E5	Retrofit existing buildings with PV systems	(21)	(21)	(21)
T7	Energy use from EVs	7	7	7
Sector Total:		**(810)**	**(1,009)**	**(1,095)**
Energy (Non-Residential Electricity)				
E1	Future Growth is Electric Only	7	23	28
E2	Retrofit existing buildings for energy efficiency	(9)	(9)	(9)
E3	Increase 3CE Prime participation	(1,651)	(2,066)	(2,231)
E4	Cool roofs on new development	(0)	(0)	(1)
E5	Retrofit existing buildings with PV systems	(27)	(27)	(27)
E6	Municipal Energy Projects	(0)	(0)	(0)
E7	WWTP	(5)	(5)	(5)
T7/T9	Energy use from EVs	9	9	9
Sector Total:		**(1,677)**	**(2,077)**	**(2,237)**
Energy (Residential Natural Gas)				
E1	Future Growth is Electric Only	(7,879)	(8,995)	(9,445)
E2	Retrofit existing buildings for energy efficiency	(595)	(595)	(595)
Sector Total:		**(8,474)**	**(9,590)**	**(10,040)**
Energy (Non-Residential Natural Gas)				
E1	Future Growth is Electric Only	(446)	(1,409)	(1,711)
E2	Retrofit existing buildings for energy efficiency	(512)	(512)	(512)
E6	Municipal Energy Projects	(14)	(14)	(14)
Sector Total:		**(971)**	**(1,934)**	**(2,236)**
Solid Waste				
SW1	Divert food and green waste	**(2,786)**	**(3,001)**	**(3,075)**
Other				
V1	Tree planting and Protected Open Space	**(76)**	**(234)**	**(287)**

	Emissions (MT CO2e)											
	2030				2045				2050			
Sector	BAU Total	BAU Per Capita	Reduced Total	Reduced Per Capita	BAU Total	BAU Per Capita	Reduced Total	Reduced Per Capita	BAU Total	BAU Per Capita	Reduced Total	Reduced Per Capita
Transportation (Vehicles)	*67,488*	*1.19*	**58,836**	**1.04**	*58,290*	*0.95*	**26,209**	**0.43**	*58,186*	*0.93*	**26,010**	**0.41**
Residential Electricity Use	*177*	*0.00*	**(634)**	**(0.01)**	*192*	*0.00*	**(732)**	**(0.01)**	*198*	*0.00*	**(812)**	**(0.01)**
Non-Residential Electricity	*410*	*0.01*	**(1,273)**	**(0.02)**	*451*	*0.01*	**(1,645)**	**(0.03)**	*466*	*0.01*	**(1,793)**	**(0.03)**
Residential Natural Gas	*26,131*	*0.46*	17,524	**0.31**	*28,364*	*0.46*	18,499	**0.30**	*29,265*	*0.47*	18,895.20	**0.30**
Non-Residential Natural Gas	*22,438*	*0.39*	21,383	**0.38**	*24,643*	*0.40*	22,500	**0.37**	*25,475*	*0.41*	22,993	**0.37**
Wastewater	*513*	*0.01*	513	**0.01**	*552*	*0.01*	552	**0.01**	*566*	*0.01*	565.79	**0.01**
Solid Waste	*17,997*	*0.32*	15,211	**0.27**	*19,386*	*0.32*	16,385	**0.27**	*19,863*	*0.32*	16,788	**0.27**
New Green Space			(76)				(234)				(287)	
Total	*135,155*	*2.38*	**111,483**	**1.96**	*131,877*	*2.15*	**81,533**	**1.33**	*134,020*	*2.14*	**82,359**	**1.31**
Target Emissions			113,658				0				125,442.20	125442.2
Reduction Gap			**(2,175)**				**81,533**				**(43,083)**	
Transportation (Airport)	*1,793*	*0.03*	*1,793*	*0.03*	*2,353*	*0.04*	*2,353*	*0.04*	*2,577*	*0.04*	*2,577*	*0.04*
Total (Scope 1, 2, and 3)	*136,949*	*2.41*	*113,277*	**1.99**	*134,231*	*2.19*	*83,887*	**1.37**	*136,597*	*2.18*	*84,936*	**1.35**

Emissions Summary

	Emissions (MT CO2e)								
	2030			2045			2050		
Sector	BAU Total	Total With CAAP	Total Per Capita with CAAP	BAU Total	Total With CAAP	Total Per Capita with CAAP	BAU Total	Total With CAAP	Total Per Capita with CAAP
Transportation (Vehicles)	*67,488*	*58,836*	*1.04*	*58,290*	*26,209*	*0.43*	*58,186*	*26,010*	*0.41*
Energy	*49,157*	*36,999*	*0.65*	*53,650*	*38,622*	*0.63*	*55,404*	*39,283*	*0.63*
Wastewater	*513*	*513*	*0.01*	*552*	*552*	*0.01*	*566*	*566*	*0.01*
Solid Waste	*17,997*	*15,211*	*0.27*	*19,386*	*16,385*	*0.27*	*19,863*	*16,788*	*0.27*
New Green Space		(76)			(234)			(287)	
Total	*135,155*	**111,483**	**1.96**	*131,877*	**81,533**	**1.33**	*134,020*	**82,359**	**1.31**
Target Emissions		113,658	2		0			125,442	2
Reduction Gap		**(2,175)**	**0.04**		**81,533**			**(43,083)**	**0.69**

Reduction Measure Sources

AMBAG. 2040 Metropolitan Transportation Plan/Sustainable Communities Strategy and Regional Transportation Plans. June 2018.
Bureau of Transportation Statistics. Average Fuel Efficiency of U.S. Light Duty Vehicles. Accessed August 2021.
CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. August.
CAPCOA. 2021. User's Guide for CalEEMod Version 2020.4.0, Appendix D - Default Data Tables. June.
CARB 2021. EMFAC2021 Web Database, Version 1.0.0.
CARB. 2021. Revised Draft 2020 Mobile Source Strategy. April 23.
CEC. 2018. 2019 Building Energy Efficiency Standards - Frequently Asked Questions. March
City of Watsonville. 2020. Complete Streets to School Plan. February.
DNV-GL. 2019 California Residential Appliance Saturation Survey. September 6.
NCES. 2021. Fast Facts: Back to school statistics. Accessed February 2021.
Nelson Nygaard. 2017. Watsonville Downtown Parking Plan. November.
Pajaro Valley Unified School District. 2020-2021 Calendar. June 2020.
Reuters. 2021. "Average age of U.S. vehicles hit record 12.1 years in 2020-HIS Markit"

Sage Renewables. 2018. Energy Projects Assessment and Development – Potential Energy Efficiency Measures Identified for Evaluation and Recommendations

Santa Clara County. 2018. Electric Vehicle Charging Stations as CEQA Mitigation: Greenhouse Gas Reductions and Cost Effectiveness. March 9.
SMAQMD. 2021. Draft Handbook Update Measure Quantification Methodology. February.
Statista. 2020. Grocery Shopping: U.S. Consumers' weekly trips per household 2006-2019

UCLA Institute of Transportation Studies. A Scoot, Skip, and a JUMP Away: Learning from the Micromobility Systems in San Francisco
US Census. U.S. and World Population Clock. Accessed February 2021.
USDOT. 2019. "Portland's E-Scooter pilot reduced VMT by 300,000 over 120 days". February 25.
USDOE. 2021. Fuel Conversion Factors to Gasoline Gallon Equivalents. Accessed January 2021.
USDOE. 2021. EPA Fuel Economy. Accessed January 2021.
USEPA. 2008. "Cool Roofs". In: Reducing Urban Heat Islands: Compendium of Strategies.

This page intentionally left blank.