City of Campbell

Climate Action and Adaptation Plan

CITY OF CAMPBELL
Climate Action & Adaptation Plan

December 2025

ACKNOWLEDGMENTS

The City of Campbell's Climate Action and Adaptation Plan (CAAP) was developed to reduce the community's contribution to climate change and strengthen local resilience. The completion of this plan would not have been possible without the dedication, expertise, and collaboration of many partners. We extend our sincere gratitude to everyone who contributed their time, insights, and support throughout this process.

We also wish to thank the community members who participated in the CAAP's development at various stages and provided invaluable input that helped shape this plan. Your perspectives and experiences were fundamental in guiding the thoughtful development of strategies to create a more sustainable and resilient Campbell.

Together, we will continue advancing the initiatives identified in the CAAP and building a safer, healthier, and more climate-resilient future for our community.

THIS CAAP REFLECTS A COORDINATED EFFORT BETWEEN:

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TABLE OF CONTENTS

APPENDICES

GLOSSARY

A

Active Transportation – A means of transportation that is powered by human energy, for example walking, biking, or rolling.

Adaptation – Adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.

Assembly Bill (AB) 1279 – California Climate Crisis Act, which codified the GHG emissions reduction goals of achieving carbon neutrality by 2045, by expanding the definition of carbon neutrality to reducing direct emissions 85 percent below 1990 levels and removing the remaining 15 percent of emissions though carbon sequestration and other technologies. The 2022 Scoping Plan Update, adopted in December 2022, provided the pathway for reaching the State's AB 1279 goal.

Assembly Bill (AB) 2684 – Extreme Heat Planning, which requires local governments to update their safety elements to mitigate heat-related risks. Additionally, AB 2684 mandates regular reviews to integrate the latest data on extreme heat hazards, bolstering California's efforts to adapt to rising temperatures.

Atmosphere – The envelope of gases surrounding the Earth; the gases that make up the atmosphere primarily include nitrogen (78 percent) and oxygen (21 percent), as well as argon, helium, carbon dioxide, methane, and water vapor in trace amounts.

B

C

California Air Resources Board (CARB) – The lead agency for climate change programs that also oversees all air pollution control efforts in California to attain and maintain health-based air quality standards.

Carbon Dioxide (CO_2) – A naturally occurring gas and a by-product of burning fossil fuels and biomass, as

Carbon Dioxide Equivalent (CO_2e) – A metric measure used to compare the emissions from various greenhouse gases based upon their GWP. Carbon-neutrality/Net-Zero Emissions – Balancing anthropomorphically generated emissions by removing GHGs from the atmosphere in a process known as carbon sequestration.

Climate – The average of weather patterns over a long period of time (usually 30 or more years).

Climate Action and Adaptation Plan (CAAP) – Community's framework for improving our health and environment, limiting our global impact by reducing GHG emissions, and increasing our resilience in the face of climate change.

Climate Change – A change in the average conditions — such as temperature and rainfall — in a region over a long period of time.

Climate Change Vulnerability Assessment (CCVA) – Identifies how exposed, sensitive, and adaptable a system or community is to climate hazards. It informs adaptation planning by highlighting high-risk areas and guiding resilience strategies.

Climate Hazard – A potential occurrence of climate related physical events or trends that may cause damage and loss.

Community Based Organization (CBO) – A public or private nonprofit organization that is representative of the community or specific segments of a community and provides educational or outreach services to the community.

D

Decarbonization – Replacing technologies and services that run on fossil fuels (ex. natural gas) with ones that run on zero-carbon sources of energy (for example electricity from renewable energy like solar or wind power), ideally from renewable sources.

E

Electric Vehicle (EV) – A vehicle that uses one or more electric motors or traction motors for propulsion.

Emissions – The release of a substance (usually a gas when referring to the subject of climate change) into the atmosphere.

Equity – Actively empowering vulnerable communities to thrive and reach their full environmental, economic, and social potential by transforming the behaviors, institutions and systems that are causing disproportionate harm. Decisions and processes that intentionally prioritize equity are inclusive across vulnerable communities, increase access to a broad suite of critical resources, and maximize opportunities in vulnerable communities.

F

Fossil Fuel – A general term for fuel formed from decayed plants and animals that have been converted to crude oil, coal, natural gas, or heavy oils by exposure to heat and pressure in the Earth's crust.

G

Greenhouse Gas (GHG) – A gas that absorbs infrared radiation, traps heat in the atmosphere and contributes to the greenhouse effect.

H

I

ICLEI – Local Governments for Sustainability; a global network of more than 1,750 local and regional governments committed to sustainable urban development – emissions estimates were calculated using ICLEI's best available methodologies.

Impact – Impacts on natural and human systems – including lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure – resulting from the interaction between climate hazards and the vulnerabilities of affected systems or assets.

Intergovernmental Panel on Climate Change (IPCC) – The United Nations body for assessing the science related to climate change.

J

K

L

M

Methane (CH_4) – A hydrocarbon that is a greenhouse gas produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Metric Tons (MT) – Common international measurement for the quantity of greenhouse gas emissions – one metric ton is equal to 2205 pounds or 1.1 short tons.

Microgrid – A group of interconnected loads and distributed energy resources that act as a single controllable entity in respect to the grid. A microgrid can operate in 'island mode' and disconnect from the grid or operate while connected to the grid.

Mitigation – An action or ongoing efforts to minimize, prevent, or eliminate negative impacts or effects.

N

Nitrous Oxide (N_2O) – A powerful greenhouse gas with a high global warming potential; major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.

O

Organic Material – Natural or organic materials, for example food scraps and yard waste.

P

Q

R

Renewable Energy – Energy derived from natural sources that are replenished at a higher rate than they are consumed (ex. wind, biomass).

Resilience – Ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate.

S

Senate Bill (SB) 32 – SB 32 is the California Senate bill in 2016 that requires there be a reduction in GHG emissions to 40 percent below 1990 levels by 2030.

Senate Bill (SB) 100 – Renewable Portfolio Standard which requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 50 percent of total procurement by 2026, 60 percent by 2030, 90 percent by 2035, 95 percent by 2040, and 100 percent by 2045. The increase in renewable energy resources reduces the GHG-intensity of electricity.

Senate Bill (SB) 379 – Requires local governments to incorporate climate adaptation and resilience strategies into their general plans, evaluating vulnerabilities to various climate impacts like wildfires and flooding.

Senate Bill (SB) 1383 – California's Short-Lived Climate Pollutant Reduction Strategy, which sets statewide targets to reduce compostable materials in landfills by 75 percent by 2025, and to rescue at least 20 percent of edible food currently disposed for human consumption by 2025.

Sensitivities – The extent to which a species, natural system, community, asset, or related system is impacted by changing climate conditions.

T

U

V

Vehicle Miles Traveled (VMT) – The number of total miles traveled by motor vehicle that are generated over a population over a given timeframe (e.g., 1 year).

Vulnerable Populations/ Vulnerable Communities – Certain populations/ communities experience increased exposure or risk to climate change and often have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. Given this, assessing and mitigating impacts to these populations/ communities is a priority.

Vulnerability – The propensity or predisposition to be negatively affected.

W

Weather – The state of the atmosphere over a short period of time (usually an hour or day), describing if it is hot or cold, wet or dry, calm or stormy, clear or cloudy, etc.

Y

Z

LAND ACKNOWLEDGEMENT

The City of Campbell acknowledges that the city is located on ancestral lands of great importance to Tamien Nation, a tribe recognized under California State Law, and that the people of Tamien Nation are important members of the Campbell community.

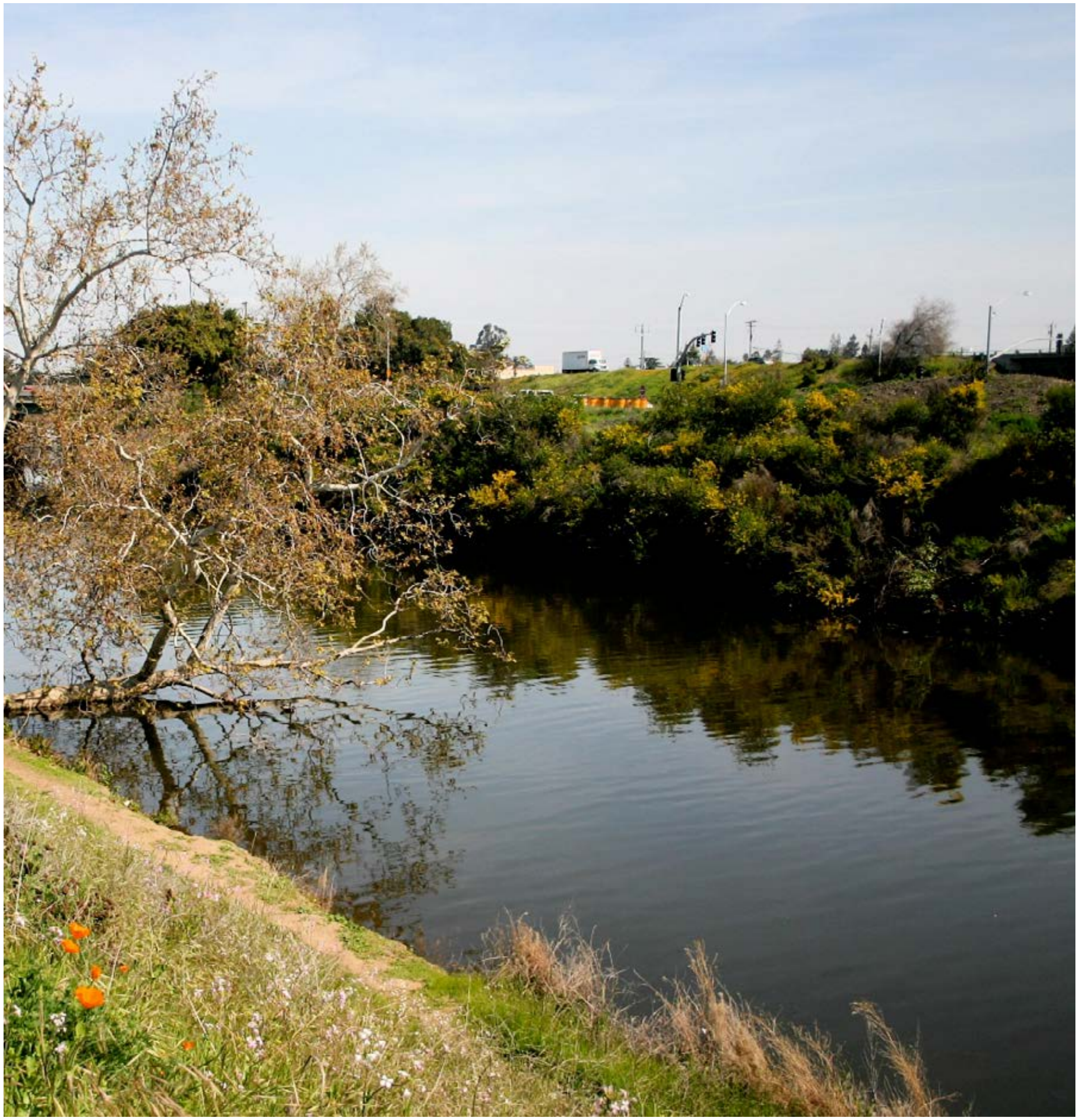
EXECUTIVE SUMMARY

The City of Campbell's Climate Action and Adaptation Plan (CAAP) outlines a comprehensive strategy to reduce greenhouse gas (GHG) emissions and enhance community resilience in the face of climate change. Developed through extensive community engagement and aligned with California's climate legislation and Campbell's 2040 General Plan, the CAAP provides a roadmap for achieving carbon neutrality by 2045 while improving public health, environmental quality, and economic vitality.

The CAAP aims to:

- Reduce GHG emissions by 40 percent below 1990 levels by 2030.
- Achieve carbon neutrality by 2045.
- Prepare for climate hazards including extreme heat, poor air quality, flooding, and drought.
- Prioritize equity and support vulnerable populations.

Campbell envisions a future powered by renewable energy, resilient infrastructure, and sustainable urban planning. The plan emphasizes inclusivity, community ownership, and multi-benefit solutions that improve quality of life while addressing climate risks.



COMMUNITY ENGAGEMENT

The CAAP was shaped by robust outreach efforts that informed the plan's priorities, including tree planting in vulnerable areas, building electrification, and expanded mobility options.

CLIMATE VULNERABILITY AND GREENHOUSE GAS EMISSIONS

Campbell faces increasing extreme weather events including extreme heat, stronger storms, and poor air quality from regional wildfire. Climate impacts in Campbell are summarized in the graphic below.

The 2022 GHG inventory identified transportation (57%) and building natural gas use (28%) as the largest emission sources. A consumptive-based inventory (which includes emissions generated outside of Campbell to make the things we buy) also highlighted emissions from food, goods, and travel.

Extreme Heat

Extreme heat can be dangerous for everyone, but especially seniors, young children, disadvantaged individuals, and individuals with health conditions like asthma or diabetes. Extreme heat can also affect the stability and effectiveness of certain medications, posing additional health risks for vulnerable populations during prolonged heat events. Extreme heat can lead to more frequent use of air conditioning, raising expenses and potentially causing power outages, which can in turn worsen health risks. Additionally, wildlife and plants may experience heat stress, affecting ecosystem health in Campbell.

Air Quality Degredation

Air quality declines from regional wildfires, vehicle and lawn equipment emissions, and wood burning can cause respiratory illnesses and worsen existing health conditions, especially for seniors, young children, and disadvantaged individuals. People with existing health conditions are at higher risk of respiratory and heart problems. Poor air quality can also harm ecosystems and make parks and outdoor areas unsafe for the community.

Drought

Drought can place a significant financial strain on vulnerable populations, like disadvantaged individuals, due to higher water rates and difficulties in accessing clean water. Additionally, drought affects ecosystems, leading to stressed vegetation and increased plant deaths. This can reduce the quality and benefits of parks and natural spaces like the Los Gatos Creek Trail, impacting the overall health and well-being of the community.

Riverine Flooding

Riverine flooding caused by extreme precipitation events is a hazard along the Los Gatos Creek, particularly affecting Timber Cove Mobile Home Park, affordable housing units, residential roads, Highway 17, and bridges. Flooding can lead to increases in infectious diseases like Lyme Disease and West Nile Virus, and cause mold growth in buildings, which can impact health.

STRATEGIES AND MEASURES

The CAAP emphasizes cost-effective strategies with long-term benefits. While some actions require upfront investment, many offer lifecycle savings and resilience dividends. The plan also positions Campbell to compete for state and federal funding, including climate bonds and grant programs.

The CAAP organizes actions into four systems:

1. **Urban Ecosystems and Sustainable Foods** – Tree planting, composting, water conservation.
2. **Social and Governance** – Resilience hubs, climate communication, equity-focused outreach.
3. **Buildings** – Electrification, retrofits, renewable energy adoption.
4. **Transportation** – EV adoption, transit improvements, active mobility infrastructure.

Together, these measures are projected to reduce 57,677 metric tons of carbon dioxide equivalent (MT CO_2e) by 2030 and 212,086 MT CO_2e by 2045. This is roughly the same as removing 12,400 and 45,600 gasoline-powered cars from the road for one year, respectively.

PERSONAL CLIMATE ACTION AND RESILIENCE ROADMAPS

To empower residents, the CAAP includes Climate Action and Resilience Roadmaps tailored to individual actions. These one-page guides offer practical steps and resources for:

- **Electrifying homes:** Switching to efficient electric appliances, accessing rebates, and improving insulation.
- **Driving electric:** Choosing EVs, installing chargers, and using incentive programs.
- **Staying safe during heat and smoke events:** Tips for cooling homes, protecting air quality, and accessing community resources.
- **Eating sustainably:** Reducing meat consumption, composting, and supporting local agriculture.

These roadmaps help residents understand their personal impact and contribute to citywide climate goals.

IMPLEMENTATION AND MONITORING

The Campbell CAAP will be implemented through coordinated efforts with community-based organizations and agencies in Campbell. Monitoring and reporting are central to accountability. The City will produce annual progress reports and update its GHG inventory and the CAAP every 3–5 years, using performance metrics to prioritize cost-effective, high-impact actions. Through education, engagement, and partnerships, the City will empower residents, businesses, and organizations to participate in climate action, identify barriers, and foster long-term support for sustainability initiatives.


CITY OF CAMPBELL
CAAP
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Community
Development
Department

1. INTRODUCTION

The City of Campbell's Climate Action and Adaptation Plan (CAAP) presents a detailed approach to reducing greenhouse gas (GHG) emissions and preparing for extreme weather events to foster a healthier and more resilient future. This is an evolving document that serves as a guide to enhance Campbell's ongoing efforts to mitigate GHG emissions in line with the 2040 General Plan and the State's targets set by both SB 32 and AB 1279. It emphasizes practical, measurable, and time-bound strategies, providing a framework for implementation, monitoring, and adjustment to best serve the community.

Even if emissions were brought to zero today, Campbell would still face a changing climate. Public health, infrastructure, and ecosystems are experiencing impacts due to increased heat, poor air quality, seasonal flooding, and prolonged drought. These challenges will particularly impact vulnerable populations and may lead to increased health risks, financial strain, and damage to buildings, roads, and natural habitats.

The CAAP was developed through local research and community feedback, and it will be implemented using the same collaborative approach. During its development, special attention was given to hearing from community members most at risk from extreme weather events throughout the community engagement process. The strategies in this CAAP went through multiple iterations with both City staff and the CAAP Community Advisory Committee (CAC) to ensure they are community-focused, practical, and aligned with existing City priorities and efforts. Implementation will require careful collaboration across City staff and funding and resource allocation will be part of the City's annual budgeting process. Throughout the implementation of this CAAP, the City of Campbell will continue to work towards a healthier and more resilient community.

By adopting this plan, the City of Campbell seeks to protect public health and the environment, foster a green economy, and improve the quality of life for residents and visitors amidst a changing climate, while also supporting business retention and attraction through collaboration with the business community and promoting practices that enhance long-term economic resilience. Through dedicated efforts to cut GHG emissions, adapt to extreme weather events, promote renewable energy, preserve habitats and biodiversity, and facilitate equitable access to sustainability benefits, Campbell positions itself as a leader in climate action and adaptation.

CAAP VISION

The Campbell community envisions a decarbonized future where fossil fuels have been replaced by renewable energy, advanced green technologies, and sustainable urban planning practices. Campbell is a place where infrastructure is built with resiliency in mind, where resources are managed wisely, and natural ecosystems are preserved. Vulnerable communities—such as young children, older adults, disadvantaged individuals, and individuals with health conditions—are prioritized, helping them adapt and thrive in a changing climate.

At the core of this CAAP is the engagement of the entire Campbell community, fostering inclusivity throughout the process. The plan aims to create multi-benefit solutions, for example, green spaces that serve as both cooling centers and community gathering areas. The CAAP also encourages behavioral changes. Adding bike lanes and improving sidewalks can help promote more active modes of transportation. It promotes holistic thinking and education, leading with community values to create actionable initiatives.

OVERVIEW OF CAMPBELL

Campbell, California, also referred to as "The Orchard City," is a vibrant community located in the heart of Silicon Valley. Known for its small-town feel, Campbell offers a unique blend of historic charm and modern amenities. The downtown area is a walkable and bustling hub with a variety of shops, restaurants, and cafes, making it a popular destination for both residents and neighboring communities.

Campbell is situated in Santa Clara County, approximately 25 miles inland from the California coast. San Jose, Saratoga, and Los Gatos border the city. Covering an area of 6.35 square miles, the city features numerous neighborhood parks scattered throughout, offering peaceful spaces for residents, their families, and visitors to enjoy.

Campbell has a population of approximately 43,300 residents.[1,2] The city's demographics reflect a diverse community, with 51.1 percent identifying as White, 24.2 percent identifying as Asian, and 19.2 percent identifying as Hispanic or Latino.[3] Of individuals aged 5 years old and over, 39.5 precent speak a language other than English at home.[4] This diversity contributes to the rich cultural tapestry of the city, fostering a welcoming and inclusive atmosphere. 15.7 percent of the population in Campbell is 65 years old or over.[5]

There is a balanced mix of renters and homeowners, with 50.5 percent of housing units being owner-occupied.[6] The median value of owner-occupied housing is $2.11 million, reflecting Campbell's desirable location and quality of life.[7,8] The median household income in Campbell is $147,128.[9] An estimated 68.6 percent of individuals 16 years old and over are in the labor force.[10] The poverty rate is relatively low, with 5.3 percent of the population being below the poverty line.[11] Additionally, individuals living with disabilities make up 9.5 percent of the population and only 3.4 percent of residents under the age of 65 are without health insurance, indicating a generally well-insured community.[12,13]

1. *State of California, Department of Finance, E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2024, and 2025. Sacramento, California, May 2025.*
2. *Although the population estimate here is from 2025, the greenhouse gas inventory for the Campbell CAAP is based on 2022 data, which was the most recent available at the time of analysis. To maintain consistency, all population figures used in the greenhouse gas calculations reflect 2022 estimates, aligning with the inventory year.*
3. *U.S. Census Bureau. Race and Hispanic Origin, 2020 Decennial Census.* ***https://data.census.gov***.
4. *U.S. Census Bureau. Language Spoken at Home, 2020 Decennial Census.* ***https://data.census.gov***.
5. *U.S. Census Bureau. Age and Sex, 2023 American Community Survey 5-year Estimates.* ***https://data.census.gov***.
6. *U.S. Census Bureau. Selected Housing Characteristics, 2023 American Community Survey 5-year Estimates.* ***https://data.census.gov***.
7. *City of Campbell Finance Department. August 21, 2025.*
8. *The most recent comprehensive data available on race and ethnicity is from the 2020 Decennial Census, conducted by the U.S. Census Bureau.*
9. *U.S. Census Bureau. Income in the Past 12 Months (in 2023 Inflation-Adjusted Dollars), 2023 American Community Survey 5-Year Estimates.* ***https://data.census.gov***.
10. *U.S. Census Bureau. Selected Economic Characteristics, 2023 American Community Survey 5-Year Estimates.* ***https://data.census.gov***.
11. *U.S. Census Bureau. Poverty Status in the Past 12 Months, 2023 American Community Survey 5-year Estimates.* ***https://data.census.gov***.
12. *City of Campbell Finance Department. August 21, 2025.*
13. *The most recent comprehensive data available on race and ethnicity is from the 2020 Decennial Census, conducted by the U.S. Census Bureau.*

Figure 1 Population Demographics

5.3% of the population is below the poverty line.

50.5% of the housing in Campbell is owner-occupied.

Individuals living with disabilities make up approximately 9.5% of the population.

Median household income is $147,128.

Of individuals aged 5+, approximately 39.5% speak a language other than English at home.

3.4% of residents under the age of 65 are without health insurance.

Individuals aged 65+ make up approximately 15.7% of the population.

An estimated 68.6% of indivudals aged 16+ are in the labor force.

Data source: U.S. Census Bureau 2023 American Community Survey

THE GREENHOUSE GAS EFFECT AND CLIMATE CHANGE

The sun's energy drives Earth's climate. When solar radiation enters the atmosphere, some is reflected into space, while the rest is absorbed by the Earth's surface, warming it. The warmed surface then emits this heat back towards the atmosphere.[14] While some of the heat escapes into space, GHGs trap a portion of it, creating a natural greenhouse effect is essential for maintaining temperatures that support life on Earth.[15] However, rising levels of GHGs trap more heat near the Earth's surface, increasing global average temperatures and driving climate change.[16]

Human-caused climate change is well understood and widely accepted in the scientific community, with over 97 percent of climate scientists agreeing that the planet is warming and human activities are the primary cause.[17] Scientists study historical atmospheric records by extracting ice cores—sometimes from depths over a mile.[18] These ice layers contain particles like dust, ash, pollen, trace elements, and sea salts that were present in the atmosphere at different times.[18] As the ice compresses over time, it traps tiny bubbles of the atmosphere, including GHGs like carbon dioxide and methane.[18] These air pockets fossilize, providing samples of what the atmosphere was like when each layer formed.[18] By analyzing them, scientists can measure past concentrations of GHGs.[18] Collecting cores from various locations around the world allows researchers to study regional climate variations and distinguish these patterns from global climate trends.[18]

According to the Intergovernmental Panel on Climate Change (IPCC), GHG levels are now higher than at any point in the past 400,000 years. This sharp rise is due to human activities like burning fossil fuels, deforestation, and industrial processes.[19] As a result, global surface temperatures have increased more rapidly since 1970 than in any other 50-year span in at least the last 2,000 years.[20]

Rising global temperatures are intensifying wildfires, increasing the frequency of extreme heat events, altering precipitation patterns, affecting water supplies, raising sea levels, and changing ocean temperatures and chemistry.[21] Climate change is already impacting both human and natural systems worldwide. Scientists have documented shrinking ice sheets, warming and acidifying oceans, reduced snow cover, and rising global temperatures and sea levels.[22] These impacts pose significant risks and have led to widespread adverse effects on nature and people, disproportionately affecting vulnerable communities who have historically contributed the least to current climate change.[22]

Although climate change is a global issue, the effects are experienced intensely at the local level, impacting various aspects of society such as health outcomes, availability of natural resources, infrastructure durability, emergency response capabilities, tourism, and the frequency and intensity of disasters.

14. *The National Aeronautics and Space Administration (NASA). 2024. The Causes of Climate Change, Climate Change: Vital Signs of the Planet.* **https://climate.nasa.gov/causes. Accessed** *April 2025.*
15. *UCAR. 2025. The Greenhouse Effect | Center for Science Education.* **https://scied.ucar.edu/learning-zone/how-climate-works/greenhouse-effect**. *Accessed April 2025.*
16. *IPCC. 2018. Summary for Policymakers — Global Warming of 1.5 C.* **https://www.ipcc.ch/sr15/chapter/spm/**. *Accessed April 2025.*
17. *NASA. 2024. Scientific Consensus: Earth's Climate Is Warming. Climate Change: Vital Signs of the Planet.* **https://climate.nasa.gov/scientific-consensus**. *Accessed April 2025.*
18. *The National Aeronautics and Space Administration (NASA). 2017. Core questions: An introduction to ice cores.* **https://science.nasa.gov/science-research/earth-science/climate-science/core-questions-an-introduction-to-ice-cores/**. *Accessed January 2025.*
19. *The National Aeronautics and Space Administration (NASA). 2022. The Effects of Climate Change.* **https://climate.nasa.gov/effects/**. *Accessed April 2025.*
20. *Intergovernmental Panel on Climate Change (IPCC). 2023. AR6 Synthesis Report Climate Change 2023.* **https://www.ipcc.ch/report/ar6/syr/**. *Accessed March 2025.*
21. *The National Aeronautics and Space Administration (NASA). 2022. The Effects of Climate Change.* **https://climate.nasa.gov/effects/**. *Accessed April 2025.*
22. *Intergovernmental Panel on Climate Change (IPCC). 2023. AR6 Synthesis Report Climate Change 2023.* **https://www.ipcc.ch/report/ar6/syr/**. *Accessed March 2025.*

CALIFORNIA REGULATORY FRAMEWORK

In response to a changing climate, California has emerged as a global leader in climate action, setting numerous ambitious targets and strategies for reducing GHG emissions. Key legislation currently driving statewide GHG reductions includes Senate Bill (SB) 32, Assembly Bill (AB) 1279, SB 379, and AB 2684. Detailed descriptions of these regulations can be found in Appendix A – Climate Change Legislation.

State Bill 32 (2016)

SB 32 established a new statewide objective to cut GHG emissions by 40 percent below the levels recorded in 1990 by the year 2030. This goal builds on the 2020 target set by the Global Warming Solutions Act. In 2017, the California Air Resources Board updated the Scoping Plan, outlining a strategy to meet the 2030 emissions reduction target.

Assembly Bill 1279 – California Crisis Act (2022)

AB 1279 establishes bold climate objectives for California, requiring the state to attain carbon neutrality by 2045 or earlier. It also mandates a reduction in GHG emissions to at least 85 percent below the levels of 1990 by the same deadline. This legislation authorizes the California Air Resources Board to devise and execute methods for capturing and removing carbon dioxide, aiding the state's aim to achieve net-negative emissions after 2045.

State Bill 379 (2015) and Assembly Bill 2684 (2024)

SB 379 and AB 2684 both mandate that cities and counties revise their planning frameworks to tackle climate change-related hazards. SB 379 requires local governments to incorporate climate adaptation and resilience strategies into their general plans, evaluating vulnerabilities to various climate impacts like wildfires and flooding. AB 2684 enhances these requirements by specifically addressing extreme heat, obligating local governments to update their safety elements to mitigate heat-related risks. Additionally, AB 2684 mandates regular reviews to integrate the latest data on extreme heat hazards, bolstering California's efforts to adapt to rising temperatures.


SCHRADER
BUILDING
STOP

2. COMMUNITY ENGAGEMENT

Engaging the community and stakeholders was a critical part of developing the CAAP. Community feedback gathered during this process laid the foundation for a more equitable approach with intentional efforts to include Campbell's diverse populations. This input helped shape the plan's vision and tailor the goals and strategies to the community's needs.

ENGAGEMENT APPROACH

The outreach approach was designed to be inclusive and offered a diverse means of participation. The activities planned were intended to be:

- Educational and meaningful
- Consistent and transparent
- Accessible and engaging
- Relevant in focus and purpose
- Inclusive, both culturally and geographically
- Coordinated

Coordination with community-based organizations (CBOs), the CAC, and other stakeholders helped the City of Campbell reach beyond the traditionally engaged interested parties and gather input from a broader segment of the community. The following engagement goals were developed early in the process to guide the engagement and outreach efforts throughout the CAAP development process:

- Conduct a robust engagement and outreach process that meets people where they are, prioritizing equity and input from vulnerable populations, especially youth.
- Educate the community on climate hazards and climate change impacts and share how the CAAP will work to improve community resilience and address the underlying issues of climate change impacts and the interconnectedness of benefits.
- Engage a broad and diverse audience for the CAAP, reaching as many parts of the community as possible.
- Empower community ownership and increase support for future adaptation projects.
- Ensure outreach communications distinguish the CAAP purpose and focus, facilitating community buy in from the start while highlighting and achieving state requirements.
- Leverage work and outreach events with other City of Campbell departments and key regional and local partners to address resilience issues while avoiding duplicative efforts and reducing community involvement fatigue.
- Present data and science-based information with straightforward language and through storytelling techniques to ensure that materials are accessible, clear and engaging, and contribute to the community dialogue and decision-making process.

ENGAGEMENT HIGHLIGHTS

Key engagement efforts included collaboration with CBOs, input from the CAC, two community surveys, a vision boarding activity, community conversations, and pop-up events throughout the planning process. These efforts were designed to ensure that the CAAP reflects the priorities, concerns, and aspirations of Campbell residents. Key engagement efforts are summarized in Figure 2 and the sections below. Events were held throughout the city to provide local opportunities for participation, with some events specifically aimed at engaging potentially vulnerability populations in Campbell. Figure 3 shows total survey responses by district, as well as locations and number of events. In-person engagement was paired with strong online engagement through newsletters, email blasts, and social media posts. Together, these efforts demonstrate strong community support for the CAAP and help ensure that the plan is grounded in local values and needs. For additional information on CAAP engagement, refer to Appendix B – Community Engagement Summary.

Figure 2 Engagement by the Numbers

Online Engagement

Two online surveys were circulated, receiving a total of 833 responses.

Events with Community-Based Organizations

Three Community-Based Organizations participated and utilized provided engagement toolkits.

General Public Engagement

13 pop-up events led by City staff and Community-Based Organizations were held, reaching over 5,000 residents.

Interdepartmental and Agency Meetings

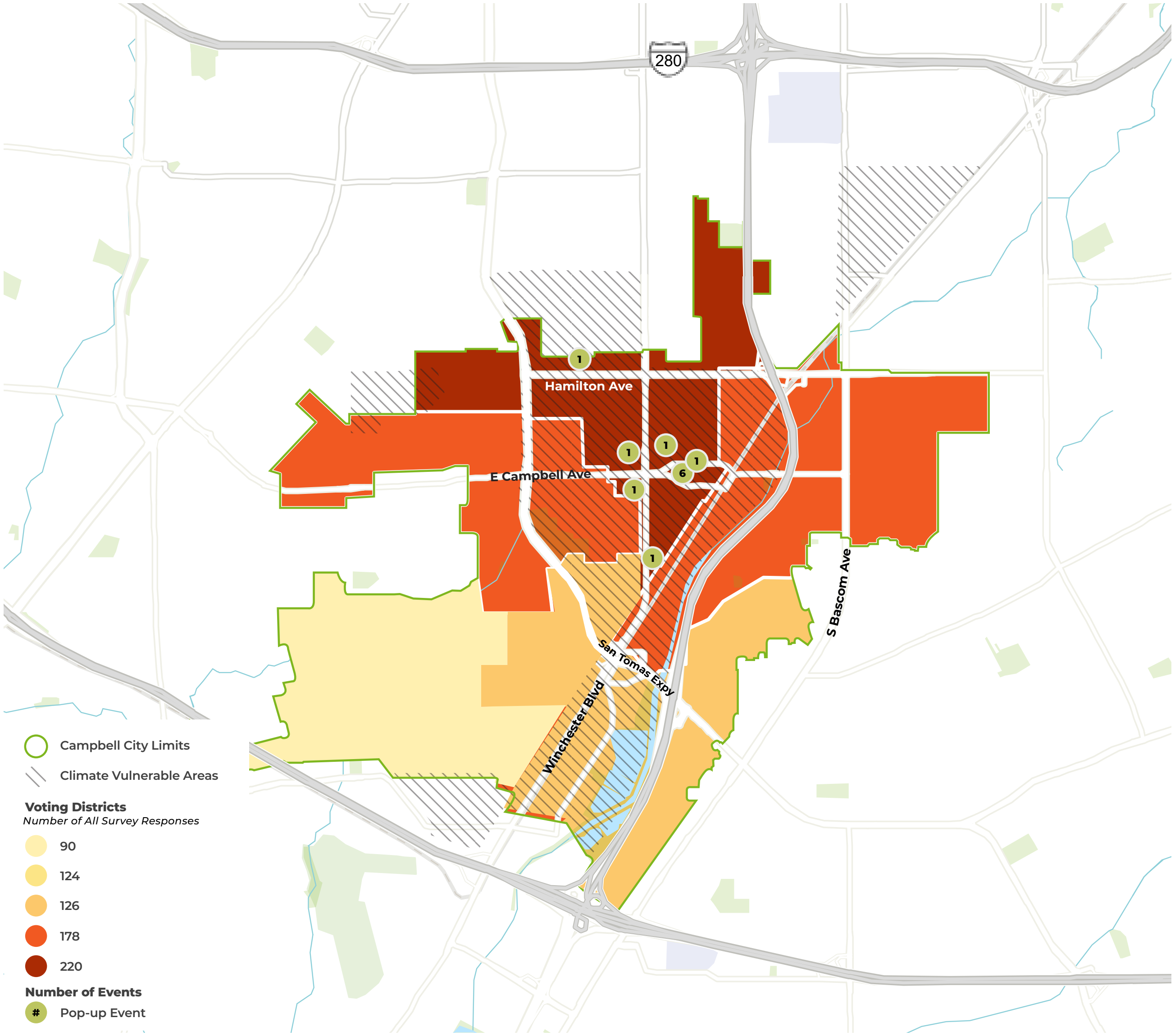
Measures and actions were discussed at five interdepartmental meetings and a public hearing.

Mini-Grants

A total of $14,000 was distributed to Community-Based Organizations through mini grants.

*Numbers provided are an estimate. Some residents may have been engaged in multiple events and therefore counted twice.

Figure 3 CAAP Engagement by Location



Basemap provided by Esri and its licensors © 2025.
Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021; City of Campbell, 2025.

Community-Based Organization Support

An important element of the Campbell CAAP Community Engagement Strategy was collaborating with and supporting CBOs. The City of Campbell disbursed a total of $14,000 and provided engagement toolkits to three CBOs: Acterra, Breathe California, and Silicon Valley Youth Climate Action (SVYCA). An estimated 3,700 residents were reached through engagement led by these CBOs. These groups completed the following engagement activities in support of the CAAP:

- Youth training on climate action planning best practices and civic engagement.
- Tabling at community events, like the Campbell Farmer's Market, to share information and gather feedback.
- Social media outreach.
- Mini focus groups to gather more in-depth feedback.

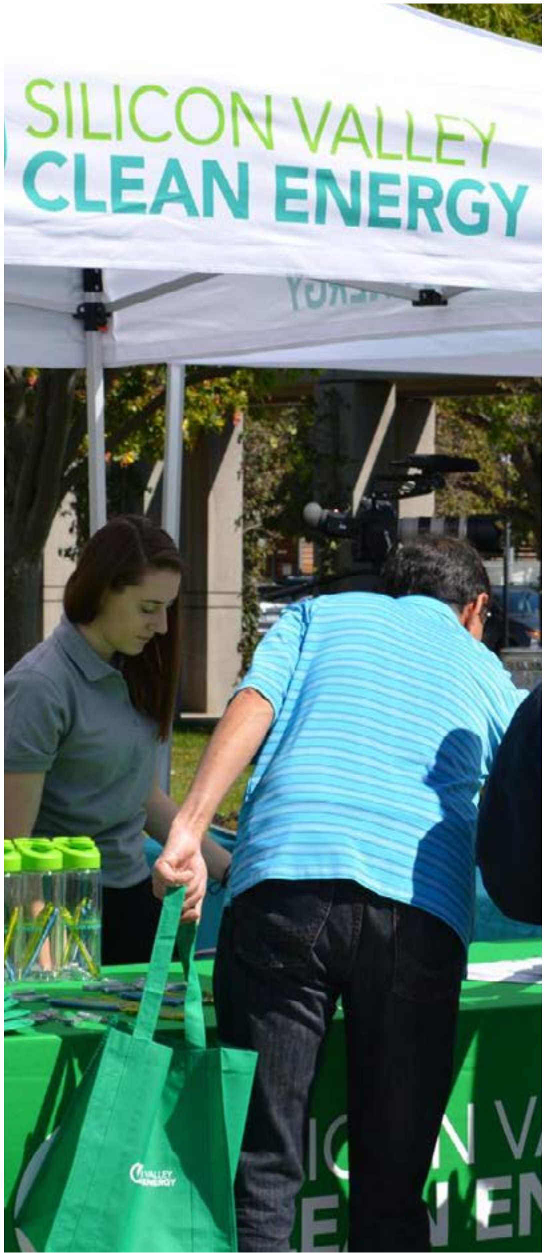
Community Advisory Committee

The CAC helped to shape the CAAP by providing feedback throughout the planning process. The CAC was the first line of community review throughout the CAAP development process by providing input on the CAAP primary vision, helping to identify vulnerable populations, identifying implementation strategies, and refining the surveys and other engagement events to help tailor the approach to the Campbell community. This committee was developed to be representative of the greater Campbell community and included eight community members. The CAC met four times via online meetings and once in person.

Online Engagement

The first survey collected information about the community's experiences and interests related to sustainability. The survey received 470 responses in English and Spanish. These responses were used to develop a set of preliminary priorities and draft high impact actions.

The second community survey asked community members to weigh in on potential actions for reducing emissions and building resilience and prioritize strategies. Results incorporate feedback from 363 English and Spanish speakers. The majority of survey respondents own a home, have lived in Campbell for over 10 years, speak English, and fall into the 40-64 age range. Most respondents have noticed changes in weather patterns and feel the city is somewhat prepared in case of a natural disaster. The community is most concerned with extreme heat, drought, wildfires, and impacts to health and basic needs. Respondents were familiar with climate resilience and adaptation strategies and have implemented some practices to make themselves and their communities more resilient. When asked about actions the City could take, respondents strongly supported installing solar and battery storage in new buildings, offering incentives and educational resources to help residents switch from gas to electric appliances, expanding EV infrastructure, and improving stormwater systems. High support was also shown for planting more trees, enhancing walkability and bikeability, and creating resilience hubs for extreme weather events. When asked to rank strategies, the most desired were making new buildings more resilient, improving existing



buildings (particularly through electrification), and making neighborhoods more walkable and bike friendly. Increasing EV adoption and conserving water were also ranked highly.

Highlights from the surveys can be found in Figure 4.

Pop-Up Events and Conversations

To engage with the community effectively, thirteen pop-up events were held, reaching over 5,000 community members. At these events, City of Campbell staff or CBO partners hosted a booth to provide information about the CAAP process, solicit feedback, and promote the online surveys. These events were held at Farmers Markets, community festivals, and a Campbell Union High School District Career/Volunteer Fair. The City of Campbell extends its sincere thanks to Acterra, Silicon Valley Youth Climate Action (SVYCA), and Breathe California. These three CBOs played a vital role in connecting with residents and ensuring broad community participation in the planning process.

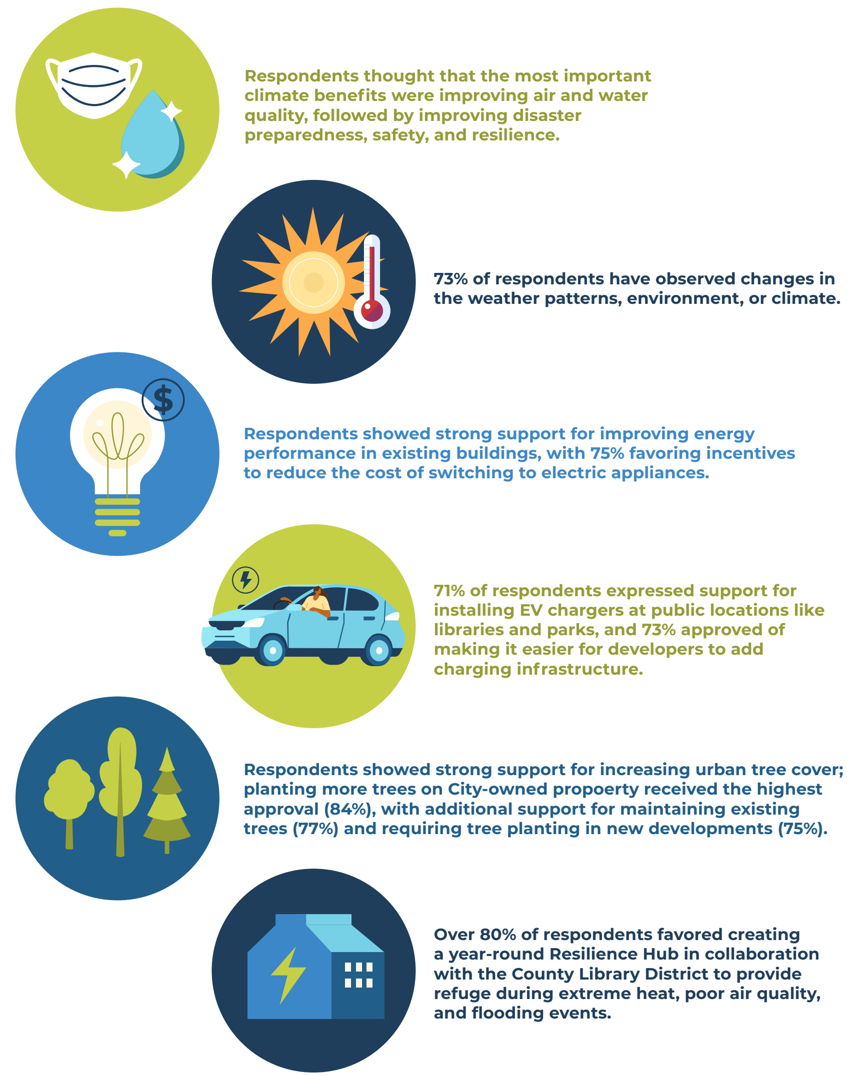
Two community conversation events were held to dive deeper into the priorities, concerns, and desires from the community. One of these events was a mini focus group hosted by Acterra held with low-income residents, the other a discussion with City of Campbell staff and seniors during a Kiwanis Club meeting. These conversations provided valuable opportunities for community members to share their perspectives in greater depth, allowing the project team to gain meaningful insights that helped shape the CAAP to better reflect local priorities and needs.

Integrating Community Feedback

Community feedback influenced various aspects of the CAAP development, as described below:

- **Climate Vulnerability Mapping**. Enhanced desktop mapping in Section 3 Climate Vulnerability, based on feedback from the CAC.
- **Greenhouse Gas Emissions Analysis**. Section 4 Greenhouse Gas Emissions Analysis includes a Consumptive-Based Inventory, developed based on CAC input.
- **Individual Action Roadmaps**. Section 7 Personal Climate Action and Resilience Roadmaps added based on input from the CAC and community survey feedback.
- **Resilience and Mitigation Strategies**. Section 6 Climate Resilience and Mitigation Strategies refined based on CAC feedback and community survey input. Look for the ★ icon to identify community-informed measures.

Figure 4 Key Survey Findings



3. CLIMATE VULNERABILITY

The two primary goals of the CAAP are to reduce Campbell's GHG emissions and to prepare to adapt for the impacts of climate change. Developing effective policies and adaptation strategies to protect the community's health, safety, and economic resilience requires a clear understanding of local climate hazards and vulnerabilities. This section evaluates Campbell's vulnerability and capacity to adapt. The methodology and are available in Appendix C – Climate Change Vulnerability Assessment.

CLIMATE HAZARDS

According to the IPCC, human-induced climate change is already intensifying weather globally.[19] Like many parts of California, Campbell is experiencing some of these impacts and facing a range of climate-related hazards. The primary climate hazards identified in Campbell are extreme heat, air quality degradation due to wildfire, riverine flooding, and drought. An overview of Campbell's exposure to these hazards can be found in Figure 5 below. These hazards pose risks to residents' health and well-being, as well as to the community's infrastructure and natural resources. Climate projections for each hazard are based on ***Silicon Valley 2.0***, which utilizes data from Cal Adapt, as recommended by the California Adaptation Planning Guide.[20,21] Led by Santa Clara County's Office of Sustainability and funded by California's Strategic Growth Council, Silicon Valley 2.0 is a regional initiative that helps local governments and agencies collaboratively plan for near- and long-term climate challenges.[21]

19. *Intergovernmental Panel on Climate Change. 2023. Climate Change 2023 Synthesis Report.* ***https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf****. Accessed March 2025.*
20. *County of Santa Clara Office of Sustainability. 2015. Silicon Valley 2.0 Climate Adaptation Guidebook.* ***https://files.santaclaracounty.gov/migrated/150519_ExecSum_FINAL.pdf****. Accessed June 2025.*
21. *California Energy Commission (CEC). 2023.* ***https://cal-adapt.org/****. Accessed March 2025.*

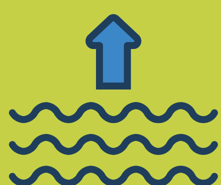
Figure 5 Climate Hazards in Campbell

Extreme Heat

An extreme heat day is when temperatures are higher than usual, specifically above 96°F for Campbell. An extreme heat event is when there are five or more of these hot days in a row. Santa Clara County has had six extreme heat events in the past, with the worst ones in 2000 and 2006. By the end of the century, Campbell could see a big increase in extreme heat days, going from four to 24 per year if emissions stay high.

Air Quality Degradation

Higher temperatures, increased humidity, decreased airflow, and wildfires can all reduce air quality. Ozone levels rise with higher temperatures and strong sunlight. Climate change will lead to poorer air quality in Santa Clara County, with more extreme heat and wildfire events contributing to higher pollution levels. Even though Campbell is not directly affected by wildfires, wildfires in surrounding areas will impact its air quality.



Riverine Flooding

Riverine flooding occurs when rivers overflow their banks due to heavy rain. Critical facilities and areas in and around the city are at risk from major flooding events that happen once every 100 or 500 years. Flooding along Los Gatos Creek in Campbell are anticipated to get worse due to more intense and frequent heavy rain events.

Drought

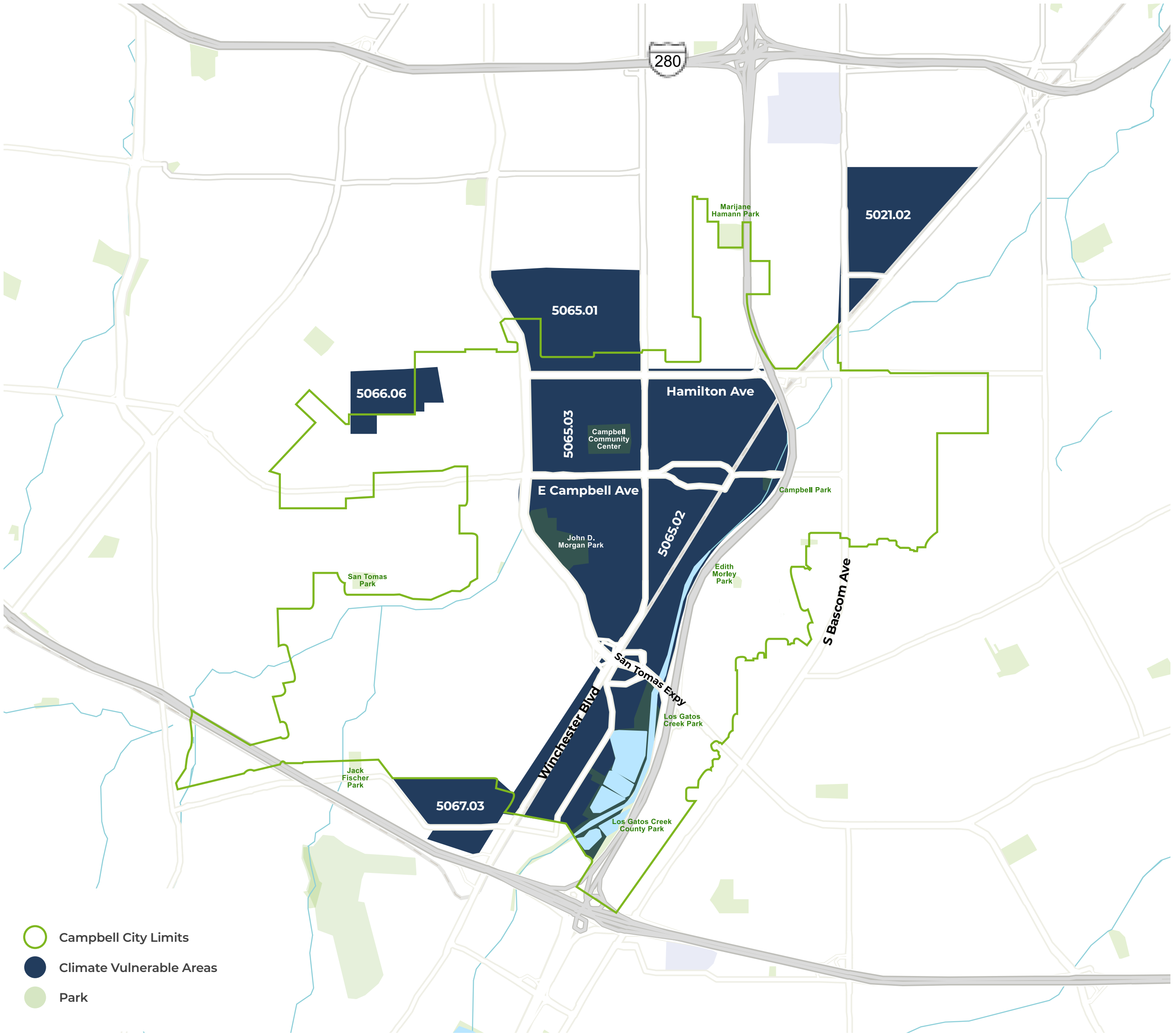
A drought is a long period with little to no rain, leading to water shortages. In Campbell, droughts will become more common because of due to higher temperatures and less rainfall. By mid-century, we can expect extreme dry spells every six to eight years, and by the end of the century, they could happen every three to four years.

VULNERABLE COMMUNITY MEMBERS

All members of the community are vulnerable to the impacts of climate change; however, some populations face significantly greater vulnerability due to factors such as geographic exposure, underlying health conditions, or limited access to resources. By identifying these at-risk groups, the City of Campbell can better prioritize interventions, allocate resources efficiently, and implement targeted strategies to reduce climate impacts.

The identification of vulnerable populations in Campbell was informed by multiple regional and local sources including Silicon Valley 2.0, the Metropolitan Transportation Commission's Equity Priority Communities, and the San Francisco Bay Conservation & Development Commission community vulnerability map. The Campbell CAAP CAC reviewed the draft climate vulnerability map created using these data sources. The committee confirmed initial findings and identified an additional climate-vulnerable area along Los Gatos Creek (Census Tract 5065.02), citing a high concentration of affordable housing units and the presence of unhoused individuals in the area. Figure 6 below illustrates the climate-vulnerable census tracts in Campbell used in the CAAP analysis.

Figure 6 Climate Vulnerability in Campbell



Basemap provided by Esri and its licensors © 2025.
Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021; CPAD, 2023.

CLIMATE IMPACTS

Climate change will impact various aspects of the Campbell community including public health and safety, buildings and properties, transportation, and ecosystems. Campbell faces several public health and safety challenges due to extreme heat, poor air quality, riverine flooding, and drought. Vulnerable populations, including seniors, young children, disadvantaged individuals, and those with health conditions, are at higher risk of health issues and financial burdens. Additionally, these environmental factors can impact buildings, transportation infrastructure, and ecosystems, leading to increased maintenance costs, deteriorating road conditions, as well as vegetation and wildlife stress and mortality. Figure 7 summarizes the key climate impacts in Campbell. For more information on these impacts, refer to Appendix C – Climate Change Vulnerability Assessment.

Figure 7 Climate Impacts in Campbell

Extreme Heat

Extreme heat can be dangerous for everyone, but especially seniors, young children, disadvantaged individuals, and individuals with health conditions like asthma or diabetes. Extreme heat can also affect the stability and effectiveness of certain medications, posing additional health risks for vulnerable populations during prolonged heat events. Extreme heat can lead to more frequent use of air conditioning, raising expenses and potentially causing power outages, which can in turn worsen health risks. Additionally, wildlife and plants may experience heat stress, affecting ecosystem health in Campbell.

Air Quality Degradation

Air quality declines from regional wildfires, vehicle and lawn equipment emissions, and wood burning can cause respiratory illnesses and worsen existing health conditions, especially for seniors, young children, and disadvantaged individuals. People with existing health conditions are at higher risk of respiratory and heart problems. Poor air quality can also harm ecosystems and make parks and outdoor areas unsafe for the community.

Drought

Drought can place a significant financial strain on vulnerable populations, like disadvantaged individuals, due to higher water rates and difficulties in accessing clean water. Additionally, drought affects ecosystems, leading to stressed vegetation and increased plant deaths. This can reduce the quality and benefits of parks and natural spaces like the Los Gatos Creek Trail, impacting the overall health and well-being of the community.

Riverine Flooding

Riverine flooding caused by extreme precipitation events is a hazard along the Los Gatos Creek, particularly affecting Timber Cove Mobile Home Park, affordable housing units, residential roads, Highway 17, and bridges. Flooding can lead to increases in infectious diseases like Lyme Disease and West Nile Virus, and cause mold growth in buildings, which can impact health.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4. GREENHOUSE GAS EMISSIONS ANALYSIS

A key aspect of climate planning is creating a GHG emissions inventory for specific time periods, such as a calendar year. This inventory measures emissions from various sectors (e.g., energy, transportation) and helps guide the development of the CAAP by identifying the largest sources of emissions. As part of the CAAP process, the City of Campbell completed a 2022 GHG emissions inventory for the community (2022 Community Inventory), which includes emissions from activities within the city's boundaries during 2022. The City also completed an inventory for municipal activities (2022 Municipal Inventory), which focuses specifically on emissions from city-owned facilities and municipal operations.[22]

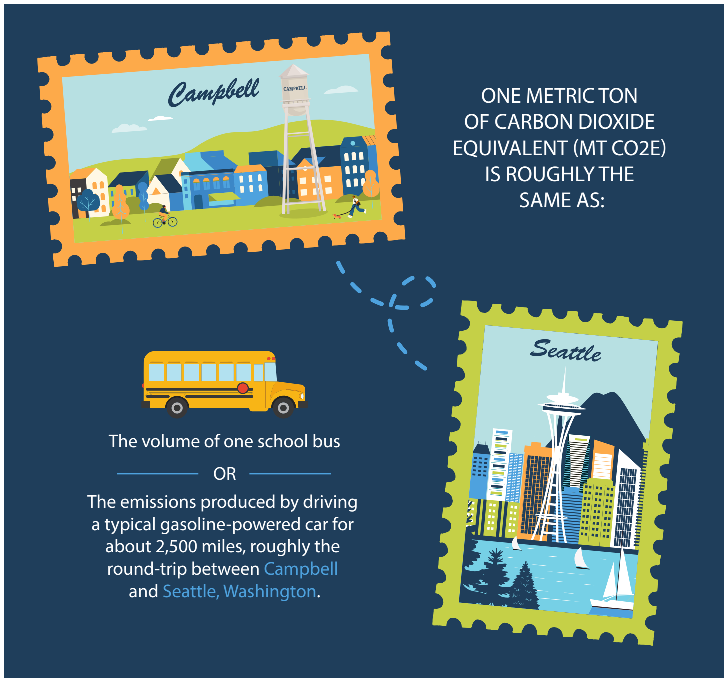
22. The community inventory also includes municipal emissions within each sector, so the municipal and community inventories are not additive.

While traditional GHG inventories focus on emissions within a community's boundaries (where the City of Campbell has direct control), a consumptive-based model considers emissions from the entire lifecycle of activities within the community, including energy use and imbedded emissions from goods, services, food, and travel, regardless of where those emissions occur. This CAAP also includes a Consumptive-Based Inventory. While this inventory overlaps the Community Inventory and Municipal Inventory in some areas, it provides a separate understanding emissions contributions. The Consumptive-Based Inventory is especially helpful for community members to understand how their purchases affect global GHG emissions.

GREENHOUSE GAS EMISSIONS INVENTORY

GHG inventories are created by pinpointing the sources and stores of GHGs within a specific geographic area (e.g., Campbell city limits) and gathering activity data for each sector. Different activities release different gases—methane, for example, traps 84-87 times more heat than carbon dioxide over two decades. Once the activity data has been gathered, an emissions factor is applied to convert all GHGs into one unit of measure: carbon dioxide equivalent (CO_2e). GHG inventories are often reported in metric tons of carbon dioxide equivalent (MT CO_2e). One MT CO_2e is about the same volume as a full-sized school bus. That is roughly the same as the emissions produced by driving a typical gasoline-powered car for about 2,500 miles, roughly the round-trip between Campbell and Seattle, Washington. This is illustrated in Figure 8. A summary of the GHG Inventory is included below, and the methodology and full results can be found in Appendix D – Greenhouse Gas Analysis Report.

Figure 8 Carbon Dioxide Equivalents

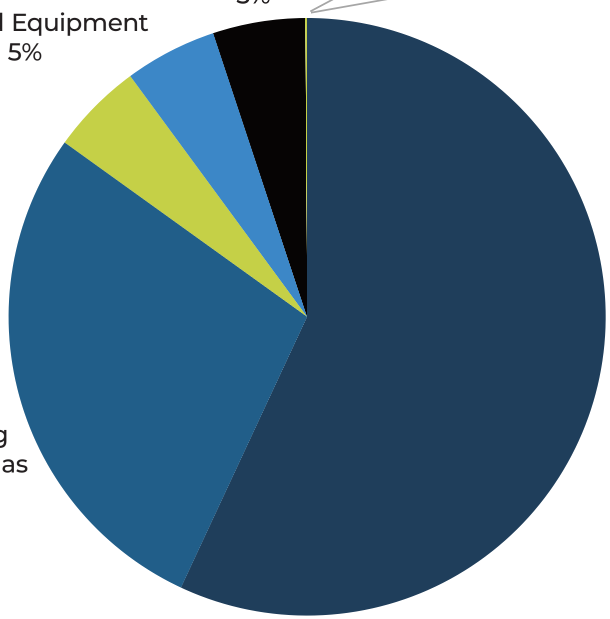


Community Greenhouse Gas Emissions Inventory

The 2022 Community Greenhouse Gas Emissions Inventory provides the current GHG emissions estimates that follow the ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 (Community Protocol) and current best practices for GHG accounting. The Community Protocol serves to guide the measurement and reporting of GHG emissions in a standardized way and is used by other jurisdictions to support their own inventory, forecast, and climate action planning efforts. The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory. The Community Inventory sectors are defined as follows:

- **On-road Transportation** includes on-road passenger vehicle miles traveled (VMT), on-road commercial total VMT, on-road bus total VMT, on-road passenger electric vehicle miles traveled (EVMT), on-road commercial EVMT, and on-road bus EVMT.
- **Off-road Equipment** includes off-road diesel, off-road gasoline, and off-road natural gas vehicles and equipment.
- **Building Natural Gas** includes residential natural gas, commercial natural gas, and natural gas leakage.[23]
- **Building Electricity** includes residential electricity, commercial electricity, direct access electricity, and transmission and distribution (T&D) losses associated with electricity use.[24,25]
- **Solid Waste** includes landfill methane and process emissions.
- **Wastewater** includes stationary combustion, process Nitrous Oxide (N_2O) emissions, effluent discharge fugitive N_2O, electricity use, electricity use T&D, NG Use, and NG leakage.
- **Water** includes imported and purchased water.

Figure 9 Community Inventory Greenhouse Gas Emissions by Sector



As illustrated in Figure 9, on-road transportation is the largest contributor of GHG emissions at 57 percent, followed by Building Natural Gas at 28 percent. Off-road Equipment (e.g., lawnmowers, leaf blowers, and chainsaws), Building Electricity, and Solid Waste each contribute five percent of the Community GHG emissions, and both Water and Wastewater contribute less than one percent of the Community GHG Emissions.

23. Natural gas leakage refers to the unintended release of methane from pipelines, appliances, or infrastructure. It is included because leaked methane is a potent greenhouse gas, contributing significantly to the overall climate impact of natural gas use in buildings.

24. Direct access electricity refers to electricity purchased directly from energy service providers rather than through a regulated utility. This option is typically available to large commercial or industrial customers and can affect how electricity use is tracked and reported.

25. Transmission and distribution (T&D) losses represent the energy lost as electricity travels through power lines and transformers from generation sources to end users. These losses are included to account for the full environmental impact of electricity consumption.

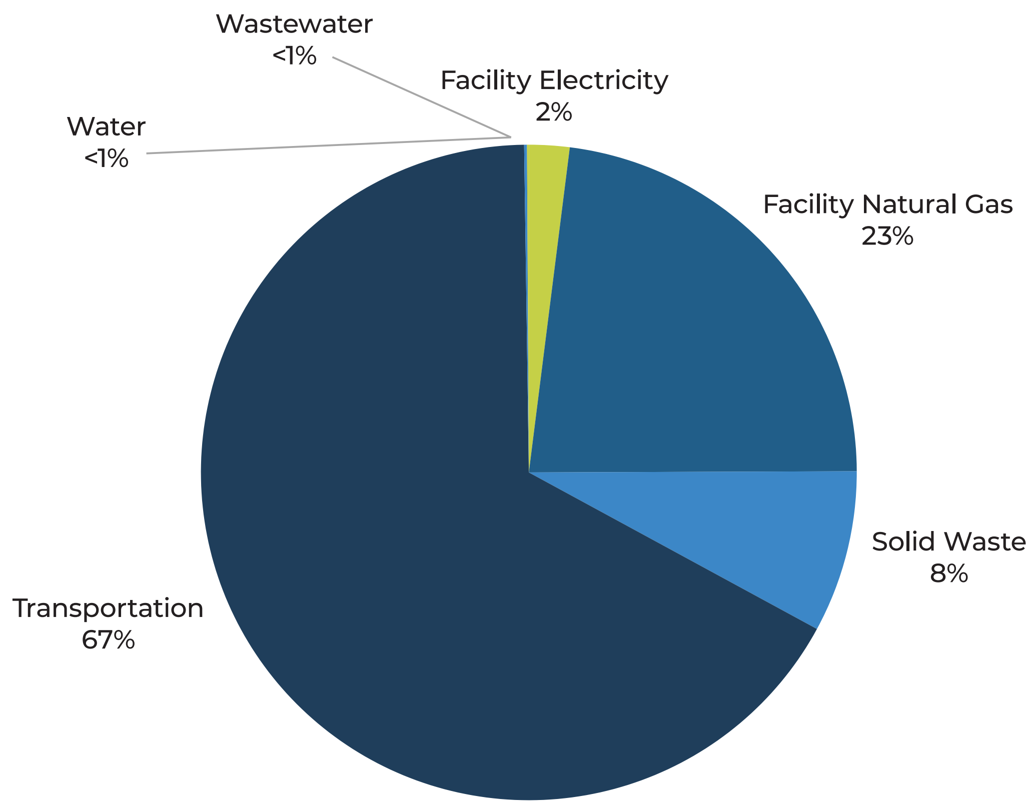
Municipal Greenhouse Gas Emissions Inventory

The 2022 Municipal Inventory provides Campbell with current GHG estimates that follow the Local Government Operations Protocol and current best practices for GHG accounting at the municipal level. The Municipal Inventory sectors are defined as follows:

- **Transportation** includes on-road vehicle fleet diesel, on-road vehicle fleet gasoline, off-road vehicle fleet diesel, and off-road vehicle fleet gasoline.
- **Facility Natural Gas** includes natural gas combusted in buildings and facilities as well as the associated natural gas leakage.
- **Facility Electricity** includes electricity use in buildings and facilities, electricity for streetlights and traffic signals, and T&D losses associated with this electricity.
- **Solid Waste** includes landfill methane and process emissions.
- **Wastewater** includes stationary combustion, process N_2O emissions, effluent discharge fugitive N_2O, electricity use, electricity use T&D, natural gas use, and natural gas leakage.
- **Water** includes imported and purchased.

As seen in Figure 10, Transportation is the largest contributor of Municipal GHG Emissions at 67 percent, followed by Infrastructure Natural Gas at 23 percent, Solid Waste at eight percent, and Infrastructure Electricity at two percent. Both Water and Wastewater contribute less than one percent of the Municipal GHG Emissions.

Figure 10 Municipal 2022 Greenhouse Gas Inventory



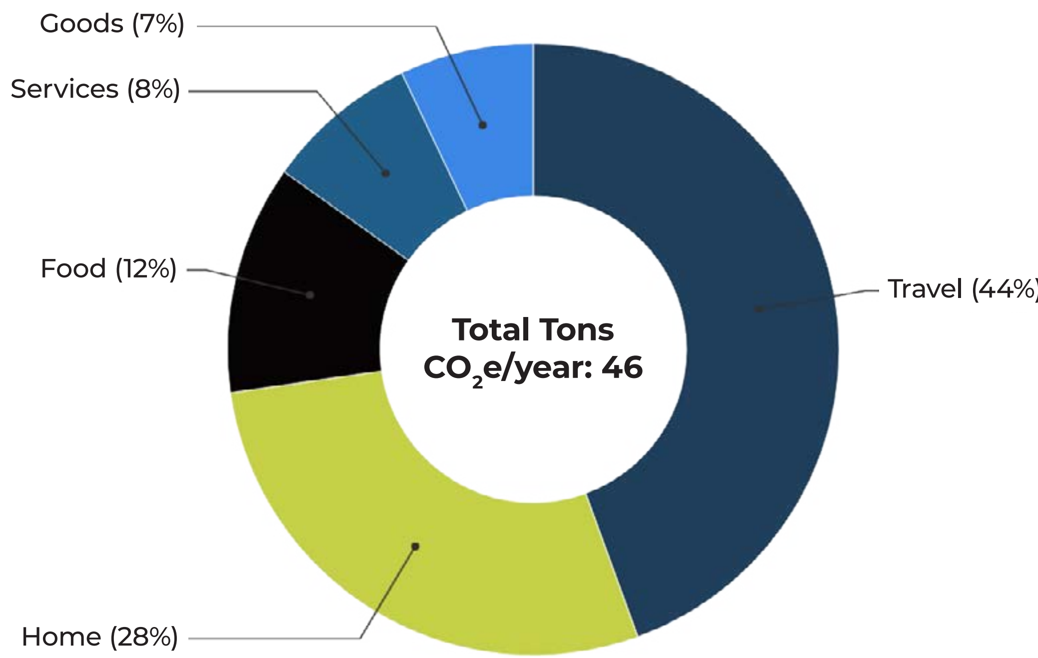
Consumptive-Based Inventory

The Campbell Consumptive-Based Inventory considers the emissions from the entire lifecycle of activities within the community. This includes not only the energy used in homes, businesses, and vehicles, but also the emissions from goods and services used in Campbell, regardless of where they were manufactured. For this reason, the Consumptive-Based Inventory is larger and offers a more comprehensive view of Campbell's emissions. The Consumptive-Based Inventory was calculated using the CoolClimate Calculator, developed by the CoolClimate Network at the University of California, Berkeley.[26] This calculation incorporates lifecycle analysis data for each product category, economic data (including household purchases), and survey results.

The Consumptive-Based Inventory Categories are as follows:

- **Travel** takes into account the emissions from the entire lifecycle of various transportation modes utilized by Campbell residents, including personal vehicles, buses, trains, and air travel.
- **Home** covers emissions from building a household and the yearly use of electricity, natural gas, and water.
- **Food** includes emissions from food production, distribution, consumption, and disposal. Food emissions are classified into categories such as meat, dairy, fruits and vegetables, cereals, and other products.
- **Services** emissions come from various sources, including household maintenance and repair, healthcare, information and communication, vehicle services, organizations, charities, and more.

Figure 11 Average Campbell Household's Annual Consumptive-Based Greenhouse Gas Emissions



- **Goods** includes emissions from household items, including clothing, furniture, and other goods such as entertainment, personal care, stationery, reading materials, and medical supplies.

Figure 11 provides a summary of the consumptive emissions in Campbell. Travel accounts for 44 percent of emissions, followed by Home at 28 percent, Food at 12 percent, Services at 8 percent, and Goods at 7 percent.

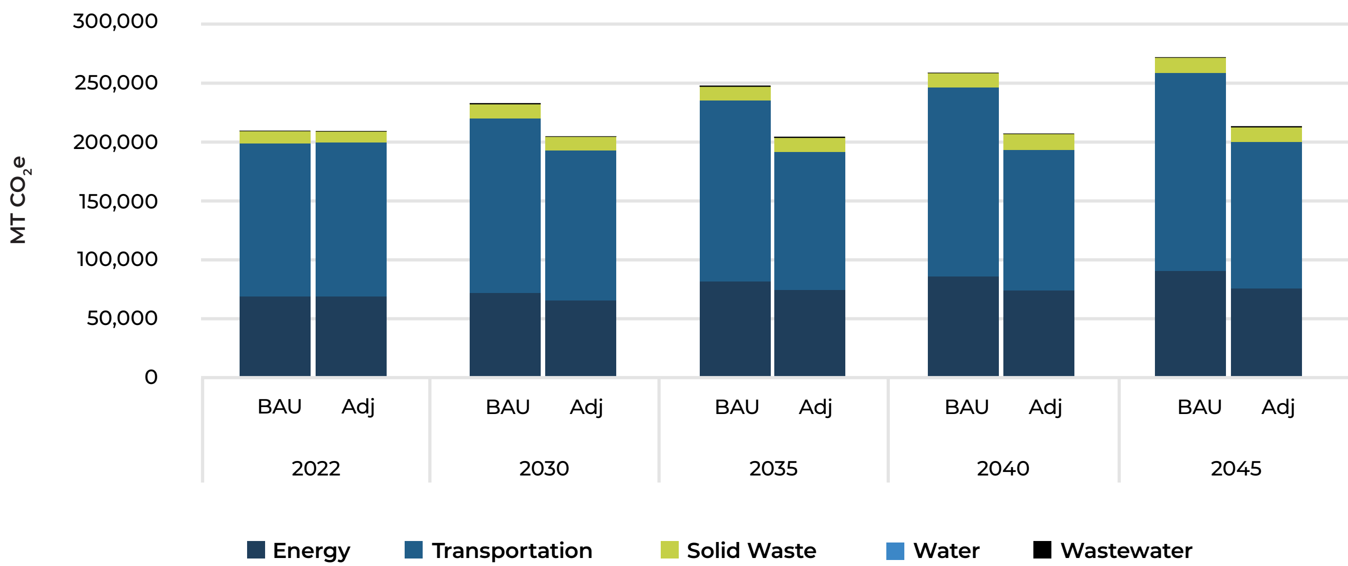
26. CoolClimate Calculator. N.d. https://coolclimate.berkeley.edu/calculator. Accessed May 2025.

Greenhouse Gas Emissions Forecast and Targets

Greenhouse Gas Emissions Forecast

A GHG emissions inventory establishes a baseline for a specific year, but annual GHG emissions fluctuate due to factors like population growth, increased in jobs, technological advancements, and policy changes. A GHG emissions forecast predicts future changes in GHG emissions by considering expected community growth and transformations. By comparing the GHG emissions forecast with reduction targets, we can identify the gap that needs to be addressed through local GHG reduction policies. This section provides an estimate of future emissions for Campbell for the years 2030, 2035, 2040, and 2045 under two scenarios: business-as-usual (BAU) and legislative-adjusted.

Figure 12 Business-As-Usual and Adjusted Forecast Results Summary by Emission Sector (MT CO_2e)



Business-As-Usual Forecast

This scenario projects future GHG emissions based on the continuation of 2022 consumption trends and anticipated changes in population, housing, employment, and transportation within Campbell. It does not account for any GHG reductions from state regulations.

Legislative-Adjusted Forecast

This scenario estimates how current state legislation will reduce GHG emissions compared to the BAU scenario. It reflects the state's efforts to help reduce local GHG emissions to meet state goals. This target considered the more accurate view of future GHG emission trends and highlights Campbell's responsibility for reducing GHG emissions through local and regional initiatives. This adjusted forecast takes into account legislative programs related to transportation, waste, and energy that are expected to reduce GHG emissions in specific sectors throughout California.

These forecasts are summarized in Figure 12. By 2045, under BAU conditions, total GHG emissions are projected to hit 272,446 MT CO_2e, an increase of 62,799 MT CO_2e from 2022 levels. For comparison, 272,446 MT CO_2e is roughly equivalent to the annual emissions from 58,000 gasoline-powered passenger vehicles. State legislation is expected to reduce emissions by 59,160 annually by 2045, about the same as removing 12,600 gasoline-powered passenger vehicles from the road each year.

Greenhouse Gas Emissions Targets

Setting targets helps guide the City towards deep decarbonization in line with the scientific consensus. Thoughtful and long-term planning will allow the City to consider lifecycle financial impacts, avoid unnecessary costs, and find cost effective decarbonization strategies. For example, encouraging residents to transition directly from air conditioning to heat pumps, rather than installing AC now and replacing furnaces later, can reduce future financial burdens. While more detailed financial analysis will be needed, setting clear goals helps the City make smarter, more efficient investments over time. The California Air Resources Board (CARB) provides guidance on health, air quality monitoring, and environmental justice with the goal to protect the public from the harmful effects of air pollution and develop actions to fight climate change. CARB advises aiming to exceed SB 32's goal of reducing GHG emissions by 40 percent below 1990 levels and working towards carbon neutrality by 2045. Targets should be provisional until feasible GHG reduction measures are analyzed.

Achieving these targets requires significant changes in energy use, transportation, and living/building practices. Campbell's provisional targets are:

- Reduce GHG emissions by 40 percent below 1990 levels by 2030.
- Progress towards carbon neutrality by 2045.

The GHG emissions reduction gap is the difference between the Legislative-Adjusted Forecast and these targets. Table 1 provides a summary of the GHG emission reduction targets in mass emissions, which refers to the total quantity of GHGs released into the atmosphere from various sources, expressed in MT CO_2e. As demonstrated in Figure 13, Campbell will need to reduce 54,732 MT CO_2e by 2030, and 213,285 MT CO_2e by 2045 in order to meet State targets. To contextualize these reductions, 54,732 MT CO_2e is roughly equivalent to the annual emissions from 11,800 gasoline-powered cars, and 213,285 MT CO_2e is comparable to the annual emissions from 46,000 gasoline-powered cars.

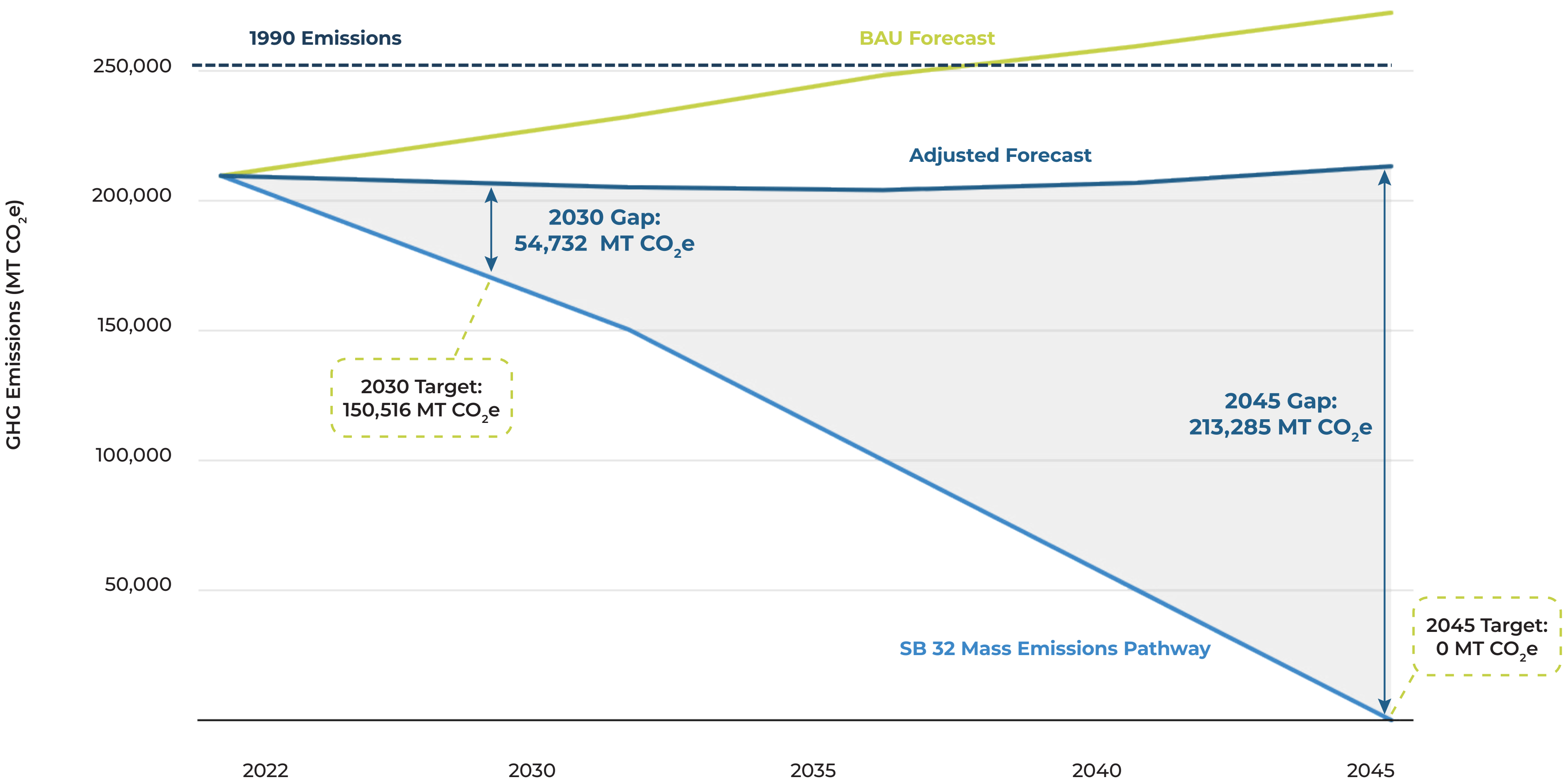
Table 1 GHG Emissions Reduction Targets and Gap Analysis Measured in MT CO_2e

Metric	2030	2035	2040	2045
Adjusted Forecast (State Legislation)	205,248	204,124	206,951	213,285
SB 32 Mass Emissions Pathway	150,516	100,344	50,172	0
Remaining Emissions Gap	54,732	103,780	156,779	213,285

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] The SB 32 Mass Emissions Pathway is calculated by reducing 1990 mass emissions by 40% in 2030 and to 0 in 2045. This pathway is consistent with both SB 32 and a trajectory set forth to achieve AB 1279.

Figure 13 **GHG Emissions Forecast and Provisional Target Pathways (Mass Emissions)**




CAMPBELL

5. COST EFFECTIVENESS

The costs of climate action and adaptation plans can vary widely depending on the specific measures taken, how they are implemented, and the funding strategies used. For example, expenses can range from high-cost projects like building bike lanes to more affordable, but labor-intensive, efforts like City of Campbell staff conducting outreach and educational campaigns.

Cost Considerations

For each strategy, the cost description focuses on both internal costs (municipal-focused) and external costs (community-focused) and provides insight into the variability of these costs, including the primary variables that determine cost effectiveness. These considerations include:

Upfront versus Lifecycle Costs

When discussing how much a strategy or action costs, it is important to differentiate between the upfront costs, the cost of a Light Emitting Diode (LED) light bulb, versus the lifecycle costs of purchasing, operating, maintaining, and ultimately disposing of that lightbulb. While LED lightbulbs may be more expensive up front when compared to an incandescent bulb, the lifecycle costs of owning an LED lightbulb are lower, providing a significant return on investment.

Incremental Costs

When discussing costs, it is important to specify the difference between how much a strategy costs overall and what the incremental or marginal cost is. The incremental or marginal cost is the difference in cost between the new action and the old or standard action. For example, purchasing a new electric vehicle could cost $30,000, which could be considered a high cost. However, the marginal cost of purchasing an electric vehicle versus purchasing a new internal combustion vehicle may be only a few thousand dollars or less after rebates and incentives. This incremental cost can then be further offset by considering the lifecycle cost savings including lower fuel costs and lower maintenance costs. It is important to consider what the incremental/marginal costs are for each strategy by keeping in mind what the alternative costs are. In many cases, the difference is negligible.

Financing and Funding Availability

One of the major financial tools available to make large investments in infrastructure, vehicles, or buildings is financing. Financing allows for the ability to leverage the time

value of money and put future expected money flows to use today. For example, a solar array may cost $20,000 and result in an energy bill that is $200 less per month than before installation. The cost of the solar array could be considered high. However, the loan for the solar array requires a monthly payment of $150 dollars, resulting in a net monthly savings of $50 dollars. Under this scenario the solar array does not carry a high cost, rather it provides overall savings. The ability to finance can make seemingly high-cost investments low to no cost over time, though the City will need to balance the time and resources it takes to set up and service these loans over time and prioritize the most impactful strategies.

Understanding the ranges of cost savings and revenue streams, and how those costs and revenues accrue over time into a payback or return on investment (ROI) calculation, are prudent factors to structuring partnerships, engaging interested parties, and making optimal financial decisions. For example, energy efficiency retrofits can generate cost savings of more than 30 percent for 15 to 20 years. If external partners are involved, such as with an energy savings performance contract, cities may not need to provide any upfront capital, but the project's cost savings would accrue with a private third party and be lost by the City. For example, an electrification project to convert a city facility to an all-electric system may cost about $5 million but reduce long-term maintenance costs and significantly expand energy conservation efforts. Projects like this can offer financial and environmental returns over time. Cities must consider the estimated ROI, how project costs and revenues balance out over the useful life of the project, and whether they are willing to forego long-term cost savings or revenue generation capacity by partnering with a private third party.

In addition, cities are often able to fund significant infrastructure projects with grants or other funding sources. Large infrastructure projects like bike lanes or pedestrian bridges can be funded through state and federal grant monies. While matching funds or other costs can be incurred by the city, these funding strategies can significantly reduce the upfront costs of larger infrastructure projects.

What Are the Costs?

The CAAP strategies have been selected to minimize upfront costs and maximize long-term benefits including cost savings. Many measures aimed at reducing GHGs not only cut down on emissions but also offer long-term cost savings for both the City of Campbell and the community throughout the lifespan of the CAAP. Although some initiatives require higher initial investments, they often result in operational efficiencies, reduced energy consumption, and avoidance of future expenses. The primary strategies and their associated monetary costs and benefits are summarized here.

Adaptation

Once the CAAP is adopted, it will align with California's goals for reducing GHG emissions and funding strategies, thereby positioning Campbell to be competitive for state grant funds. California's recently passed Proposition 4 introduces a $10 million climate bond dedicated to financing projects related to water, wildfire prevention, green energy, and other climate initiatives. Additionally, the CAAP emphasizes proactive, long-term investments, encouraging the City of Campbell and community to spend a bit more now to achieve greater savings in the future. For instance, investing in climate smart strategies like tree planting, solar panel installation, and battery back-up requires initial expenditures today to prepare Campbell for extreme heat events and rising energy demands, which would otherwise necessitate costly emergency responses or infrastructure upgrades. The World Resources Institute estimates a benefit cost ratio between 2:1 and 10:1 for such investments, meaning that for every dollar spent on resilience, $2 to $10 in benefits could be seen. The financial and social advantages of the CAAP, along with additional co-benefits to public health and the direct impact on reducing GHG emissions, mean that the benefits of CAAP implementation may outweigh the costs.

Building Electrification

The CAAP measures emphasize a transition to electric appliances when existing equipment is due for replacement or reaches the end of its useful life, as well as phasing out home appliances powered by natural gas. This approach not only minimizes waste and avoids additional manufacturing emissions but also allows for cost savings.

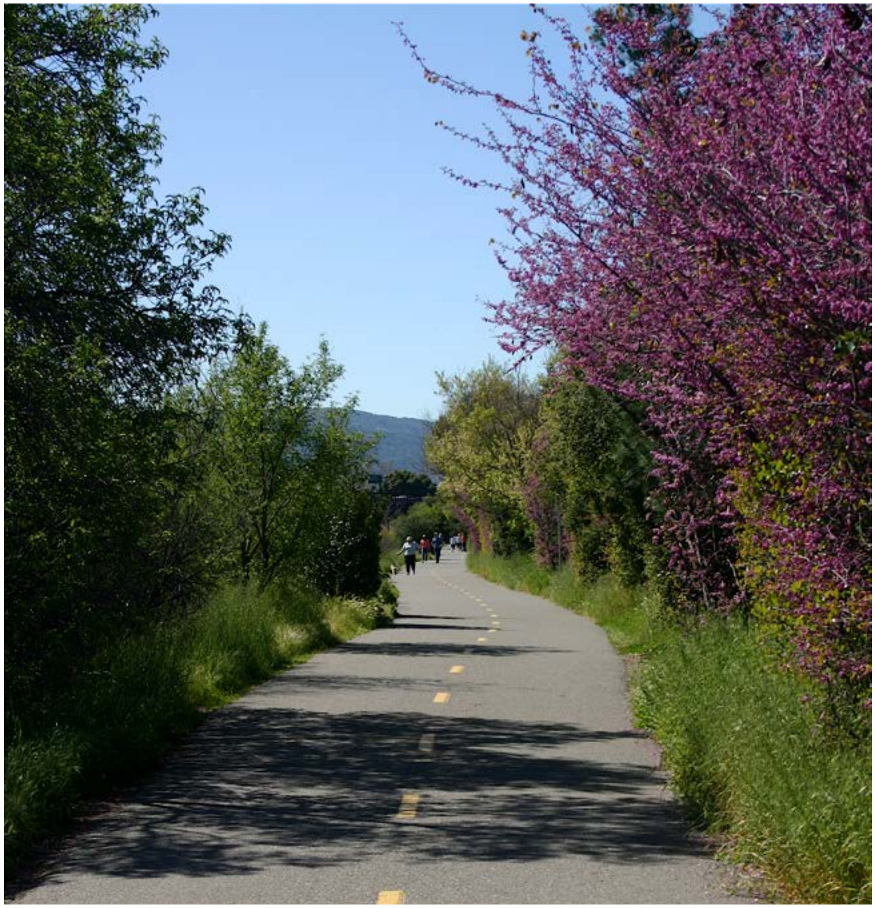
Beginning January 1, 2027, the Bay Area Air District will enforce new regulations targeting gas appliances, specifically water heaters and furnaces. These rules mandate that newly installed appliances must meet zero-emission standards for nitrogen oxides (NOx). Given that these requirements will be implemented regardless of Campbell's actions, it is crucial for the City of Campbell to proactively educate and prepare the community for this transition. By informing residents about the upcoming changes and encouraging early adoption of compliant appliances, as described in the paragraph above, Campbell can help mitigate potential disruptions and financial burdens associated with retrofitting existing systems.

Although the total upfront cost of a heat pump water heater is higher than that of a gas equivalent, the incremental costs, or the difference in cost between the two, are only slightly higher. These incremental costs can be offset by leveraging available federal, state, and regional incentives, ultimately making the installation of a heat pump water heater more affordable than a gas water heater. Market data shows a steady increase in consumer adoption of heat pump technologies, driven by improved affordability and availability. In California, the market share for heat pump space heaters has grown from five percent in 2009 to 55 percent in 2023, while heat pump water heaters increased from six percent to 16 percent over the same period.[27,28] By prioritizing such time-of-replacement measures, Campbell could position itself for sustainable growth, aligning financial savings with environmental resilience.

Electric Vehicles and Mobility

While upfront electric vehicle costs are generally higher than their internal combustion engine counterparts, these costs are dropping. Low-cost passenger EVs are increasingly available, and their costs are being further offset with State incentives for both vehicles and charging infrastructure. Over the long term, however, EVs can generate substantial savings. Research conducted by MIT found that EVs offer the lowest lifecycle costs while also providing the lowest GHG emissions.[29] Furthermore, the health benefits to a community can be significant. A study recently found that for every additional 20 EVs per 1,000 people there was a 3.2 percent drop in the rate of asthma-related emergency visits.[30]

Expanding alternative mobility can be some of the highest cost strategies undertaken in the CAAP. While building new infrastructure in California can be expensive and time consuming, the benefits can also be significant. A study completed by the National Institute of Health found that for every $1 invested in trails and bike infrastructure, the community received $2.90 in direct medical benefits. Additional savings can be found through increased economic activity. Studies have found that reducing travel lanes and increasing bike and pedestrian safety increased retail employment by 4 percent compared to the control area.[31]

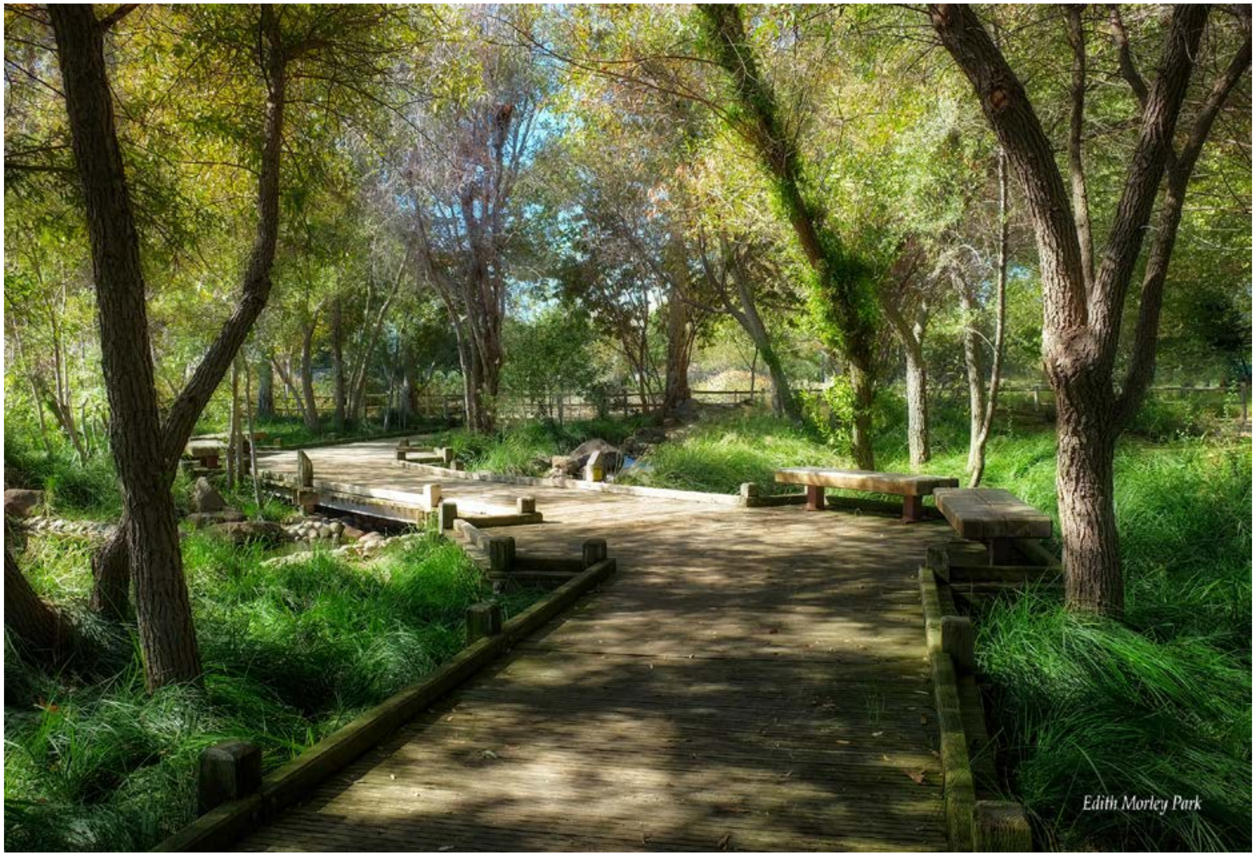


27. *California Energy Commission. 2023. Top Global Building Appliance Manufacturers and Distributors Commit to Help California Achieve Six Million Heat Pump Goal.* ***https://www.energy.ca.gov/news/2023-10/top-global-building-appliance-manufacturers-and-distributors-commit-help#:~:text=The%202022%20Energy%20Code%20established%20heat%20pumps%20as,and%2016%20percent%20for%20heat%20pump%20water%20heaters***. *Accessed May 2025.*
28. *Opinion Dynamics. 2022. California Heat Pump Residential Market Characterization and Baseline Study.* ***https://pda.energydataweb.com/#!/documents/2625/view***. *Accessed May 2025.*
29. ***https://www.carboncounter.com/#!/explore***
30. ***https://keck.usc.edu/news/study-links-adoption-of-electric-vehicles-with-less-air-pollution-and-improved-health/***
31. ***https://trec.pdx.edu/news/study-finds-bike-lanes-can-provide-positive-economic-impact-cities***

Urban Ecosystems

Tree planting and composting are two of the most cost-effective and impactful strategies for enhancing urban ecosystems and building climate resilience. While these strategies require upfront investment, their long-term environmental, health, and economic benefits can far outweigh the initial costs.

Tree planting costs can vary depending on species, size, and location, but estimates typically range from $300 to $400 per tree, including planting and initial maintenance.[32] Ongoing care—such as watering, pruning, and pest management—adds to the cost, but the return on investment is substantial. According to the U.S. Forest Service's i-Tree analysis, every dollar invested in urban forestry can yield up to $5.82 in benefits, including reduced energy use, improved air quality, stormwater management, and increased property values.[33] Tree-lined streets have been shown to increase retail activity and improve mental health outcomes. Trees also play a critical role in reducing the urban heat island effect, which is especially important as extreme heat events become more frequent.



Composting programs also require initial setup costs, such as purchasing bins, establishing collection systems, and developing public education campaigns. However, these costs are often offset by reduced landfill tipping fees, lower GHG emissions, and improved soil health. Composting also supports local agriculture and tree health by returning nutrients to the soil, reducing the need for synthetic fertilizers.

By continuing to invest in tree planting and composting, Campbell can build a greener, more resilient community while advancing its GHG reduction goals. These strategies are not only cost-effective, but they are also foundational to a thriving urban ecosystem.

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32. California Department of Forestry and Fire Protection (CAL FIRE). N.d. Urban and Community Forestry Grant Program Guidelines. Accessed June 2025 at Available at: ***https://www.fire.ca.gov/what-we-do/grants/urban-and-community-forestry-grants***.

33. U.S. Forest Service. N.d. i-Tree Tools. Accessed June 2025 at ***https://www.itreetools.org***.

The Cost of Doing Nothing

Predicting the exact financial impact of climate change on the world—and specifically on the City of Campbell and its community—is a complex challenge. Despite the difficulties in fully quantifying the costs of mitigation and adaptation, economists and scientists globally agree: the costs of inaction are already substantial and will continue to rise the longer we delay action.

Current figures are already alarming. Globally, it is estimated that without immediate action, catastrophic or extreme climate impacts are likely by 2050, with economic losses potentially reaching 19 percent of global Gross Domestic Product (GDP).[34] Climate change could cause up to $38 trillion in global financial damage each year by 2050. To put this into perspective: saving $1 billion at a rate of $100 per day would take over 27,000 years—saving one trillion would take more than 2.7 million years.

In the United States alone, the Global Change Research Program estimates that extreme weather events cost the country approximately $150 billion annually, or over $17 million per hour. These figures do not include loss of life, healthcare expenses, or damages to ecosystem services.

In October 2024, the U.S. Department of the Treasury released a report titled The Impact of Climate Change on American Household Finances, revealing that 13 percent of Americans experienced economic hardship due to disasters or severe weather events in the previous year. Additionally, recent analyses indicate that for every 1°C increase in global temperatures, there could be a 12 percent loss in global GDP, with the most severe losses occurring within just six years of the temperature rise.

The consequences are not theoretical. In California, the recent Los Angeles fires are expected to result in $250 billion in damage. Even a modest 1 percent reduction in the likelihood of such an event could save Californians $2.5 billion.

34. Institute and Faculty of Actuaries & University of Exeter. (2025). Planetary Solvency – Finding Our Balance with Nature: Global Risk Management for Human Prosperity. Accessed June 2025 at: ***https://actuaries.org.uk/news/ifoa-research-included-in-key-climate-risk-reports-for-global-finance-ministers/***


CAMPBELL
HERITAGE
THEATRE

6. CLIMATE RESILIENCE AND MITIGATION STRATEGIES

Building a resilient and decarbonized community requires rethinking the City's systems to better serve the community. Preparing for extreme weather events will need leadership from Campbell's municipal operations and community-wide actions. By reducing GHG emissions, promoting sustainable practices, and enhancing resilience to climate hazards, the quality of life can be protected now and for future generations. Every resident, business, and organization has a crucial role in this collective effort to safeguard the environment, prioritize equity, and adapt Campbell to the challenges of climate change.

This section outlines strategies, measures, and specific actions the City of Campbell will take to achieve significant emissions reductions and boost resilience, helping Campbell reach its climate goals. While the plan is focused on how the City of Campbell will drive change in each system, the community's role is essential. A detailed guide for households and businesses is available in the Personal Climate Action and Resilience Roadmaps. Through these collaborative efforts and ongoing commitment, a foundation for resilience will be established, making Campbell a sustainable and thriving community for everyone. The measures and actions highlighted in the following sections are the highest priority actions in the CAAP. For the full list of measures and action and implementation plan, refer to Appendix E – Measures, Actions, and Implementation Plan. Successful implementation will require coordinated efforts across City departments, with funding and resource allocation integrated into the City's annual budgeting process.

Strategy Framework

The climate action and adaptation strategies in this CAAP offer a comprehensive implementation path, with funding and resource needs to be integrated into the City's annual budgeting process. As seen in Figure 14, below, measures and supporting actions are organized into four systems that, if implemented together, would help Campbell achieve its climate goals. The CAAP outlines actionable and achievable GHG emissions reduction policies aimed at meeting Campbell's 2030 target (40 percent below 1990 levels) and making significant progress towards the 2045 carbon neutrality goal. Effective climate action and adaptation planning must be grounded in principles that ensure long-term success. Six foundational Climate Policy Pillars guides Campbell's approach: feasibility, education, equity, funding, partnerships, and structural change. These pillars served as a framework throughout the development of climate measures, helping to evaluate each initiative through a consistent and values-driven lens. Each action in the plan is aligned with one or more of these pillars, as detailed in Appendix E – Measures, Actions, and Implementation Plan.

Additionally, the strategies address climate vulnerabilities in Campbell and include adaptation measures and supporting actions to enhance the City of Campbell's and the Campbell community's resilience to climate impacts. The CAAP will be updated over time, with additional actions added as needed to advance the established measures. These regular updates will ensure the CAAP remains effective in tackling new challenges, leveraging opportunities for innovation, and meeting updated local, state, or federal climate goals. Periodic updates also allow for the integration of lessons learned from past actions, enabling the adoption of more impactful and equitable strategies to further progress on the established measures.

In total, the measures will reduce 57,677 MT CO_2e by 2030 and 212,086 MT CO_2e by 2045. This is roughly equivalent to removing 12,400 gasoline-powered cars from the road for one year by 2030 and taking 45,600 cars off the road for one year by 2045. For further detail on the substantial evidence and calculation methods of the GHG emissions reduction, refer to Appendix F – Measure Substantial Evidence Report. While all measures benefit the community, they do not all result in equal GHG emissions reductions. Some measures are considered "supportive" and do not directly lower emissions on their own; however, by aiding the overall strategy, they may collectively enhance the total emissions reductions achieved.

Campbell is already seeing the impacts of climate change, and each measure prepares the community for future challenges. Areas for increased focus on resilience include:

Extreme Heat | Poor Air Quality | Drought | Riverine Flooding

The measures and actions have been developed to be implemented over time to reduce emissions and increase the City's resilience in a thoughtful, achievable, and stepwise process. Therefore, the actions are anticipated to be completed in phases, as outlined below:

- Phase 1: 2026 – 2027
- Phase 2: 2028 – 2030
- Phase 3: 2031 – 2033
- Ongoing

Figure 14 Systems Approach

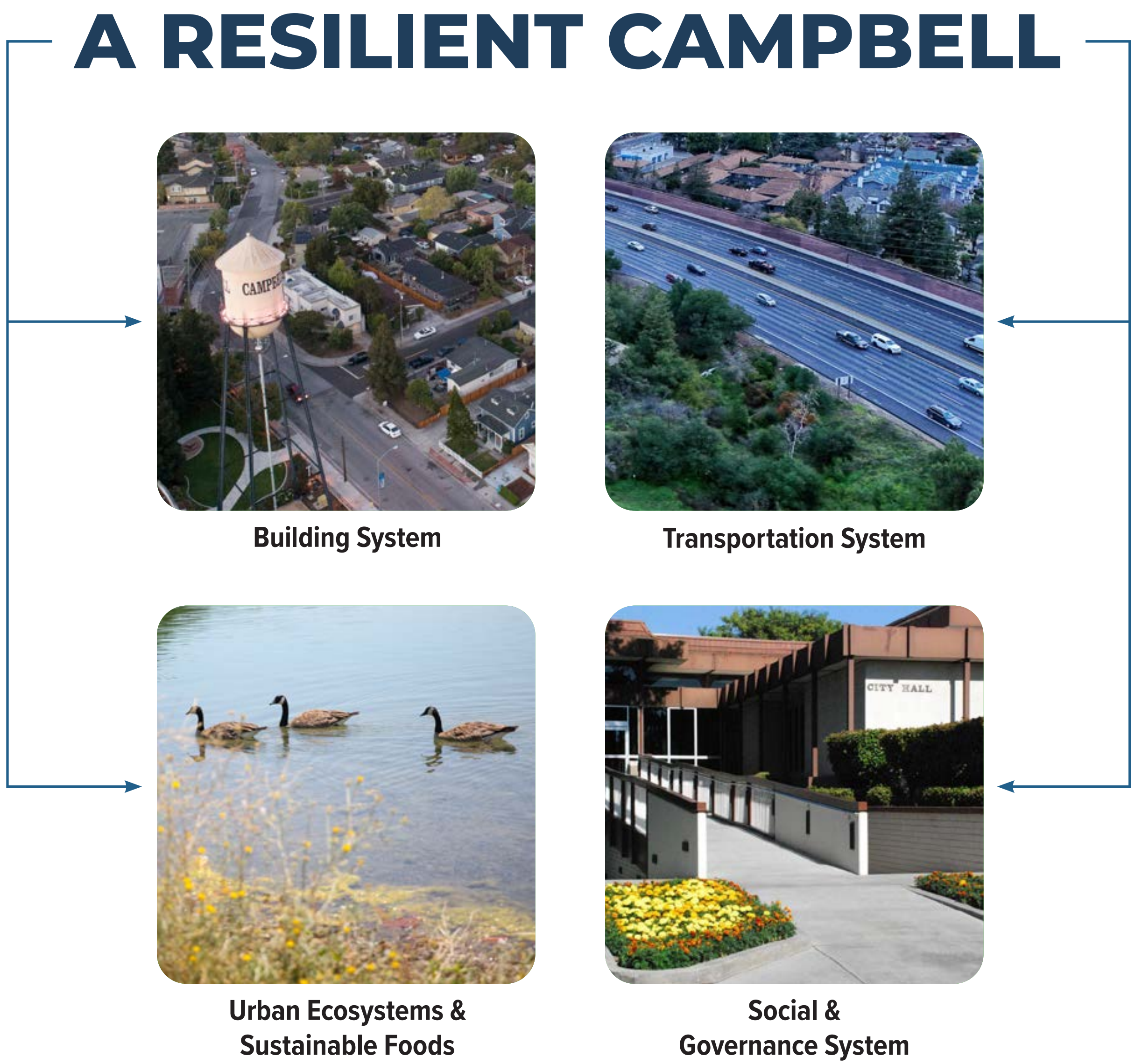


Table 2 shows each of the CAAP measures alongside their GHG reduction potential and resilience benefit.

Table 2 Campbell CAAP Measures

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential (MT CO_2e)	2045 GHG Emissions Reduction Potential (MT CO_2e)	Resilience Benefit
Urban Eco-Systems and Sustainable Foods				
UE-1★	Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.	Supportive	Supportive	
UE-2★★ Community Priority Measure	Increase tree canopy to 17.1% from 17.0% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.	30	327	
UE-3★	Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016).	9,191	13,302	Not Applicable
UE-4	Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.	Supportive	Supportive	
UE-5	Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.	Supportive	Supportive	

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential (MT CO_2e)	2045 GHG Emissions Reduction Potential (MT CO_2e)	Resilience Benefit
UE-6	Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.	Supportive	Supportive	
Social and Governance System				
SG-1★★	Support the development of a Resilience Hub to offer refuge to vulnerable populations from extreme heat conditions, poor air quality, and flooding, while also serving as community resource center year-round.	Supportive	Supportive	
SG-2	Enhance the Campbell community's awareness of climate hazards by educating residents and staff about existing emergency alert services (e.g., AlertSCC) and how to sign up for them. Provide staff with climate change communication training and deliver health alert and evacuation messages in English and Spanish, and in multiple forms (e.g., online, brochure, radio). All messaging protocols and hazard mitigation measures should align with Campbell's Emergency Operations Plan and its annexes, which serve as the primary reference for emergency communications and procedures.	Supportive	Supportive	
SG-3★	Increase community resilience through internal capacity building, ongoing collaboration with community-based organizations, and continued community outreach and implementation related to the CAAP.	Supportive	Supportive	

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential (MT CO_2e)	2045 GHG Emissions Reduction Potential (MT CO_2e)	Resilience Benefit
Building System				
BLD-1	Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.	8,301	0[1]	
BLD-2★	Require new buildings to be safe, decarbonized, and resilient by 2025.	3,672	14,468	
BLD-3★★	Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.	10,003	60,682	
BLD-4	By 2033 decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.	Supportive	Supportive	
Transportation System				
TR-1★★	Decrease dependence on single-occupancy vehicles by incentivizing high-density transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.	Supportive	Supportive	
TR-2	Improve the transit system to be more convenient, accessible, and resilient to climate impacts, in order to increase mode share to 10% by 2030 and 15% by 2045.	4,248	7,219	

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential (MT CO_2e)	2045 GHG Emissions Reduction Potential (MT CO_2e)	Resilience Benefit
TR-3★	Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.	18,819	99,558	Not Applicable
TR-4	Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.	263	1,923	Not Applicable
TR-5	Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.	Supportive	Supportive	
TR-6	Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.	3,150	14,607	

Note:

★: High community support based on feedback

★★: Highest community support based on feedback

Extreme Heat | Poor Air Quality | Drought | Riverine Flooding

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Values may not add up to totals due to rounding.

[1] SB 100 (2018) requires the State's electricity sector to achieve 100 percent renewable and zero-carbon electricity by 2045. By that time, the electricity GHG emission factor will be 0 MT CO_2e per kilowatt-hour (kWh), resulting in no additional reductions beyond the State-mandated baseline.

URBAN ECO-SYSTEMS AND SUSTAINABLE FOODS

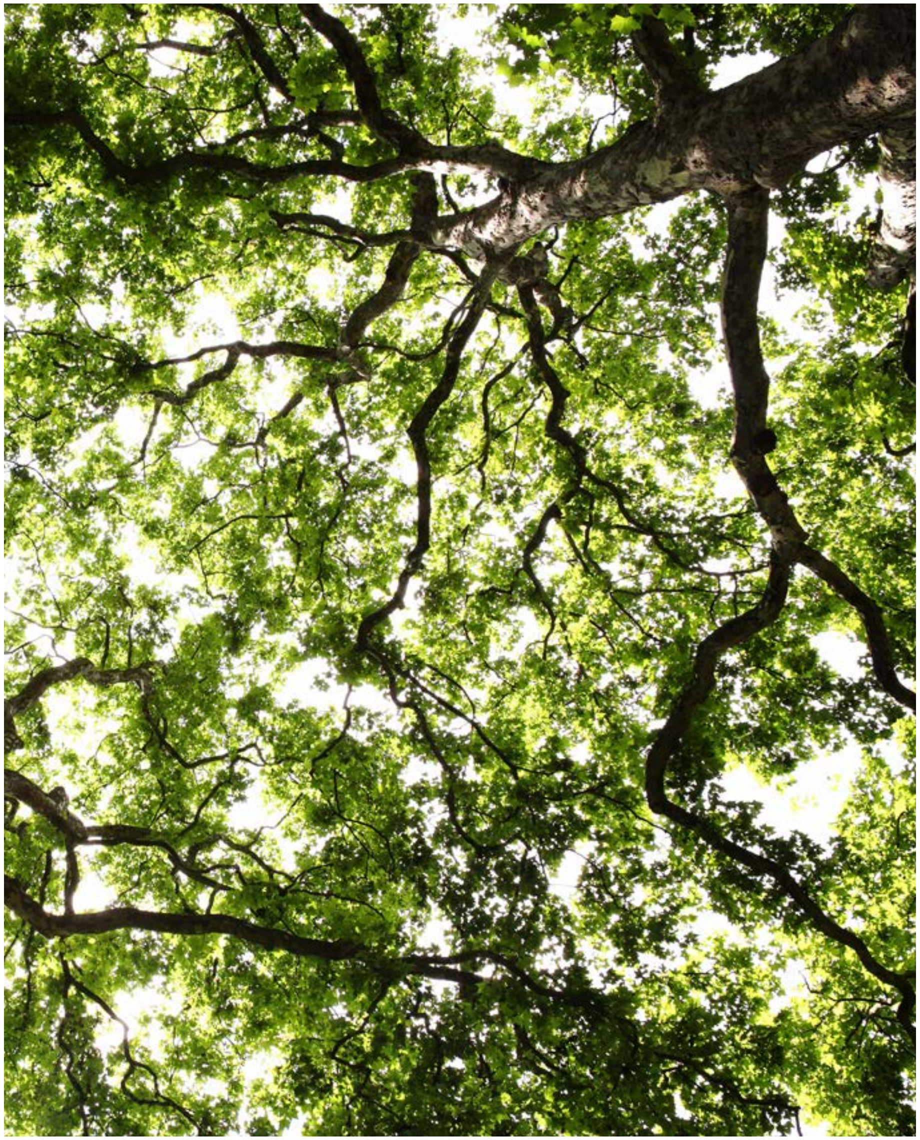
Greenhouse Gas Emissions Benefits

Campbell's parks and green spaces are not only sources of enjoyment for the community but also powerful mechanisms for capturing and storing carbon. The trees, plants, and soil throughout Campbell can pull out and sequester carbon dioxide from the air. By enhancing carbon sequestration through planting more trees and applying compost to soils, Campbell can increase sequestration levels to combat climate change. Additionally, Campbell will create a circular economy around organics like yard waste and food scraps by keeping them out of landfills, where they generate methane (a potent GHG), and instead generate compost to amend soil and increase carbon sequestration.

Resilience Benefits

Enhancing the urban ecosystem also provides significant resilience benefits. Measures and actions within this system will expand the urban forest, conserve and reuse water, and enhance natural ecosystems. Expanding Campbell's tree canopy will provide shade, reduce temperatures, and improve air quality. Additionally, applying compost to soil will improve soil health by increasing nutrient availability and supporting microbial life, as well as increasing water retention. Maintaining open spaces will support biodiversity and provide recreational areas for the community.

California's SB 1383 plays a pivotal role in increased statewide composting efforts. This legislation mandates that organic waste, including food scraps and yard trimmings, must be diverted from landfills by residential and commercial generators. By doing so, SB 1383 aims to reduce GHG emissions and promote the development of composting infrastructure. In addition to state regulations, research has shown that green space has significant positive impacts on mental and physical health and well-being, highlighting the importance of parks, community gardens, and recreational areas that are accessible to all.



Community Priority Action

Informed by extensive community input gathered through CAAP Survey #2 and ongoing discussions, the CAC has identified the following priority action:

UE-2.1 Prioritize planting 40 trees annually in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, with the lowest tree equity score, along safe routes to school, and near bus stops. Partner with a community-based organization to host a community planting event to promote community building and the Campell Climate Action and Adaptation Plan.

This action addresses the increasing threat of extreme heat events driven by climate change by enhancing urban canopy cover, which provides cooling and sequesters carbon dioxide. It also advances environmental equity by focusing resources on the neighborhoods most in need. Additionally, it strengthens the City of Campbell's collaboration with CBOs, reinforcing shared ownership of climate resilience and CAAP implementation.

This initiative is designated as a high-priority action and will be implemented during the early stages of CAAP implementation, with funding and resource needs to be incorporated into the City's annual budgeting process.

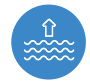
Metrics

GHG Reduction: 9,221 MT CO_2e by 2030; 13,629 MT CO_2e by 2045. This is roughly equivalent to removing 2,000 gasoline-powered cars from the road for one year by 2030 and taking 2,900 cars off the road for one year by 2045.

Resilience Focus:

Extreme Heat

Riverine Flooding

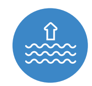
Action		Climate Hazard	Feedback from Community/CAC	Phase
★UE-1 Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.				
UE-1.1	Support Valley Water in a feasibility study to address recurring flood damage and/or erosion in high-risk areas. Incorporate native plants and sustainable landscaping to strengthen flood protection while offering accessible recreational and educational opportunities for the community. Consider the implementation of nature-based solutions, including setback levees, water quality improvements, and strategic retreat of vulnerable city assets, ensuring long-term resilience.		CAC Feedback Meeting #2, CBO Engagement	Phase 1
UE-1.2	Secure state or federal funding to adopt a phased, adaptive approach to flood risk management with clear triggers and thresholds for action. In partnership with Valley Water, implement a monitoring system to track extreme weather trends, such as 100-year storms, guiding proactive planning and community outreach in coordination with Campbell Police Department.		Not Applicable	Phase 2
UE-1.3	Use the outcomes from the monitoring program (Action UE-1.1) to guide adaptive management, inform strategic relocation efforts, and keep the community informed about risks and adaptation strategies. In partnership with Valley Water prioritize investments in resilient infrastructure or relocate assets that are repeatedly damaged and in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, to ensure long-term resilience and alignment with adaptive climate strategies.	Not Applicable	Not Applicable	Phase 2+ Ongoing

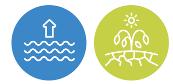
Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-1.4	Encourage Valley Water to upgrade creek-side trails and bike paths as flood-resilient infrastructure, allowing them to function also as elevated flood barriers. Incorporate native plants and sustainable landscaping for flood protection and partner with community-based organizations to provide educational opportunities along trails. Consider implementing nature-based solution restoration techniques, such as beaver dam analogs, live vegetation, and brush packing, to slow stormwater and mitigate runoff impacts near creek-adjacent areas.		CBO Engagement	Phase 3
★★UE-2 Increase tree canopy from 17.0% to 17.1% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.				
UE-2.1 – Community Priority Action	Prioritize planting 40 trees annually in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, with the lowest tree equity score, along safe routes to school, and near bus stops. Partner with a community-based organization to host a community planting event to promote community building and the Campell Climate Action and Adaptation Plan.		CAC Feedback Meeting #2 and #4, CBO Engagement	Phase 1+ Ongoing
UE-2.2	Conduct a comprehensive analysis on success rates for trees planted over the past five years (planted 2019 – 2024). This analysis will consider factors such as species selection, soil conditions, and maintenance practices to determine the survival rate. The findings will inform future tree planting initiatives and promote sustainable urban forestry practices.		Not Applicable	Phase 1
UE-2.3	Evaluate and update the "Official Street Tree List" for canopy potential and future climate conditions.		Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-2.4	Pursue and obtain grant funding for tree planting and maintenance. Identify and apply for Federal and State grants annually to meet the tree planting goal identified in Action UE-1.1 (e.g., USDA, California ReLeaf, Affordable Housing and Sustainable Communities Program, Cal Fire's Urban and Community Forestry Program, and the California Natural Resources Agency's Urban Greening Program). Regularly monitor trees for potential risk due to tree branches falling.		Not Applicable	Phase 1+ Ongoing
UE-2.5	Update and regularly maintain the City's website to include a webpage for trees that provides information such as best practices for watering and fertilizing trees, guidelines for pruning and maintenance, information on local tree species, and resources for reporting tree damage or disease. Additionally, provide information on the benefits of a healthy tree canopy, including improved air quality, reduced urban heat island effects, and increased property values.		Not Applicable	Phase 1+ Ongoing
UE-2.6	Conduct site assessments along the creeks to evaluate thermal comfort, availability of shade (over land and the creek), and landscape features. Based on these assessments, collaborate with Valley Water to strategically direct tree planting to enhance shade.		City Council Feedback, CBO Engagement	Phase 2
UE-2.7	Partner with schools in the city to develop a plan to reduce the heat islands in and around schools, including along walking routes. This plan will focus on removing impervious surfaces, planting trees, and increasing shade structures. Prioritize schools located in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment.		CBO Engagement	Phase 2+ Ongoing

Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-2.8	Update the City's tree removal policy to require the replacement of removed trees with species that are resilient to Campbell's projected future climate conditions, including increased heat, drought, and extreme weather. For trees removed without a permit, apply a replacement penalty requiring new trees to be planted at a minimum of two times the standard replacement ratio for unlawfully removed trees from developed single-family residential properties, and four times the standard replacement ratio for all other properties. As part of this update, establish a fund, supported by permit fees or other sources, to subsidize the cost of replacement trees for low-income residents located in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment.		CAC Feedback	Phase 1+ Ongoing
UE-2.9	Develop a community tree planting outreach and engagement initiative that combines incentives, education, and engagement to expand Campbell's urban canopy. The program will share information on financial assistance or free trees to low-income residents (e.g., existing programs led by community-based organizations such as Our City Forest), prioritize climate-resilient species, and include educational workshops on tree care, planting techniques, and the environmental benefits of urban forestry. The City will partner with schools, neighborhood groups, and community-based organizations to host planting events and promote stewardship, with a focus on areas with low tree cover and high heat vulnerability.		CAC Feedback	Phase 1+ Ongoing
★UE-3 Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016).				
UE-3.1	Continue to participate in the Santa Clara County edible food recovery program which collaborates with all food generators and food recovery organizations across the county. Update the City website to promote the program.	Not Applicable	SB 1383, CBO Engagement	Ongoing

Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-3.2	Continue to participate in the West Valley Solid Waste Management Authority to develop and distribute educational materials describing options for disposal of construction and demolition debris, home composting, residential organics collection, and source reduction and recycling for schools.	Not Applicable	Not Applicable	Ongoing
UE-3.3	Continue to implement the City's organics program with equitable and clearly defined enforcement mechanisms and penalties, as required by Article 16 in SB 1383 (2016). Maintain records, including an initial compliance report, annual report, and implementation record as required by Articles 3, 14, and 16 of SB 1383 for (1) the organic waste collection program and (2) the edible food recovery program. Additionally, develop an organics procurement tracking program.	Not Applicable	SB 1383, CBO Engagement	Ongoing
UE-3.4	Continue to collaborate with regional partners including Santa Clara County, Solid Waste Joint Power Authority, and Waste Management to provide compost to be applied on agricultural and working lands countywide to meet procurement requirements.	Not Applicable	Not Applicable	Ongoing
UE-3.5	Require all new multi-story residential buildings to incorporate dedicated chutes or collection systems for trash, recycling, and organic waste. This design standard will support compliance with SB 1383 by making it easier for residents to properly sort and dispose of organic material.	Not Applicable	Not Applicable	Phase 2
UE-4 Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.				
UE-4.1	Partner with community-based organizations and Valley Water to provide native and drought tolerant landscape educational workshops and trainings to multi-family and single-family residents and homeowner associations to increase use of low-maintenance, native landscaping and high efficiency irrigation. Additionally, use these workshops to promote Valley Water's Landscape Rebate Program.	Not Applicable	CAC Feedback Meeting #1, CBO Engagement	Phase 1+ Ongoing

Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-4.2	Partner with local community-based organizations to create a community garden with edible fruits and vegetables in a climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.	Not Applicable	CAC Feedback Meeting #4	Phase 2
UE-4.3	Collaborate with Valley Water to adopt and implement a Model Water Efficient New Development Ordinance (MWENDO) to help reduce water use in Campbell.	Not Applicable	CAC Feedback Meeting #4	Phase 1
UE-5 Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.				
UE-5.1	Identify low lying areas in Campbell and implement stormwater mitigation strategies in those areas, prioritizing nature-based solutions.		City Council Feedback, CBO Engagement	Phase 1
UE-6 Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.				
UE-6.1	Develop and implement a procurement policy for all City-hosted and sponsored meetings and events, encouraging increased locally-sourced, plant-based, and other climate smart food options, as well as the use of plastic-free materials. Provide information on health, environmental, and carbon benefits of these choices.	Not Applicable	CAC Feedback Meeting #1, CBO Engagement	Phase 1
UE-6.2	In partnership with the Solid Waste Authority, conduct annual audits of bin location and signage for landfill, recycle, and compost waste in municipal buildings and municipally-owned land. Verify that bins have clear signage and are placed together for proper disposal.	Not Applicable	Not Applicable	Phase 1+ Ongoing
UE-6.3	Complete a municipal water use analysis and, in partnership with San Jose Water Company, implement recommendations resulting from the analyses to reduce total water use by 10%, compared to 2022 water use, by 2030.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
UE-6.4	Update the Campbell Municipal Code to prohibit the installation of non-functional turf.	Not Applicable	Not Applicable	Phase 2
UE-6.5	Identify and replace non-functional turf at City-owned and operated locations to comply with AB 1572. Additionally, replace non-native vegetation with native and drought tolerant species in Campbell parks, medians, and other landscapes. Secure funding to create bioswales on City land and along roadway right-of-way to increase stormwater capture and groundwater recharge. Explore adoption of a local ordinance requiring adjacent property owners to maintain landscaping, particularly where such obligations are already established as conditions of approval for land use entitlements, to support long-term sustainability and reduce municipal maintenance burdens.		Not Applicable	Phase 2
UE-6.6	Assess the feasibility of adding more farmers market locations and/or introducing rotating pop-up markets to increase access to fresh, local produce.	Not Applicable	CAC Feedback Meeting #4	Phase 2
UE-6.7	Conduct a comprehensive update to the City's purchasing policies to integrate sustainability criteria into procurement decisions. This update will include standards for minimum recycled content in office supplies (e.g., paper products), prioritization of vendors with low-carbon operations, and evaluation tools to assess environmental impacts across product lifecycles. Train staff on sustainable purchasing practices to ensure consistent implementation and alignment with climate-smart goals.	Not Applicable	Not Applicable	Phase 2

SOCIAL AND GOVERNANCE SYSTEM

Greenhouse Gas Emissions Benefits

The City of Campbell's Social and Governance Systems focus on developing programs, partnerships, and communication pathways to implement the CAAP. This system addresses the social aspects of making meaningful improvements within a complex community by incorporating community engagement, public health, and equity into the decision-making processes. These measures and actions will facilitate the tailoring of programs and policies to reduce GHG emissions while establishing community feedback channels for long-term success.

Resilience Benefits

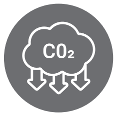
Measures within this system aim to enhance communication about extreme weather events, establish a resilience hub, incorporate a climate and equity lens into City of Campbell operations, foster long-lasting partnerships with CBOs, and strengthen community capacity to better withstand extreme weather events.

Metrics

GHG Reduction: Supportive

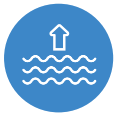
Resilience Focus:


Extreme Heat



Poor Air Quality


Drought


Riverine Flooding

Action		Climate Hazard	Feedback from Community/CAC	Phase
★★SG-1 Support the development of a Resilience Hub to offer refuge to vulnerable populations from extreme heat conditions, poor air quality, and flooding, while also serving as community resource center year-round.				
SG-1.1	Conduct a study to identify potential partners and locations for establishing a Resilience Hub in Campbell, including but not limited to school districts, religious organizations, community centers, and other City or County facilities. The study should include a list of criteria for the Resilience Hub.		CAC Feedback Meeting #2, CBO Engagement	Phase 1
SG-1.2	Following the feasibility study (SG-1.1), conduct a detailed needs assessment of the selected site to evaluate infrastructure suitability and climate resilience (e.g., the potential for all-electric systems with solar panels and battery storage) along with staffing needs and opportunities to distribute cooling resources like fans and rentable coolers. This needs assessment should be conducted with the identified partners identified as part of Action SG-1.1.		Not Applicable	Phase 2
SG-1.3	Coordinate with the identified partners in action SG-1.1 to secure external funding sources (e.g., grant funding) to facilitate the necessary infrastructure improvements and resource needs of the Resilience Hub identified in Action SG-1.2.		Not Applicable	Phase 3
SG-1.4	Partner with community-based organizations to launch outreach programs and advertise the Resilience Hub and recruit volunteers to support the Hub. Coordinate with local law enforcement to maintain safety and facilitate communication during Hub activation.		Not Applicable	Phase 3+ Ongoing
SG-1.5	Monitor and evaluate the Resilience Hub's performance, including infrastructure effectiveness, community utilization, and climate resilience outcomes, while gathering community feedback to guide future improvements		Not Applicable	Phase 3

Action		Climate Hazard	Feedback from Community/CAC	Phase
SG-2 Enhance the Campbell community's awareness of climate hazards by educating residents and staff about existing emergency alert services (e.g., AlertSCC) and how to sign up for them. Provide staff with climate change communication training and deliver health alert and evacuation messages in English and Spanish, and in multiple forms (e.g., online, brochure, radio). All messaging protocols and hazard mitigation measures should align with Campbell's Emergency Operations Plan and its annexes, which serve as the primary reference for emergency communications and procedures.				
SG-2.1	Partner with the County of Santa Clara Office of Emergency Management and community-based organizations to establish coordinated notification and response services to provide timely dissemination of critical information through multiple channels (e.g., mobile notifications, social media platforms, community alerts systems).	CO_2	Not Applicable	Phase 1
SG-2.2	Conduct emergency alert notifications, including extreme heat warnings and poor air quality days, in English and Spanish. Distribute information via alerting systems in English and Spanish in areas of high climate vulnerability.	CO_2	Not Applicable	Ongoing
SG-2.3	Secure funding to enhance the redundancy of emergency evacuation communication systems during power outages. This might include providing backup power for telecommunication towers (e.g., the police tower) and other critical facilities, disseminating information through radio channels, encouraging the use of hand-cranked radios, and other methods. Additionally, conduct regular tests of alert systems to ensure readiness for potential evacuation scenarios.	CO_2	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
SG-2.4	Develop a training program to raise awareness among all City staff about climate risks to the community, GHG contributions, the significance of the CAAP and its relevance to the City, as well as available internal and external resources. The program could include a handout with customized information on integrating climate change considerations into the agency's processes, regular formal training sessions, and onboarding training for new employees. The program may by based on existing trainings such as the United States Environmental Protection Agency Local Government Climate Adaptation Training or be developed in-house with support from a consultant as needed.		CBO Engagement	Phase 2
SG-2.5	Develop and formalize specific climate hazard thresholds that trigger emergency response protocols, such as activation of the Emergency Operations Center (EOC). For example, define temperature thresholds (e.g., when heat exceeds a certain temperature) or flood levels (e.g., a 100-year flood event) that require staff mobilization. These thresholds should be integrated into Campbell's Emergency Operations Plan and communicated clearly to relevant departments to ensure timely and coordinated action.		Not Applicable	Phase 2
★SG-3 Increase community resilience through internal capacity building, ongoing collaboration with community-based organizations, and continued community outreach and implementation related to the CAAP.				
SG-3.1	In the first year after CAAP adoption, staff will present to Council a study session to evaluate and identify means of funding the implementation of the CAAP.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
SG-3.2	Build from the existing ***Campbell Building Effective Partnerships with Non-Governmental Organizations*** resource to draft a framework for ongoing and capacity building with community-based organizations that builds off the collaboration during CAAP development. The framework will include: ▪ Establishing regular communication to discuss ongoing projects, challenges, and opportunities for collaboration ▪ Identify and seek to obtain funding and resources to support community-based organizations' initiatives that align with implementation of the CAAP ▪ Collaborative planning so community-based organizations are included in the decision-making process ▪ Implementing a monitoring and evaluation system to measure the effectiveness of partnerships with community-based organizations, including by collecting feedback from the organizations to continuously improve the collaboration process		Not Applicable	Phase 1
SG-3.3	Secure grant funding, in partnership with community-based organizations, to support broad CAAP implementation.		Not Applicable	Phase 1+ Ongoing
SG-3.4	Institute a Cool Block Program in partnership with community-based organizations to encourage residents to get to know their neighbors and to organize events that foster community and address issues such as safety, climate hazards, and improving quality of life. Launch the first Cool Block Program in a highly climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.		Not Applicable	Phase 2

BUILDING SYSTEM

Greenhouse Gas Emissions Benefits

Campbell's Building System approach focuses on providing decarbonized energy to residential and commercial buildings to utilize increasingly carbon-free and renewable energy. Electrifying buildings in Campbell involves transitioning natural gas appliances (water heaters, furnaces, and cooking appliances) to efficient electric alternatives. When combined with carbon-free electricity, all-electric buildings eliminate GHG emissions from the building system, effectively decoupling development and energy needs from GHG emissions.

Resilience Benefits

The transition to electric buildings not only reduces GHG emissions but also enhances resilience to climate change and improves health. Replacing natural gas in homes and businesses improves indoor air quality, reducing incidences of asthma and other respiratory issues. With higher rates of air quality impacts from smoke and extreme heat, maintaining high-quality indoor air is critical. All-electric buildings paired with solar and battery storage create microgrids, which can operate independently during emergencies and reduce energy costs over time.

Campbell's proactive measures to prepare its residents will help save time and money in the future. The identified measures and actions are low upfront cost for the community while incentivizing and requiring low-cost efforts that will save residents money over the long term by aligning with upcoming state and regional requirements.

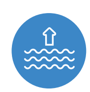
Metrics

GHG Reduction: 21,976 MT CO_2e by 2030; 75,150 MT CO_2e by 2045. This is roughly equivalent to removing 4,700 gasoline-powered cars from the road for one year by 2030 and taking 16,100 cars off the road for one year by 2045.

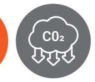
Resilience Focus:

Extreme Heat

Poor Air Quality

Action		Climate Hazard	Feedback from Community/CAC	Phase
BLD-1 Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.				
BLD-1.1	Partner with Silicon Valley Clean Energy to conduct an annual analysis of direct access electricity users within the City. Contact direct access electricity users and provide information on the benefits of upgrading to GreenStart/GreenPrime with Silicon Valley Clean Energy.	Not Applicable	Not Applicable	Phase 1+ Ongoing
BLD-1.2	Continue partnering with Silicon Valley Clean Energy to conduct educational campaigns, such as tabling at community events or hosting an annual Earth Day event. Establish comprehensive informational resources on the City's website, regularly post on social media, and develop energy bill inserts. These efforts will highlight the benefits of 100% carbon-free and renewable energy and promote the available incentives.	Not Applicable	CBO Engagement	Ongoing
BLD-1.3	Provide education and outreach to Campbell residents and businesses on the value of installing solar and battery storage for both GHG emissions reduction and resilience. Additionally, educate and guide residents and businesses on the fire rating requirements for battery storage systems, including the necessity for installation on 1-hour fire-rated walls, to ensure safe and compliant installations. Promote Silicon Valley Clean Energy incentives, federal tax credit programs, and other statewide and regional incentives to reduce costs.		CBO Engagement	Phase 1+ Ongoing
★BLD-2 Require new buildings to be safe, decarbonized, and resilient by 2025.				
BLD-2.1	Continue enforcing the Campbell Air Quality Ordinance which prohibits NOx emissions from appliances in all new buildings and major remodels (with exemptions for some industrial and commercial uses), as defined in the municipal code.		Not Applicable	Ongoing

Action		Climate Hazard	Feedback from Community/CAC	Phase
BLD-2.2	Adopt a reach code to require CALGreen Tier 2 Voluntary Standards Section A5.106.11.2 for cool roofs and Section A5.106.7.2 for cool walls for new residential and non-residential buildings. Include an alternative option allowing buildings to install solar roofing shingles or solar PV and increase attic insulation instead of a cool roof, which can generate electricity while also enhancing thermal comfort.		Not Applicable	Phase 1
BLD-2.3	Adopt a reach code to require indoor cooling in new multi-family buildings. Monitor the California Department of Public Health guidance regarding indoor cooling which will inform the 2025 California building code update cycle.		Not Applicable	Phase 1
BLD-2.4	Collaborate with regional partners including Silicon Valley Clean Energy to host and promote workforce development programs for installers, local contractors, and building owners/operators to provide technical requirements and financial resources, including information on new electric appliances, approaches to electrification, and rebates available. Partner with community-based organizations to connect members of climate vulnerable communities, as defined in Campbell's Climate Change Vulnerability Assessment, to these training programs.	Not Applicable	Not Applicable	Phase 2+ Ongoing
★★BLD-3 Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.				
BLD-3.1	Conduct a high-level existing building electrification analysis for City-owned and private properties to identify the specific costs and potential hurdles for building electrification in Campbell. Assess the return on investment of electrification to encourage building owners to comply and participate. Use the results of the analysis to fine tune education and outreach as well as policy directives associated with building decarbonization.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
BLD-3.2	Collaborate with Silicon Valley Clean Energy to increase Campbell resident participation in programs that support residents going all-electric, like the Go Electric Advisory program, a free live service to help Silicon Valley Clean Energy customers go electric. Additionally, connect low-income homeowners and renters with the Department of Energy's Weatherization Assistance Program to install weatherization measures. Focus outreach on climate vulnerable areas first, including in mobile home parks, as defined in Campbell's Climate Change Vulnerability Assessment.	 	CAC Feedback Meeting #1	Phase 1
BLD-3.3	Adopt an ordinance requiring new roof replacements for existing residential and non-residential buildings to utilize cool roof materials, as defined by CALGreen Tier 2 Voluntary Standards Section A5.106.11.2, by 2026 to minimize absorption of solar energy and reduce building energy use. Include an alternative option allowing buildings to install solar roofing shingles or traditional PV and increased attic insulation instead of a cool roof, which can generate electricity while also enhancing thermal comfort.		CBO Engagement	Phase 2
BLD-3.4	Partner with community-based organizations to launch an education and outreach campaign to help people in Campbell prepare for, and understand the benefits of, the Bay Area Air District zero-NOx threshold which phases out natural gas appliances over time, beginning with water heaters in 2027.	Not Applicable	Not Applicable	Phase 2
BLD-3.5	Implement streamlined permitting processes for electrification projects (e.g., installing electric heat pumps, solar panels, battery storage, heat pump HVAC systems), such as offering instant online permitting and bundling similar permit types to reduce costs. This will simplify the application process, making it faster and more affordable for individuals and businesses to adopt sustainable energy solutions.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
BLD-3.6	Develop educational materials outlining opportunities to avoid panel upgrades when cost prohibitive. Make this information readily available on the City's website. This information will help residents and business owners identify the most efficient and cost-effective solutions for their electrical needs, ensuring a smooth transition to sustainable energy systems.	Not Applicable	Not Applicable	Phase 1
BLD-3.7	Amend the municipal code to require all newly installed HVAC units for existing buildings to have two-way air conditioning unit capabilities to provide heating and cooling.		Not Applicable	Phase 1
BLD-3.8	Partner with Silicon Valley Clean Energy and community-based organizations to provide solar and storage installation resources and technical support to building owners and residents.	Not Applicable	CAC Feedback Meeting #1, CBO Engagement	Phase 1+ Ongoing
BLD-3.9	Adopt a phased approach to commercial building performance standards, with the first phase requiring buildings of a certain size to report energy consumption, the second phase requiring a building retro-commissioning (process of evaluating and optimizing the performance of an existing building's systems and equipment), and the third phase requiring a reduction in GHG emissions below an identified threshold (such as MT CO_2e per sq. ft.). Collaborate with regional partners to develop a consistent methodology and set of requirements for the building performance standard.	Not Applicable	Not Applicable	Phase 1
BLD-3.10	Work with PG&E to identify opportunities for decommissioning unnecessary natural gas lines and transitioning neighborhoods to electric systems to maximize cost savings.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
BLD-3.11	Adopt an existing building retrofit checklist which requires large-scale building retrofit/remodel projects to include additional cost-effective energy efficiency and/or electrification upgrades (such as heat pumps, enhanced insulation, air sealing, ductwork improvements).	Not Applicable	Not Applicable	Phase 1
BLD-4 By 2033, decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.				
BLD-4.1	Complete an energy audit and retro-commissioning (fine-tuning building systems to ensure a building is running at optimal performance) of all existing municipal buildings and facilities and inventory all fossil fuel-powered building equipment. Identify zero carbon replacement technology and develop a prioritized short- and long-term replacement schedule for equipment. Through this process, confirm a list of critical municipal buildings that should be prioritized for battery back-up.	Not Applicable	Not Applicable	Phase 2
BLD-4.2	Based on the energy audit results in Action BLD-3.1, maximize solar installations on City-owned buildings.		Not Applicable	Phase 3
BLD-4.3	Develop and adopt an electrification first policy for City-owned fossil fuel equipment (e.g., back-up generators and HVAC units) that outlines a strategy for addressing cost impacts of future equipment purchases and supports a fiscally responsible equipment transition.		Not Applicable	Phase 1
BLD-4.4	Seek to add energy storage, such as battery back-up, to all critical municipal buildings, identified as part of Action BLD-4.1.		Not Applicable	Phase 3

TRANSPORTATION SYSTEM

Greenhouse Gas Emissions Benefits

The single largest source of GHG emissions in the City of Campbell (and throughout California) is vehicle use, primary from single-occupancy passenger cars. By creating a multimodal network that prioritizes moving people around the city efficiently over single-occupancy car use, Campbell can reduce GHG emissions and improve quality of life.

Valley Transit Authority (VTA) provides the transit system in Campbell. The Winchester Transit Center is a key hub, offering connections to various bus routes and the VTA light rail system. The Green Line light rail serves Campbell, providing a convenient link to downtown San Jose and other parts of Santa Clara County. Additionally, VTA operates numerous bus routes that traverse Campbell, providing residents with public transportation for commuting, shopping, and other activities.

The majority of single-occupancy car trips in Campbell are between two and four miles and are for the primary purpose of shopping. Walking is the second most popular mode for shopping trips. Most trips originating in Campbell end in Santa Clara and Los Gatos, including work commutes which are typically eight to 16 miles. High VMT neighborhoods include Campbell Village and downtown.

Healthy, walkable neighborhoods are achievable in Campbell, where residents can walk or bike to amenities and reduce vehicle miles travelled (VMT). For trips that cannot be completed by walking, biking, or transit, Campbell will continue to support the transition to electric or zero-emission vehicles to leverage carbon-free electricity.

Resilience Benefits

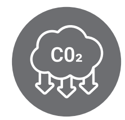
Active and shared transportation enhance resilience by reducing traffic congestion, lowering emissions, improving public health, strengthening community connections, and providing economic benefits. Active transportation will improve health by encouraging Campbell's community to move more and benefit from better air quality due to fewer fossil fuel combustion vehicles. Electrifying on-road transportation and off-road equipment also enhances resilience by reducing dependence on volatile fossil fuel supplies, lowering emissions that exacerbate climate impacts, and enabling operation during emergencies when fuel distribution may be disrupted.

Metrics

GHG Reduction: 26,480 MT CO_2e by 2030; 123,306 MT CO_2e by 2045. This is roughly equivalent to removing 5,700 gasoline-powered cars from the road for one year by 2030 and taking 26,400 cars off the road for one year by 2045.

Resilience Focus:

Extreme Heat



Poor Air Quality

Action		Climate Hazard	Feedback from Community/CAC	Phase
★★TR-1 Decrease dependence on single-occupancy vehicles by incentivizing high-density, transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.				
TR-1.1	Conduct a feasibility study to determine commercial areas, including downtown, where curbside parking spaces can be converted into mini or pocket parks, sidewalk extensions, or bicycle infrastructure, which provides more space and amenities for people.	Not Applicable	Not Applicable	Phase 1
TR-1.2	Conduct site assessments to understand current pedestrian conditions and challenges in large shopping centers including downtown and the Pruneyard. These assessments will evaluate parameters such as: ▪ **Safety**: Assess the presence of crosswalks, pedestrian signals, lighting, and visibility to ensure safe pedestrian movement. ▪ **Mobility**: Evaluate the width and condition of sidewalks, the availability of ramps, and the ease of access for individuals with disabilities. ▪ **Comfort**: Measure the availability of seating, shade, and shelter, as well as the overall cleanliness and maintenance of pedestrian pathways. ▪ **Connectivity**: Examine the connectivity between pedestrian pathways on private property and public rights-of-way (ROW), ensuring seamless transitions and accessibility. ▪ **Aesthetics**: Assess the visual appeal of the pedestrian environment, including landscaping, public art, and the overall ambiance. Supportive amenities will be identified under each parameter. Areas will then be scored based on the presence, quality, and accessibility of these amenities. Challenges for pedestrians may include obstacles such as uneven surfaces, lack of signage, high vehicle traffic, and inadequate crossing facilities. The action will address pedestrian circulation on the public right-of-way.	Not Applicable	Not Applicable	Phase 1+ Phase 2

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-1.3	Based on the findings of the site assessment (TR-1.2), implement one pilot project that improves pedestrian infrastructure (e.g., widening or improving sidewalks, installing high-visibility crosswalks, providing seating areas and shelters, adding greenery and shade trees). Implement the pilot project in a climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.		Not Applicable	Phase 2
TR-1.4	Encourage property owners of large shopping centers (greater than 100,000 square feet of building space) to build active transportation infrastructure on their properties. This may include amenities such as bike racks, bike repair stations, shaded seating areas, water fountains, and improved sidewalk connections.	Not Applicable	Not Applicable	Phase 2
TR-1.5	As part of the outreach associated with the City of Campbell Multimodal Transportation Plan and other City initiatives, continue to engage with members of the community, landowners, local businesses, and community organizations to gather input and educate the public on the benefits of increased density and mixed-use development on reducing single-occupancy vehicles and greenhouse gas reduction.	Not Applicable	Not Applicable	Phase 1+ Ongoing
TR-1.6	As the City works through future Land Use Element and Housing Element updates, continue to identify appropriate locations in residential areas and near parks to implement targeted zoning changes that promote new mixed use commercial development (e.g., corner stores and cafés) to create more vibrant and walkable neighborhoods.	Not Applicable	CAC Feedback Meeting #4	Ongoing
TR-1.7	Partner with developers, property owners of shopping centers, residents, and employers to expand the reach of the City's Transportation Demand Management program to target the shift from single-occupancy vehicles to alternative modes of transportation, including by offering discounted transit cards and promoting remote work.	Not Applicable	Not Applicable	Phase 2

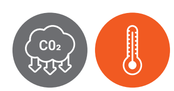
Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-1.8	Seek funding opportunities to explore the feasibility of a Transportation Management Association which works with large employers in the region to organize resident commute trips for work. Consider leveraging existing Transportation Management Associations in the region or partner with one to reduce implementation costs.	Not Applicable	Not Applicable	Phase 3
TR-1.9	Create a citywide carpooling system to encourage residents to share rides to work.	Not Applicable	Not Applicable	Phase 2
TR-1.10	Coordinate with regional partners and service providers to pilot and implement mobility hubs with docked e-bikes in and around downtown, the Pruneyard, Community Center, and along Hamilton Avenue, Winchester Boulevard, San Tomas Expressway, Virginia Avenue, and Dell Avenue, where there are high vehicle miles traveled from single-occupancy vehicles.	Not Applicable	CAC Feedback Meeting #2, CBO Engagement	Phase 2
TR-1.11	Align local parking requirements with AB 2097 by removing parking minimums citywide, which require a certain number of parking spaces for new developments. Developers may still propose parking if they choose.	Not Applicable	Not Applicable	Phase 1
TR-1.12	As part of the City of Campbell Multimodal Transportation Plan, consider identifying roads for lane removal and replace lanes with linear parks, walking/biking routes, and trees. Consider targeting implementation at San Tomas Expressway, Campbell Avenue, and Winchester Boulevard for initial analysis.	Not Applicable	CBO Engagement, CAC Feedback Meeting #4	Phase 1

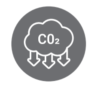
Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-2 Improve the transit system to be more convenient, accessible, and resilient to climate impacts, to increase mode share to 10% by 2030 and 15% by 2045.				
TR-2.1	Partner with Santa Clara Valley Transportation Authority to survey all transit stops in Campbell and identify the top priority locations for installation of shade structures and other bus stop amenities based on average use of the transit stop, location in climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment, and proximity to parks and schools.		Not Applicable	Phase 1
TR-2.2	Coordinate with Santa Clara Valley Transportation Authority to identify opportunities to improve transit options (e.g., new stops, shade features at existing stops) in Campbell, particularly in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment.	Not Applicable	Not Applicable	Phase 1
TR-2.3	Partner with Santa Clara Valley Transportation Authority to educate the community on available transit opportunities through informational pop-up events at existing community events, highlighting the benefits and convenience of public transportation options, including the Santa Clara Valley Transportation Authority Guaranteed Ride Home program and reduced fares for seniors over 65, youth, and individuals with disabilities.	Not Applicable	CBO Engagement	Phase 1+ Ongoing
TR-2.4	Identify funding and partnership opportunities (such as public private partnerships, Santa Clara Valley Transportation Authority, and grant funding) to offer an electric shuttle to various high-traffic locations, including the Valley Transportation Authority Downtown Campbell Station (Green Line), for individuals traveling within Campbell and those traveling out of Campbell.	Not Applicable	CAC Feedback Meeting #2, CBO Engagement	Phase 2

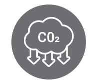
Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-2.5	Secure grant funding to add a mobility hub, or location with docked e-bikes, and end of use facilities, near the Valley Transportation Authority Downtown Campbell Station for first and last mile commute to the Green Line going to San Jose. This will provide convenient and sustainable transportation options, making it easier for people to use public transportation and reduce reliance on single occupancy vehicles.	Not Applicable	CAC Feedback Meeting #2, CBO Engagement	Phase 2
TR-2.6	As part of the City of Campbell Multimodal Transportation Plan, consider planning, securing funding for, and building protected bicycle lanes within two miles of light rail stations.	Not Applicable	CBO Engagement	Phase 2
TR-2.7	Explore opportunities to establish a City shuttle services connecting Campbell residents to key commuter destinations, including Santa Clara, Los Gatos, and Palo Alto. Explore potential partnerships with companies in key commuter destinations and demand for this type of service.	Not Applicable	Not Applicable	
★TR-3 Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.				
TR-3.1	Maintain building and site development standards for new commercial and multi-family residential construction, as well as for major renovations to parking areas (including when parking spaces, electrical systems, or lighting systems are added or altered) that meet the most recent CALGreen Tier 2 requirements for electric vehicle charging infrastructure.	Not Applicable	CBO Engagement	Phase 1
TR-3.2	Adopt an ordinance that creates an expedited, streamlined permitting process (e.g., electronic submissions, permitting checklist, and administrative approval) for electric vehicle charging stations in alignment with California Government Code Section 65850.7 (as amended by AB 1236 in 2015), and develop a permitting checklist with permitting requirements and guidance for applicants. Score a "green rating" on the CA Electric Vehicle Charging Station Permit Streamlining Map by 2027.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-3.3	Evaluate opportunities for installation of electric vehicle charging stations at City-owned facilities and in the public right-of-way. The feasibility study will assess electrical capacity, electrical demand, financial constraints, and parking utilization to provide a prioritized list of locations to install new publicly accessible electric vehicle charging stations. In the feasibility study, include evaluation of opportunities and prioritization of locations to increase the equitable distribution of publicly available electric vehicle chargers to residents of multi-family homes in climate vulnerable areas (as defined in Campbell's Climate Change Vulnerability Assessment) and residents living on low- and moderate-incomes, as well as consideration for optimizing daytime charging.	Not Applicable	CBO Engagement	Phase 1
TR-3.4	After identifying locations for publicly accessible chargers (action TR-3.3), leverage public-private partnerships and secure grants to install 224 chargers by 2030.	Not Applicable	CBO Engagement	Phase 1+ Phase 2
TR-3.5	Partner with community-based organizations to conduct at least one annual zero-emission vehicle education event for residents. Prioritize events for residents living on low- and moderate- incomes as well as residents living in multi-family buildings. City staff hosting these events will evaluate the barriers to zero-emission vehicle adoption, promote information on the costs and benefits of owning zero-emission vehicles, and detail the steps on how to receive incentives for zero-emission vehicles.	Not Applicable	Not Applicable	Phase 2
TR-3.6	Update zoning codes to reflect state law requirements for streamlined permitting of electric vehicle charging stations as an accessory use. Allow electric vehicle charging stations as permitted accessory use in all zones and establish an administrative use permit process for standalone electric vehicle charging stations, where feasible.	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-3.7	Maintain streamlined permitting practices for electric vehicle charging stations by continuing to allow installations with only an electrical permit, without requiring planning review or setbacks. Preserve the existing expedited process and support the use of online permitting tools, to provide clarity and consistency for applicants.	Not Applicable	Not Applicable	Phase 1
TR-4 Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.				
TR-4.1	As part of the City of Campbell Multimodal Transportation Plan, consider planning and building protected bicycle lanes within a 2-mile radius of parks and schools in the city, in alignment with the City's Safe Routes to School Program.	Not Applicable	CAC Feedback Meeting #1, CBO Engagement	Phase 1+ Ongoing
TR-4.2	Secure funding to implement Campbell Priority Development Area Enhancement projects for pedestrian and bicycle safety improvements including accessibility ramps, curb extensions, sidewalk installation, traffic calming (e.g., lane narrowing, flashing beacon systems), signal modifications, sharrows, crosswalks, bike striping and signs, and guide signs (signs that provide information to pedestrians and cyclists about routes, directions, and distances to nearby locations).	Not Applicable	CBO Engagement	Phase 1
TR-4.3	As part of the City of Campbell Multimodal Transportation Plan, consider implementing traffic calming strategies (e.g., curb extensions, textured or colored pavement to visually cue drivers to slow down, speed feedback signs) and pedestrian infrastructure improvements from the Pruneyard to Downtown Campbell and along Winchester Boulevard to create safer streets for pedestrians and cyclists.	Not Applicable	CBO Engagement, CAC Feedback Meeting #4	Phase 2

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-4.4	Explore opportunities to enhance active transportation facilities and around public transit station, building on existing infrastructure such as electronic bike lockers. This may include evaluating the useability and capacity of current lockers and assessing the need for additional amenities to secure short-term bike parking, bike share docks, or wayfinding signage to support first-and last-mile connections.	Not Applicable	Replica Analysis, CBO Engagement	Phase 2
TR-4.5	Evaluate future options to increase active transportation and reduce vehicular traffic in the Downtown area, including street modifications or temporal street closures. The City will coordinate with Downtown interested parties, including the Downtown Campbell Business Association (DCBA) and the Chamber of Commerce, as well as Campbell Police Department and Santa Clara County Fire Department so that any changes maintain emergency access and public safety, address parking and circulation considerations, and reflect community needs while supporting a vibrant, accessible downtown environment.	Not Applicable	CAC Feedback Meeting #2, CBO Engagement	Phase 1
TR-5 Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.				
TR-5.1	Complete and regularly update the Fleet Electrification Plan to identify the needs and constraints involved in transitioning to a zero-emission municipal fleet, including specialized vehicles such as police patrol units and other emergency response vehicles.	Not Applicable	Not Applicable	Phase 1+ Ongoing
TR-5.2	Install battery backups combined with onsite solar panels and renewable diesel generators to enhance the resilience of the municipal fleet.		Not Applicable	Phase 2

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-5.3	Secure funding from state programs (e.g., the California Air Resources Board's Clean Vehicle Rebate Project and the Truck and Bus Voucher Incentive Program, Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project) and federal sources to increase procurement of zero-emission vehicles and installation of zero-emission vehicle charging/ fueling infrastructure at municipal facilities. Additionally, explore opportunities for Low Carbon Fuel Standard credit generation from use of low carbon fuels/electricity for fleet vehicles.	Not Applicable	Not Applicable	Phase 1
TR-5.4	Meet the advanced clean fleet rules for medium- and heavy-duty vehicles.		Not Applicable	Phase 2
TR-5.5	Showcase the City's transition to zero-emission vehicle fleet at community events to demonstrate its commitment to climate action and resilience. Highlight the benefits of electric vehicles, such as lower air pollution, reduced noise levels, and positive health impacts.	Not Applicable	Not Applicable	Phase 1+ Ongoing
TR-5.6	Install EV charging infrastructure needed to support a zero-emission vehicle fleet based on the results of the Fleet Electrification Plan (action TR-5.1). Work collaboratively with Silicon Valley Clean Energy and regional partners to identify funding and technical support.	Not Applicable	Not Applicable	Phase 2+ Ongoing
TR-6 Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.				
TR-6.1	Identify off-road equipment fleets in the City with the highest decarbonization potential and those lacking zero-emission alternatives. Provide technical assistance and/or incentives to fleet owners to support the transition to cleaner technologies (Action TR-6.3).	Not Applicable	Not Applicable	Phase 1

Action		Climate Hazard	Feedback from Community/CAC	Phase
TR-6.2	Develop and adopt a phased series of ordinances that exceed AB 1346 to ban local operation of specific types of gasoline and diesel-powered off-road equipment (e.g., lawn and garden, construction). Update the ordinances based on a regular review of relevant state regulations, regional rules, and available technology.		Not Applicable	Phase 1
TR-6.3	Partner with community-based organizations to promote Bay Area Air District off-road equipment resources and funding opportunities to contractors and residents in the City. Include educational resources on public health and safety benefits of using decarbonized off-road equipment. Prioritize education and outreach in climate vulnerable areas of the City, as defined in Campbell's Climate Change Vulnerability Assessment.	Not Applicable	Not Applicable	Phase 2
TR-6.4	Work to achieve 100% decarbonization of off-road equipment operated by the City before 2040 and require zero-emission off-road equipment in all City contracts by 2030.	Not Applicable	Not Applicable	Phase 1+ Ongoing


LOVE
FROM HISTORIC DOWNTOWN CAMPBELL

7. PERSONAL CLIMATE ACTION AND RESILIENCE ROADMAPS

The following Climate Action and Resilience Roadmaps were developed to empower Campbell community members to prepare for the impacts of climate change and take meaningful actions to reduce their personal carbon footprints. The topics covered in these roadmaps were carefully selected based on input from the CAC, broad community feedback, and findings from the GHG Emissions Analysis (Appendix D) and the Climate Change Vulnerability Assessment (Appendix C).

Consume More Sustainably

Why eat more sustainably?

- **Food choices are a major driver of climate change**. Shifting toward a plant-based diet is one of the most effective ways to reduce your personal carbon footprint.[35] Meat and dairy emit a larger amount of GHGs than plant-based foods, and are a primary driver of deforestation, biodiversity loss, and ocean pollution.[36] In addition, plant-forward diets can reduce risk for chronic illnesses like diabetes, heart disease, and even some types of cancer.[37]

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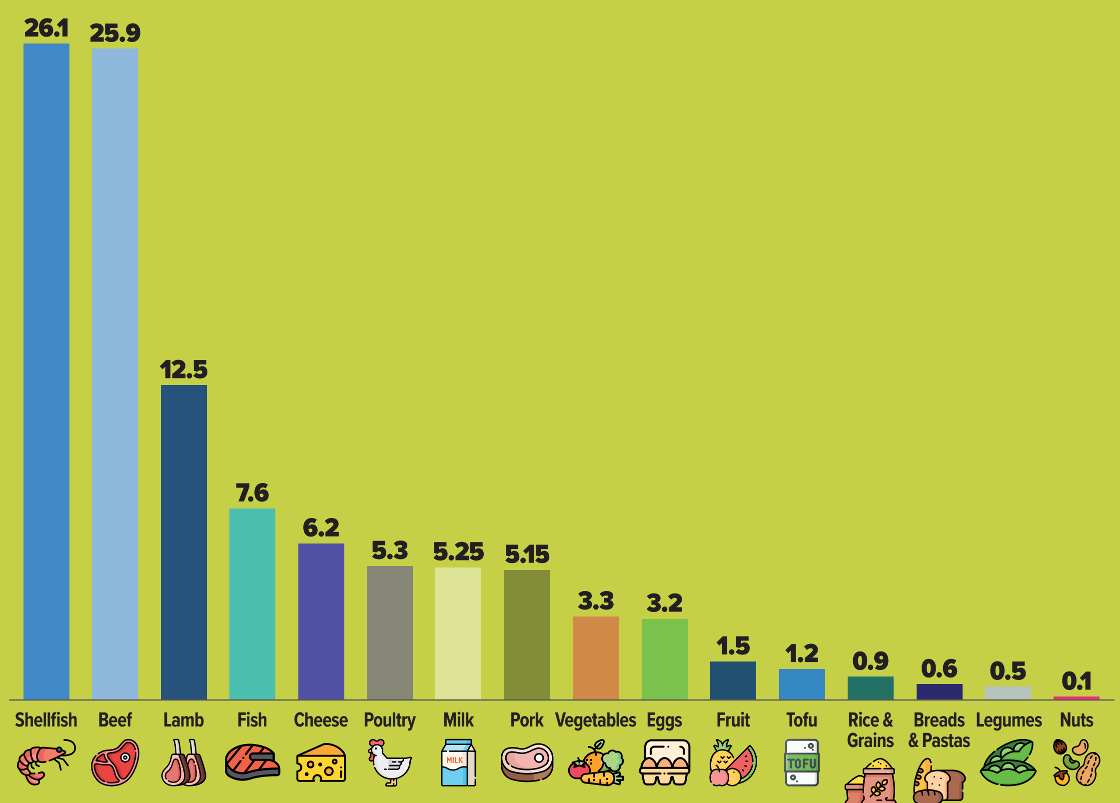
35. Our World in Data. 2020. The carbon footprint of foods: are differences explained by the impacts of methane? ***https://ourworldindata.org/carbon-footprint-food-methane****. Accessed June 2025.*

36. Xu, X., Sharma, P., Shu, S. et al. Global greenhouse gas emissions from animal-based foods are twice those of plant-based foods. Nat Food 2, 724–732 (2021). ***https://doi.org/10.1038/s43016-021-00358-x***

37. Wang Y, Liu B, Han H, Hu Y, Zhu L, Rimm EB, Hu FB, Sun Q. Associations between plant-based dietary patterns and risks of type 2 diabetes, cardiovascular disease, cancer, and mortality - a systematic review and meta-analysis. Nutr J. 2023 Oct 4;22(1):46. doi: 10.1186/s12937-023-00877-2.

Kilograms of Greenhouse Gas Emissions per 1,000 Kilocalories



https://www.un.org/en/climatechange/science/climate-issues/food

How do I eat more sustainably?

- ### Eat Plant-Forward
- Plant based foods have significantly lower emissions on a per calorie basis.
- Explore plant-forward recipes, shifting meat from the main dish to a side dish or swapping for plant-based alternatives, while increasing veggies, beans, and whole grains.
- Swap milk for oat, soy, or almond alternatives.
- Try “Meatless Mondays” or other meat-free days, and opt for sustainably sourced options when eating meat.
- Removing meat from your diet could reduce your household emissions about 6 percent, from 46 to 43 tons CO_2e per year. That’s like cutting out the emissions from driving over 7,400 miles in a gasoline-powered car each year.

Reduce Waste

- Focus on reducing food waste for significant emissions reductions.
- Plan meals and make a shopping list.
- Store food properly to extend its shelf life.
- Use leftovers creatively in new meals.

Choose Local and Seasonal Produce:

- Shop at farmer’s markets.
- Look for seasonal fruits and vegetables.
- Support local farms and producers.

Compost Organic Waste

- The City of Campbell has three waste streams: landfill, recycling, and compost. To support proper sorting and reduce environmental impact, consider setting up a compost bin for kitchen scraps and other organic waste that can be placed in your green waste organics bin for weekly collection or composted at your own home. This helps divert materials from landfills, lowers methane emissions, and contributes to a more sustainable waste system.

How to Electrify Your Home

Why Switch to Electric?

- Electrification will save you money on your energy bills when you switch to a high performance ***heat pump system***.
- Using fossil fuels for cooking and heating can greatly contribute to local air pollution, which in turn leads to climate change and health problems.
- In 2024, Campbell introduced an ***Air Quality Ordinance*** that bans nitrogen oxides (NOx) emissions from appliances and equipment in new buildings and major renovations.
- Electrifying your home can lead to a cleaner, healthier environment and potentially lower energy bills due to more efficient appliances and better energy rates

Replacing natural gas appliances with electric ones could reduce your household emissions about 8 percent, from 46 to 42 tons CO_2e per year. That's like cutting out the emissions from driving over 9,900 miles in a gasoline-powered car each year.

Steps to Electrify Your Home

- **Assess Current Appliances:** Identify aging gas appliances to replace.
- **Research Incentives:** Look for available rebates and discounts at ***campbellca.gov/electrify*** or ***Theswitchison.com*** and find out if you are eligible.
- **Leverage support:** Utilize the planning and support programs from Silicon Valley Clean Energy.
- **Plan Upgrades:** Prioritize which appliances to replace first.
- **Hire Contractors:** Find licensed professionals for installation.
- **Obtain Permits:** Apply for necessary permits through the City of Campbell's streamlined electrification process.
- **Install Appliances:** Replace gas appliances with electric ones.
- **Avoid an Electrical Panel Upgrade:** Many homes can electrify on panels of 100amps or less! Using circuit sharing, smart circuits, or a subpanel can help save space on your existing panel.
- **Improve Insulation:** Enhance home insulation for better energy efficiency.
- **Monitor Energy Usage:** Use smart meters to track and optimize energy consumption.
- **Stay Informed:** Keep up with new incentives and technologies.

Induction Cooking Tips

- **Induction stoves** are fast, efficient, and safer than gas.
- **Cookware compatibility:** Cast iron, stainless steel, and any pan with a magnetic base will work. If a magnet sticks to the bottom of your pan, it's induction-ready!
- **Benefits:** Induction stoves offer precise temperature control, easy cleanup, and improved indoor air quality by eliminating combustion-related pollutants.

Incentives and Support

- ***Go Electric Advisor***, created by Silicon Valley Clean Energy, is a free service with trained professionals to support home electrification.
- ***The Whole Home Bonus Incentive*** allows property owners to get a $4,250 bonus when they decarbonize their whole home. To be eligible, single family property owners must convert all gas appliances and equipment to advanced electric systems including heat pump space heating, heat pump water heating, induction cooking, and electric clothes dryer. Visit the City of Campbell ***Electrify Your Home*** page for more information.
- **The Automated Renewable Energy Systems Permit** is a streamlined process that allows Campbell residents to permit electrification projects in the home. For more information refer to the City of Campbell ***Building Application Guide***.
- ***Silicon Valley Clean Energy Payment Assistance Programs*** offer renewable, carbon-free electricity to residents and businesses at competitive prices. SCVE serves as the official electricity provider for Campbell. Through partnership between SVCE and PG&E, both new and existing SCVE customers can receive discounts and participate in payment assistance programs administered by PG&E.
- **The Automated Renewable Energy Systems Permit** is a streamlined process that allows Campbell residents to permit electrification projects in the home. For more information refer to the City of Campbell ***Building Application Guide***.
- ***Silicon Valley Clean Energy Payment Assistance Programs*** offer renewable, carbon-free electricity to residents and businesses at competitive prices. SCVE serves as the official electricity provider for Campbell. Through partnership between SVCE and PG&E, both new and existing SCVE customers can receive discounts and participate in payment assistance programs administered by PG&E.

Stay Cool and Keep Your Home Safe From Smoke

Why are these protective actions so important?

- Extreme temperatures brought on by heat waves are hazardous for many people, increasing the likelihood of heat-related illnesses, particularly among older adults, young children, those with medical conditions, and individuals without air conditioning.[38]
- Wildfires emit various harmful air pollutants, including cancer-causing substances and tiny particles that can worsen existing health issues and increase the risk of heart attacks or strokes. The primary concern from wildfire smoke for short-term exposures (hours to weeks) is particulate matter (PM), especially $PM_{2.5}$. These particles are small enough to penetrate deep into the lungs and even enter the bloodstream, with well-documented effects on heart and lung health.[39]

How to Protect Yourself and Your Home from Low Air Quality

- During periods of low air quality, stay indoors and close windows and doors.
- Use a California Air Resources Board-certified air filter and run continuously on a high setting.
- Avoid activities such as smoking that create particles indoors.
- Use a damp cloth or mop to trap particles that settle indoors.
- Wear N95 masks when travelling or evacuating.
- Avoid using wood burning fireplaces.

How to Stay Cool During a Heat Wave

- **Use energy efficiently**:
- To prevent electricity shortages and ensure everyone stays cool, California encourages residents to reduce energy consumption (especially between peak hours of 4 p.m. and 9 p.m.) to avoid power outages.
- An effective strategy is to “over cool” your home overnight and in the morning, so it remains cool throughout the day while using less energy during peak hours.
- **Stay Hydrated**: Drink water regularly, even if you don't feel thirsty. Avoid alcohol, caffeine, and sugary drinks as they can cause dehydration.
- **Limit Physical Activity**: Try to avoid strenuous activities during the hottest part of the day, typically between 10 a.m. and 3 p.m.

*38. California Department of Aging. 2025. **https://www.aging.ca.gov/Heatwave_Resources/**. Accessed April 2025.*

*39. California Air Resources Board (CARB). 2025. Smoke Ready California. **https://ww2.arb.ca.gov/smokereadyca**. Accessed April 2025.*

- **Never Leave People or Pets in Cars**: Do not leave anyone or any pets in a parked car, as temperatures can rise quickly.
- **Use Air Conditioning**: Whenever possible, stay in air-conditioned spaces to keep cool. Upgrading to a new heat pump provides both efficient heat and air conditioning with one unit.
- **Cool Off with Water:** Take cool baths or showers or use moist towels to cool down.
- **Wear Light Clothing:** Choose lightweight, light-colored, and loose-fitting clothes. Cotton is a good option as it allows sweat to evaporate.
- **Keep Babies Cool:** Babies are sensitive to heat, so avoid wrapping them in blankets or heavy clothing.
- **Protect Your Head**: Wear a wide-brimmed hat or use an umbrella to shield your head from the sun.
- **Use Sunglasses and Sunscreen:** Apply sunscreen with at least SPF 15 and wear sunglasses when outside.
- **Take Breaks in the Shade:** Find shady spots to rest and cool down when you're outdoors.
- **Check on Vulnerable Individuals:** Regularly check on elderly family members, friends, or neighbors to ensure they are staying cool and hydrated.

How to Access Support

- Sign up for ***Flex Alert*** notifications from your utility provider (Silicon Valley Clean Energy)
- Access ***Santa Clara Cooling Centers***, such as County Libraries.
- Find Heat Preparation information from ***Heat Ready CA***.
- Utilize information from resources like the ***Bay Area Air District***, which provides Air Quality Index, Air Pollution, and Meteorology information based on measurements taken at stations in the Air District's air quality data network.
- Download ***California Smoke Spotter***, the California Air Resources Board's first mobile app that combines the latest fire mapping and smoke forecasting technology.

How to Switch to an Electric Vehicle

Why Switch to an Electric Vehicle (EV)?

- **Save Money Over Time:** EVs typically have lower fuel and maintenance costs compared to gas-powered vehicles. Over the lifetime of the vehicle, this can result in significant savings.
- **Cleaner Air, Healthier Communities:** EVs produce zero tailpipe emissions, helping reduce local air pollution and greenhouse gas emissions.
- **Incentives Make It Easier:** State and local programs offer rebates and tax credits that can significantly reduce the upfront cost of EVs and charging equipment.
- **Replacing your gasoline-powered car with an EV could reduce your household emissions about 26 percent, from 46 to 39 tons CO_2e per year. That's like avoiding 6 round-trip flights from San Francisco to London every year.**

Steps and Incentives to Switch to an EV

- **Evaluate Your Driving Needs:** Consider your daily mileage, charging options, and vehicle size requirements.
- **Explore EV Models:** Research available EVs that fit your lifestyle and budget. Visit ***CarbonCounter.com*** to compare the cost-effectiveness and environmental impact of different EV models. This interactive tool helps you make informed decisions based on real-world data.
- **Check for Incentives:** Find available rebates at campbellca.gov/electrify, such as:
- ***Silicon Valley Clean Energy (SVCE)***: Offers rebates for EVs and home charging equipment.
- **Plan for Charging:**
- **Home Charging:** Install a Level 2 charger at home for faster charging. The City of Campbell provides a ***permit handout for EV charger installations***.
- **Public Charging:** Use apps like ***PlugShare*** or ***ChargePoint*** to locate nearby stations.
- **Rebates:** ***SVCE*** and ***PG&E*** offer rebates for charger installation and panel upgrades.
- **Buy or Lease Your EV:** Choose the best financing option for your situation.
- **Register and Insure:** Complete registration and update your insurance policy for your new EV.

8. IMPLEMENTATION AND MONITORING

The Campbell CAAP acts as a strategic guide for achieving the City of Campbell's GHG emissions reduction targets while increasing resilience against extreme weather impacts. The CAAP specifies measures and actions that comply with state legislation and lays the groundwork for future carbon neutrality by 2045. While the CAAP is structured to meet both short- and long-term objectives, it recognizes uncertainties related to technological advancements, new state legislative mandates, and climate science. Regular monitoring and updates will ensure the City of Campbell adapts to new developments, refining actions as necessary. To support successful implementation, funding and resource needs will be incorporated into the City's annual budgeting process.

Ongoing Community Education and Outreach

Ongoing community outreach for the CAAP is crucial for its successful implementation. The City of Campbell will need to actively and continuously engage with residents, businesses, CBOs and other stakeholders to empower the community to take climate action as well as identify any issues or hurdles to implementation that could hinder the effective adoption of measures and actions. By addressing these barriers head-on through education and collaboration, solutions can be tailored to meet the unique needs of partnerships,

a sense of collective responsibility can be fostered, encouraging active participation in the City of Campbell's broader sustainability goals.

Effective community education fosters long-term behavior change by providing residents with accessible information and resources on energy efficiency, sustainable transportation, waste reduction, and water conservation. By maintaining regular communication, the City of Campbell can continuously raise awareness, highlight progress, and adapt to emerging challenges or opportunities in climate action. The City of Campbell's outreach efforts aim to strengthen relationships with local organizations, schools, businesses and community leaders, as well as build new partnerships. This collaboration will help shape policies, increase participation in CAAP-related initiatives, and drive measurable outcomes in emissions reductions and resilience-building projects. The community's engagement initiatives outlined in the CAAP's implementation plan (Appendix E) provide a clear framework for outreach, facilitating organization and effectiveness for the City of Campbell's efforts.

CAAP Implementation Roles

To maximize implementation of the CAAP following its adoption, the City of Campbell has developed an implementation plan (Appendix E). This plan outlines the key steps, responsible City staff, and timelines to achieve the goals of the CAAP. The Community Development Department's Sustainability Division will serve as the overall lead, coordinating implementation and efforts and acting as the primary point of contact for both internal staff and the community. This Community Development Department will also play a central role in facilitating cross-departmental collaboration and ensuring consistent oversight throughout the implementation process. Each action in the CAAP is assigned an implementation lead in Appendix E, clearly designating the department or division responsible for execution. Identified implementation leads include:

- City Manager's Office
- Community Development Department
- Finance Department
- Police Department
- Public Works Department
- Recreation and Community Services Department

As outlined in Measure SG-3, the City will also collaborate with community-based organizations to support and enhance implementation efforts. The City's Finance Department will play a critical role in evaluating the financial feasibility of proposed actions, analyzing costs, and ensuring that funding strategies are aligned with long-term fiscal sustainability. Funding and resource needs will be incorporated into the City's annual budgeting process to support effective and sustained implementation. The implementation structure will continue to evolve as strategies are rolled out and progress is monitored.

CAAP Monitoring and Updates

Monitoring and reporting processes are crucial for ensuring accountability in achieving the adopted targets. As part of CAAP implementation, the City of Campbell will complete an annual progress report to keep the

community informed and engaged. Additionally, the City will conduct a GHG inventory update approximately every three to five years. The annual progress reports will evaluate implementation progress against the established schedule. A comprehensive CAAP update is planned for 2030, which will include another inventory to evaluate progress and adjust strategies as needed. These efforts are dependent on available City resources, including funding and staff capacity, and may be adjusted accordingly. Various City of Campbell departments will monitor and report on the implementation of the CAAP. This team will collaborate with interested parties to gather data on the effectiveness of the strategies and report progress to the City Council and the public. The City Council will provide oversight and guidance to ensure successful implementation of the CAAP, while also helping to balance funding decisions against competing priorities to support long-term sustainability. The CAAP establishes metrics to monitor the effectiveness of the measures and actions. The actions that offer the greatest long-term benefits for the lowest upfront and ongoing costs are prioritized.

CITY OF CAMPBELL

Climate Action & Adaptation Plan

Appendix A

Climate Change Legislation

Climate Change Legislation Summary

As the impacts of climate change become more apparent, numerous strategies to address climate change have emerged across all levels of government. This section provides an overview of local, regional, state, and international legislation that align with and support the City of Campbell's actions for reducing greenhouse gas (GHG) emissions.

City of Campbell Sustainability Plans and Policies

The City of Campbell is committed to building a more sustainable, climate-resilient community through targeted policies, strategic planning, and community-focused programs. By reducing GHG emissions, improving air quality, conserving natural resources, and expanding access to sustainable transportation, Campbell is aligning local action with regional, state, and global climate goals. The following initiatives reflect the City's integrated approach to environmental stewardship and its dedication to supporting residents and businesses in the transition to a cleaner, healthier future.

Measure O (2013)

Measure O gave the City of Campbell the authority to issue $50 million in general obligation bonds to build a modern police emergency operations center designed to stay fully functional during disasters, along with a state-of-the-art library housed in facilities that are seismically secure, accessible to all, energy-efficient, and compliant with current safety standards.[1]

City of Campbell Emergency Operations Plan (2019)

The City of Campbell's Emergency Operations Plan (EOP) is a comprehensive, all-hazards framework that outlines how the City manages emergencies of all scales—from routine incidents to major disasters. It establishes a flexible incident management system, ensures legal compliance, supports continuity of government, and promotes coordination across agencies and the community. While it doesn't detail specific hazard responses, the EOP provides the foundation for annexes that address particular threats like earthquakes, floods, fires, and public health emergencies.[2]

City of Campbell Green Stormwater Infrastructure Plan (2019)

To reduce the environmental impact of urban development, the City of Campbell has developed a Green Stormwater Infrastructure (GSI) Plan that promotes nature-based solutions to manage stormwater. Building on the success of the Hacienda Avenue Green Street Project, the Plan outlines how the City will identify, implement, and track GSI projects through 2040. These features, like rain gardens and permeable surfaces, help filter runoff, reduce pollution, and enhance public spaces. The Plan supports regional stormwater permit requirements and aligns with broader City goals for sustainability, safety, and livable streetscapes.[3]

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[1] Campbell, California. 2025. Measure O Progress. https://www.campbellca.gov/1367/Measure-O-Progress. Accessed June 2025.
[2] City of Campbell. 2019. Emergency Operations Plan. https://www.campbellca.gov/DocumentCenter/View/13077/Campbell-EMERGENCY-OPERATIONS-PLAN. Accessed June 2025.
[3] City of Campbell. 2019. Green Stormwater Infrastructure Plan. https://www.campbellca.gov/DocumentCenter/View/13505/City-of-Campbell-GSI-Plan---Approved-1. Accessed June 2025.

City of Campbell Energy Conservation Upgrades and Infrastructure Improvements (Updated 2023)

The City of Campbell is advanced sustainability through a series of energy conservation and infrastructure upgrades across city facilities and properties. Partnering with Syserco Energy Solutions, the City implemented improvements such as HVAC upgrades, LED lighting retrofits, and energy management system enhancements. These projects were expected to cut electricity use by over 1.6 million kWh and natural gas by more than 23,000 therms annually, reducing greenhouse gas emissions by 862 metric tons each year. These efforts align with the City's General Plan goals to reduce environmental impact and promote long-term energy efficiency.[4]

General Plan – Open Space and Conservation Element (2023)

Campbell's parks, trails, open spaces, scenic views, and cultural and ecological assets are key elements that shape the City's identity and enhance residents' quality of life. The Open Space and Conservation Element of the General Plan emphasizes the protection and enhancement of these assets for future generations. It also promotes waste reduction, improved air and water quality, and sustainable land use.

General Plan – Safety Element (2023)

In accordance with California's state requirements, the City of Campbell has incorporated a Safety Element into its General Plan. This component addresses both natural and human-made hazards and outlines objectives and strategies designed to minimize associated risks.

Air Quality Ordinance (2024)

Adopted in 2024, Campbell's new Air Quality Ordinance aims to eliminating nitrogen oxide (NOx) emissions from appliances and equipment in newly constructed residential and commercial buildings, as well as in major renovations that incorporate parts of existing structures. Effective October 3, 2024, the ordinance applies to a wide range of appliances used for space heating and cooling, water heating, cooking (indoor and outdoor), and clothes drying.

Exemptions include commercial kitchens, specialized equipment that relies on gas (e.g., pottery kilns), emergency-use devices, and outdoor heaters or grills using small propane tanks.

[4] City of Campbell. 2023. Energy Conservation Upgrades and Infrastructure Improvements. https://www.campbellca.gov/1195/Energy-Conservation-Upgrades-and-Infrast. Accessed June 2025.

Campbell Stormwater Programs (2025)

The City of Campbell has partnered with the West Valley Stormwater Authority to protect local waterways through proactive stormwater pollution prevention. Programs focus on keeping creeks clean by preventing runoff contamination, promoting green infrastructure, and enforcing responsible development practices. Initiatives include street sweeping, installing trash capture systems, and supporting low-impact development. Residents are encouraged to report spills and illegal dumping to help safeguard the environment and maintain the health of local ecosystems.[5]

City of Campbell Parks Master Plan (2025)

The City of Campbell created its first-ever Parks and Recreation Master Plan—an initiative to shape the future of parks, recreation programs, and facilities. This comprehensive plan will guide the development, maintenance, and enhancement of public spaces for years to come. Community input was a key part of the process, with multiple meetings and online opportunities for residents to share their ideas and feedback.

Multimodal Transportation Plan (In Progress)

The City of Campbell is in the process of developing the Campbell Multimodal Transportation Plan to improve mobility, reduce vehicle emissions, and support active and public transportation. This plan will play a critical role in shaping a more connected, accessible, and sustainable transportation network citywide.

Regional Regulations and Sustainability Plans

The San Francisco Bay Area continues to lead in regional climate action through progressive air quality regulations and innovative clean energy programs. These efforts not only complement state and federal climate goals but also provide a foundational framework for local jurisdictions. For the City of Campbell, regional initiatives—such as appliance electrification mandates from the Bay Area Air Quality Management District (BAAQMD) and clean energy programs from Silicon Valley Clean Energy (SVCE)—have directly informed the development of the City's Climate Action and Adaptation Plan (CAAP). These programs offer both policy alignment and practical tools that support Campbell's transition to a low-carbon, climate-resilient future.

Bay Area Air District Rules and Regulations (2024)

The Air District has adopted Regulation 9, Rules 4 and 6 to reduce NO_x emissions from residential and commercial appliances. These rules include:

- Starting in 2027, the sale and installation of most new natural gas water heaters will be prohibited in the Bay Area.
- Beginning in 2029, new gas-powered furnaces must be replaced with zero-NO_x-emission electric systems.
- By 2031, large commercial water heaters must also comply with zero-emission standards.

[5] City of Campbell. 2025. Stormwater. https://www.campbellca.gov/1132/Stormwater. Accessed June 2025.

These rules apply only to new appliance sales and installations, not to existing units or repairs. The regulations aim to reduce smog-forming NO_x emissions, which are linked to asthma, heart disease, and premature death.[6]

Silicon Valley Clean Energy Programs

SVCE is a community-owned electricity provider serving 13 jurisdictions in Santa Clara County, including the City of Campbell. SVCE delivers 100 percent carbon-free electricity and partners with PG&E to expand access to clean energy while maintaining competitive rates. Key programs include:

- Go Electric Advisor – Personalized support for residents transitioning to electric appliances and vehicles.
- FutureFit Home Rebates – Incentives for upgrading to electric heat pumps, induction cooktops, and other efficient appliances.
- Payment Assistance Programs – Includes monthly discounts, flexible payment plans, and one-time bill relief for income-qualified customers.

SVCE's initiatives support regional decarbonization and help residents reduce their carbon footprint while improving indoor air quality and energy affordability.

Santa Clara Basin Stormwater Resource Plan (2019)

Developed through a collaborative, two-year effort led by SCVURPPP and the Santa Clara Valley Water District, the SWRP identifies and prioritizes Green Stormwater Infrastructure (GSI) projects that use natural processes to capture and treat runoff. These projects offer multiple environmental benefits, including pollution reduction, groundwater recharge, flood mitigation, and enhanced community resilience. The SWRP supports local GSI planning efforts and aligns with the region's broader "One Water" strategy to integrate water quality, supply, and ecosystem goals at a watershed scale.[7]

Santa Clara County Multijurisdictional Hazard Mitigation Plan (2024)

The Santa Clara County Multijurisdictional Hazard Mitigation Plan (MJHMP), approved by FEMA in February 2024, outlines strategies to reduce risks from natural and human-caused hazards across multiple communities. Developed alongside the Community Wildfire Protection Plan and the General Plan Safety Element update, the MJHMP aligns with state legislation (AB 2140) to enhance disaster resilience and secure state funding eligibility. The plan remains in effect until February 2029, with the County already seeking grant funding to support its next update.[8]

Water Efficient Landscape Guidelines (2015)

To promote long-term water sustainability, California's Water Efficient Landscape Guidelines encourage the design and maintenance of landscapes that conserve water while enhancing environmental quality. These guidelines support the use of climate-appropriate plants, efficient irrigation systems, and soil health practices that reduce runoff, improve air and water quality, and create resilient urban green spaces. By setting clear standards for new and rehabilitated landscapes, the guidelines help

[6] KQED. 2023. Bay Area Regulators Approve Rules to Phase Out Gas Furnaces and Water Heaters. https://www.kqed.org/news/11943668/bay-area-regulators-approve-rules-to-phase-out-gas-furnaces-and-water-heaters
[7] Santa Clara Valley Urban Runoff Pollution Prevention Program. 2019. Stormwater Resource Plan. https://scvurppp.org/swrp/. Accessed June 2025.
[8] County of Santa Clara. 2024. Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). https://oem.santaclaracounty.gov/multi-jurisdictional-hazard-mitigation-plan-mjhmp. Accessed June 2025.,

communities like Campbell reduce water waste, protect natural resources, and align with statewide conservation goals.[9]

California Regulations and State GHG Targets

California remains a global leader in the effort to reduce GHG emissions and combat climate change through its mitigation and adaptation strategies. With the passage of Assembly Bill (AB) 32 in 2006, California became the first state in the United States to mandate GHG emission reductions across its entire economy. To support AB 32, California has enacted legislation, regulations, and executive orders (EO) that put it on course to achieve robust emission reductions and address the impacts of a changing climate. The following is a summary of executive and legislative actions most relevant to the City of Campbell's Climate Action and Adaptation Plan (CAAP).

Senate Bill 1078 (2002)

In 2002, Senate Bill (SB) 1078 established the California Renewables Portfolio Standards (RPS) Program and was accelerated in 2006 by SB 107, requiring that 20 percent of retail electricity sales be composed of renewable energy sources by 2010. EO S-14-08 was signed in 2008 to further streamline California's renewable energy project approval process and increase the State's RPS to 33 percent renewable power by 2020.

Assembly Bill 1493 (2002)

In 2002, the California State Legislature enacted Assembly Bill 1493 (aka "the Pavley Bill"), which directs CARB to adopt standards that will achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles," considering environmental, social, technological, and economic factors. In September 2009, CARB adopted amendments to the "Pavley" regulations to reduce GHG emissions in new passenger vehicles from 2009 through 2016. The Pavley Bill is considered to be the national model for vehicle emissions standards. In January of 2012, CARB approved a new emissions control program for vehicle model years 2017 through 2025. The program combines the control of smog, soot, and GHGs and the requirement for greater numbers of zero emission vehicles into a single package of standards called Advanced Clean Cars.

Executive Order S-3-05 (2005)

EO S-3-05 was signed in 2005 establishing statewide GHG emissions reduction targets for the years 2020 and 2050. The EO calls for the reduction of GHG emissions in California to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The 2050 emission reductions target would put the State's emissions in line with the worldwide reductions needed to reach long-term climate stabilization as concluded by the IPCC *2007 Fourth Assessment Report*.

Assembly Bill 32 (2006)

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020. CARB was tasked with preparing a Scoping Plan to

[9] City of Campbell. 2015. Water Efficient Landscape Guidelines. https://www.campbellca.gov/DocumentCenter/View/176/Water-Efficient-Landscape-Guidelines-MWELO. Accessed June 2025.

outline strategies for achieving this goal. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions.

Based on this guidance, CARB approved a 1990 statewide GHG baseline and 2020 emissions limit of 427 million metric tons of carbon dioxide equivalent (MMT CO_2e). The Scoping Plan was approved by CARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards,[10] and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2014 Scoping Plan update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use.

Senate Bill 107 (2006)

SB 107 builds on SB 1078 and requires investor-owned utilities, energy service providers, and Community Choice Aggregations to procure an additional 1 percent of retail sales per year from eligible renewable sources until 20 percent is reached, no later than 2010. The California Public Utilities Commission and California Energy Commission are jointly responsible for implementing the program.

Executive Order S-1-07 (2007)

Also known as the Low Carbon Fuel Standard, EO S-1-07, issued in 2007, established a statewide goal that requires transportation fuel providers to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. EO S-1-07 was readopted and amended in 2015 to require a 20 percent reduction in carbon intensity by 2030, the most stringent requirement in the nation. The new requirement aligns with California's overall 2030 target of reducing climate changing emissions 40 percent below 1990 levels by 2030, which was set by SB 32 and signed by the governor in 2016.

Senate Bill 97 (2007)

Signed in August 2007, SB 97 acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Natural Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

Senate Bill 375 (2008)

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and

[10] On September 19, 2019, the National Highway Traffic Safety Agency (NHTSA) and the US Environmental Protection Agency (EPA) issued a final action entitled the One National Program on Federal Preemption of State Fuel Economy Standards Rule. This action finalizes Part I of the Safer, Affordable, Fuel-Efficient (SAFE) Vehicles Rule. This rule states that federal law preempts State and local tailpipe greenhouse gas (GHG) emissions standards as well as zero emission vehicle (ZEV) mandates. The SAFE Rule withdraws the Clean Air Act waiver it granted to California in January 2013 as it relates to California's GHG and zero emission vehicle programs.

2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPOs) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the MPO's Regional Transportation Plan (RTP).

Executive Order S-14-08 (2008)

EO S-14-08 was issued in 2008 and sets a statewide target of 33 percent renewable energy use by 2020.

California Green Building Code (2009)

The California Green Building Standards Code (CALGreen) is Part 11 of the California Building Standards Code or Title 24 and is the first statewide "green" building code in the nation. The purpose of CALGreen is to improve public health, safety, and general welfare by enhancing the design and construction of buildings. Enhancements include reduced negative impact designs, positive environmental impact designs, and encouragement of sustainable construction practices. The first CALGreen Code was adopted in 2009 and has been updated in 2013, 2016, and 2019. The CALGreen Code is expected to have subsequent, and continually more stringent, updates every three years.

Senate Bill X7-7 (2009)

In 2009, SB X7-7, also known as the Water Conservation Act, was signed, requiring all water suppliers to increase water use efficiency. This legislation sets an overall goal of reducing per capita urban water use by 20 percent by 2020.

Senate Bill 2X (2011)

In 2011, SB 2X was signed, requiring California energy providers to buy (or generate) 33 percent of their electricity from renewable energy sources by 2020.

Assembly Bill 341 (2012)

AB 341 directed the California Department of Resources Recycling and Recovery (CalRecycle) to develop and adopt regulations for mandatory commercial recycling. As of July 2012, businesses were required to recycle, and jurisdictions had to implement a program that includes education, outreach, and monitoring. AB 341 also set a statewide goal of 75 percent waste diversion by the year 2020.

Senate Bill 743 (2013)

SB 743 introduces a new performance metric, vehicle miles traveled (VMT), as a basis for determining significant transportation impacts under CEQA. Projects that are projected to increase VMT may mitigate their impacts through measures such as car-sharing services, unbundled parking, improved transit, and enhanced pedestrian and bicycle infrastructure.

Assembly Bill 32 Scoping Plan Update (2014)

AB 1826 was signed in 2014 to increase the recycling of organic material. GHG emissions produced by the decomposition of these materials in landfills were identified as a significant source of emissions contributing to climate change. Therefore, reducing organic waste and increasing composting and mulching are goals set out by the AB 32 Scoping Plan. AB 1826 specifically requires jurisdictions to establish organic waste recycling programs by 2016, and phases in mandatory commercial organic waste recycling over time.

Assembly Bill 1826 (2014)

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Senate Bill 350 (2015)

SB 350, the Clean Energy and Pollution Reduction Act of 2015, has two objectives: to increase the procurement of electricity from renewable sources from 33 percent to 50 percent by 2030 and to double the energy efficiency of electricity and natural gas end users through energy efficiency and conservation.

Executive Order B-30-15 (2015)

In 2015, EO B-30-15 was signed, establishing an interim GHG emissions reduction target to reduce emissions to 40 percent below 1990 levels by 2030. The EO also calls for another update to the CARB Scoping Plan.

Senate Bill 32 (2016)

On September 8, 2016, the governor signed SB 32 into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). The bill charges CARB to adopt the regulation so that the maximum technologically feasible emissions reductions are achieved in the most cost-effective way. California's 2030 target of 40% below 1990 levels is consistent with the IPCC's mid-century goals, while the 2045 neutrality goal is ahead of the IPCC's global 2050 timeline.

Senate Bill 1383 (2016)

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Black carbon – 50 percent below 2013 levels

SB 1383 also requires CalRecycle, in consultation with the CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills. The bill further requires 20 percent of edible food disposed of at the time to be recovered by 2025. Implementation is ongoing, with local jurisdictions required to enforce compliance and report progress to CalRecycle.

Scoping Plan Update (2017)

On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 goal set by SB 32. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies, such as SB 350 and SB 1383.

The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2014 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six metric tons (MT) CO_2e by 2030 and two MT CO_2e by 2050. As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the State.[11] This plan was succeeded by the 2022 Scoping Plan, which sets a legally binding target of carbon neutrality by 2045 and an 85 percent reduction in GHG emissions below 1990 levels.

Senate Bill 100 (2018)

Adopted on September 10, 2018, SB 100 accelerates the state's RSP Program by requiring:

- 33 percent renewable electricity by 2020
- 60 percent by 2030
- 100 percent zero-carbon electricity by 2045

SB 1020 (2022) later added interim targets of 90 percent by 2035 and 95 percent by 2040.

Executive Order B-55-18 (2018)

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100, and was codified in AB 1279 (2022).

Assembly Bill 2127 (2018)

AB 2127 directs the California Energy Commission (CEC) to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption for the state to meet its goal of putting at least five million zero-emission vehicles on California roads by 2030. The 2022 report identified a need for 1.2 million public and shared chargers by 2030.

Innovative Clean Transit Rule (2018)

The Innovative Clean Transit Rule, adopted by CARB in 2018, requires public transit agencies to gradually transition to 100 percent zero-emissions bus fleets by 2040. This regulation applies to all transit agencies that own, operate, or lease buses with gross vehicle weight rating above 14,000 pounds.

Executive Order N-79-20 (2020)

On September 23, 2020, the governor issued EO N-79-20, which sets new statewide goals for phasing out gasoline-powered cars and trucks in California, which is applicable to state agencies. The EO requires:

[11] California Air Resources Board. 2017. 2017 Scoping Plan Documents. https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2017-scoping-plan-documents. Accessed June 2025.

- 100 percent of in-state sales of new passenger cars and trucks to be zero-emission by 2035
- 100 percent of in-state sales of medium- and heavy-duty trucks and busses to be zero-emission by 2045, where feasible
- 100 percent of off-road vehicles and equipment sales to be zero-emission by 2035, where feasible

Advanced Clean Trucks (ACT) Regulation (2020)

The ACT Regulation requires that manufacturers of medium- and heavy-duty vehicles (Class 2b through Class 8) selling vehicles in California begin shifting toward zero-emission vehicles (ZEVs) by model year 2024. Under its provisions, sales of ZEVs must increase steadily over time: for example, by model year 2035 manufacturers must achieve approximately 55% zero-emission sales for Class 2b-3, 75% for Class 4-8 straight trucks, and 40% for Class 7-8 tractor trucks. In addition to the manufacturer sales requirement, the regulation imposes a one-time reporting obligation on large fleets or entities (those with greater than 50 trucks) to report current fleet makeup and operations.

Enforcement of the ACT regulation remains uncertain at this time. On June 12, 2025, House Joint Resolution 87 was signed into law nullifying the United States Environmental Protection Agency's (U.S. EPA) notice which granted CARB's waiver request for the regulation. The future of its implementation remains unclear as California pursues legal action against the resolution.

Small Off-road Engine Regulations (2021)

In 2021, CARB approved amendments to the Small Off-road Engine (SORE) Regulations. The SORE regulations are intended to reduce emissions from equipment with SOREs and transition such equipment to zero-emission equipment. SORE equipment includes spark-ignition engines 25 horsepower, or below, which are used in most lawn and garden equipment. The regulations set emission standards for smog-forming pollutants to zero for all new SOREs (except for generator and large pressure washer engines) beginning with model year 2024. The regulations set more stringent emission standards for new portable generators and large pressure washer engines beginning with model year 2028. The regulations apply to manufacturers, sellers, retailers, and distributors producing, distributing, and selling new SOREs.

U.S. EPA has granted CARB an authorization to waive federal preemption for its current SORE regulations. CARB will fully implement the regulations beginning with the 2026 model year and implement the regulations for the remainder of the 2025 model year.

Senate Bill 27 (2021)

Adopted on September 23, 2021, SB 27 requires the state Natural Resources Agency to:

- Establish carbon sequestration goals for natural and working lands by July 2023
- Create a registry of projects for public and private investment and track the carbon benefits of each project
- Ensure projects to not generate Cap-and-Trade offsets

Additionally, as part of the next Scoping Plan Update, CARB is required to establish specific CO_2 removal targets starting in 2030.

Senate Bill 379 (2022)

Adopted September 16, 2022, SB 379 requires cities and counties to implement an online, automated permitting platform to verify solar installation code compliance and issue permits in real time for residential solar energy systems no larger than 38.4 kilowatt hours.

Senate Bill 1020 (2022)

Adopted September 16, 2022, SB 1020 expedites the previous goals established by SB 100 by requiring:

- 90 percent clean electricity by 2035
- 95 percent by 2040
- 100 percent clean electricity for state agencies = by December 31, 2035.

Senate Bill 1063 (2022)

Adopted September 16, 2022, SB 1063 creates appliance efficiency standards set by the State Energy Resources Conservation and Development Commission, which may now take effect sooner than one year after their adoption/revision. SB 1063 builds on Title 20 efficiency standards enforced through the California Energy Commission and first adopted in 1977.

Assembly Bill 1909 (2022)

Adopted September 16, 2022, AB 1909 removes prohibition of operating motorized electric bicycles or Class 3 bikes on bicycle paths or trails, bikeways, or bicycle lanes. However, the bill also includes an exemption for the Department of Parks and Recreation, which may prohibit these classes of bicycles on any bicycle path or trail within the department's jurisdiction, where appropriate.

Assembly Bill 1857 (2022)

Adopted September 16, 2022, AB 1857 amends various sections of the California Integrated Waste Management Act of 1989, which required jurisdictions to divert 50% of solid waste through source reduction, recycling, and composting activities, with no more than 10% through transformation. AB 1857 repeals the provision that jurisdictions may divert 10% through transformation (e.g., incineration). Additionally, AB 1857 requires the Department of Resources Recycling and Recovery to establish the Zero-Waste Equity Grant Program to support targeted strategies and investments in communities transitioning to zero-waste circular economies.

Assembly Bill 1985 (2022)

Adopted September 16, 2022, AB 1985 establishes penalties applied to jurisdictions for not meeting SB 1383 requirements. Penalty will be based on the percentage of the target the jurisdiction was able to achieve.

Assembly Bill 1279 (2022)

In September 2022, AB 1279 (e.g., the California Climate Crisis Act) was approved, which established a legally binding requirement for California to achieve and maintain carbon neutrality no later than 2045. Assembly Bill 1279 also established the requirement to achieve a Statewide reduction in GHG emissions of 85 percent below 1990 levels by 2045. This indicates that the remaining 15 percent to achieve carbon neutrality can be achieved via carbon sequestration and other non-direct-GHG-emissions-reductions techniques.

2022 Scoping Plan Update (2022)

In response to AB 1279 and the 2045 GHG reduction target, CARB adopted the Final 2022 Climate Change Scoping Plan in November 2022. This update builds on previous plans and outlines a comprehensive, equity-focused, and technologically feasible roadmap to achieve:

- 40 percent GHG reduction below 1990 levels by 2030
- 85 percent GHG reduction and carbon neutrality by 2045

The plan emphasizes:

- Phasing out fossil fuel combustion
- Expanding clean energy and electrification
- Enhancing carbon sequestration on natural and working lands
- Deploying carbon capture and storage (CCS)
- Integrating environmental justice and affordability

It also includes four modeled scenarios, with the selected scenario prioritizing a balanced approach across sectors.[12]

Advanced Clean Cars II (2022)

By 2035, all new passenger cars, trucks, and SUVs sold in California will be ZEVs. The Advanced Clean Cars II regulations take the state's already growing ZEV market and robust motor vehicle emission control rules and augments them to meet more aggressive tailpipe emissions standards and ramp up to 100% ZEVs.

Enforcement of the Advanced Clean Cars II regulation remains uncertain at this time. On June 12, 2025, House Joint Resolution 88 was signed into law nullifying the U.S. EPA's notice which granted CARB's request for the regulation. The future of implementation remains unclear as California pursues legal action against the resolution.

Senate Bill 1020 (2022)

Also known as the Clean Energy, Jobs, and Affordability Act of 2022, SB 1020 builds on SB 100 and sets the following targets:

- 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035
- 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040
- 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045
- 100 percent of electricity procured to serve all state agencies by December 31, 2035

Advanced Clean Fleets Regulation (2023)

Adopted by CARB in 2023, the Advanced Clean Fleets (ACF) regulation requires fleets that are well suited for electrification to reduce emissions through requirements to phase-in the use of ZEVs for targeted fleets.

In 2025, California withdrew the request for a federal waiver for the addition of the ACF regulation to the State's emissions control program. At this time, CARB is not enforcing the portions of the ACF

[12] CARB. 2022. 2022 Scoping Plan for Achieving Carbon Neutrality. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf

regulation that require a federal waiver. However, not all elements of the ACF regulation require a federal waiver or authorization. The State and local government fleets portion of the ACF regulation remains unaffected. Additionally, CARB is encouraging affected industries and fleets to continue reducing their GHG emissions.

Assembly Bill 2684 (2024)

Adopted September 30, 2024, AB 2684 requires cities and counties to update the Safety Element chapter of the general Plan after January 1, 2028, to address extreme heat hazards.

Senate Bill 1221 (2024)

Adopted September 25, 2024, SB 1221, also known as Empowering neighborhood-scale decarbonization for a cleaner, safer future, will create long-term energy affordability for Californians, reduce emissions from the state's building stock, and create an equitable transition toward carbon neutrality by 2045. Signed by Governor Gavin Newsom, this legislation authorizes the California Public Utilities Commission to create up to 30 "neighborhood decarbonization zones." In these zones, communities can transition from gas to zero-emissions alternatives, such as electric heating and cooking appliances.

AB 130 New Exemptions Under CEQA (2025)

California Assembly Bill (AB) 130, signed into law on June 30, 2025, includes provisions that affect both the electrification of buildings and the California Environmental Quality Act (CEQA). While generally aimed at increasing housing and expediting development, the bill places a moratorium on local governments from adopting new residential energy "reach codes" between October 1, 2025, and June 1, 2031. This freeze on new, stricter codes applies to residential units and also suspends the 2028 statewide energy code update cycle. Local governments may still update reach codes if the changes are substantially equivalent to codes in effect as of September 30, 2025, if deemed necessary for health and safety emergencies, or if the changes are needed to align with a General Plan adopted before June 10, 2025.

International Climate Action Guidance

Climate change is a global challenge that transcends national borders, requiring coordinated international action. Over the past three decades, a series of landmark agreements and frameworks have been established to guide countries in reducing GHG emissions, adapting to climate impacts, and promoting sustainable development. The following section outlines key international treaties and accords that shape the global response to climate change and inform local efforts, including those of the City of Campbell.

United Nations Framework Convention on Climate Change (1992)

The primary international regulatory framework for GHG reduction is the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC is an international treaty adopted in 1992 with the objective of stabilizing atmospheric GHG concentrations to prevent disruptive anthropogenic climate change. The framework established non-binding limits on global GHG emissions and specified a process for negotiating future international climate-related agreements.[13]

Kyoto Protocol (1997)

The Kyoto Protocol is an international treaty that was adopted in 1997 to extend and operationalize the UNFCCC. The protocol commits industrialized nations to reduce GHG emissions per country-specific targets, recognizing that they hold responsibility for existing atmospheric GHG levels. The Kyoto Protocol involves two commitment periods during which emissions reductions are to occur, the first of which took place between 2008-2012 and the second of which has not entered into force, and the second from 2013-2020.[14] The second commitment period, established under the Doha Amendment, officially entered into force in December 2020 and concluded successfully, with participating countries achieving an average emissions reduction of 22 percent compared to 1990 levels.[15]

Disaster Mitigation Act (2000)

The Federal Emergency Management Agency (FEMA)'s Disaster Mitigation Act intends to "reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters." [16] Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through the Hazard Mitigation Assistance Program.[17]

The Paris Agreement (2015)

The Paris Agreement is the first-ever universal, legally binding global climate agreement that was adopted in 2015 and has been ratified by 190 countries worldwide.[18] The Paris Agreement establishes a roadmap to keep the world under 2°C of warming with a goal of limiting an increase of temperature to 1.5°C. The agreement does not dictate one specific reduction target, instead relying on individual countries to set Nationally Determined Contributions (NDCs), or GHG reductions, based on GDP and other factors. According to the Intergovernmental Panel on Climate Change (IPCC), limiting global warming to 1.5°C will require global emissions be reduced through 2030 and hit carbon neutrality by mid-century.[19] The United States has had a varied relationship with the agreement: it initially signed in 2016 under the Obama administration, withdrew in 2020 under the Trump administration, rejoined in 2021 under President Biden, and submitted formal notification to withdraw again in January 2025 under President Trump's second term, with the withdrawal set to take effect in January 2026.

Glasgow Climate Pact (2021)

The Glasgow Climate Pact[20] (Pact) was adopted by nearly 200 nations in 2021 and builds on the 2015 Paris Agreement. The Pact includes an agreement to revisit the emissions reduction plans to keep the 1.5°C target achievable and is the first global climate agreement that commits to phasing down

[13] United Nations Framework Convention on Climate Change (UNFCCC). United Nations Framework Convention on Climate Change. https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf
[14] UNFCCC. What is the Kyoto Protocol? https://unfccc.int/kyoto_protocol
[15] United Nations Framework Convention on Climate Change (UNFCCC). Emission Reductions under the Kyoto Protocol Pave the Way for Increased Ambition. https://unfccc.int/news/emission-reductions-under-the-kyoto-protocol-pave-the-way-for-increased-ambition
[16] Federal Emergency Management Agency (FEMA). Disaster Mitigation Act of 2000. https://www.fema.gov/sites/default/files/2020-11/fema_disaster-mitigation-act-of-2000_10-30-2000.pdf
[17] FEMA. Hazard Mitigation Assistance Grants. https://www.fema.gov/grants/mitigation
[18] UNFCCC. Paris Agreement - Status of Ratification. https://unfccc.int/process/the-paris-agreement/status-of-ratification
[19] IPCC. Global Warming of 1.5 C. https://www.ipcc.ch/sr15/
[20] UNFCCC. Glasgow Climate Pact. https://unfccc.int/documents/310475

unabated coal. Further, the Pact includes a commitment to provide increased climate finance to developing countries.

Appendix B

Community Engagement Summary

Summary of Engagement

Phase 1 Engagement (July 2024 – August 2024)

Total Survey Responses: 470

Organization	Description	Date(s)	#
City of Campbell	Survey posted on City webpage campbellca.gov/climatesurvey	July - August	
City of Campbell	Survey posted on City social media accounts	7/16; 7/22; 8/16	2,500
Campbell Community Development Department	Survey link emailed via Mail Chimp to subscribers of Campbell Community Development updates	6/28; 7/5;	5,000
Campbell Farmers Market	Tabling at Farmers Market to promote community survey	7/28; 7/4	800
Local Businesses	Flyers shared with ~30 businesses to post in windows or in backrooms for employees; posted on community boards (Starbucks, Philz Coffee, Sports Basement, Home Depot, etc.) to promote community survey	August	est. 150
Cambell Union School District	Email to all faculty/staff to promote community survey	7/16; 8/1; 8/12	400
Cambell Union High School District	Email to all faculty/staff to promote community survey	7/16; 8/1; 8/12;	300
City of Campbell Council, Boards, & Commissions	Survey shared in announcement during meetings	August	
Climate Action Community Advisory Committee	13 members asked to share survey with friends, family, neighbors, coworkers, etc.	6/27	
Silicon Valley Clean Energy	Shared in the Member Agency Working Group (MAWG) newsletter	7/12; 7/19	50

Phase 2 Engagement (October 2024 – December 2024)

Organization	Description	Date(s)	#
Breathe California	Forest Hill Fall Festival Tabling	10/18	100
Breathe California	Oktoberfest Fun Run Tabling	10/19	200
Breathe California	Tabling at Campbell Farmers Market to promote community survey	10/27	1,000
Breathe California	Rosemary Elementary Harvest Festival	10/30	350
Breathe California	Tabling at Campbell Farmers Market to promote community survey	11/17	1,000
Breathe California	Tabling at Campbell Farmers Market to promote community survey	11/24	650
Acterra	Tabling at Second Harvest Food Bank Farmers Market	11/15	400
Acterra	Focus Group at Campbell Community Center	12/10	12
Silicon Valley Youth Climate Action	Webinar training for youth, including discussion of vision	10/22	

Phase 3 Engagement (January 2025 – April 2025)

Total Survey Responses: 360

Organization	Description	Date(s)	#
City of Campbell Staff	Five interdepartmental meetings to discuss full list of measures and actions	1/28 – 2/6	12
Campbell City Council	Public Hearing to discuss measures and actions	3/18	
Campbell City Council	Mayor's announcements at start of meeting to promote community survey	4/1; 4/15	
City of Campbell	Survey posted on City webpage campbellca.gov/climatesurvey	July - August	
Cambell Union School District	Email to all faculty/staff to promote community survey	3/21; 3/31; 4/21	400
Cambell Union High School District	Email to all faculty/staff to promote community survey	3/21; 3/31; 4/21	300
Cambell Union High School District	Tabling at Student Career/Volunteer Fair to promote community survey and recruit students to SVYCA	3/19	50
Silicon Valley Youth Climate Action	Promoted community survey through Slack channel	3/26	
Breathe California	Promoted community survey through social media channels	3/28	
Mothers Out Front	Promoted community survey through newsletter	Late March	
Acterra	Promoted community survey through newsletter	Late March	
Moreland West Neighborhood Association	Meeting presentation to promote community survey	3/27	
Pruneyard-Dry Creek Neighborhood Association	Survey shared in community newsletter	3/25	
Kiwanis Club	Meeting presentation to promote community survey	4/1	10
Campbell Farmers Market	Tabling at Farmers Market to promote community survey	4/27	500
City of Campbell	Posted survey as a News Flash on the City's main webpage and Department webpage	3/20 – 4/30	
City of Campbell	Survey posted on City social media accounts	3/25; 4/8; 4/22	2,500
Campbell Community Development Department	Survey link emailed via Mail Chimp to subscribers of Campbell Community Development updates	3/28; 4/14; 4/22	5,000
City of Campbell Boards & Commissions	Survey shared in announcement during meetings	April	
Local Businesses	Flyers shared with businesses to post in windows or in backrooms for employees; posted on community boards (Starbucks, Philz Coffee, Sports Basement, Home Depot, etc.) to promote community survey	April	est. 150

Downtown Campbell Business Association	Presentation at monthly meeting to promote community survey	4/2	20
Downtown Campbell Business Association	Shared on DCBA's social media channels	April	

Community Advisory Committee
Meeting Summaries

Community Advisory Committee Meeting Summary

June 27, 2024, 5:30 pm – 7:00 pm
Remotely via Zoom

Meeting Overview

The first meeting of the Campbell Climate Action and Adaptation Plan Community Advisory Committee took place on June 27, 2024, from 5:30 pm to 7:00 pm remotely via zoom. The purpose of this meeting was to understand the role of the Community Advisory Committee, introduce the Climate Action & Adaptation Plan Project, purpose, and process, and discuss the initial conditions and identify community concerns and opportunities

Twelve Advisory Committee Members and the Project Team (Team), comprised of Tiffany Hudson, the Environmental Programs Specialist, and the consultant team, attended the meeting. Mindy Craig, Principal of BluePoint Planning, facilitated the group through the following agenda with support from Ryan Gardner, Project Manager and Camila Bobroff, Project Manager with Rincon Consultants, Inc.

1. Introductions & Meeting Objectives
2. Community Advisory Committee Role
3. About the Project
4. Initial Conditions
5. Discussion
6. Next Steps

Community Advisory Committee Members and the Campbell Climate Action and Adaptation Plan (Plan) team began with a brief introduction highlighting what members think is valuable to get out of this plan and planning process, followed by the roles, expectations, and responsibilities of the Community Advisory Committee. The Project Team then walked through a brief overview of the Climate Action and Adaptation Plan, purpose, and engagement process.

The Project Team then introduced an example of the Carbon Emission Analysis and the Key Climate Hazards and Impacts affecting Campbell. The Project team then presented the Potentially Vulnerable Populations, highlighting the focus of lifting up these groups in this planning process. The Community Advisory Committee was then asked for input on additional communities to be considered. The Project Team then presented the draft Climate Vulnerable Populations Map and asked the Committee if the indicated areas made sense and if there were additional areas to consider.

The project team then facilitated a conversation on what the Community Advisory Committee considers as the biggest concerns around climate, and the biggest opportunities for creating a resilient Campbell.

After reviewing the next steps, BluePoint closed the meeting. All meeting materials, including the presentation, meeting summary and notes, pictures of the activity, will be sent to Community Advisory Committee members via email and posted on the Slack channel.

The following pages provide details of the discussion.

Attendees

Advisory Group Members

- Shreya
- Tom McCalmont
- Yash Ranjith
- Dustin Makowski
- Meghana Varma
- Ulka Agarwal
- Martin Rouch
- Kurt Anderson
- Orisha Bhanushali
- Denise Witte
- Stephanie Morris
- Sean Mendelson

City Staff

- Tiffany Hudson, Environmental Programs Specialist

Campbell Climate Action & Adaptation Plan Project Team

- Ryan Gardner, Rincon Consultants
- Camila Bobroff, Rincon Consultants
- Mindy Craig, BluePoint Planning
- Allisia Sandoval, BluePoint Planning

Community Advisory Committee Meeting #1 Summary

Meeting Themes

- The Community Advisory Committee would like to ensure that this plan is **doable** and can be implemented and is **guided by community values**
- Ensuring the planning process is reaching those who are most affected by Climate Change and engages a wide audience (Children to business owners)
- Creating **multi-benefit solutions** (Ex; green spaces that are cooling centers but can also be used as community gathering spaces)
- Supporting **behavioral change** to build resilience but also providing the environment and infrastructure to nourish the behavioral change)
- Thinking holistically and **educating** the community on risks (both physical and mental), and benefits of change.
- Engaging and informing the next generation to start the conversation. Raise awareness and identify small changes that individuals can make today while breaking down concepts into smaller digestible chunks.
- Specific concerns on Air Quality, Air Pollution, and Extreme Heat, green spaces, Wildfires and effects on wildlife, Shade and urban forest

Action Items

- The next meeting is **September 27th virtually at 5:30-7:00pm**
- The project team will set up a Slack channel to foster Advisory Committee communication
- Please send any questions or comments to Tiffany at tiffanyh@campbellca.gov
- Homework: Review Social Vulnerabilities Map and verify that areas make sense, or if additional areas should be included
- This round of engagement includes a survey please take and share!

Meeting Notes:

The following text is more detailed notes from the meeting.

Questions & Answers during the presentation

Q: Will this be a consumption-based inventory?
A: This will not be a consumption based inventory, but there is a large consumption-based inventory that was completed by UC Berkeley that will be integrated/referenced. It is not at the county level.

Q: What is included under Waste (food waste vs separated waste?
A: Includes all of the emissions generated in the landfill as it decays. All the waste that is sent in a specified year, and the emissions as this amount of waste decays at once. About 95% of this is methane from organic waste. This does not include organic or green waste that is composted that does not go to the landfill since it breaks down.

- The Landfill emissions are counted based on waste that is generated in Campbell. It is the same process with how energy emissions are calculated.
- Some things are counted outside the city like
    - Transportation: Vehicle miles traveled both to the city and out of the city (divided in half and allocated between relevant cities)
    - Electricity (electricity needed for a water pump at the city level)

The 2017 Inventory is an example and will not be used as the baseline. The inventory that is being created is a 2022 Inventory.

Q: Can we do a comparative analysis from 2017 to 2022
A: Since this is the first inventory for Campbell there is no 2017 data to compare to, the 2022 Inventory will be the baseline.. Though the Santa Clara County GHG inventory will be ready soon for 2022 to do a comparative analysis at the county level.

Discussion on Climate Vulnerable Populations Map

The map presented in the presentation shows areas of high proportion of vulnerable populations within Campbell. The areas identified are culminations of data sets that are given a threshold score. The black line indicated city limits, with the lower portion being Los Gatos.

- Do the locations of the climate vulnerable areas generally make sense?

- Add the area around Campbell Park and the creek specifically for unsheltered individuals and those in Mobile Home communities.
- Hamilton Santa Mass and the South by 185 do not make sense
- What caused the area by 85?
    - Could be a lot of renters, non English, high proportion of children

Discussion on Key Concerns, Opportunities & Needs

What are the key concerns or opportunities around climate?

- People getting left out of the process or are not engaged. Engage the entire community from the children to the business.
- Creating multi-benefit solutions (Ex; green spaces that are cooling centers but can also be used as community gathering spaces)
- Supporting behavioral change to build resilience but also providing the environment to nourish the behavioral change (Ex: More bike lanes support people using bikes as the primary mode of transportation)
- Thinking holistically and educating the community on risks (both physical and mental), and benefits of change.
- Leading with community values and creating something the community can actually do.
- Engaging and informing the next generation to start the conversation.
- Identify goals and targets to actively work towards.
- Raise awareness and identify small changes that individuals can make today while breaking down concepts into smaller digestible chunks.
- Specific concerns on Air Quality, Air Pollution, Extreme Heat, green spaces, Wildfires and effects on wildlife, Shade and urban forests

Community Advisory Committee Meeting Summary

September 16, 2024, 5:30 pm – 7:00 pm
Via zoom

Meeting Overview

The second meeting of the Campbell Climate Action and Adaptation Plan Community Advisory Committee took place on September 16, 2024, from 5:30 pm to 7:00 pm remotely via zoom. The purpose of this meeting was to share the results of the Greenhouse Gas Inventory results, the Community Vulnerability Analysis, and the results from the community survey and begin to develop a community vision and priorities to guide the Climate Action and Adaptation Plan.

Seven Advisory Committee Members and the Project Team (Team), comprised of Tiffany Hudson, the Environmental Programs Specialist, and the consultant team, attended the meeting. Mindy Craig, Principal of BluePoint Planning, facilitated the group through the following agenda with support from Ryan Gardner, Project Manager with Rincon Consultants, Inc.

1. Introductions & Meeting Objectives
2. Project Recap
3. Results of GHG Emissions Inventory
4. Results of Vulnerability Analysis
5. Community Survey Results
6. Visioning Exercise
7. Next Steps

Community Advisory Committee Members and the Campbell Climate Action and Adaptation Plan (Plan) team began with a brief introduction followed by an overview of the Climate Action and Adaptation Plan, current process and project phase and engagement activities planned for this round, and a recap of the previous Advisory Committee Meeting.

The team then presented the results of the Greenhouse Gas Inventory results for both the larger community and Municipal operations. The team then walked through the guiding California targets and explained how Campbell can reach these targets in each sector highlighting the work currently being done by the city.

Building off of the Greenhouse Gas Inventory Report the team then walked through the Community Vulnerability Analysis which highlights which areas in Campbell are the most vulnerable to climate hazards which was developed with considerations of socially vulnerable areas, projected floodplain areas, and input from the Community Advisory Committee. The team then walked through the climate hazards and key impacts that are likely to affect Campbell, including Riverine Flooding, Extreme Heat, Air Quality Degradation, and Drought.

The team then provided a brief overview of the previous phase of engagement, highlighting the number of people reached, the collection and promotion process followed by key findings and direct survey results.

The Community Advisory Committee then participated in an online activity using the tool Mural to develop a vision for a resilient Campbell but moving and categorizing pictures as Essential, Important, and Good to have. The Community Advisory Group Members then dove into a topic specific discussion on Transportation using the Conversation Cards.

After reviewing the next steps, BluePoint closed the meeting. All meeting materials, including the presentation, meeting summary and notes, pictures of the activity, will be sent to Community Advisory Committee members via email and posted on the Slack channel.

The following pages provide details of the discussion.

Attendees

Advisory Group Members

- Tom McCalmont
- Ulka Agarwal
- Martin Rouch
- Denise Witte
- Stephanie Morris
- Sean Mendelson

City Staff

- Tiffany Hudson, Environmental Programs Specialist

Campbell Climate Action & Adaptation Plan Project Team

- Ryan Gardner, Rincon Consultants
- Mindy Craig, BluePoint Planning
- Allisia Sandoval, BluePoint Planning

Community Advisory Committee Meeting #2 Summary

Meeting Themes

- Through the visioning exercise the Community Advisory Committee Members began to highlight the importance of the following as part of the Community Vision:
    - Healthy food and climate-friendly diets
    - Safe, protected, and connected biking routes
    - Electric charging infrastructure and capacity
    - Clean and reliable energy
    - Education and infrastructure to support behavior shifts
    - Swiss army knife solutions highlighting the muti-benefits
- The Community Advisory Committee also recommends closing streets for cars and activating downtown for people.

Action Items

- The next meeting is **January 16th in person from 5:30pm-7:30 pm**
- Please use the Comment Cards to have topic conversations with your neighbors, friends, or family and record their feedback
- Please also help us promote the community padlet!
- Please send any questions or comments to Tiffany at tiffanyh@campbellca.gov
- The project team will be working with Community Based Organizations to conduct community outreach from September – early December

Activity Notes:

The following text is more detailed notes from the activity.

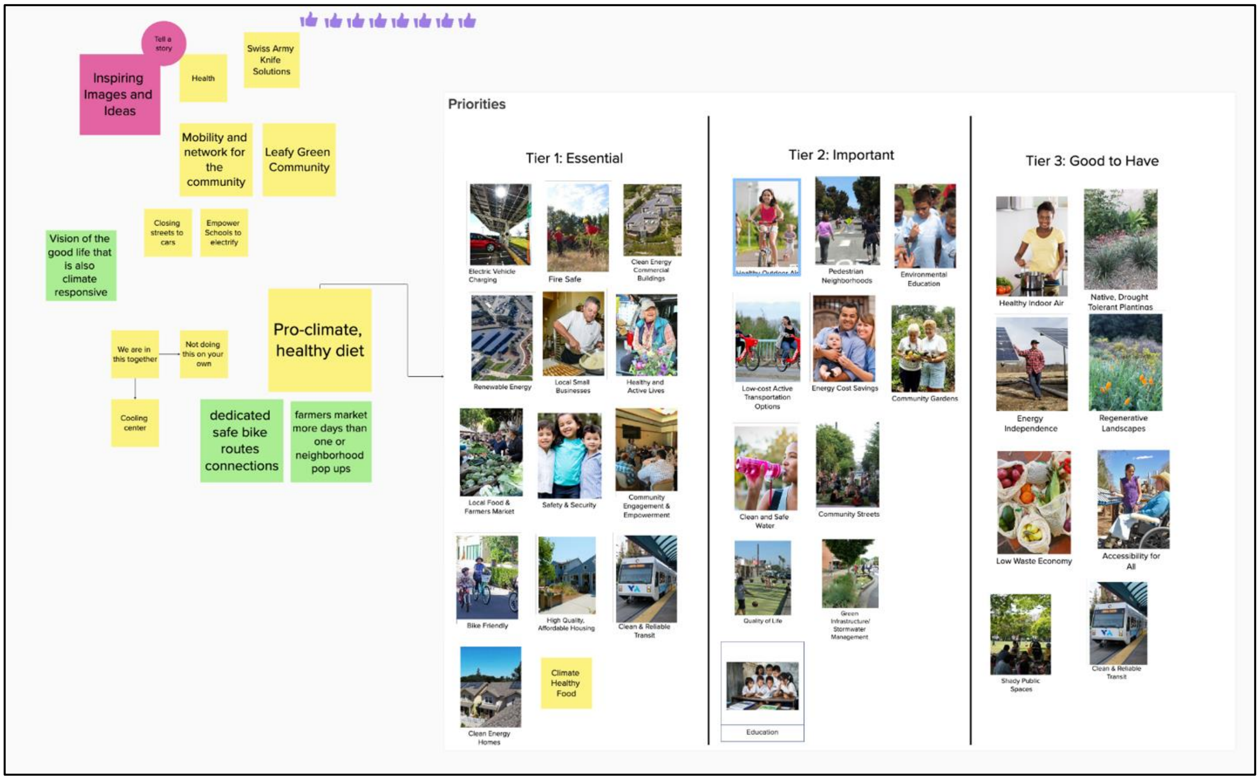
Visioning Activity

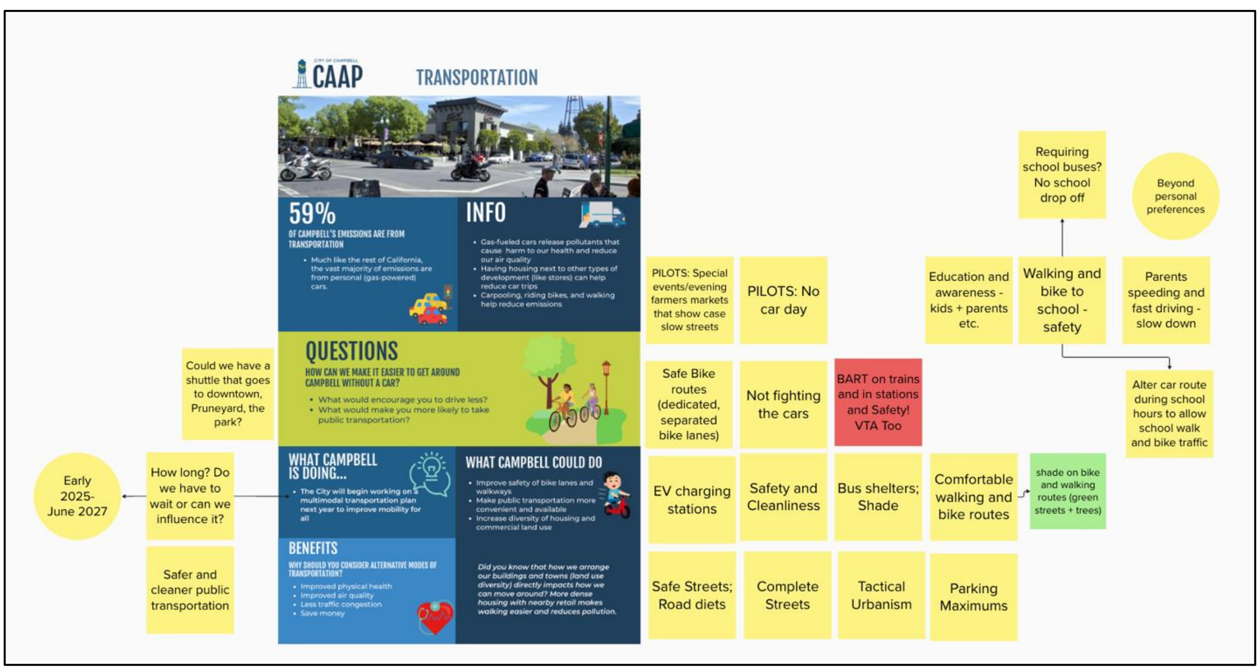
- Promoting health at the forefront is important
- A good life that is climate-responsive and resilient
- We need to promote swiss army knife solutions for people to want to make change
- A vision for a leafy green Campbell with more trees
- Closing streets for cars
- Promoting a pro-climate healthy diet and access to food through neighborhood pop ups or farmers markets
- Connecting the city through dedicated safe bike lanes or shuttles

Transportation Conversation Card

- Safer and cleaner transportation
- Safe streets with calmer slower and complete streets
    - Not fighting the cars
- Improving waiting for transportation with safety and shade
- Pilot no car days, using down town for people
- Walking and biking to school safety, reducing parents speed at drop off
    - Maybe alternative route for people who bike or walk to school
- Education and awareness

Pictures of Mural Activity


Tell a story
Inspiring Images and Ideas
Health
Swiss Army Knife Solutions
Mobility and network for the community
Leafy Green Community
Closing streets to cars
Empower Schools to electrify
Vision of the good life that is also climate responsive
Pro-climate, healthy diet
We are in this together
Not doing this on your own
Cooling center
dedicated safe bike routes connections
farmers market more days than one or neighborhood pop ups
Priorities
Tier 1: Essential
Electric Vehicle Charging
Fire Safe
Clean Energy Commercial Buildings
Renewable Energy
Local Small Businesses
Healthy and Active Lives
Local Food & Farmers Market
Safety & Security
Community Engagement & Empowerment
Bike Friendly
High Quality, Affordable Housing
Clean & Reliable Transit
Climate Healthy Food
Clean Energy Homes
Tier 2: Important
Pedestrian Neighborhoods
Environmental Education
Low-cost Active Transportation Options
Energy Cost Savings
Community Gardens
Clean and Safe Water
Community Streets
Quality of Life
Green Infrastructure/ Stormwater Management
Education
Tier 3: Good to Have
Healthy Indoor Air
Native, Drought Tolerant Plantings
Energy Independence
Regenerative Landscapes
Low Waste Economy
Accessibility for All
Shady Public Spaces
Clean & Reliable Transit


CAAP
TRANSPORTATION
59%
OF CAMPBELL'S EMISSIONS ARE FROM TRANSPORTATION
Much like the rest of California, the vast majority of emissions are from personal (gas-powered) cars.
INFO
Gas-fueled cars release pollutants that cause harm to our health and reduce our air quality
Having housing next to other types of development (like stores) can help reduce car trips
Carpooling, riding bikes, and walking help reduce emissions
QUESTIONS
HOW CAN WE MAKE IT EASIER TO GET AROUND CAMPBELL WITHOUT A CAR?
What would encourage you to drive less?
What would make you more likely to take public transportation?
WHAT CAMPBELL IS DOING...
The City will begin working on a multimodal transportation plan next year to improve mobility for all
WHAT CAMPBELL COULD DO
Improve safety of bike lanes and walkways
Make public transportation more convenient and available
Increase diversity of housing and commercial land use
BENEFITS
WHY SHOULD YOU CONSIDER ALTERNATIVE MODES OF TRANSPORTATION?
Improved physical health
Improved air quality
Less traffic congestion
Save money
Did you know that how we arrange our buildings and towns (land use diversity) directly impacts how we can move around? More dense housing with nearby retail makes walking easier and reduces pollution.
Could we have a shuttle that goes to downtown, Pruneyard, the park?
Early 2025- June 2027
How long? Do we have to wait or can we influence it?
Safer and cleaner public transportation
PILOTS: Special events/evening farmers markets that show case slow streets
PILOTS: No car day
Safe Bike routes (dedicated, separated bike lanes)
Not fighting the cars
BART on trains and in stations and Safety! VTA Too
EV charging stations
Safety and Cleanliness
Bus shelters; Shade
Safe Streets; Road diets
Complete Streets
Tactical Urbanism
Parking Maximums
Requiring school buses? No school drop off
Beyond personal preferences
Education and awareness - kids + parents etc.
Walking and bike to school - safety
Parents speeding and fast driving - slow down
Alter car route during school hours to allow school walk and bike traffic
Comfortable walking and bike routes
shade on bike and walking routes (green streets + trees)

Community Advisory Committee Meeting Summary

January 16, 2024, 5:30 pm – 7:30 pm
Campbell City Hall | 70 N 1st St. Campbell, CA

Meeting Overview

The third meeting of the Campbell Climate Action and Adaptation Plan Community Advisory Committee took place on January 16, 2024, from 5:30 pm to 7:30 pm at the Campbell City Hall Council Chambers. The purpose of this meeting was to review Phase 2 of community engagement efforts and share the resulting initial community values, introduce the Scenario Planning and Reductions Quantification Tool (SPARQ), share draft measures and begin to develop actions.

Five Advisory Committee Members and the Project Team (Team), comprised of Tiffany Hudson, the Environmental Programs Specialist, and the consultant team, attended the meeting. Mindy Craig, Principal of BluePoint Planning, facilitated the group through the following agenda with support from Ryan Gardner, Project Manager with Rincon Consultants, Inc.

1. Introductions & Meeting Objectives
2. Project Recap
3. Community Engagement Round 2
4. Measure & Action Development
5. Draft Systems & Measures
6. Action Brainstorm Discussion
7. Next Steps

Community Advisory Committee Members and the Campbell Climate Action and Adaptation Plan (Plan) team began with a brief introduction followed by an overview of the Climate Action and Adaptation Plan, current process and project phase and engagement activities planned for this round, and a recap of the previous Advisory Committee Meeting. The team then provided a brief overview of the previous phase of engagement, highlighting the number of people reached, the activities, and the collection process followed by the initial community values developed from the engagement.

The team then presented the process for Measure & Action Development for this Plan and introduced the SPARQ tool, which is used to calculate potential emissions reduction pathways based on different climate strategies. The Community Advisory Committee then took a survey on the Climate Action and Resilience Pathways, which prompted participants to choose a pathway “ambitious, moderate, or no action” as it relates to each sector and measure of the Plan to reduce greenhouse gas emissions in Campbell. The team inputted the survey results into the SPARQ tool in real time to show the expected projected emission reductions based off of the Advisory Committee's aggregate responses. The consultant team then walked through each sector (Transportation, Building Systems, Urban Ecosystems and Sustainable Food, and Social Governance Systems) and had a preliminary discussion on measures and actions to reach the projected targets.

After reviewing the next steps, BluePoint closed the meeting. All meeting materials, including the presentation, meeting summary and notes, pictures of the activity, will be sent to Community Advisory Committee members via email and posted on the Slack channel.

The following pages provide details of the discussion.

Attendees

Advisory Group Members

- Ulka Agarwal
- Martin Rouch
- Denise Witte
  Stephanie Morris
- Sean Mendelson

City Staff

- Tiffany Hudson, Environmental Programs Specialist

Campbell Climate Action & Adaptation Plan Project Team

- Ryan Gardner, Rincon Consultants
- Mindy Craig, BluePoint Planning
- Allisia Sandoval, BluePoint Planning

CITY OF CAMPBELL
Climate Action & Adaptation Plan

Community Advisory Committee Meeting #3 Summary

Meeting Themes

- Through the survey evaluating emissions reduction strategies, the Advisory Committee chose an aggressive pathway for the majority of actions to reach reduction targets.
- The Advisory Committee recommends adding an educational section to the plan to help motivate people to change behavior and reduce emissions.
- The Advisory Committee recommends piloting programs downtown to limit or remove cars and use streets for the community to support behavior change.

Action Items

- The next meeting is **March 20th virtually at 5:30-7:30pm**
- The project team will update the survey based off feedback received
- Please send any questions or comments to Tiffany at tiffanyh@campbellca.gov
- The project team will be conducting community outreach on the Climate Action and Resilience Pathways from January – early April

Meeting Notes:

The following text is more detailed notes from the meeting.

Presentation Notes

The following questions were posed by the Advisory Group during the presentation. Answers were included from the Project Team as well.

Question: How much of the reduction targets are regulatory mandated by the state?
Answer: There are no requirements to reach GHG reductions, but the State does incentivize it.

Question: Campbell has a particularly high amount of particulate matter, which causes damage to the ozone layer; why is this?
Answer: There are a lot of emissions coming from gas vehicles and diesel vehicles and equipment. This could also be coming from the combustion of natural gas in buildings

SPARQ Survey Feedback

The 2022 Greenhouse Gas Emissions Inventory result was discussed as a preamble to the survey, the results of the inventory are below.

This report is not a consumption-based inventory and does not include scope 3 emissions like embodied carbon or emissions associated with building or creating things.

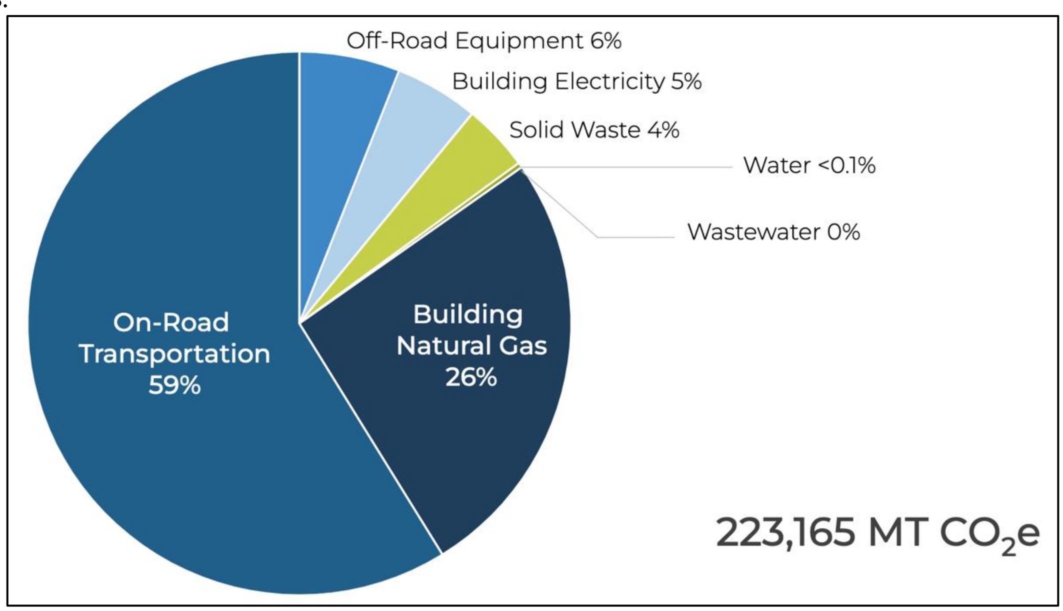


Figure 1 Campbell 2022 Greenhouse Gas Emissions

The SPARQ Tool helps to show what levers (policy changes or behavior change projects) the City of Campbell can utilize to reduce emissions and reach reduction targets.

After taking the Climate Action and Resilience Pathways Survey the Advisory Committee had the following feedback.

- The survey was informative and made people think about the implications of each action.
- A regular community member may think these things as unattainable, can we change the language (ambitious, moderate, no action) to guide participants to a more impactful option.
- To further differentiate the options add a cost benefit analysis.
- Community Advisory Committee Members have been presented and understand the Greenhouse Gas Inventory which provides context for the survey and its questions. This should be added to the beginning.
- Add other success measures or policies that have made a significant impact, such as the no NOx policy, for options to seem more achievable.

Activity Discussion

After the Community Advisory Committee had completed the survey the results were uploaded to the SPARQ tool. The image below shows the following results which guided the discussion. The following are notes from the discussion.

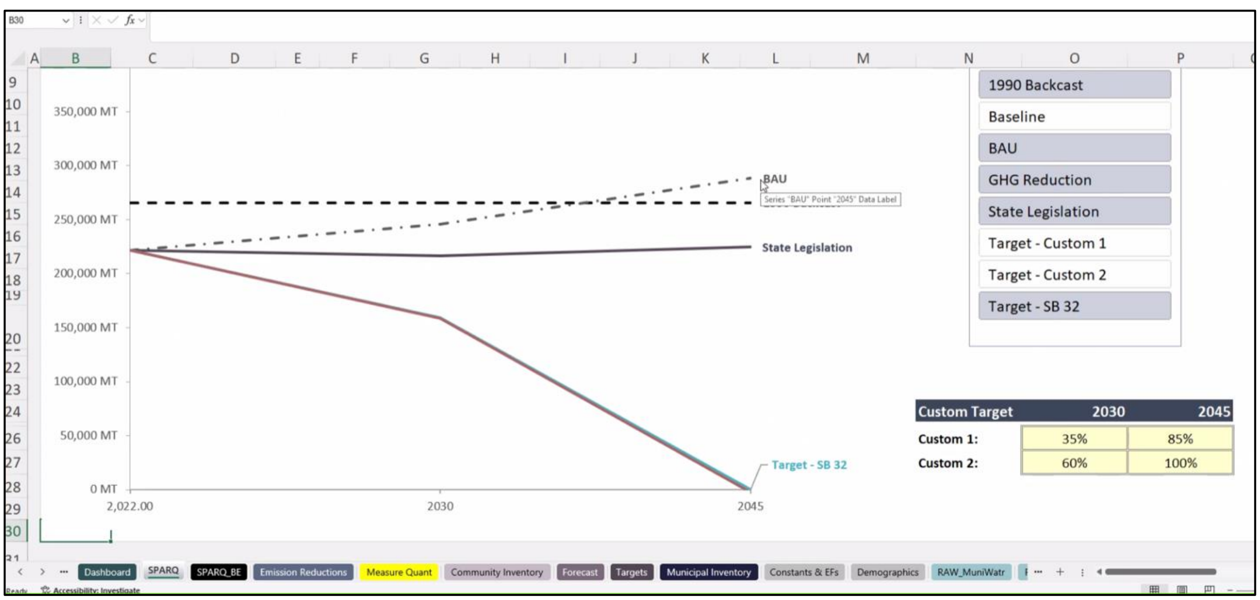


Figure 2 SPARQ Tool Dashboard

Similar to the Greenhouse Gas Inventory, the SPARQ tool does not include embodied carbon. Rincon is still waiting for guidance on frameworks to accurately count these emissions.

- **The Advisory Committee recommends adding an educational or behavioral section** on actions that may not be included in these emissions but still make an impact, including:
    - Plastic usage
    - Consumption

Building Energy Measures

- This sector assumes 100% of the electricity will be carbon-free
- Campbell has passed an electric building ordinance in 2022 which is supporting this reduction
- Campbell cannot make an ordinance that removes residents working gas water heater or furnace and replace it with their electric counterparts, so the focus is instead on the permitting side when it comes to replacing these appliances
- There are state reimbursements to support the electric replacements for these appliances
- 80% of gas use comes from water heating and gas heating
- Campbell could extend the no NOx ordinance to the water heater and HVAC system or offer a checklist that incentivizes reductions
- Campbell could enforce a two-AC requirement (heating and cooling system in one) to reduce the need for multiple appliances and emissions
- Bring together education and incentives

Transportation

- The transportation sector is the biggest emission source
- Reducing emissions involves getting people out of their cars, using public transportation, and making vehicles electric
- It is really hard to reduce Vehicle Miles Traveled (VMT) as California is a car-central place
- The answer is to redesign cities, and the question is how much money and resources to put into this
    - Removing parking is difficult
- Campbell has a downtown that can be used to pilot areas for a different type of lifestyle, like walking, car low areas, or a jitney service
- Campbell could build infrastructure for designated drop off zones for people with disabilities
- Creating a connected network of bike lanes would reduce emissions
- Working with transportation services and workplaces to incentivize public transportation for commuting

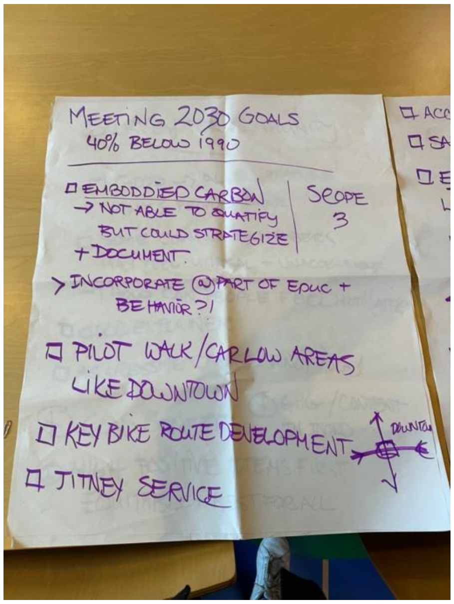
Electric Vehicles

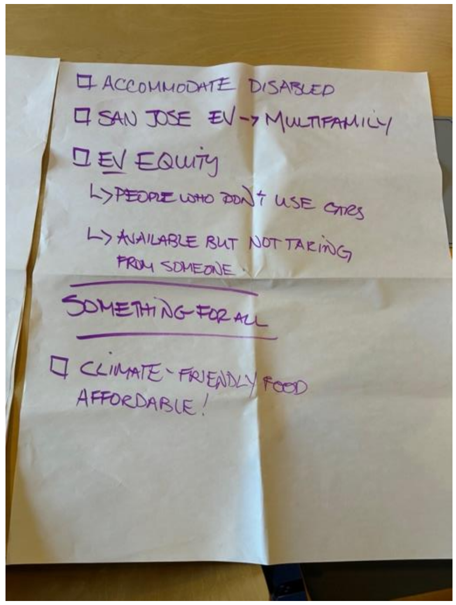
- The State's legislation will mandate a ban on the sale of gas vehicles by 2035 which will help reduce transportation emissions
- How do we provide the infrastructure to support a shift t
  - Public charging stations
    - Including areas for people without a Single Family Garage to charge
    - Areas for road trip charging
  - Workplace charging stations
- Advancing municipal vehicles to clean vehicles
- Ensuring EV equity
  - Thinking about people who do not use cars
  - Making things available but not taking from someone, for ex. In multi-family residents with competing priorities, an electric vehicle charger may not be the top priority

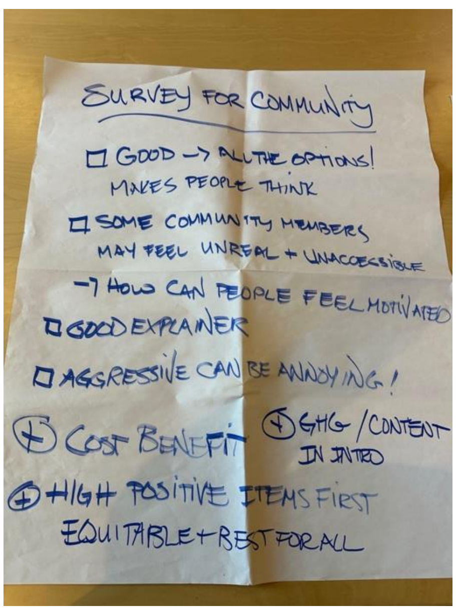
Sustainable Food

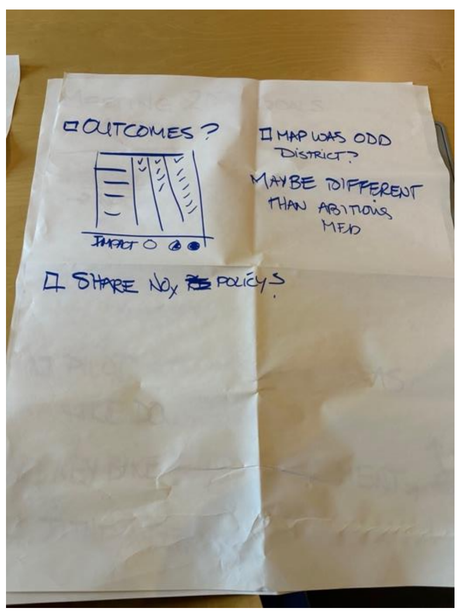
- Improving access to climate-friendly, healthy, and affordable food will help promote healthy lifestyles and reduce food waste

Pictures of Discussion Wall Graphic









Community Advisory Committee Meeting Summary

March 20, 2025, 5:30 pm – 7:00 pm
Remotely via Zoom

Meeting Overview

The fourth meeting of the Campbell Climate Action and Adaptation Plan Community Advisory Committee (CAC) took place on March 20, 2025, from 5:30 pm to 7:00 pm remotely via Zoom. The purpose of this meeting was to do a deep dive into key Climate Action and Adaptation Plan (CAAP) actions, share feedback received at the City Council, and continue to refine and develop community priorities and cornerstone measures for the Plan.

Seven Advisory Committee members and the Project Team (Team), comprised of Tiffany Hudson, Environmental Programs Specialist, and the consultant team, attended the meeting. Mindy Craig, Principal of BluePoint Planning, and Ryan Gardner, Project Manager with Rincon Consultants, facilitated the group with the following agenda:

1. Introductions & Meeting Objectives
2. Project Recap
    a. Project Overview
    b. Recap of Community Advisory Committee Meeting 3
    c. Community Survey
3. Measure & Action Development
    a. What We Heard from City Council
    b. Deep Dive into Key CAAP Actions
    c. Community Priorities and Cornerstone Measure
4. Next Steps

CAC members and the Project Team began with a brief introduction followed by an overview of the CAAP, the process and engagement activities planned for this round, and a recap of the previous CAC Meeting. The Team informed the CAC that the community survey, presented at the previous meeting, has been updated based on their feedback and is ready for the public.

The Team then provided an overview of the inputs and guidance for measure and action development including greenhouse gas emission reduction, community resilience and community feedback then reviewed the key CAAP systems, which include transportation systems, urban ecosystems and sustainable food, building systems, and social and governance systems. The Team shared the feedback received from City Council on the CAAP direction and draft measures and actions.

The Team requested that the CAC review the draft measures and actions and provide feedback by April 3, 2025.

The Team then facilitated the group through three activities using the online tool Mural.

1. The first activity asked CAC members to identify locations throughout the City to implement three key actions: targeted zoning changes, including promoting mixed use commercial development; mobility hubs; and roads for lane removal.
2. The second activity asked CAC members to evaluate the Community Priorities developed through community engagement to date and add any additional areas to consider.
3. The last activity asked CAC members to identify existing or new strategy areas for high impact community-driven strategies to call out in the Plan.

After reviewing the next steps, BluePoint closed the meeting. All meeting materials, including the presentation, meeting summary and notes, pictures of the activity, will be sent to CAC members via email and posted on the Slack channel.

The following pages provide details of the discussion.

Attendees

Advisory Group Members

- Ulka Agarwal
- Martin Rauch
- Denise Witte
- Stephanie Morris
- Sean Mendelson
- Meghna Varma
- Dustin Markowski

City Staff

- Tiffany Hudson, Environmental Programs Specialist

Campbell Climate Action & Adaptation Plan Project Team

- Ryan Gardner, Rincon Consultants
- Mindy Craig, BluePoint Planning
- Allisia Sandoval, BluePoint Planning

Community Advisory Committee Meeting #4 Summary

Meeting Themes

- In the first activity, CAC members identified a preliminary set of areas for targeted zoning changes, including recommendations to:
    - Add mixed use centers and mobility hubs farther from downtown
    - Institute road diets on San Tomas Ave., Winchester Ave., Campbell Ave, Hacienda.
    - Establish road diets near schools to promote safety
    - Create both road diets and mobility hubs in tandem to support behavior change
- In the second activity, CAC members identified equity and reducing the burden of climate impacts to disadvantaged communities as a top priority. Additional priorities included promoting tree canopies, clean and renewable energy, community capacity, biodiversity, and reducing single-use goods.
- CAC members also highlighted tree canopies, biodiversity and reusable goods as areas for the to build community-capacity and create community-driven high-impact cornerstone actions.

Action Items

- Please take and share the Community Survey with your community! You are welcome to use the social media graphics (emailed from Tiffany) to promote the survey. Survey can be found at this link: https://www.surveymonkey.com/r/9MPMD3S?GHG=[GHG_value]
- Review the Draft Measures and Actions by April 3rd and send all feedback to Tiffany at tiffanyh@campbellca.gov.
- The Project Team will be refining Measures and Actions based on feedback received and will begin drafting the Plan.
- The next CAC meeting will be in early summer to gather feedback on the Draft Plan and to discuss implementation.

Meeting Notes:

The following text is more detailed notes from the activities.

Presentation Notes

Questions and Answers on Draft Measures and Actions

Q: Unsure of how the city has the ability to do some of these things, is reducing the adoption of single use vehicles building off of the state actions or is this something the city can influence?

A: The measures are the high level areas we want to go, under the measures are all the actions that will help them get to implementation. There is a lot of stuff the city can do but a lot will come down to people making different choices.

- 45% of emissions in the United States come down to the kitchen table and decisions on questions like, what car are we going to buy, what HVAC system, what stove, what heater etc.. Getting people to make these decisions to reduce emissions will come from incentives.

Q: Do you think we have a council that will be more responsive to our progressive actions? It is important when framing these actions as there is a short term cost now but it outweighs the long term cost of doing nothing or responding to damage from a hazard.

A: This Plan is aimed to make peoples lives easier, after presenting some of the more aggressive things to Council they were generally on board but we did receive pushback on removing parking.

Q: Once the plan is adopted and we have all the draft measures in place will the Council need to approve all of them then at a later time to implement them?

A: Generally they will approve this plan then that will allow staff to implement some actions on their own, others they will have to go back to city council for approval like building ordinances ect. In this case when going back to Council they have the support of Climate Action and Adaptation Plan being already adopted to pass what ever is needed

Activity 1 Areas for Actions

Advisory Committee members identified the following areas to implement the following 3 actions.

TR 1.6: Mixed use

- Area above Hacienda and San Tomas Ave, this area is father away from existing stores
- Further away from downtown you have to take a car to get anywhere, so adding mixed use areas and hubs further out

TR 1.11: Mobility hubs

- Bike lanes on Winchester
- Next to Jack Fisher park next to the high school and middle school
- Further away from downtown needs additional options of transportation

TR 1.13: Road diets identify areas for lane removal

- Campbell Ave, it is busy in some places but not in others
- San Tomas all the way to Vasking
- Downtown Campbell, reducing lanes and promoting pedestrian only areas
- Hacienda, the road is too big
- Traffic on Winchester is too busy, Winchester and Bud has a lot of people walking
- West of San Tomas, reduce the number of lanes as people are trying to cross to Safeway and Target
- Hamilton and connection to 17

General Comments:

- Accidentally moving next to a 7/11 it is actually very convenient and saves a lot of travel
- Mobility hubs and road diets are symbiotic but not interchangeable, they are similar but have different impacts.
- Connecting the schools with the parks and making it less congested especially during peak hours and allow for safe child drop off and access to the highway. There are issues of safety around schools.
- Looking at areas with disadvantaged communities and how these actions can support them, avoiding further burdens.
- Implementing these actions in areas with visible change to show the community that change is happening.

Activity 2 Community Priorities

Looking at bigger buckets the CAC highlighted the following community priorities:

- Healthy Equity Wellness
- Cost effectiveness
- Clean and renewable energy
- Connected community
  - Building community capacity
- Health equity & wellness
  - Health status effects and boots climate resilience
  - People in the most impacted areas tend not to be the healthiest because of the impacts
- Tradeoffs are not hitting the members of our community that are struggling
  - Costs and impacts but also in benefits
- Biodiversity native plants and trees
  - Increasing Tree cover to reduce impacts of heat and flooding
  - 3x30x300
    - 3 trees out of your window within 30 ft of greenery and 300 meters from a park
  - Maintenance of your trees and the existing canopy
  - Equitable distribution of tree canopies
- Reusables and composting, promoting organizations offering reusable plates
  - Things to share with community

Activity 3 Cornerstone Measure:

Is there a measurable action or something you would like to showcase the values we did, something to do early on?

- Reusables that we can see instant waste reduction
- Tree canopy and community building, or improved landscaping
- Focusing on the smaller communities and how they can make a difference
- Making the city more walkable
- Community garden where we plant an edible garden with free vegetables or fruit trees, ensuring the community knows how to access
- Electrify
- Green stormwater and water management tied in with tree canopies
- Paradigm shift on how people think
  - We are going to make a stand as a community to make a change,

Pictures of Discussion Wall Graphic

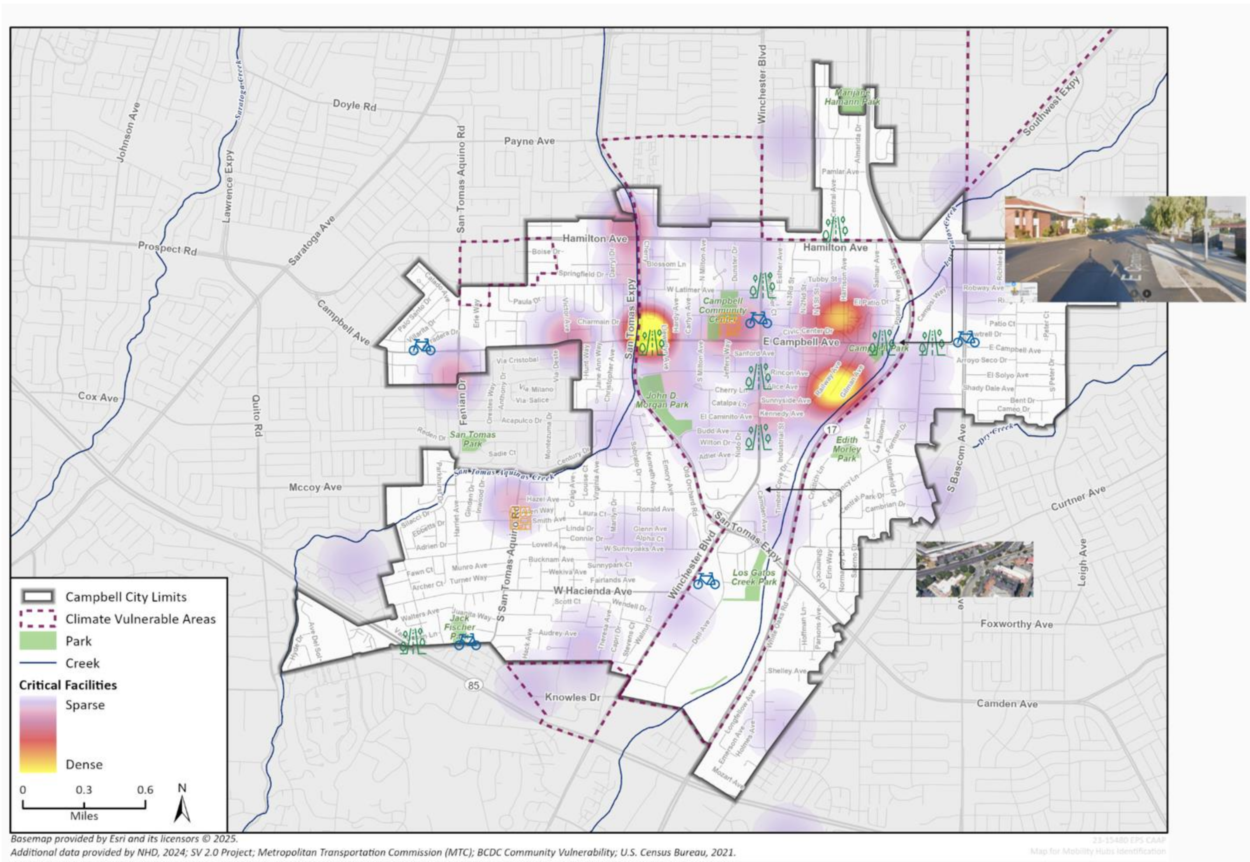


Figure 1 Activity 1 Areas for Action

Community Advisory Committee Meeting #4 Summary

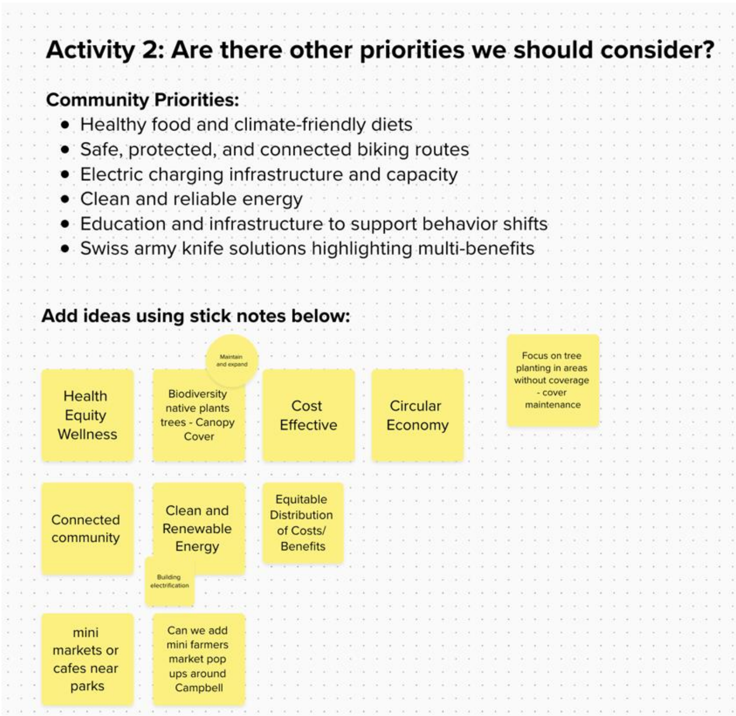


Figure 2 Activity 2 Community Priorities

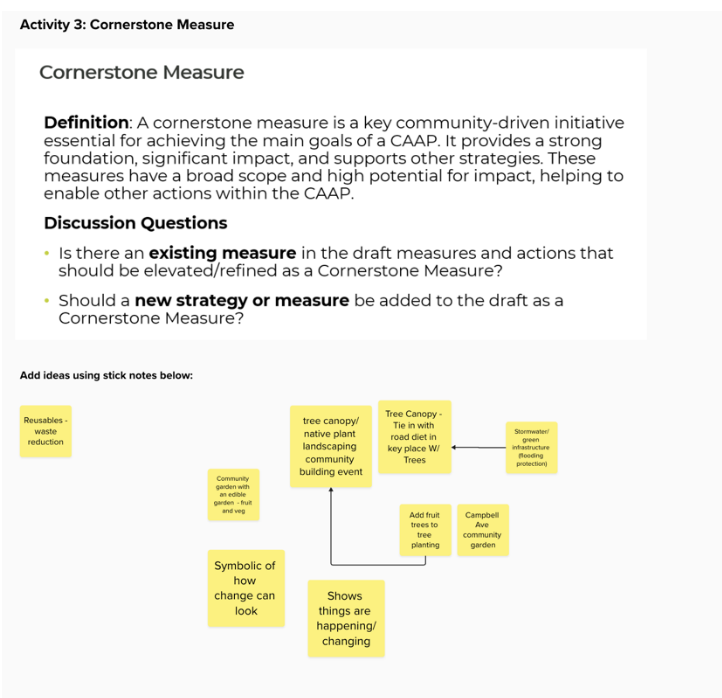


Figure 3 Activity 3 Cornerstone Measures

Community Advisory Committee Meeting Summary

June 26, 2025, 5:30 pm – 7:00 pm
Remotely via Zoom

Meeting Overview

The fifth meeting of the Campbell Climate Action and Adaptation Plan (CAAP) Community Advisory Committee (CAC) was held remotely via Zoom on June 26, 2025, from 5:30 PM to 7:00 PM. The meeting focused on reviewing initial impressions and gathering feedback on the early draft of the CAAP. Committee members also discussed input received from Community Survey #2, the City Council, and City staff, and discussed how this feedback has influenced the development of the plan.

Five members of the Community Advisory Committee and the Project Team attended the meeting. The Project Team included Tiffany Hudson, Environmental Programs Specialist, along with the consultant team from Rincon Consultants. Ryan Gardner, Director-in-Charge, and Camila Bobroff, Project Manager, facilitated the meeting and guided the group through the following agenda:

- Welcome & Ice Breaker
    - Project Recap & Updates
    - CAAP Process Overview
    - Community Advisory Committee Meeting #4 Highlights (03/20/25)
    - Community Survey #2 Insights
- Early Review of Public Draft CAAP
    - City Council Feedback
    - The Power of Community Voice
    - Discussion: First Impressions & Feedback on the Draft CAAP
- Next Steps

The CAC members and Project Team began the meeting with a brief welcome and icebreaker, followed by an overview of the CAAP process and a recap of the previous CAC meeting. The Project Team then presented the results of Community Survey #2 and explained how this community feedback has informed the development of the Draft CAAP.

Next, the Project Team shared feedback received from the City Council and City staff, highlighting how this input led to revisions in specific measures and actions. They also emphasized the importance of community voices at City Council meetings as the CAAP moves closer to adoption.

The Team then showcased sections of the Draft CAAP that were developed directly in response to CAC recommendations, including the Consumption-Based Inventory and the Climate Action and Resilience Roadmaps for Individuals.

Following the presentation, the Project Team facilitated an open discussion to gather first impressions of the Draft CAAP. The conversation was guided by the following questions:

- What parts of the Draft CAAP felt the clearest or most compelling to you?
- Were there any sections that felt confusing or too technical? What would help clarify them?
- Do you feel the draft reflects the priorities and concerns of our community? Why or why not?
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Attendees

Advisory Group Members

- Ulka Agarwal
- Martin Rauch
- Denise Witte
- Stephanie Morris
- Meghna Varma

City Staff

- Tiffany Hudson, Environmental Programs Specialist

Campbell Climate Action & Adaptation Plan Project Team

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Next Steps

- By July 10, 2025 – CAC to review and provide feedback on the Administrative Draft CAAP.
- Mid–Late July 2025 – Project Team to refine the Administrative Draft and prepare the Public Draft CAAP.
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- August–September 2025 – CAC members to share the Public Draft CAAP with your networks and provide additional feedback (optional).
- October 21 & 23, 2025 (Tentative) – 🎉 Join us at the City Council Adoption Meetings!
  - Show your support, provide public comment, celebrate the culmination of our work!

Meeting Notes:

The following notes summarize key points from the Community Advisory Committee (CAC) discussion on the Draft Climate Action and Adaptation Plan (CAAP):

Positive Feedback

- **Empowering Tools**: CAC members appreciated the inclusion of the **Consumption-Based Inventory** and the **Climate Action and Resilience Roadmaps for Individuals**, noting that these tools empower residents to take meaningful action.

Suggestions for Improvement

- **Making Emissions Data Tangible**: Members found large greenhouse gas (GHG) emissions figures difficult to interpret. They recommended using relatable comparisons—such as the number of Olympic swimming pools, miles driven in a gasoline car, or emissions from a small country—to help contextualize the data.
- **Clarifying Individual Impact**: The Roadmaps could better highlight the impact of individual actions. For example, quantifying the emissions reduction from a community-wide "Meatless Monday" initiative (e.g., "equivalent to taking X gasoline cars off the road") would make the benefits more concrete.
- **Linking Actions to Inventory Reductions**: Members expressed interest in seeing how the Consumption-Based Inventory would change if Campbell residents adopted the actions outlined in the Roadmaps, such as switching to electric vehicles.
- **Improving Visuals**: While the CAAP is generally well-written and accessible, Figure 13 (emissions forecasts, targets, and gaps) was noted as confusing. Suggestions included:
    - Removing the two preceding bar charts.
    - Adding 1990 emissions data for context.
    - Labeling lines directly on the chart instead of using a legend.
    - Highlighting 2030 and 2045 targets with callouts.
- **Enhancing Accessibility**: To encourage broader engagement, members suggested breaking the report into smaller, digestible pieces for the City's website. The Executive Summary and Roadmaps were identified as good candidates for standalone web content. Tiffany Hudson noted plans to create dedicated webpages for specific CAAP sections.

Additional Comments

- **Tree Planting Resources**: Members highlighted "Our City Forest," a program offering two free trees to residents in Campbell, San Jose, and Sunnyvale. They suggested reaching out to the group to see if we can promote them in the Individual Roadmaps. Members also suggested exploring whether the City could provide wholesale trees to residents to support private tree planting.

- **Inventory and Reporting Cadence**: Members recommended clarifying how often GHG inventories are conducted (typically every 2–3 years) and proposed annual reporting on CAAP progress. Tiffany noted that the reporting cadence could be proposed during Council review and incorporated into the final CAAP.
- **Health-Focused Framing of Climate Impacts**: Members emphasized the importance of highlighting health impacts in the climate hazards section. Suggestions included:
  - Reframing Figure 7 to focus on health-related consequences (e.g., health impacts from air quality declines).
  - Replace references to fire near the water tower with a broader focus on health risks, as wildfire itself is not a significant threat in Campbell—however, smoke from regional fires poses a serious concern. Consider illustrating this by removing flames and instead depicting a smoke cloud to better reflect the actual risk.

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Survey #1 Results

CITY OF CAMPBELL
Climate Action & Adaptation Plan

Survey Results

08.01.24

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Climate Action & Adaptation Plan

Overall Survey

- The survey was open from **June 24, 2024** to **August 16, 2024**
- **469 responses**
  - 1 in Spanish
  - 468 in English
- The survey was promoted through social media, direct email, and an in-person farmers market

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Climate Action & Adaptation Plan

Key findings

- Most residents have lived in Campbell for **more than 10 years.** Most respondents speak English and fall into the 40-64 age range.
- Most respondents have noticed changes in weather patterns and feel the city is **somewhat prepared** in case of a natural disaster.
- The community is most concerned with **extreme heat, drought, wildfires** and **impacts to health**, and access to basic needs.
- Respondents are familiar with climate resilience and adaptation strategies and have implemented some practices.

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Survey Results

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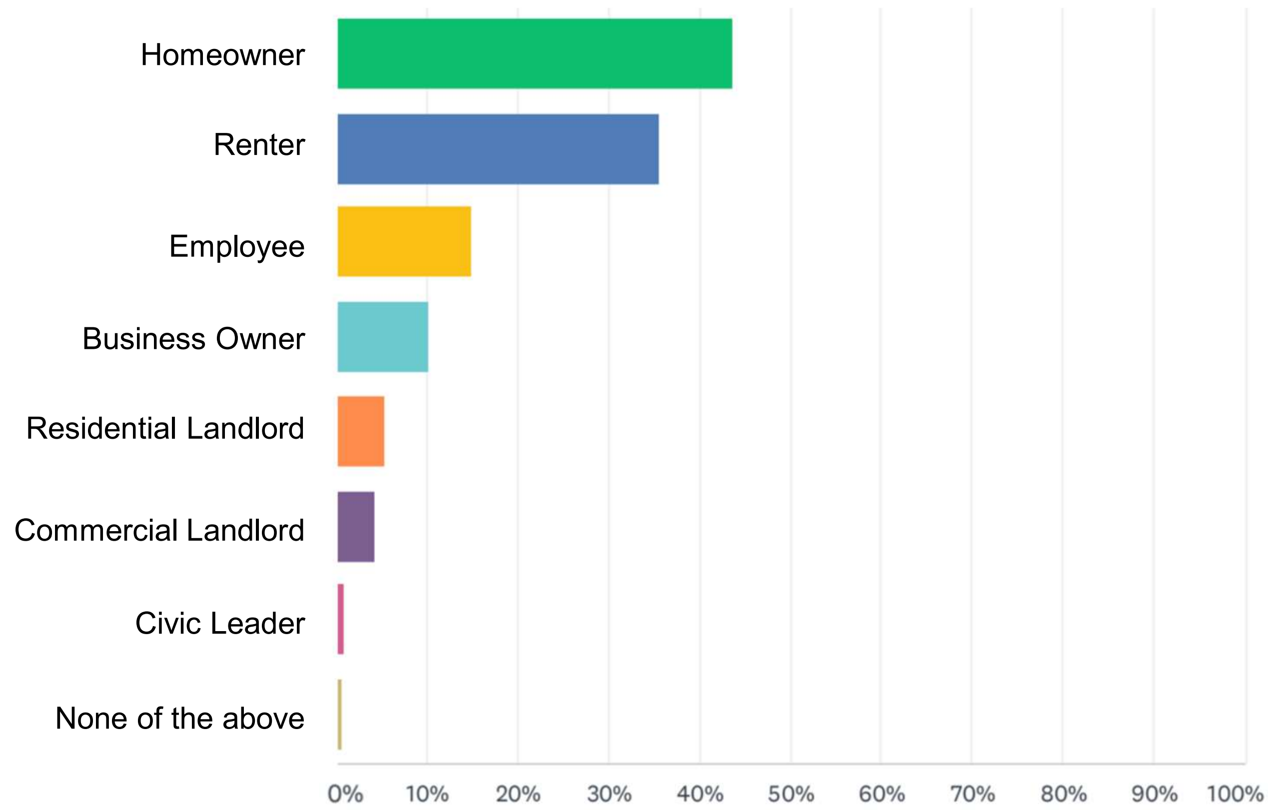
Respondents are...



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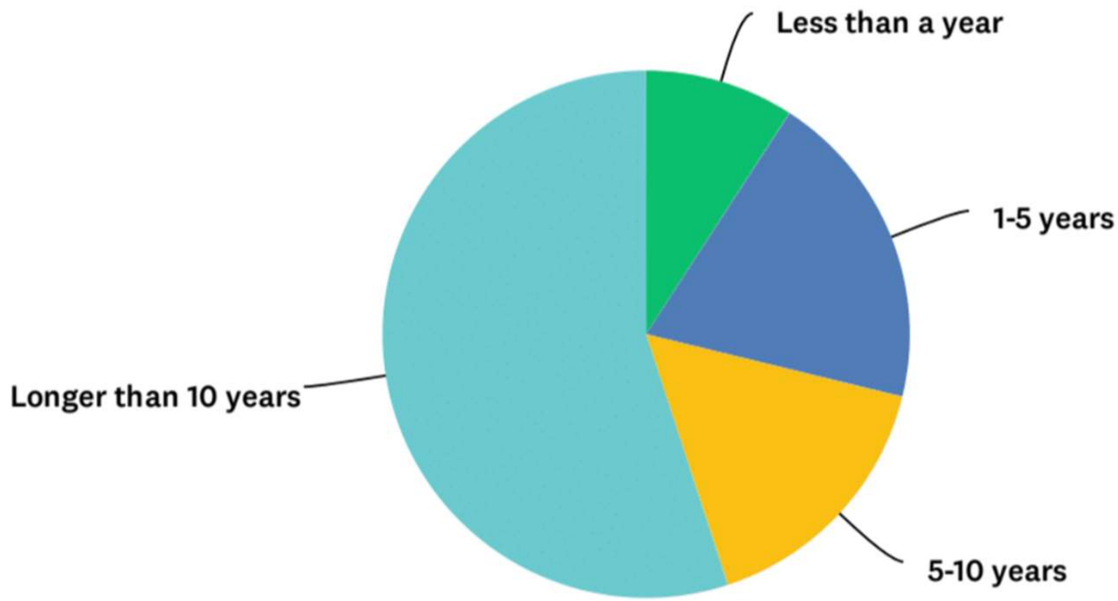
Residents have lived or worked in Campbell for



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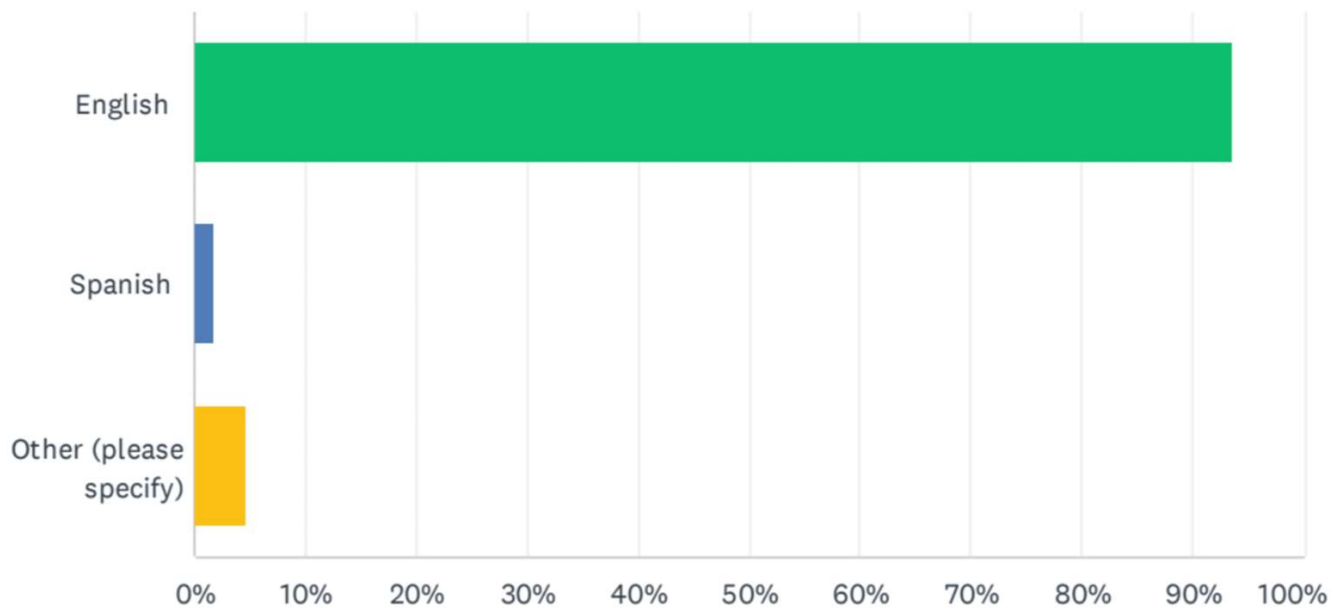
Languages spoke at home



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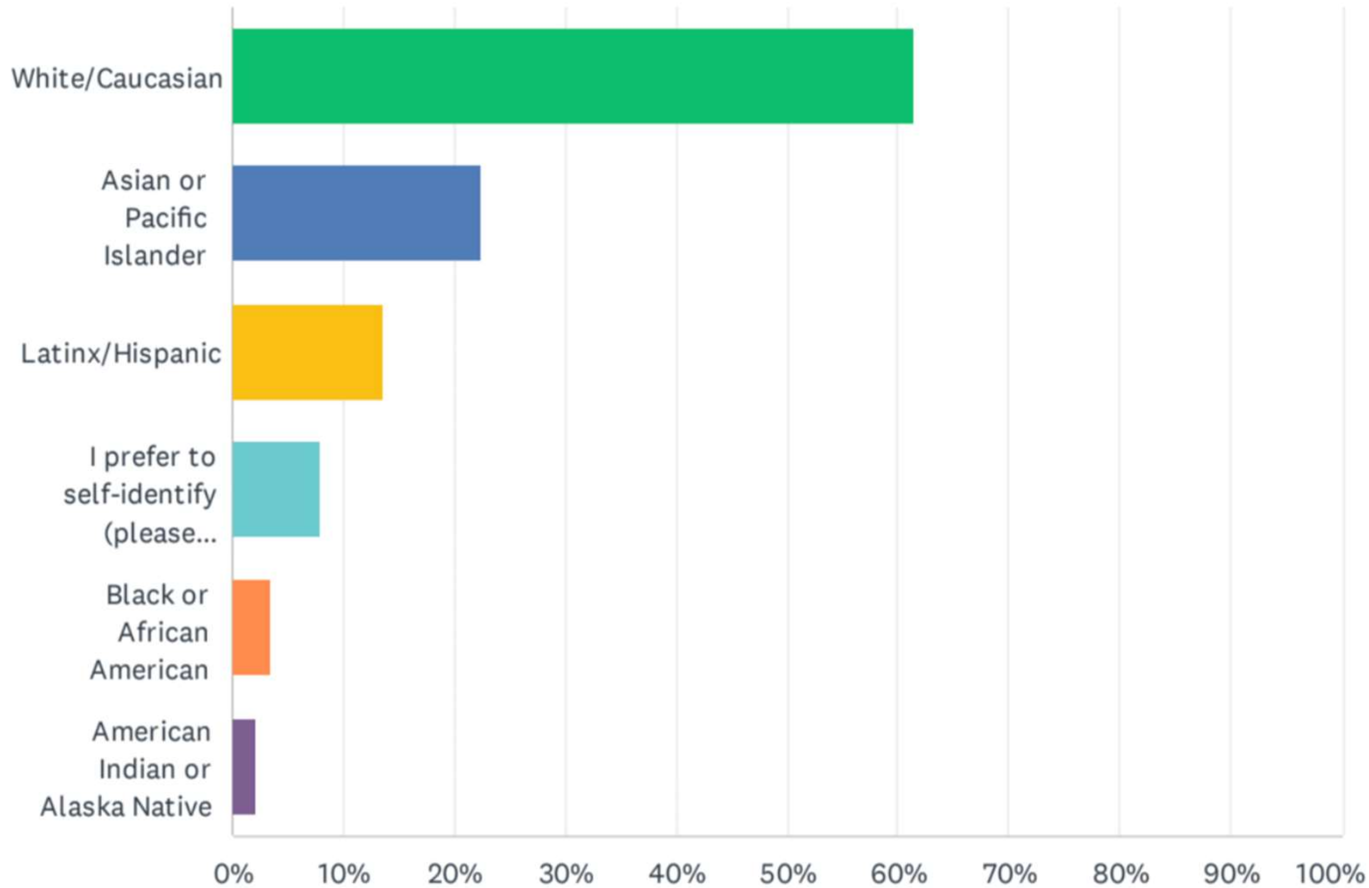
Race and Ethnicity of Respondents



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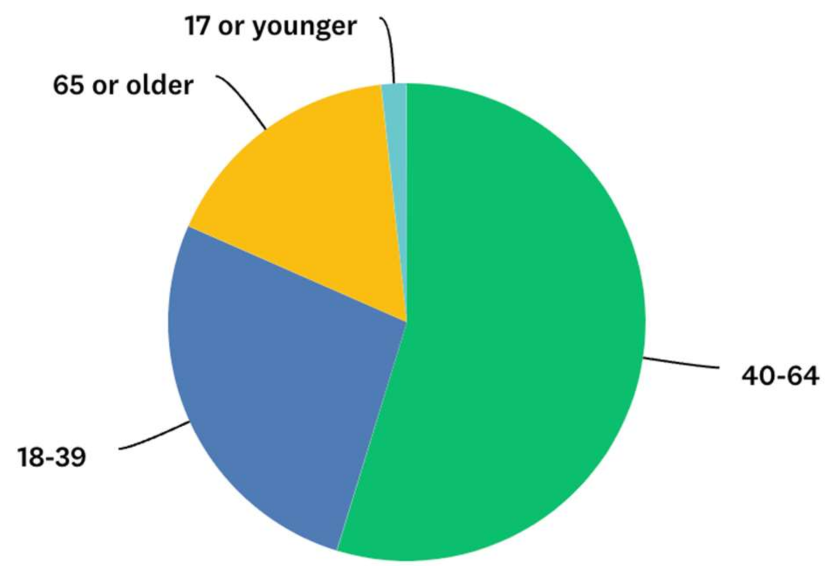
Age of Respondents



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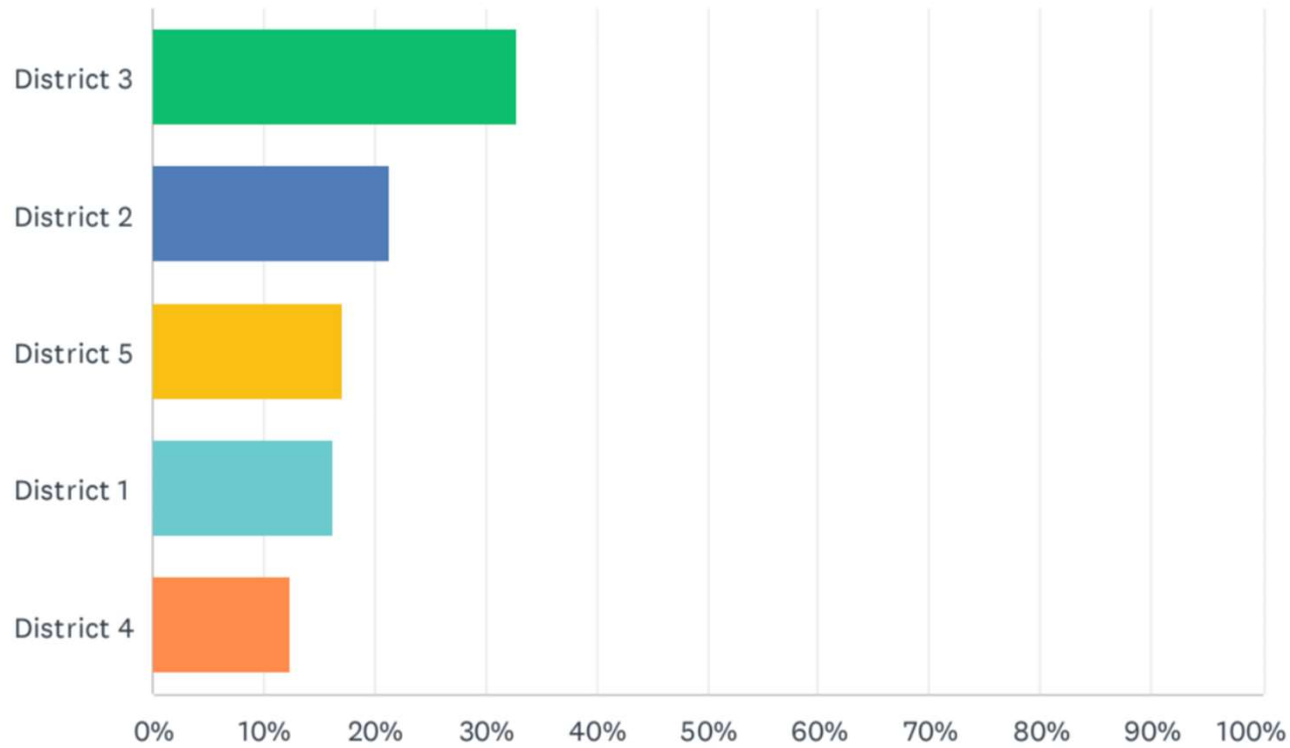
Where do respondents live or work?



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Climate Vulnerability and Resilience

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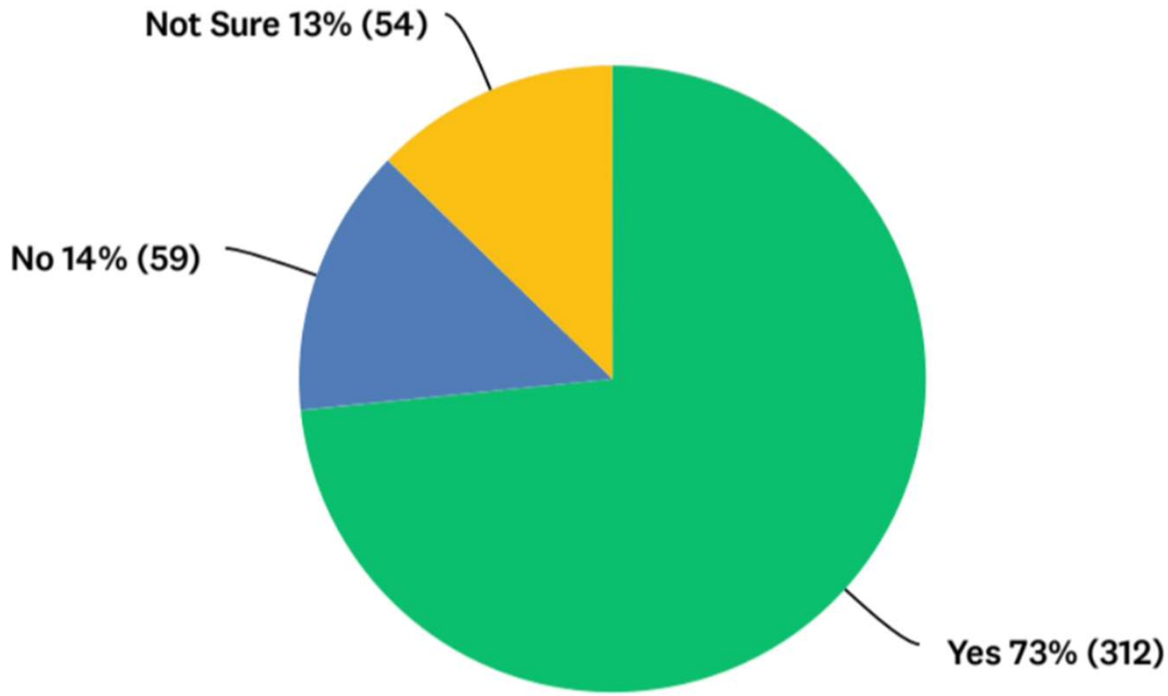
Have residents observed changes in the weather patterns, environment, or climate?



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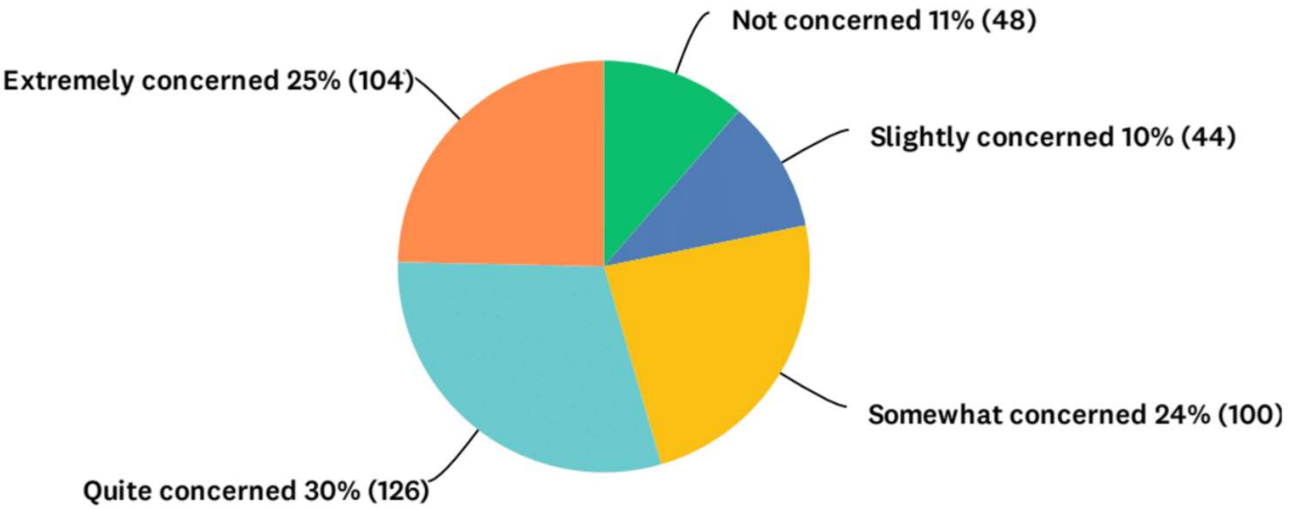
Level of concern about the impacts of climate change



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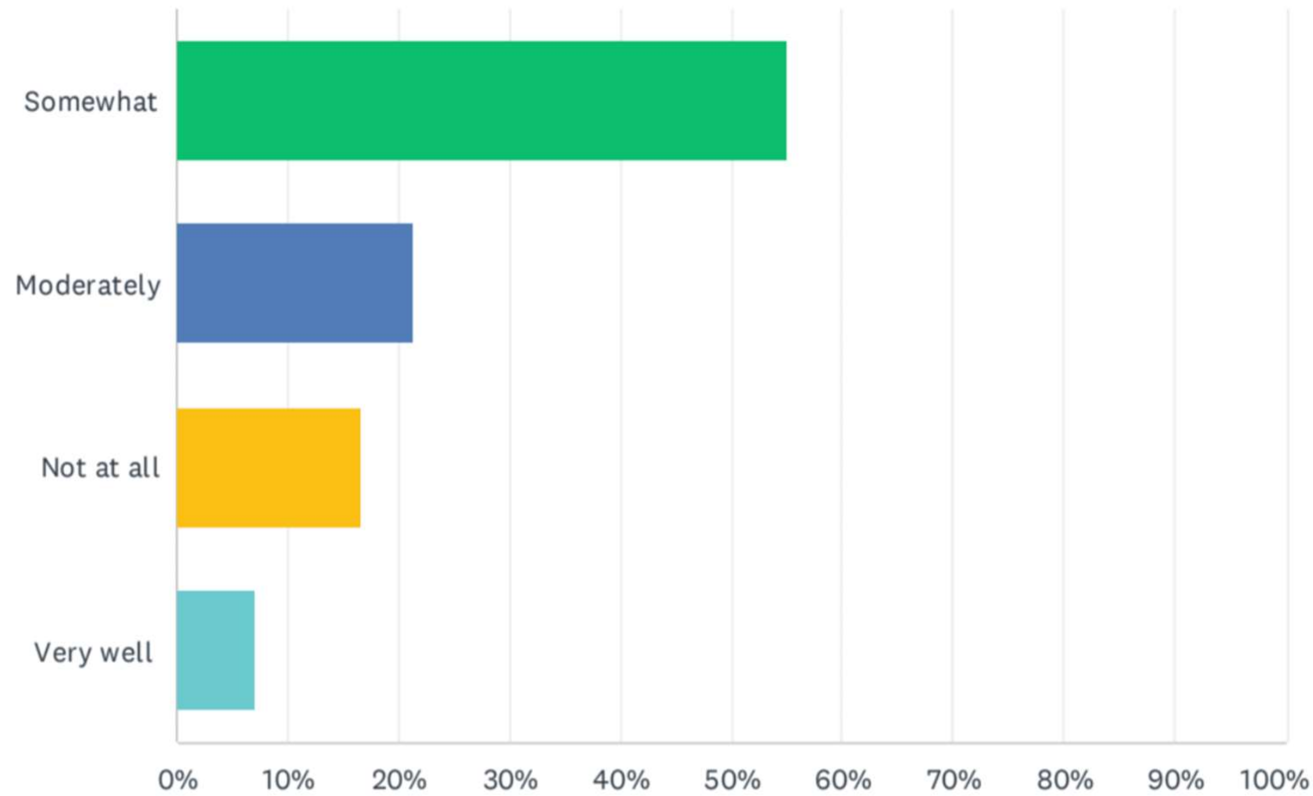
Is Campbell prepared to respond to climate disasters?



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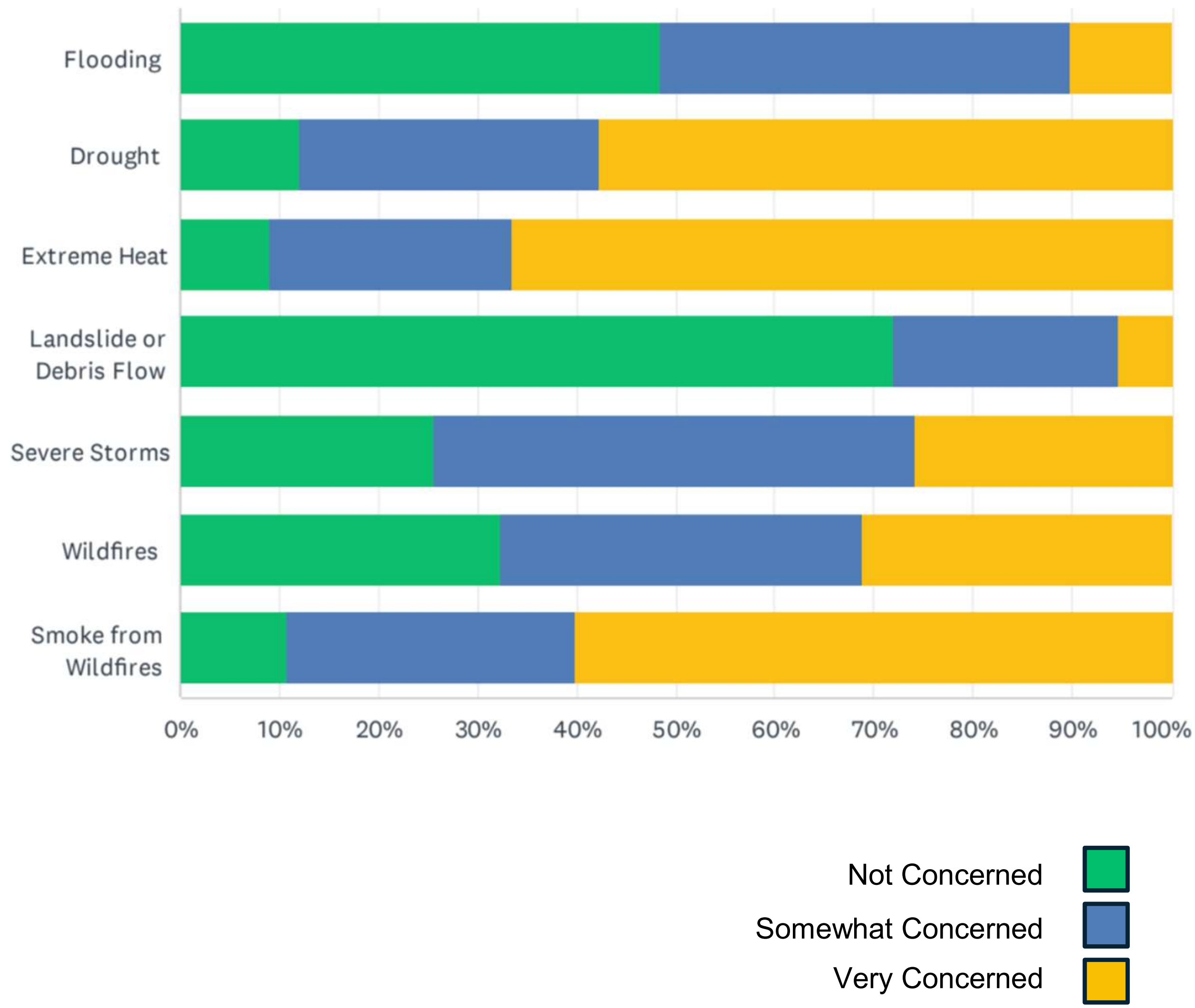
How concerned are respondents about the impacts of these hazards?



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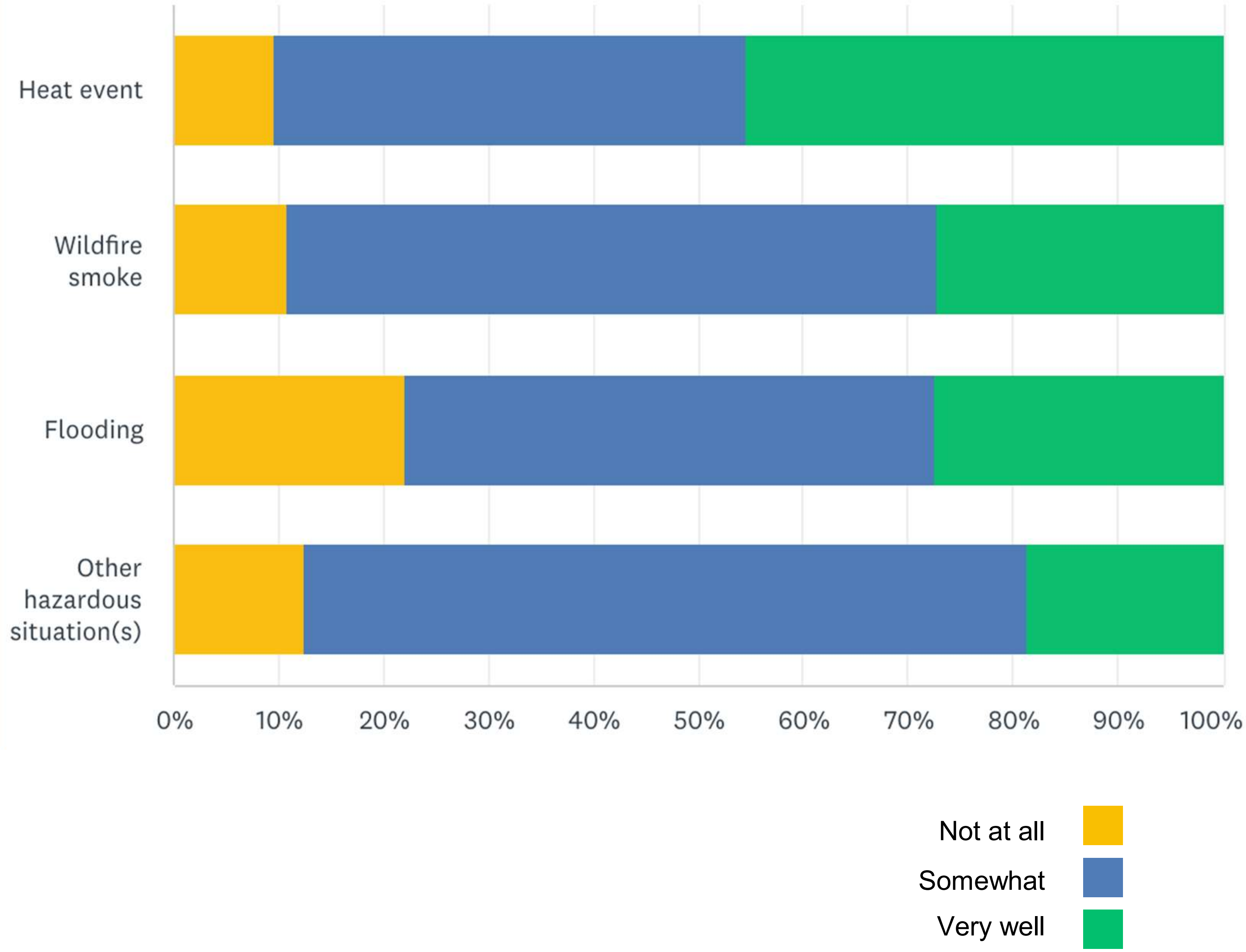
Are respondents home resilient against these hazardous events



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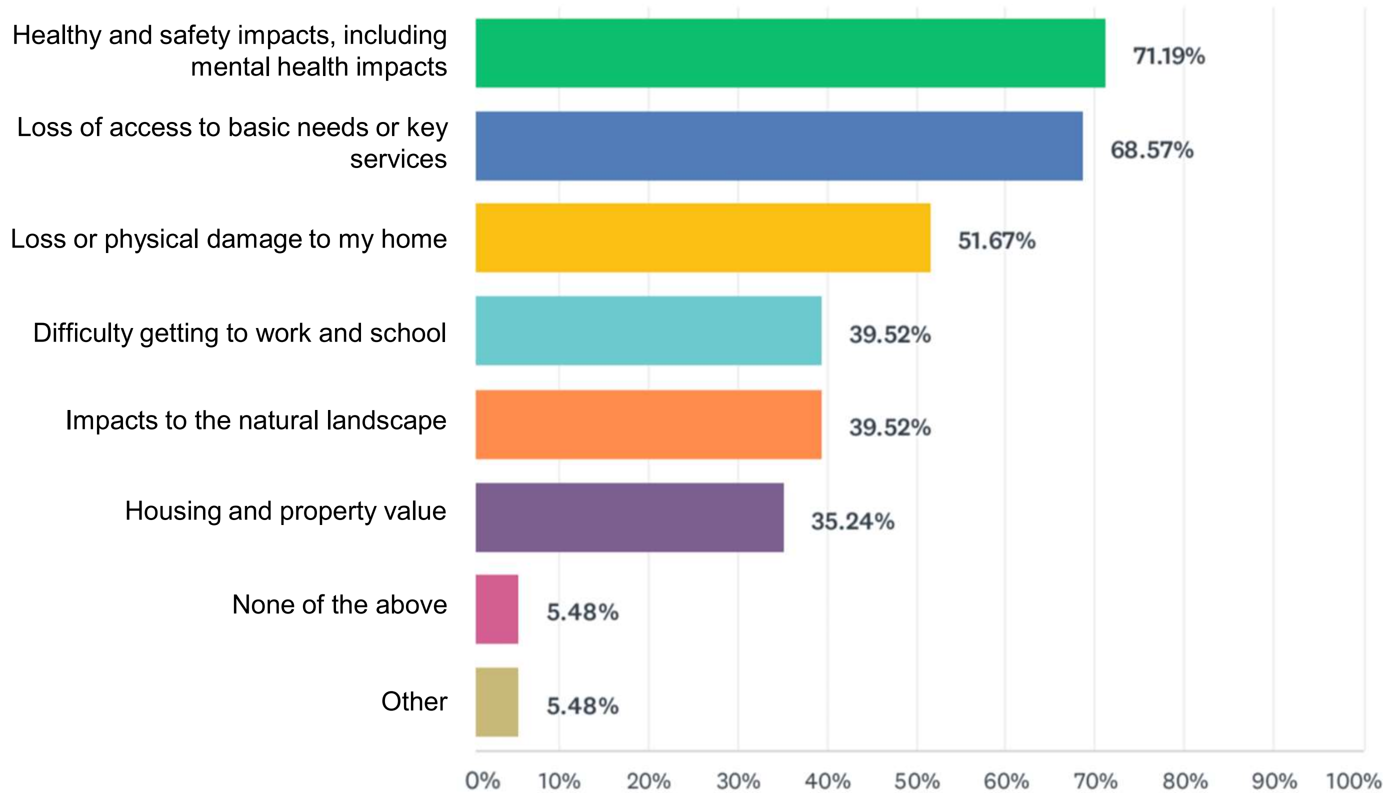
Which impacts are respondents most concerned about?



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Other notable responses

“Inability to go outside”

“Disadvantaged peoples that may not be able to recover”

“Impact on children schooling”

“Communication blackouts”

“Insurance and utility costs”

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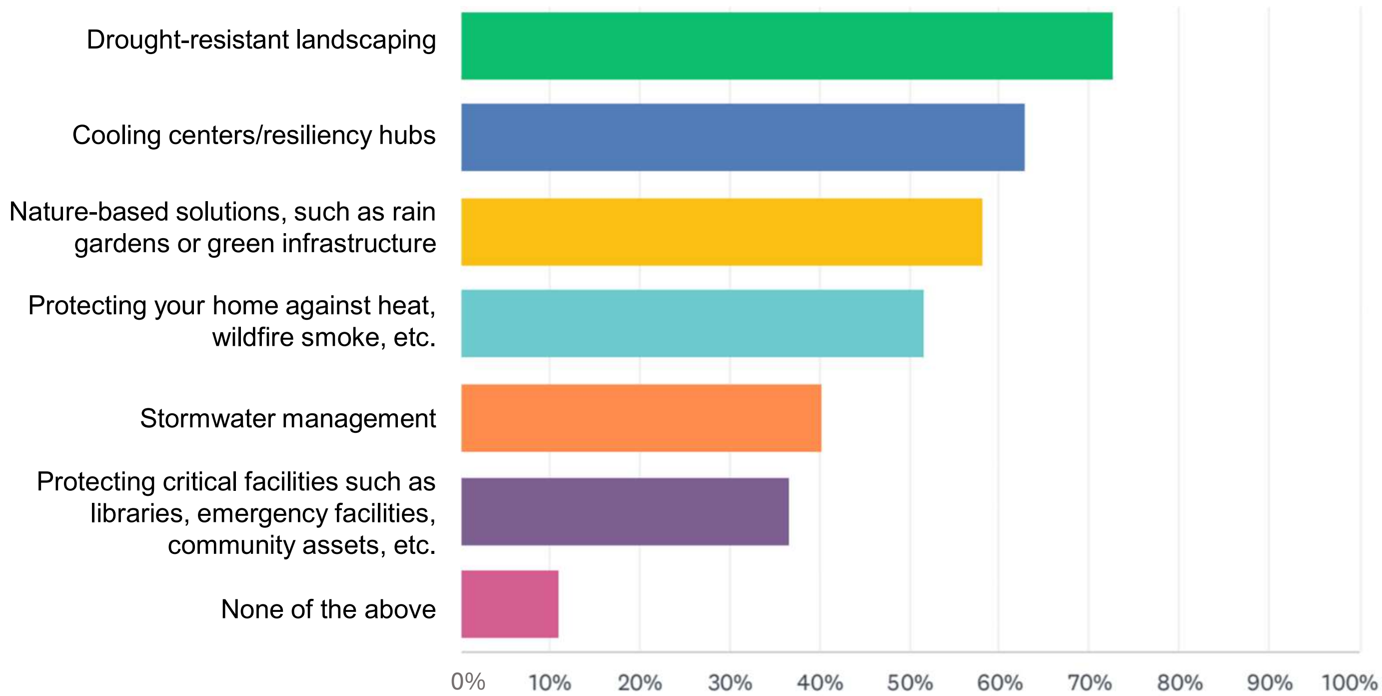
Familiar Adaptation & Resilience Strategies



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Greenhouse Gas Emissions

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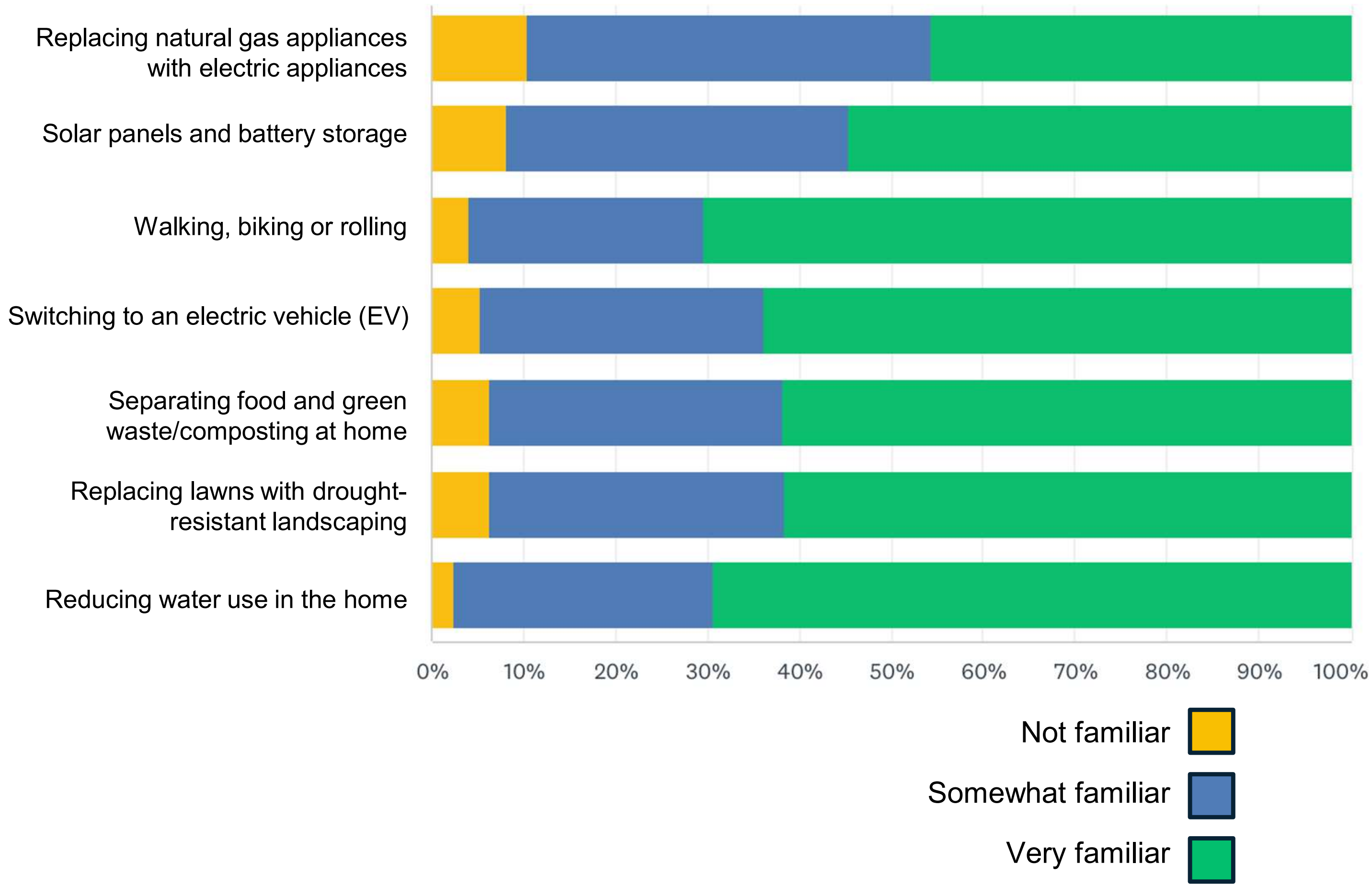
Familiar Climate Strategies



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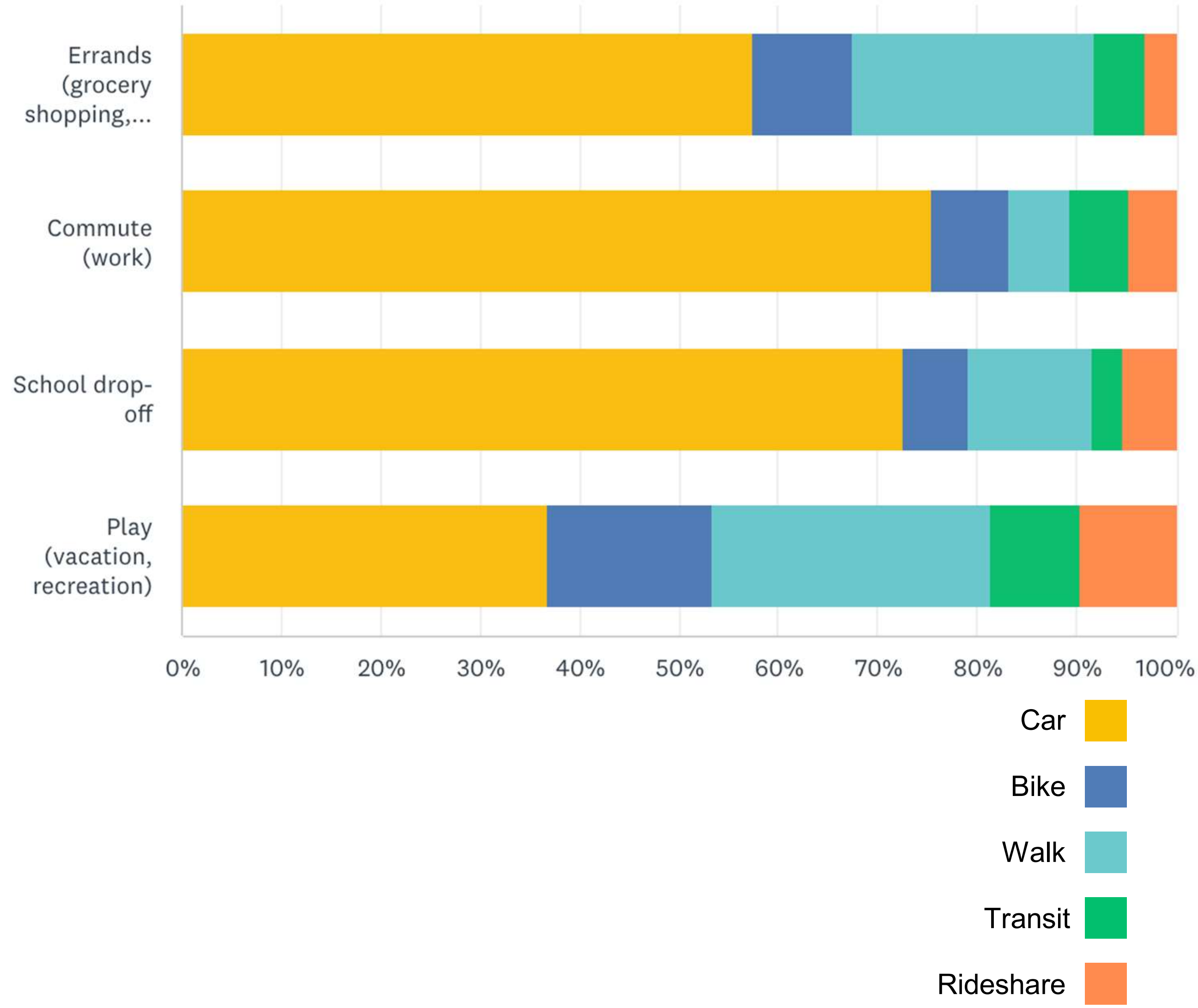
How do respondents get around town?



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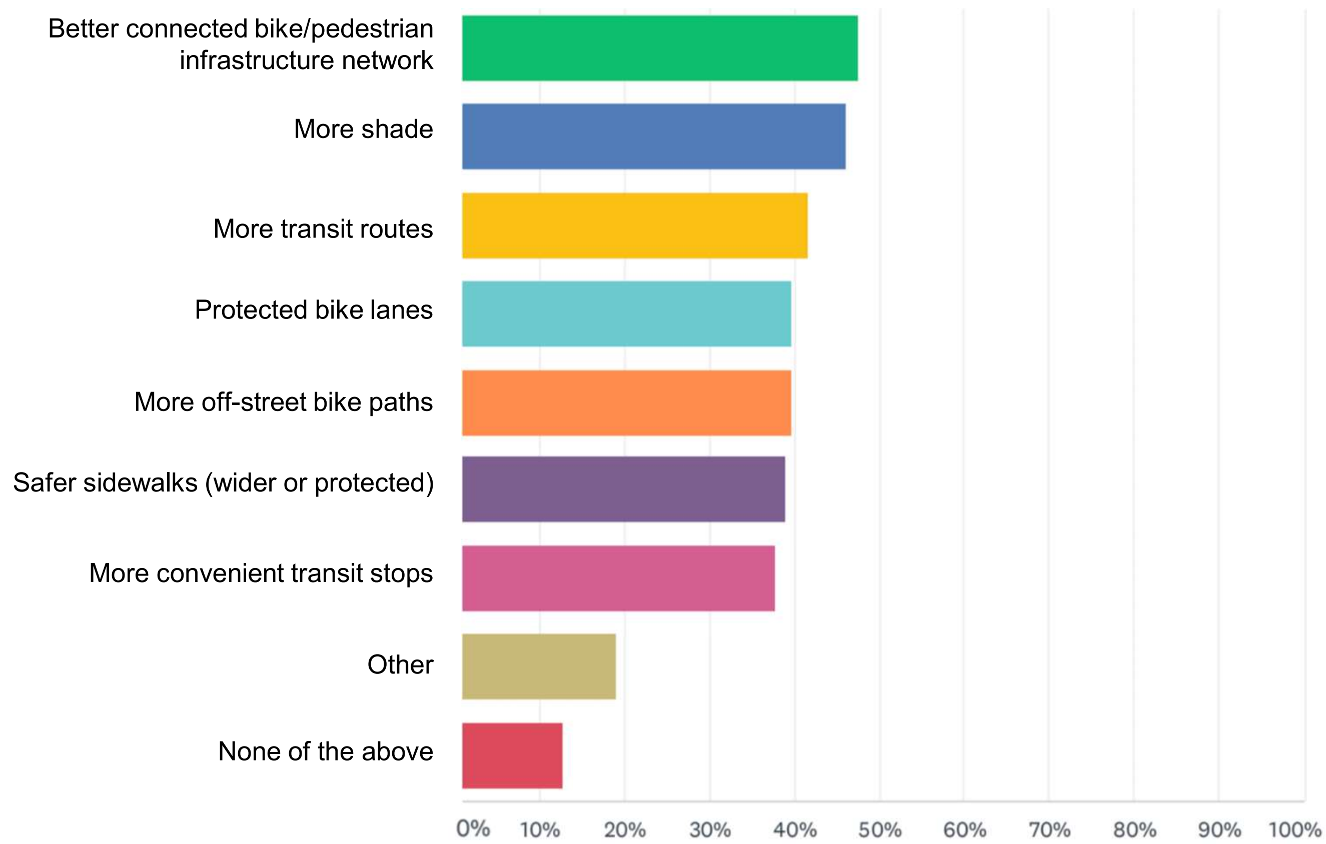
What would encourage respondents to take transit, bike, or walk more?



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Notable responses

Proximity of grocery stores

More frequent transit services

Areas for bike storage

Safety

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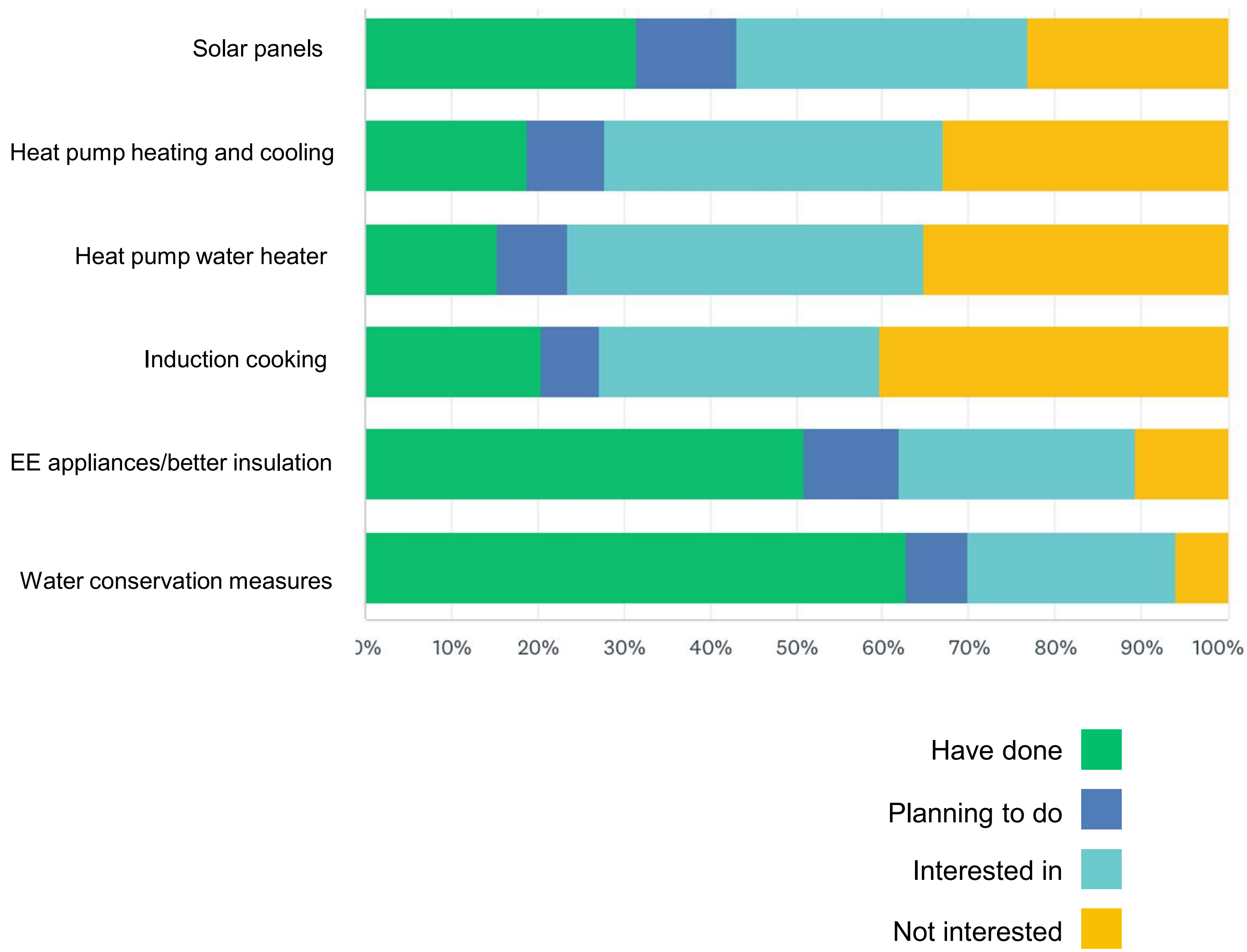
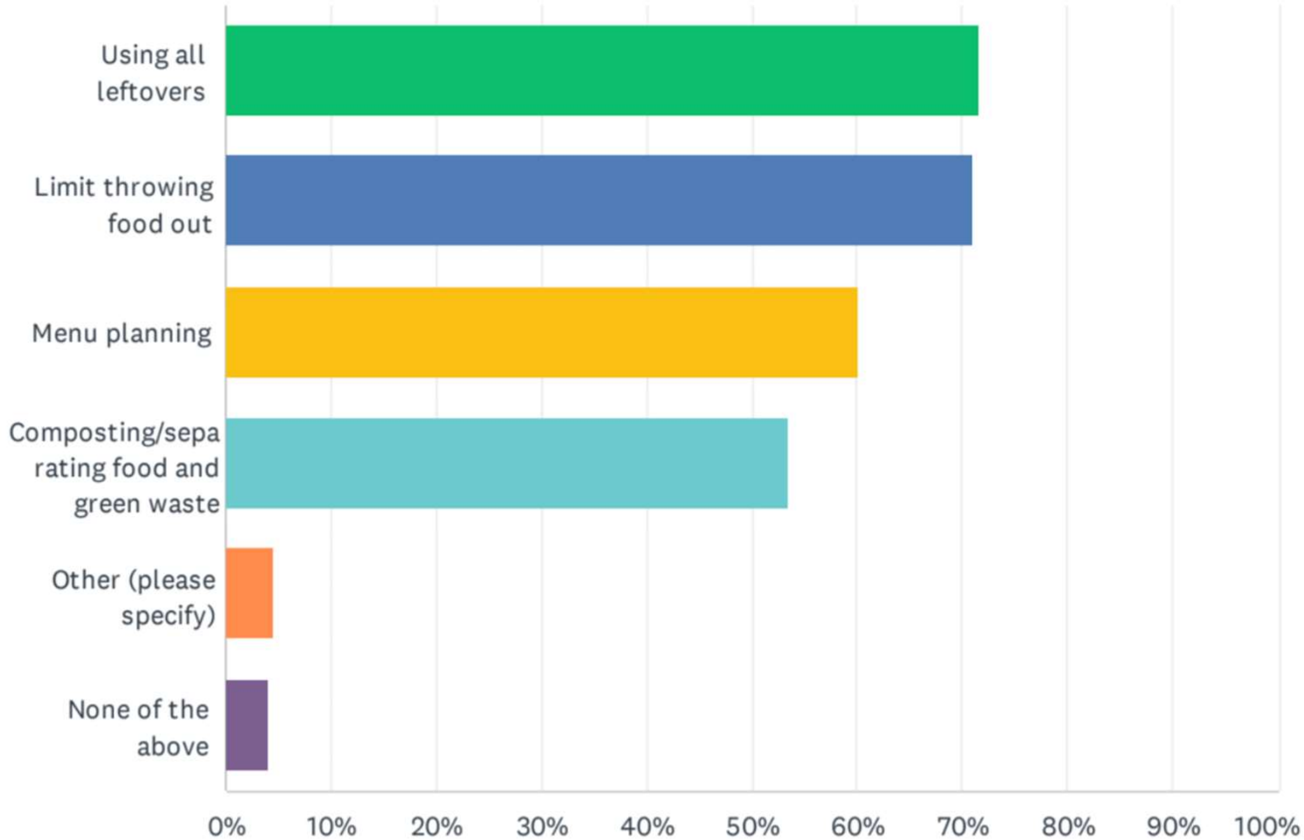
Climate Action & Adaptation Plan

Have respondents made the following improvements to your home?



CITY OF CAMPBELL
Climate Action & Adaptation Plan

How do respondents reduce food waste in your home?



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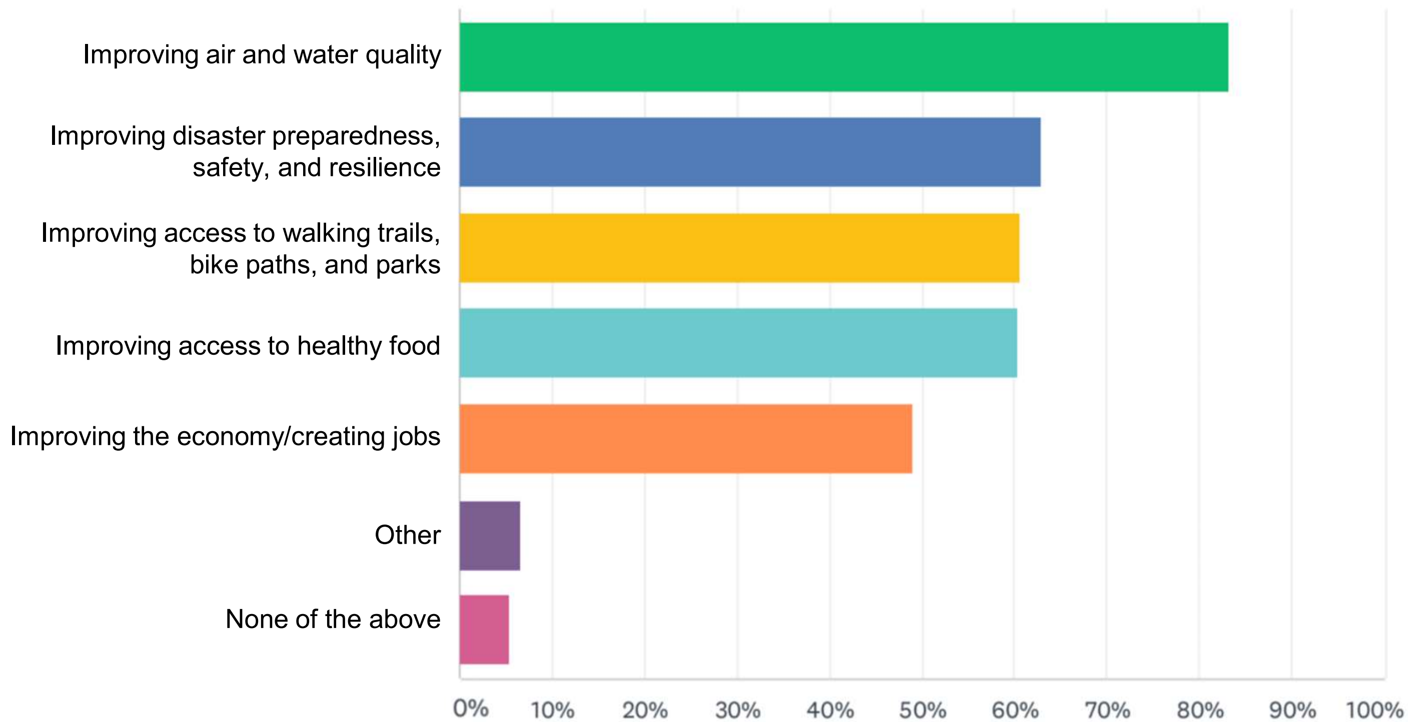
The most important climate benefits are



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Other notes

Walkable bikeable grocery stores and other resources

Reduced housing density and affordable housing

Increased education

Improved quality of life

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Additional information

- Most respondents find information about their community via the internet/website, family & neighbors, or social media
- Respondents find emergency communications on AlertSCC, family/friends, and social media
- The majority (67%) of respondents have not participated in a planning effort previously

Survey #2 Results

Campbell CAAP Prioritization

Community Survey Results

Introduction to survey and respondent demographics

- To inform the City of Campbell's first Climate Action and Adaptation Plan, this survey asked community members to weigh in on potential strategies for reducing emissions and building resilience to climate impacts like extreme heat, drought, and storms. Results incorporate feedback from 363 English and Spanish-speaking respondents.
- The majority of respondents are ages 40 to 64 (57%), and live or work in Districts 2 or 3 (53%). Most respondents own their home (67.3%), have lived or worked in Campbell for over 10 years (64.54%), speak English in their homes (94.17%), and self-identify as White/Caucasian (69.7%).

Most popular strategies supported by the community

Building Energy

- Respondents showed the strongest support for improving energy performance in existing buildings, with 75% favoring incentives to reduce the cost of switching to electric appliances. There was also significant interest (55%) in increasing education around existing state and federal incentives to help residents make energy-efficient upgrades. For new construction, requiring solar panels and battery storage was highly supported (66%), as was the adoption of "cool roofs" that reduce heat absorption (66%).
- Constructing new buildings that are resilient
  - Require new buildings to have more solar and battery storage – H (65.76%)
  - Require roofs to use materials that absorb less heat ("cool roofs") – M (65.76%)
- Improving existing buildings
  - Offer incentives to reduce costs of switching to electric appliances – M (75.15%)
  - Provide education on existing state and federal incentives to help reduce costs – L (55.45%)

Transportation

- Respondents expressed strong support for installing EV chargers at public locations like libraries and parks (71%) and making it easier for developers to add charging infrastructure (73%) were among the most favored actions. There was also solid backing (60%) for requiring EV chargers in new commercial and residential developments. To improve walkability, adding new sidewalks and crosswalks received widespread approval (74%), while maintaining existing pedestrian and bike infrastructure was also supported (63%). In terms of public transit, respondents endorsed a local shuttle connecting Campbell to nearby cities (59%) and adding shade structures at bus stops (58%), demonstrating a desire for both expanded service and increased rider comfort.

- Walkability and Compact Neighborhoods
  - Add new crosswalks and sidewalks to make streets more walkable – M (73.7%)
  - Maintain existing sidewalks and bike lanes – L (63.3%)
- Public Transportation
  - Create a Campbell shuttle that connects to Santa Clara, Los Gatos, and Palo Alto – M (58.58%)
  - Coordinate with VTA to build shade structures at bus stops – L (57.61%)
- Electric Vehicles and Lawn Equipment
  - Install publicly accessible EV chargers at the library, community center, and parks – H (70.93%)
  - Make permitting easier for developers to add EV charging – M (73.48%)
  - Require developers to install EV chargers at shopping centers, offices, and apartment buildings – H (60.38%)

Urban Ecosystems and Sustainable Food

- Respondents showed strong support for increasing urban tree cover; planting more trees on City-owned property received the highest approval (84%), with additional support for maintaining existing trees (77%) and requiring tree planting in new developments (75%). In terms of climate resilience, coordinating with Valley Water to plant native landscaping to reduce flood risk was widely favored (79%), as was upgrading creek trails and bike paths to serve as elevated flood barriers (68%). Favored waste reduction strategies included continuing the community compost program (77%) and expanding the County's food recovery efforts in Campbell (72%).
- Water Conservation and Flooding
  - Coordinate with Valley Water to upgrade creek trails and bike paths so they can function as elevated flood barriers – M (68.14%)
  - Coordinate with Valley Water to plant native, sustainable landscaping to help prevent flooding around creeks and parks – M (78.86%)
- Tree Cover
  - Plant more trees on City-owned property – H (83.85%)
  - Maintain existing trees of City-owned property – M (76.71%)
  - Require tree planting for new development projects – M (74.53%)
- Reduce Waste
  - Continue to implement the County's food recovery program in Campbell to reduce food waste – M (72.35%)
  - Continue Campbell's community compost program – M (76.85%)

Social and Governance System

- Over 80% of respondents favored creating a year-round Resilience Hub in collaboration with the County Library District to provide refuge during extreme heat, poor air quality, and flooding events. There was also moderate support (56%) for partnering with nonprofits to enhance outreach and education around climate action, signaling a desire for more inclusive and coordinated approaches to community preparedness and engagement.
- Social & governance responses:
    - Collaborate with the County Library District to develop a Resilience Hub to offer refuge to people from extreme heat conditions, poor air quality, and flooding open year-round – H (80.7%)
    - Collaboration with nonprofits on outreach related to climate action – L (56.14%)

Least popular strategies supported by the community

Building Energy

- There was less enthusiasm for requiring mandatory changes to existing buildings. Only 24% of respondents supported requiring all gas appliances to be replaced with electric ones, and just 34% supported switching specific appliances like space and water heaters at the time of replacement. Additionally, fewer than half (44%) supported developing design standards for window placement and awnings to promote passive cooling in new buildings.
- Constructing new buildings that are resilient
    - Develop standards for window locations and awnings that promote cooling – M (43.64%)
- Improving existing buildings
    - Require ALL gas appliances to be switched to electric ones at time of replacement – H (23.94%)
    - Require SOME gas appliances to be switched to electric ones at time of replacement (space and water heating) – M (33.94%)

Transportation

- Survey respondents expressed the least support for strategies that impact parking and vehicle-related regulations. Charging people for parking downtown was the least favored option, with only 16% in support, followed by removing parking minimums for new developments (23%). Proposals to enhance biking infrastructure also saw limited support, including establishing a bike-share program (30%) and building bike lanes near all VTA light rail stations (38%). Banning gas- and diesel-powered lawn equipment (41%) and providing EV education and incentive information (40%) received modest backing, suggesting that the community prefers strategies that maintain convenience and personal choice.

- Walkability and Compact Neighborhoods
  - Charge for parking downtown – H (15.6%)
  - Remove parking minimums for new developments, which require a certain number of parking spaces for new developments – M (22.94%)
- Public Transportation
  - Establish a bike-share program in popular areas (downtown, Pruneyard, VTA stops) – M (30.1%)
  - Build bike lanes within 2 miles of all VTA light rail stations – L (37.86%)
- Electric Vehicles and Lawn Equipment
  - Ban specific types of gasoline- and diesel-powered lawn and garden equipment – M (41.21%)
  - Provide educational materials on the benefits of EVs and incentives that help lower costs – L (39.94%)

Urban Ecosystems and Sustainable Food

- Measures with the lowest support from survey respondents were those involving restrictions or mandates. The least supported measure was banning the removal of trees on private property, with only 16% approval, indicating sensitivity around property rights. Relocating flood-prone assets (39%) and banning decorative grass in new developments (44%) also saw limited support. Educational initiatives had moderate interest, with around half of respondents supporting waste-sorting education (50%) and information on food recovery requirements (51%), and 47% supporting community education on tree benefits.
- Water Conservation and Flooding
  - Relocate assets that are at risk of flood damage – H (38.8%)
  - Ban non-functional (i.e., decorative) grass in new building design – L (43.53%)
- Tree Cover
  - Ban the removal of existing trees on private property – M (15.84%)
  - Provide education to the community on the benefits of trees – L (46.58%)
- Reduce Waste
  - Collaborate with community-based organizations to host educational events that teach proper waste sorting techniques – L (50.48%)
  - Develop and distribute educational materials on edible food recovery requirements – L (50.8%)

Social and Governance Systems

- Respondents showed relatively low support for expanding government staffing and communication efforts. Only 43% supported funding additional City positions dedicated to climate action, and 49% supported increasing communication to the community about climate hazards. These results suggest that while residents may be cautious about increasing government spending or may prefer more direct, tangible actions over administrative or informational initiatives.
- Social & Governance Survey Responses:
  - Fund additional positions within the City to support climate action – H (42.81%)
  - Provide communication to the community on climate hazards – L (48.77%)

For which sectors (buildings, transportation, etc.) is the community willing to be most ambitious?

- **Urban Ecosystems and Sustainable Food:** This sector saw very strong support for high-impact actions, especially Planting more trees on City-owned property (H, 83.85%), Native landscaping for flood control (M, 78.86%), and Community composting (M, 76.85%). Results indicate a readiness to invest in nature-based solutions and waste reduction.
- **Building Energy:** There was strong support for high-impact strategies in new construction, like requiring solar and battery storage in new buildings (H, 65.76%) and moderate to high support for medium-impact incentives (e.g., electrification subsidies, cool roofs). The community supports ambitious standards when paired with incentives, especially for retrofits.
- **Transportation:** There was strong approval for high-impact EV infrastructure, such as Publicly accessible EV charger installment (H, 70.93%) and EV charger requirements in new developments (H, 60.38%). Walkability improvements like adding sidewalks (M, 73.7%) were also popular.

For which sectors is the community wanting to be most conservative (least ambitious)?

- **Transportation:** Very low support for high-impact pricing, such as Charging for downtown parking (H, 15.6%) and Removing parking minimums (M, 22.94%). There was mixed interest in public transit and bike infrastructure, with lower enthusiasm for bike-share (M, 30.1%) and bike lane expansion (L, 37.86%). Indicates resistance to behavior-shifting strategies that reduce car dependency.
- **Building Energy:** Community shows hesitation around mandatory electrification, like requiring all gas appliances to be replaced (H, 23.94%), and even partial electrification mandates scored low (M, 33.94%).
- **Social and Governance Systems:** There was lower support for administrative or indirect strategies, like funding new City staff for climate action (H, 42.81%) and investing in climate hazard communication (L, 48.77%). In general, the community appears more motivated by visible or direct improvements than by governance capacity-building.

Notes (Anything interesting?)

- Community members tend to prefer incentives and flexibility over mandates.
- Little interest in educational initiatives, except for when it clearly states what incentives exist to save residents money.
- Summary: The community seems most interested in investing in nature-based solutions, visible infrastructure, and promoting incentives, but is less enthusiastic about mandates, pricing strategies, and administrative expansion.

Open-Ended Survey Responses

Community Climate Priorities - Insights from Campbell Residents

Feedback from 123 Campbell residents reveals a shared commitment to climate action grounded in practicality, equity, and community empowerment. Respondents call for voluntary, cost-sensitive, and locally responsive approaches rather than top-down mandates. Seven key themes emerged across the responses:

1. Strong Support for Community Gardening and Edible Landscapes

Community gardens are seen as vital infrastructure for food security, intergenerational learning, and neighborhood cohesion. Respondents envision gardens as:

- Sources of fresh, healthy food and gathering places that build social connection.
- Opportunities to integrate edible landscaping into parks and public spaces.
- Educational tools for promoting sustainability and climate resilience.
- Accessible to renters, seniors, and residents without yards, with reduced barriers through free or subsidized seeds, tools, and plots.

2. Education, Transparency, and Voluntary Participation

Respondents consistently emphasized the need for clear, accessible education and cost transparency around climate initiatives. They support transitioning to sustainable practices, like electric appliances, composting, and native landscaping, but stress that:

- Outreach must inform rather than compel.
- Financially sustainable options for residents of all income levels (make clear the affordability of solar energy, home electrification, and housing-related costs)
- Avoiding heavy-handed mandates, instead offering guidelines, incentives, and support.

3. Equity, Access, and Inclusion

Residents called for climate strategies that center equity, especially for historically underserved populations and high-density neighborhoods. They highlighted the importance of:

- Accessible green spaces and programs for renters and low-income residents.
- Distributed resources (seeds, plants, tools) throughout the city.
- Eliminating barriers to entry for participation in sustainability programs.

4. Neighborhood-Scale, Low-Cost Solutions

There is strong enthusiasm for hyperlocal, decentralized programs that embed climate action into everyday spaces:

- Little Free Seed Libraries for biodiversity and community sharing.
- Micro-garden kits to support balcony and patio gardening.
- Native plant corridors and pollinator pathways using medians and front yards.

5. Green Infrastructure for Urban Resilience

Residents want to see increased investment in nature-based infrastructure to address climate and environmental challenges:

- Tree planting, permeable pavement, and shade in public areas.
- Stormwater capture and reuse of sewer water.
- Installation of white/reflective roofs and green roofs to mitigate urban heat.
- Public education around tree care and water conservation.

6. Sustainable Transportation

Transportation feedback focused on improving mobility options and reducing reliance on cars without penalizing drivers:

- Support for shuttle and bike connectivity, expanded transit, and pedestrian zones (e.g. downtown Campbell).
- Collaboration with VTA and San Jose on transit extensions and community shuttles to nearby hubs.
- Concerns about reduced parking or mandates that limit flexibility, especially for those with limited alternatives.

7. Trust, Civic Engagement, and Collaboration

Many respondents expressed appreciation for the city's outreach but also concern about predetermined planning outcomes. They called for:

- More opportunities for ongoing, collaborative engagement.
- Flexible policy language that avoids terms like "ban" or "require."
- A planning process that respects public input and adapts to community feedback.

Conclusion

Campbell residents overwhelmingly support climate action that is community-driven, inclusive, and practical. They want to be partners in the process, not just recipients of prescriptive policy. The city's success will depend on how well it: invests in education and trust-building, supports voluntary participation with meaningful incentives, and prioritizes solutions that reflect the lived realities of all residents.

QUOTES FROM COMMUNITY

Strong support for community gardens and decentralized programs that embed climate action into neighborhoods (pollinator corridors, Little Free Seed Libraries)

- A “Installing free little SEED LIBRARIES in neighborhoods will provide a big payoff for a relatively small investment. SEED LIBRARIES build community and security.”

Emphasis on the need for clear, accessible education and cost transparency around climate initiatives, with a focus on strategies that center equity, especially for historically underserved populations and high-density neighborhoods

- B “(EV programs often) benefit only a small group of people who have the financial means and can charge them at their house. [...] (This must) be coordinated in a fair way so that everyone regardless of their race, economic or housing status have equal access to these programs.”
- C “Homeowners are already overwhelmed with cost issues and anything mandated hurts the wallet even more.”

Climate action that is community-driven - respondents want to be partners in the process, not just recipients of prescriptive policy

- D “Plant trees and don't create new taxes. [...] Think very carefully about cost benefit"
- E “Unless a family is very wealthy...the rates & increases are already too burdensome. So this survey may have noble goals...but til PGE lowers electricity rates, how can anyone vote for removing gas anything, for increasing any more taxes?”
- F “Instead of relying solely on mandates, we can empower individuals through education to make decisions that align with both personal values and the global good.”
- G “Educating and Incentivizing is a slow and steady process that gives people choice and flexibility for change. Forcing change breeds resentment and distrust in governance.”

Appendix C

Climate Change Vulnerability Assessment

Climate Action and Adaptation Plan

Climate Change Vulnerability Assessment

prepared by

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October 2024

RINCON CONSULTANTS, INC. SINCE 1994

CITY OF CAMPBELL
Climate Action & Adaptation Plan

Table of Contents

Figures

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1 Introduction

1.1 Land Acknowledgement

The City of Campbell acknowledges that the city is located on ancestral lands of great importance to Tamien Nation, a tribe recognized under California State Law, and that the people of Tamien Nation are important members of the Campbell community.

1.2 Purpose

Climate change is a global phenomenon that can impact ecosystems, community health, public safety, buildings, transportation infrastructure, water infrastructure, waste infrastructure, and emergency response services. The primary driver of climate change is increased greenhouse gases (GHG) in the atmosphere due to human activity. This Climate Change Vulnerability Assessment (CCVA) evaluates how climate change is anticipated to impact Campbell. The guiding methodology used in this assessment is based on the Santa Clara County Office of Sustainability's 2015 Silicon Valley 2.0 Climate Adaptation Guidebook[1] and Climate Change Preparedness Tool[2] (collectively referred to as SV 2.0)[3], which is discussed in more detail in the Vulnerability Assessment Methodology section of this report.

Understanding Campbell's vulnerabilities to climate change provides a foundation for developing climate adaptation measures and actions for the City's Climate Action and Adaptation Plan (CAAP), along with measures and actions that will help to reduce GHG emissions.

Causes of Climate Change

Climate change is caused by the addition of excess greenhouse gases to the atmosphere, which trap heat near the earth's surface, raising global average temperatures. Known as the greenhouse effect, this increase in average temperatures across the globe affects sea level rise, ocean temperatures and chemistry, precipitation patterns, the severity of wildfires, the prevalence of extreme heat events, and water supply (NASA 2022). According to the Intergovernmental Panel on Climate Change (IPCC), GHG are now higher than they have been in the past 400,000 years, raising carbon dioxide levels from 280 parts per million to 410 parts per million in the last 150 years (IPCC 2021). The dramatic increase in GHG is attributed to human activities—beginning with the industrial revolution in the 1800s, which represented a shift from an agrarian and handicraft-based economy to one dominated by industry and machine manufacturing (NASA 2022).

[1]County of Santa Clara Office of Sustainability and Climate Action. 2015. Silicon Valley 2.0 Climate Adaptation Guidebook. https://sustainability.sccgov.org/sites/g/files/exjcpb976/files/documents/1_150803_Final%20Guidebook_W_Appendices.pdf
[2]County of Santa Clara Office of Sustainability. N.d. Silicon Valley 2.0 Climate Change Preparedness Tool. https://siliconvalleytwopointzero.org/home
[3]County of Santa Clara Office of Sustainability and Climate Action. 2015. Silicon Valley 2.0 Climate Adaptation Guidebook.

1.3 Glossary

Several words and phrases are used throughout this assessment to illustrate climate vulnerabilities within Campbell. These definitions come from IPCC and the California Governor's Office of Emergency Services (Cal OES):

- **Adaptation.** The process of adjustment to actual or expected climate and its effects, either to minimize harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate.
- **Asset.** Refers to a resource, structure, facility, or service that is relied on by a community.
- **Climate Hazard.** A dangerous or potentially dangerous condition created by the effects of the local climate. Climate hazards of concern for Campbell are extreme heat, poor air quality, riverine flooding, and drought.
- **Impact.** Effects on natural and human systems including those on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate hazards and the vulnerabilities of the system or asset effected.
- **Mitigation.** An act or sustained action to reduce, eliminate, or avoid negative impacts or effects.
- **Resilience.** The capacity of an entity (an individual, a community, an organization, or a natural system) to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience.
- **Vulnerability.** The propensity or predisposition to be adversely affected.
- **Vulnerable Populations.** Certain populations experience increased exposure or risk to climate change and often have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. Given this, assessing and mitigating impacts to these populations is a priority.

1.4 Vulnerability Assessment Methodology

This report is informed by the findings of SV 2.0, which describes anticipated climate change impacts in Santa Clara County. SV 2.0 identifies historic climate variables in the County, including riverine flooding, wildfire, extreme heat, drought, and air quality deterioration. SV 2.0 assesses the following sectors: buildings and properties, communications, ecosystem, energy, public health, solid and hazardous waste, transportation, and water and wastewater. The Climate Change Preparedness Decision Support Tool offers an analysis of climate projections by city, or countrywide. In alignment with the Cal OES California Adaptation Planning Guide, this report considers a high-emissions scenario (RCP 8.5[4]) when analyzing projected climate change hazards and impacts.[5]

The social vulnerability methodology used in this report is informed by the Silicon Valley 2.0 Social Vulnerability Index (SoVI) methodology,[6] which offers a socioeconomic context to climate change impacts. The SV 2.0 SoVI methodology identifies, groups, and analyzes vulnerable populations using data from the Santa Clara County Department of Public Health, U.S. Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances and Disease Registry (ATSDR), California Office of

[4]RCP 8.5 is a Representative Concentration Pathway (RCP) scenario that describes a potential future of global warming. It's a high-emissions scenario that assumes a continuation of rising emissions throughout the 21st century.

[5]California Governor's Office of Emergency Services. 2020. California Adaptation Planning Guide. https://www.caloes.ca.gov/wp-content/uploads/Hazard-Mitigation/Documents/CA-Adaptation-Planning-Guide-FINAL-June-2020-Accessible.pdf#search=adaptation%20planning%20guide

[6]County of Santa Clara Office of Sustainability. Silicon Valley 2.0 Social Vulnerability Index (SoVI) Methodology. 2021. https://siliconvalleytwopointzero.org/downloads/SiliconValley2.0_SOVI-Methodology.pdf

Environmental Health Hazard Assessment, Public Health Hazard Assessment, Public Health Alliance of Southern California, San Francisco Bay Conservation and Development Commission (BCDC), California Department of Public Health, Pacific Institute & California Energy Commission, Delta Stewardship Council, and U.S. Census Bureau. Vulnerable populations were also mapped using BCDC's Community Vulnerability index, along with the Metropolitan Transportation Commission's Equity Priority Communities, or "Communities of Concern."

Input from the Campbell community was incorporated into the development of this report, providing critical validation of the findings. As part of the CAAP process, the City convened a Community Advisory Committee (CAC) made up of a diverse group of community members who have a vested, long-term interest in Campbell. For more information about how the CAC's input was incorporated, see the Vulnerable Community Members section of this report.

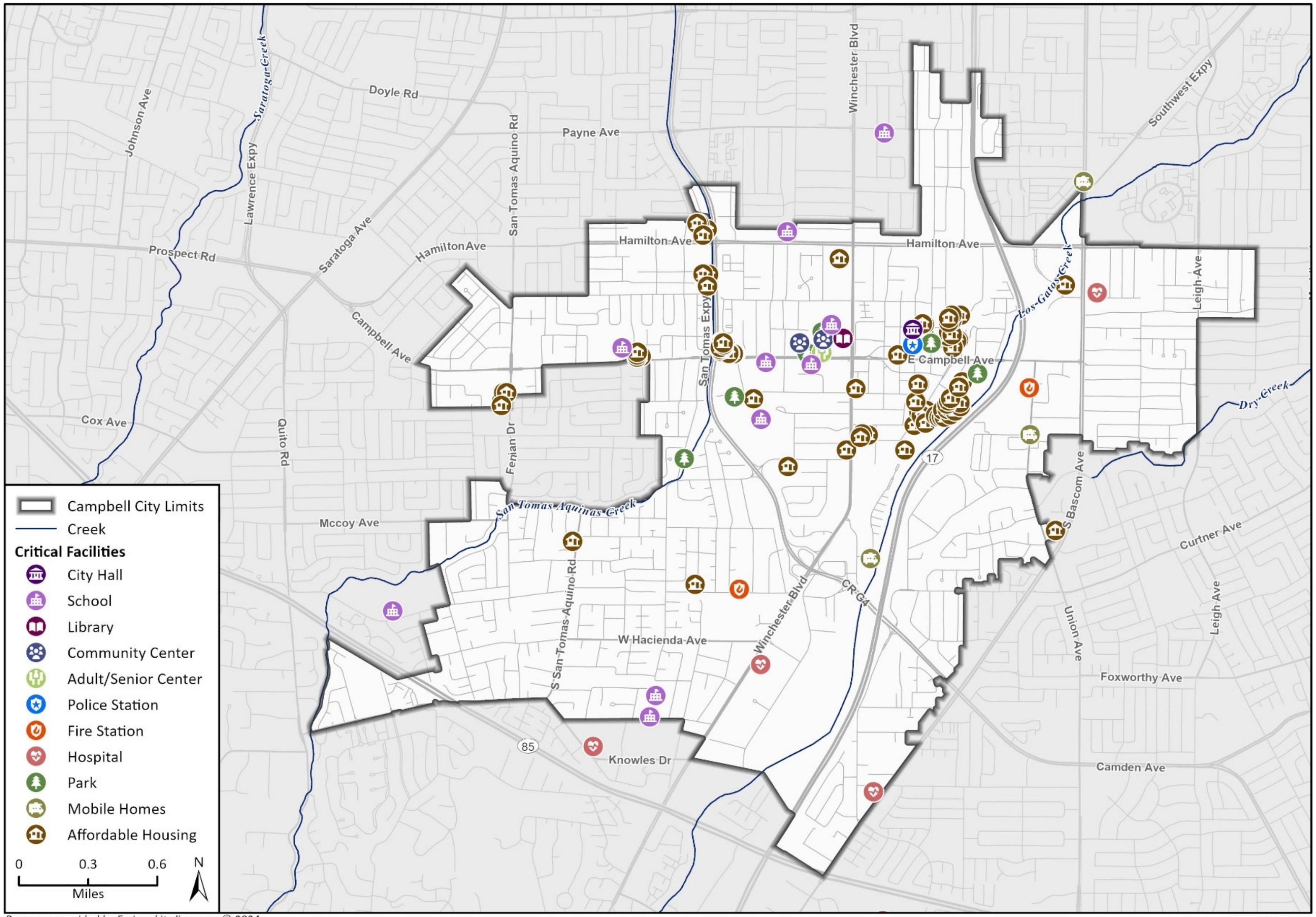
1.5 Campbell Snapshot

Campbell is located in Santa Clara County, about 25 miles east of the California coastline. The City is surrounded by the City of San Jose, City of Saratoga, and Town of Los Gatos. Campbell spans 6.35 square miles and has a population of over 42,000 residents. The City has various neighborhood parks located throughout the city for the peaceful enjoyment of residents, their families, and guests. Facilities and amenities at these parks include restrooms and playgrounds for children.

Critical facilities are important to a community's response and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts on the community and accelerate recovery. Critical facilities in Campbell, as defined in the Santa Clara County Multijurisdictional Hazard Mitigation Plan 2023 Update City of Campbell Annex[7] and shown in Figure 1 include police stations, fire stations, and hospitals. Other facilities considered critical in this report are those that house climate vulnerable populations, including schools, senior centers, affordable housing units, and mobile home parks, as well as City Hall, libraries, community centers, and parks. The majority of the critical facilities are located along Campbel Avenue. Some critical facilities outside of City limits have been included in the map as they are commonly used by Campbell residents.

[7]Santa Clara County. 2023. Santa Clara County Multijurisdictional Hazard Mitigation Plan 2023 Update City of Campbell Annex Draft. https://emergencymanagement.sccgov.org/sites/g/files/exjcpb261/files/2023-07/City%20of%20Campbell_Annex%20Draft_6.20.23.pdf

Figure 1 Critical Facilities in Campbell



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Additional data provided by NHD, 2024.

2 Vulnerable Community Members

The presence of vulnerable populations in the City of Campbell were identified based on SV 2.0, Metropolitan Transportation Commission's Equity Priority Communities (EPC), the San Francisco Bay Conservation & Development Commission (BCDC) community vulnerability map, and feedback received from the Campbell CAAP Community Advisory Committee. The following sections describe how each source was used to determine areas with high concentrations of vulnerable populations in Campbell.

Silicon Valley 2.0

The SV 2.0 methodology is a modified version of the methodology developed by the Delta Stewardship Council. The Delta Stewardship Council model is specifically tailored to capture social and economic factors that have been tied to increased vulnerability to flooding, extreme heat, and wildfire. The indicators used in SV 2.0 are the same as in the Delta Stewardship Council model with two exceptions, the addition of homelessness status to reflect the vulnerability of unhoused populations and transit access to reflect the vulnerability for residents living in areas not accessible to public transportation. SVI 2.0 includes data from the 2015-2019 American Community Survey (ACS) and other sources on socioeconomic status, age and ability, minority status and English language proficiency, housing and transportation access, and health care and food access.

SV 2.0 uses the following indicators to calculate a social vulnerability index to identify locations in Santa Clara County that are vulnerable to climate change:

Population, Housing, and Transportation

- Population density
- Low-income households
- Educational attainment
- Children
- Older adults living alone
- Ability
- Race and ethnicity
- Linguistic isolation
- Cost-burdened renters
- Vehicle access
- Homelessness status
- Transit access

Health and Food Access

- Health insurance
- Asthma
- Cardiovascular disease
- Food access

The index assigns a score to each Census tract in Santa Clara County based on the number of indicators that fall in the 70th percentile or higher. Three Census Tracts in Campbell (5065.03, 5065.04, and 5065.05), shown as the hatched area in Figure 2, were identified as moderately vulnerable as part of SV 2.0.

Metropolitan Transportation Commission: Equity Priority Communities

MTC developed a list of Equity Priority Communities (EPC) – Census Tracts that are overwhelmingly and historically underserved based on socioeconomic status – in order to direct funding toward projects that enable more equitable access to transportation, housing, and services.[8] EPCs are

[8]Metropolitan Transportation Commission (MTC). 2024. Equity Priority Communities. https://mtc.ca.gov/planning/transportation/access-equity-mobility/equity-priority-communities

included in this report because the demographic factors that make up these communities also increase vulnerability to climate change. The indicators included in the EPC framework are:

- People of color
- Low-income
- Limited English proficiency
- Zero-vehicle household
- Seniors 75 years and over
- People with a disability
- Single parent families
- Severely rent-burdened

There are two Equity Priority Communities within Campbell as shown in green in Figure 2: the Rosemary neighborhood (northwest of W. Hamilton Avenue and Winchester Boulevard in Census Tracts 5065.04 and 5065.05) and outside of the city boundary in the South Bascom Urban Village (between Southwest Expressway and W. Hamilton Ave in Tract 5021.04).

San Francisco Bay Conservation and Development Commission Community Vulnerability Map

The San Francisco Bay Conservation and Development Commission (BCDC) Adapting to Rising Tides Program developed a community vulnerability map to better understand vulnerability to current and future flooding due to sea level rise and storm surges. The data is used to help inform the implementation of the BCDC Environmental Justice and Social Equity Bay Plan amendment. The community vulnerability map uses Census Block Groups using data from the American Community Survey (2017-2021) and CalEnviroScreen 4.0 to identify areas of low, moderate, high, and highest social vulnerability. This data extends into all of Santa Clara County, including Campbell, and is used in this report because the social vulnerability indicators used by BCDC also reflect increased vulnerability to other types of climate change hazards. Social vulnerability indicators included in the BCDC map are:

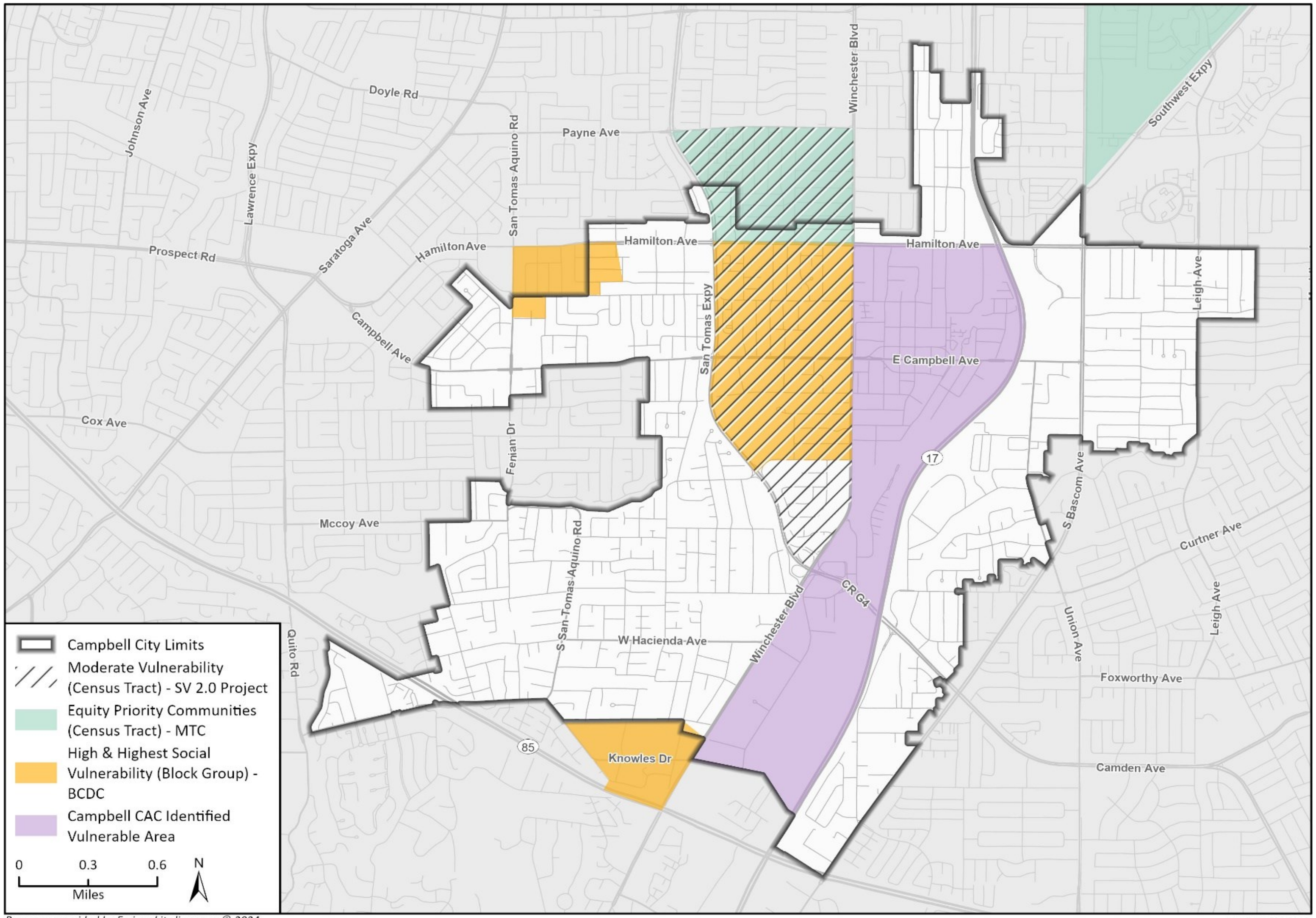
- Renters
- Under 5
- Very low-income
- Not U.S. citizen
- Without a vehicle
- People with a disability
- Single parent families
- Communities of color
- 65 and over, living alone
- Limited English proficiency
- Without a high school degree
- Severely housing cost burdened

There are four Block Groups in Campbell identified as high or highest social vulnerability, as defined by the BCDC community vulnerability map and shaded in orange in Figure 2: one Block Group in the northwest south of Hamilton Avenue (Block Group 3 in Census Tract 5066.06), two in downtown Campbell (Block Groups 1 and 2 in Census Tract 5065.03), and one in south Campbell surrounding Knowles Drive between Pollard Road and Winchester Boulevard (Block Group 3 in Census Tract 5067.03).

Campbell CAAP Community Advisory Committee Feedback

In June 2024, the Campbell CAAP Community Advisory Committee provided feedback on the draft climate vulnerability map developed using data from SV 2.0, EPC, and BCDC. The Community Advisory Committee validated the areas initially identified in these data sets, and added an additional climate-vulnerable area shown in purple in Figure 2 (Census Tract 5065.02) along the Los Gatos Creek, based on high concentrations of affordable housing units (shown in Figure 1) as well as unhoused individuals living along the creek. Figure 2 shows the climate vulnerable communities in Campbell by data source and Figure 3 shows a simplified version of all climate-vulnerable communities in Campbell resulting from the combination of methodologies described here.

Figure 2 Climate Vulnerability in Campbell by Data Source



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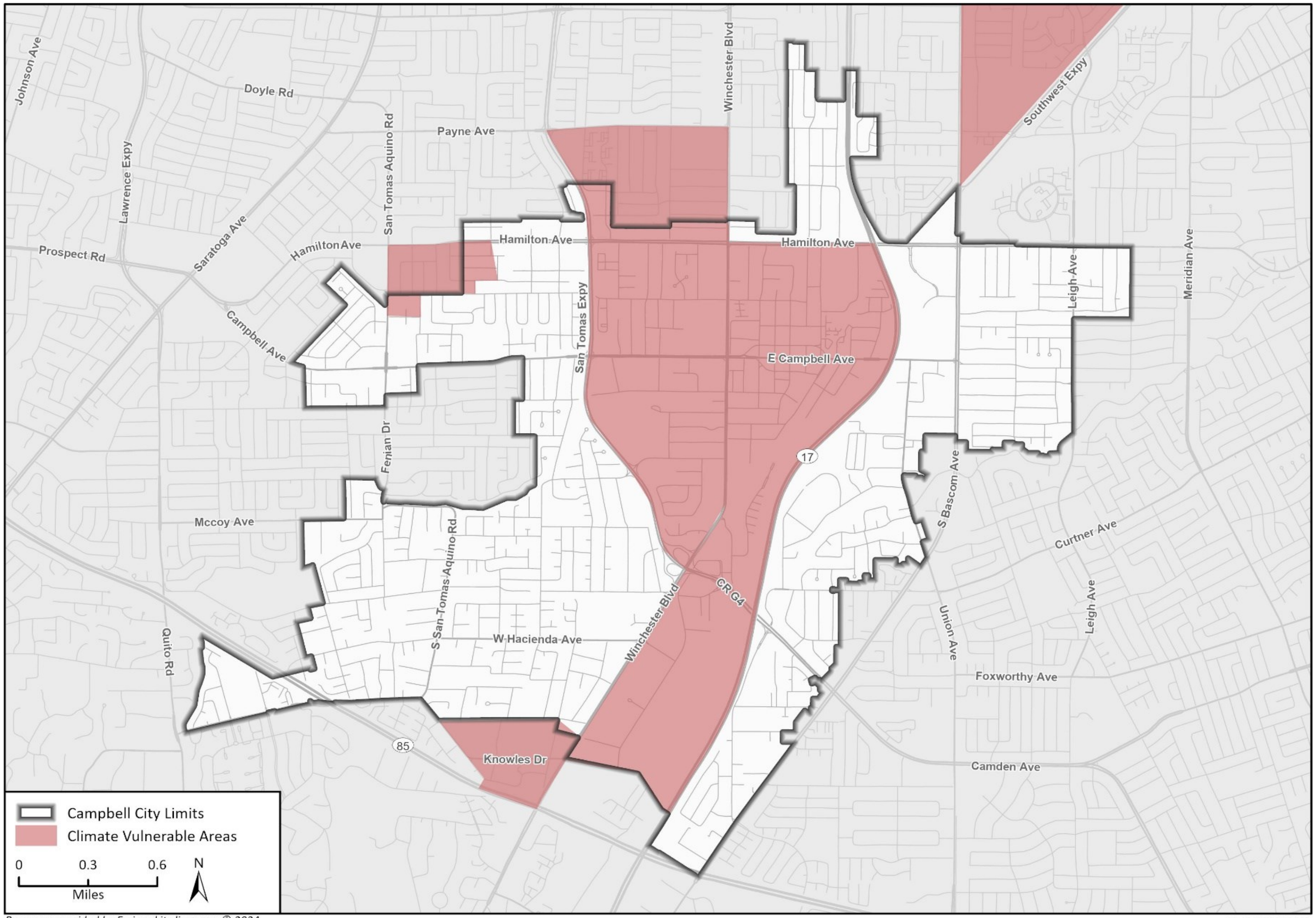
Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021.

23-15480 EPS CAAP
Fig X Social Vulnerability

Figure 3 Climate Vulnerability in Campbell



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Additional data provided by SV 2.0 Project; Metropolitan Transportation Commission (MTC); BCDC Community Vulnerability; U.S. Census Bureau, 2021.

23-15480 EPS CAAP
Fig X Climate Vulnerable Areas

3 Climate Hazards and Impacts

This section describes climate hazards and impacts that the Campbell will likely experience: extreme heat, air quality degradation, riverine flooding, and drought. The City is located approximately 200 feet above mean sea level. The most conservative projections for sea level rise suggest an increase of 6.2 feet by the year 2100.[9] This indicates that the City is unlikely to be directly impacted by sea level rise, and therefore, sea level rise is not assessed in this report.

3.1 Climate Hazards

The climate change projections included for each climate hazard are from SV 2.0. SV 2.0 uses projection data from Cal Adapt, as recommended in the California Adaptation Planning Guide developed by the University of California, Berkely, with oversight from the California Energy Commission.[10]

Extreme Heat

Cal Adapt defines a single day of extreme heat during the months between April and October where temperature exceeds the 98th percentile of maximum temperature of that local region from 1961 to 1990. For Campbell, the threshold temperature that exceeds the 98th percentile is 96 degrees Fahrenheit (°F). Cal Adapt defines an extreme heat event as a period of five or more consecutive extreme heat days. As described in SV 2.0, Santa Clara County has experienced a total of six extreme heat events in 1961, 1973, 1992, 2000, 2006, and 2009. Extreme heat events in 2000 and 2006 had the most devastating impacts. In 2000, temperatures reached 109°F, which caused one death and 11 heat-related illnesses in Santa Clara County. The heatwave in 2006 lasted 14 days and resulted in public health impacts and caused power outages throughout the county. The Santa Clara County area, including Campbell, is projected to experience longer and more frequent heatwaves, including an increase in daytime and nighttime temperatures. Campbell is expected to experience an increase from an average of four to an average of 24 extreme heat days per year by the end of the century according to the high emissions scenario.

Air Quality Degradation

Climate change is projected to result in increased air pollution, despite potential decreases in pollutant levels through advances in technology in the energy, transportation, and industrial sectors. Increased temperatures, increased humidity, decreased airflow, wildfires, and other weather conditions could reduce air quality. Ozone formation tends to increase with higher temperatures, strong sunlight, and a stable air mass. Higher temperatures also increase air pollution by causing vegetation to emit more natural hydrocarbons, air conditioners to work harder, fuel evaporation to increase, and demands on power plants to increase as well. The Bay Area Air Quality Management District (BAAQMD) shows that ozone concentration measurements in the air district violated federal standards on five days in 2014. Increasing impacts from climate change will result in poorer air quality in Santa Clara County. Increases in extreme heat and wildfire events as a result of

[9] California Sea Level Rise Guidance: 2024 Science and Policy Update. 2024. California Sea Level Rise Science Task Force, California Ocean Protection Council, California Ocean Science Trust. https://opc.ca.gov/wp-content/uploads/2024/05/California-Sea-Level-Rise-Guidance-2024-508.pdf
[10] California Energy Commission (CEC). 2023. https://cal-adapt.org/

climate change will result in higher levels of air pollution. Although there is low risk of wildfire in Campbell, air quality degradation from surrounding wildfires in the region will impact the Campbell community.

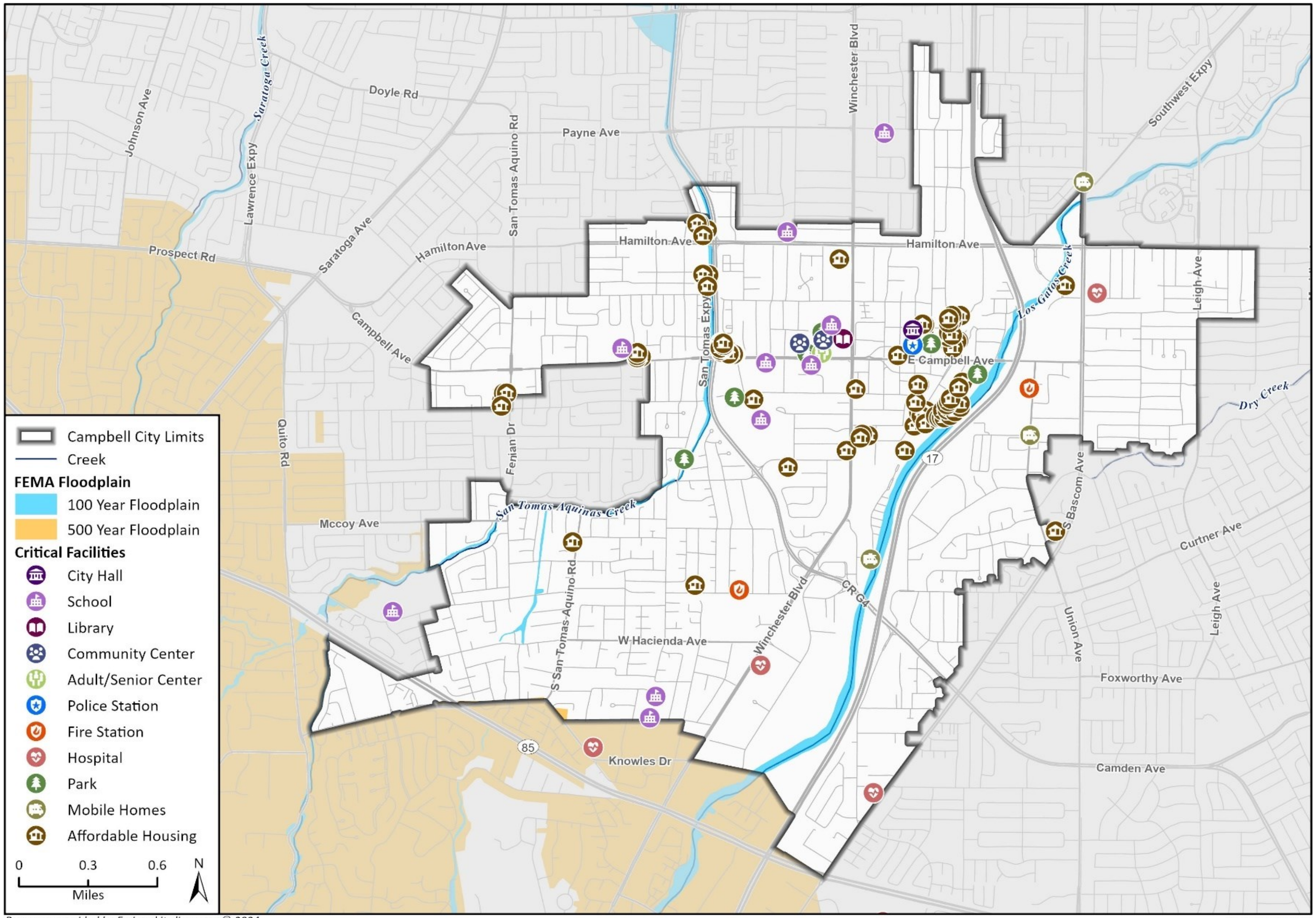
Riverine Flooding

Riverine flooding along Los Gatos Creek may intensify in Campbell given the projected increase in intensity and frequency of extreme precipitation events. Figure 4 shows critical facilities and the areas within and surrounding the city exposed to 100 and 500-year flooding events. The 500-year floodplain within Campbell is minimal because FEMA limited the study of the 500-year floodplain to outside of city limits. Given the extensive 500-year floodplain just south of the city, it is likely that areas within Campbell, along the southern border and Los Gatos Creek, would be at risk to 500-year flooding events. Though FEMA floodplains provide useful information about flood risk, they are based on historical flow data from river gauges and do not account for current or future environmental changes.

Drought

Drought is a period of abnormally dry weather caused by changes in primary variables including increase in temperature and decrease in precipitation. Campbell will experience an increasing number of drought events. According to SV 2.0, extreme dry spells are expected to occur in Santa Clara County every six to eight years by mid-century and increasing to every three to four years by end-of-century.

Figure 4 Riverine Flood Projections in Campbell



Basemap provided by Esri and its licensors © 2024.
Additional data provided by FEMA, 2021; NHD, 2024.

23-15480 EPS CAAP
Fig X Critical Facilities and Flood Hazards

3.2 Climate Impacts

This section provides a summary of the climate impacts of each climate hazard described in Section 3.1 Climate Hazards. SV 2.0 asset sectors include buildings and properties, communications, ecosystem, energy, public health, solid and hazardous waste treatment facilities, transportation, and water and wastewater facilities. For the purpose of this report, the asset sectors have been synthesized into four groups that are expected to experience similar impacts from climate hazards.[11]

- **Public Health and Safety**: This includes vulnerable populations, as well as emergency and critical services (such as hospitals, fire service, police service, power service, and water service). In alignment with SV 2.0, vulnerable populations are grouped into the following sub-asset sectors: seniors over 65 years old, young children under 5 years old, disadvantaged individuals (e.g., low-income, rent-burdened, individuals experiencing homelessness, and individuals living in mobile homes), and individuals with health conditions.
- **Buildings and Properties**. This includes buildings and properties located in Campbell, including critical facilities shown in Figure 1.
- **Transportation.** This includes highways and local roads, bridges, pedestrian ways, and bikeways, in Campbell.
- **Ecosystems**. This includes parks, natural landscapes, and minimally developed areas in Campbell.

Public Health and Safety

Extreme Heat

An increase in the intensity and frequency of heatwaves can cause several public health issues, which increase hospital admissions and emergency response calls. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors** are at higher risk of dehydration as their bodies are not able to thermoregulate compared to young and middle-aged adults.
- **Young Children** are still physiologically developing and therefore less able to regulate their bodies during extreme heat events.
- **Disadvantaged Individuals** may not be able to pay for adequate air conditioning, increasing exposure to extreme heat events. In addition, disadvantaged individuals are less likely to receive medical care for illnesses triggered or exacerbated by extreme heat, or face a significant medical costs if treated. Mobile homes, especially older homes, are more difficult to cool and retrofit, which can lead to financial stress on people living in these homes. Renters and individuals living in substandard housing are less likely to have adequately hardened and weatherized housing and are more likely to have limited control over home hardening and improvements against extreme heat. Unhoused individuals are unprotected from extreme heat due to limited access to shelter and air conditioning.
- **Individuals with Health Conditions** are particularly at risk of heat-related illness because heat can exacerbate existing conditions such as asthma, cardiovascular disease, high blood pressure, diabetes, and other respiratory and cardiovascular conditions. Extreme heat can also affect

[11]There are no water, wastewater, solid waste treatment, or hazardous waste treatment facilities within the City, so these have been excluded from the analysis.

medications. Additionally, extreme heat can result in power outages, which are particularly dangerous for individuals who are electricity-dependent for mobility, communication, or medical devices.

Air Quality Degradation

Air quality degradation can lead to the development of respiratory illnesses or worsen existing health conditions related to respiratory diseases .

- **Seniors** are more susceptible to impacts of air quality degradation because their bodies are less able to compensate for the effects of environmental hazards.
- **Young Children** are physiologically more vulnerable to air quality degradation as pollution can affect brain and lung development and function.
- **Disadvantaged Individuals** may experience health issues caused by poor air quality and are likely to experience financial burden associated with medical treatment. Renters and individuals living in substandard housing have limited control over home hardening and improvements, such as filtration, which protects against poor air quality. Individuals living in mobile homes may also face disproportion risk if their homes do not have adequate filtration.
- **Individuals with Health Conditions** are particularly at risk to respiratory health impacts associated with poor air quality. Individuals with cardiovascular disease, high blood pressure, or stroke risk may experience severe cardiovascular health impacts if exposed to poor air quality.

Riverine Flooding

With increasing temperatures and rain events, Campbell's creeks are more likely to flood, which can lead to a rise in infectious diseases such as vector-borne illnesses or increase in the distribution of diseases carried by insects and rodents. Specific disease risks include a rise in Lyme disease and West Nile Virus which have both been identified in Santa Clara County. The Santa Clara County Vector Control District and the Public Health Department monitor infectious diseases and publish data to manage the spread of infectious diseases. Flooding in buildings along the creeks can also lead to mold growth. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors**, especially those living alone, may not be able to safely evacuate floodwater hazard areas.
- **Young Children** may experience more difficulty safely evacuating floodwater hazard areas. Mold exposure in children may lead to the development of asthma and further sensitivity to mold.
- **Disadvantaged Individuals** may experience injuries from flooding events and are less likely to receive medical treatment. They may also experience cost burdens if their belongings and homes are damaged from floodwater inundation. Disadvantaged individuals, including those in substandard housing and renters are less likely to have adequately hardened and weatherized housing and are more likely to have limited control over home hardening and improvements against flooding. There are various affordable housing units and one mobile home park in the 100-year floodplain, shown in Figure 4.
- **Individuals with Health Conditions** may be more at risk of injury or illness due to exposure to mold after flooding events. According to the Center for Disease Control (CDC), exposure to damp and moldy environments may cause health effects ranging from sneezing and mild allergic reactions to fungal infections for more susceptible populations, such as those with chronic respiratory disease. Flooding can also result in power outages which are particularly dangerous

for individuals who are electricity-dependent, either for their mobility, communication, or medical devices.

Drought

Warmer temperatures and longer dry periods could result in water supply challenges across California. Increased water demand can lead to diminished storage reserves. Statewide assessments at the end of the 2012-2014 drought revealed that water levels were at 50 percent of average for that time of year, according to the California Department of Water Resources. Water supply depletion can increase costs. Potential impacts to vulnerable populations in Campbell are described below.

- **Seniors** are most likely not disproportionately at risk to drought unless there are major water shortages. Seniors who are economically disadvantaged, such as those on fixed incomes, are more likely to experience cost burden associated with increased water rates, as described for Disadvantaged Individuals below.
- **Young Children** are most likely not disproportionately at risk to drought unless there are major water shortages.
- **Disadvantaged Individuals** are more likely to experience cost burden associated with increased water rates and may struggle to access clean and affordable drinking water which may cause financial strain.
- **Individuals with Health Conditions** are most likely not disproportionately at risk to drought unless there are major water shortages.

Buildings and Properties

Extreme Heat

Extreme heat can accelerate the degradation of building materials such as wood, metal, and concrete. Prolonged exposure to high temperatures can cause roofing to contract and crack. This deterioration of building materials can lead to increased maintenance costs. In addition, operational costs could increase due to a rise in air conditioning used to cool buildings.

Air Quality Degradation

Poor air quality is not expected to impact buildings and properties.

Riverine Flooding

Properties around Los Gatos Creek are vulnerable to riverine flooding. These assets include residential buildings (including affordable housing units and a mobile home park), walking trails, and parks. With increased extreme precipitation rates, flooding extent and frequency are expected to increase.

Drought

Drought is not expected to impact buildings and properties.

Transportation

Extreme Heat

Extreme heat can impact asphalt and other materials, accelerating the deterioration of the road conditions. State Route 17 and the San Tomas Expressway, which run through Campbell, will be moderately vulnerable to extreme heat by the end of the century.

Air Quality Degradation

Air quality degradation will not affect the transportation system in Campbell.

Riverine Flooding

Parts of the transportation infrastructure in Campbell are moderately vulnerable to riverine flooding, particularly along Los Gatos Creek. This infrastructure includes bridges (Creekside Way and San Tomas), residential roads, Highway 17, pedestrian walkways and bikeways (including the Los Gatos Creek Trail).

Drought

Drought will not have an impact on the transportation system in Campbell.

Ecosystems

Extreme Heat

Extreme heat can cause plant and wildlife stress in landscaped areas, parks, riparian areas along the Los Gatos Creek, and the percolation ponds along Oka Lane. Wildlife face impacts of heat stress and heat related illness as well as disrupted reproductive cycles, and risks associated with early and extended seasonal temperature increases.[12] Plants are more likely to experience heat stress and drying, impacting the surrounding ecosystem. Extreme heat may also cause a shift in both plant and wildlife species range, and some species ill-suited to the new warmer conditions may suffer increased mortality rates.[13] Additionally, climate change is expected to increase water temperatures, making surface water supplies more vulnerable to the growth of algal blooms, the spread of invasive species, and increased evapotranspiration.[14] Warmer water has fewer nutrients and less oxygen than colder water and creates conditions less beneficial for salmon, which migrate up the Guadalupe Reiver and Los Gatos Creek from San Francisco Bay.[15]

Air Quality Degradation

Air quality declines from regional wildfires can impact ecosystem health by increasing the levels of air pollutants, which can cause plant and wildlife stress and mortality. The degradation of plant and wildlife health could impact the quality of parks and outdoor recreational areas in Campbell, and make outdoor recreational resources dangerous or unhealth for climate vulnerable populations.

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[12]Backlund, Peter, Anthony C. Janetos, and David Steven Schimel. The effects of climate change on agriculture, land resources, water resources, and biodiversity in the United States. Vol. 4. US Climate Change Science Program, 2008

[13]Ackerly, David, Andrew Jones, Mark Stacey, Bruce Riordan (University of California, Berkeley). 2018. San Francisco Bay Area Summary Report. California's Fourth Climate Change Assessment. Publication number: CCCA4-SUM-2018-005.

[14] Santa Clara Valley Water District. Climate Change Action Plan. 2021. https://fta.valleywater.org/dl/WE26jeeXbS

[15] State of Salmon in Watersheds. Pressure: Climate Change in the Ocean. https://stateofsalmon.wa.gov/executive-summary/challenges/climate/#:~:text=Warmer%20water%20has%20fewer%20nutrients,eat%2C%20making%20survival%20less%20likely.

Riverine Flooding

Ecosystems in Campbell that are highly vulnerable to flooding include freshwater wetland, riparian and riverine, and grassland. Some areas in Campbell that may be affected include Los Gatos Creek, Camden Pond, Budd Avenue Pond, and San Tomas Aquinas Creek. Negative impacts from flooding can result in erosion, increased exposure to toxins such as mercury, vegetation removal, disruption to wildlife, and decreased ecosystem services, such as flood control and carbon storage. Sensitive aquatic organisms are particularly vulnerable to habitat change due to flood events and species diversity and population in general are expected to decrease. Water quality is projected to be lower from the impacts of riverine flooding.

Drought

Drought can increase irrigation requirements for maintaining landscaping, park facilities, and street trees, while water use restrictions would potentially prevent asset managers from meeting this increased watering demand, resulting in water-stressed vegetation, increased vegetation mortality, and potentially reducing the quality of and benefits provided by parks and the urban forest.[16] Drought will disrupt habitats and the ability for wildlife to survive from dehydration and unreliable food sources.

[16]Lund, Jay, et al. 2018. "Lessons from California's 2012–2016 Drought." Journal of Water Resources Planning and Management, vol. 144, no. 10, ascelibrary.org/ doi/10.1061/%28ASCE%29WR.1943-5452.0000984.
Okin, G. S., Dong, C., Willis, K. S., Gillespie, T. W., & MacDonald, G. M. (2018). The impact of drought on native southern California vegetation: Remote sensing analysis using MODIS-derived time series. Journal of Geophysical Research: Biogeosciences, 123(6), 1927-1939.

4 Conclusion

A summary of the key climate change hazard vulnerabilities for each asset sector is provided below. The CAAP will include measures and actions that increase resilience of these key vulnerabilities in Campbell.

Public Health and Safety

- Extreme heat citywide with highest vulnerabilities to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions).
- Air quality degradation citywide with highest vulnerabilities to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions).
- Riverine flooding impacts to climate vulnerable populations (seniors, young children, disadvantaged individuals, and individuals with health conditions) living along the Los Gatos Creek. In particular, there are various affordable housing units and the Timber Cove Mobile Home Park, which house vulnerable populations, within the 100-year floodplain along Los Gatos Creek.
- Drought citywide with highest vulnerabilities to disadvantaged individuals.

Buildings and Properties

- Riverine flooding along the Los Gatos Creek, in particular flooding of the Timber Cove Mobile Home Park and affordable housing units.

Transportation

- Riverine flooding along the Los Gatos Creek, in particular flooding of bridges (Creekside Way and San Tomas), residential roads, Highway 17, pedestrian ways, and bikeways.

Ecosystems

- Extreme heat impacts to ecosystems citywide.
- Riverine flooding of ecosystems along Los Gatos Creek, in particular Campbell Park.
- Drought impacts to ecosystems citywide.

Appendix D

Greenhouse Gas Analysis Report

Campbell Climate Action & Adaptation Plan

Greenhouse Gas Inventory Analysis Report

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August 2024

RINCON CONSULTANTS, INC. SINCE 1994

CITY OF CAMPBELL
Climate Action & Adaptation Plan

Table of Contents

Tables

Figures

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1 Introduction

This document presents the data, methods, and results for a 2022 greenhouse gas (GHG) emissions inventory and 2045 forecast Campbell. This is the first GHG emission inventory for Campbell, and includes communitywide emissions, as well as emissions from municipal operations. The inventory was conducted to support Campbell's GHG emissions reduction targets, and ultimately the Campbell Climate Action and Adaptation Plan (CAAP).

California (the State) has set statewide GHG emissions reduction goals to mitigate negative climate change impacts and transition the State to a low-carbon economy. In particular, the State has established goals to reduce statewide GHG emissions 40 percent below 1990 levels by 2030, as established by Senate Bill (SB) 32, and achieve net zero GHG emissions as soon as possible, but no later than 2045, as established by Assembly Bill (AB) 1279.[1] The California Air Resources Board (CARB) is the agency responsible for addressing these goals and developing strategies to achieve them. Many local jurisdictions are completing their own GHG inventories, forecasts, and climate action plans (CAPs) to align with SB 32 and AB 1279.

Local governments play a fundamental role in reducing local GHG emissions and preparing for a more resilient future. Local policies can influence high-emissions behaviors and mitigate climate change effects.[2] To this end, the City is developing a CAAP to align with State goals, increase resilience and climate change preparedness, maintain healthy air and water resources, and improve community health and the local economy. The forthcoming CAAP will include the 2022 GHG emissions inventory for the community (2022 Community GHG Inventory) and the associated GHG emissions forecast, in addition to the municipal operations inventory (2022 Municipal GHG Inventory). Municipal GHG emissions are a subset of community GHG emissions and are included in the community GHG inventory and associated forecast.

The 2022 Community GHG Inventory completed for Campbell includes GHG emissions from communitywide activities within the jurisdictional boundaries of Campbell during 2022. Based on the inventory, Rincon developed a forecast for 2030, 2035, 2040, and 2045. The forecast provides an up-to-date projection of how GHG emissions are expected to change in the future based on population growth, employment growth, and State legislation. This document also presents a gap analysis to help identify GHG emissions reduction levels that will be needed to achieve the State GHG emissions reduction targets. Like all GHG inventories, forecasts, and targets, the analysis in this document relies on the best available data and calculation methodologies currently available.

This report includes the following information by section:

- **Section 1:** Campbell's 2022 Community GHG Inventory methodology, activity data, emissions factors, and results by sector.
- **Section 2:** City's 2022 Municipal GHG Inventory methodology, activity data, emissions factors, and results by sector.

[1] AB 1279 defines net zero GHG emissions as reducing GHG emissions at least 85 percent below 1990 levels. California also set a goal to reach 1990 levels by 2020, as established by AB 32, The 2020 goal set by AB 32 was achieved by the State in 2016. CARB. Frequently Asked Questions – California's 2022 Climate Scoping Plan. Accessed November 14, 2022, at: https://ww2.arb.ca.gov/sites/default/files/2022-06/2022_Scoping_Plan_FAQ_6.21.22.pdf

[2] CARB. California's 2017 Climate Change Scoping Plan. Accessed November 14, 2022, at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

- **Section 3:** Campbell's forecast for the years 2030, 2035, 2040, and 2045, and alignment with State targets based on a 1990 backcast.

1.1 Legislative Context

The State has developed statewide legislative goals and programs to reduce GHG emissions. CARB has issued guidance concerning the establishment of GHG emissions reduction targets for local CAPs so municipalities can contribute their fair share towards the State's goals. In CARB's first Climate Change Scoping Plan (hereafter referred to as the 2008 Scoping Plan), the Board encouraged local governments to adopt a reduction target for their own community emissions that parallels the State's commitment to reduce GHG emissions.[3] In 2017, CARB published and updated Scoping Plan (hereafter referred to as the 2017 Scoping Plan Update) outlining the strategies the State will employ to reach the additional targets set by SB 32.[4]

In December 2022, the 2022 California Climate Change Scoping Plan Update was published and includes recommendations for achieving the goal of carbon neutrality by 2045, codified in the California Health and Safety Code Section 38562.2, as amended by AB 1279.[5]

Legislative Targets

The State of California has adopted legislation and policies to address climate change, the most relevant of which are summarized below.

- **Executive Order S-3-05**, signed in 2005, established statewide GHG emissions reduction goals to achieve long-term climate stabilization as follows: by 2020, reduce GHG emissions to 1990 levels and by 2050, reduce GHG emissions to 80 percent below 1990 levels. This 2050 goal was accelerated by the 2045 carbon neutral goal established by EO B-55-18 and AB 1279, as discussed below.
- **Assembly Bill 32**, known as the Global Warming Solutions Act of 2006, required California's GHG emissions be reduced to 1990 levels by the year 2020 (approximately a 15 percent reduction from 2005 to 2008 levels). The 2008 Scoping Plan identified mandatory and voluntary measures to achieve the statewide 2020 GHG emissions limit.
- **Senate Bill 32**, signed in 2016, established a statewide mid-term GHG emissions reduction goal of 40 percent below 1990 levels by 2030. CARB formally adopted the 2017 Scoping Plan Update in December 2017, laying the roadmap to achieve 2030 goals and giving guidance to achieve substantial progress toward the 2050 State goals. The 2022 Scoping Plan Update provided further guidance for reaching the State's SB 32 goal.
- **Executive Order B-55-18**, signed in 2018, expanded upon EO S-3-05 by creating a statewide GHG emissions goal of carbon neutrality by 2045. EO S-55-18 identified CARB as the lead agency to develop a framework for implementation and progress tracking toward this goal in the 2022 Climate Change Scoping Plan Update.

[3] CARB. Climate Change Scoping Plan: A Framework for Change. Dec. 2008. Accessed November 14, 2022 at: ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/document/adopted_scoping_plan.pdf

[4] CARB. California's 2017 Climate Change Scoping Plan. Accessed November 14, 2022, at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

[5] CARB. 2022 Scoping Plan Update. Accessed November 14, 2022, at: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf

- **Assembly Bill 1279**, known as the California Climate Crisis Act, signed by the governor in 2022, codified the GHG emissions reduction goals of achieving carbon neutrality by 2045. It expanded the definition of carbon neutrality to reducing direct emissions 85 percent below 1990 levels and removing the remaining 15 percent of emissions though carbon sequestration and other technologies. The 2022 Scoping Plan Update, adopted in December 2022, provided the pathway for reaching the State's AB 1279 goal.

1.2 Climate Science Context

Greenhouse Gases

GHG emissions quantification frameworks have been developed over decades in an effort to standardize GHG accounting. The International Council for Local Government Initiatives (ICLEI) protocols for community and municipal inventories (discussed further in Section 2 and Section 3, respectively) assess emissions associated with the six internationally recognized GHGs, as outlined in Table 1. Campbell's inventory focuses on the three GHGs most relevant to the City: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The other gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) are omitted from the inventory as they are emitted primarily in private sector manufacturing and electricity transmission. This approach is consistent with typical community and municipal inventory approaches, as industrial emissions are typically outside of the City's jurisdictional control. Table 1 also includes the 100-year global warming potential (GWP) for each gas—consistent with the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report[6] and used by the State's latest GHG emissions inventory. GWP refers to the ability of each gas to trap heat in the atmosphere. For example, one pound of methane gas has 28 times more heat capturing potential than one pound of carbon dioxide gas. GHG emissions are reported in metric tons of CO_2 equivalent (MT CO_2e).

Table 1 2022 Inventory GHGs and GWPs

Greenhouse Gas	Primary Source	100-year GWP
Carbon dioxide (CO_2)	Combustion	1
Methane (CH_4)	Combustion, anaerobic decomposition of organic waste (e.g., in landfills, wastewater treatment plants)	28
Nitrous Oxide (N_2O)	Leaking refrigerants and fire suppressants	265
Hydrofluorocarbons	Leaking refrigerants and fire suppressants	4 - 12,400
Perfluorocarbons	Aluminum production, semiconductor manufacturing, HVAC equipment manufacturing	6,630 - 11,100
Sulfur Hexafluoride (SH6)	Transmission and distribution of power	23,500

Source: Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[6] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Accessed January 5, 2023, at: https://www.ipcc.ch/report/ar5/syr/

2 Community GHG Emissions Inventory

Conducting a community GHG emissions inventory serves to provide a comprehensive understanding of GHG emissions within a jurisdiction, and may be developed to serve the following purposes:

- Provide an understanding of where the highest sources of emissions originate, and where the greatest opportunities for reduction exist.
- Create a baseline from which the jurisdiction can establish a forecast, reduction targets, and evaluate future progress.
- Help the jurisdiction understand how best to meet legislative requirements.
- Enable the jurisdiction to follow accounting and reporting principles.

GHG inventories are developed by identifying the sources and sinks by sector for GHGs within the geographic boundary of interest (e.g., Campbell city limits), establishing activity data for each sector, and applying an emissions factor to determine the carbon dioxide equivalence (CO_2e). While there are often many potential sectors contributing to the jurisdiction's GHG emissions, only a select few sectors are typically considered the major contributors. The sectors used for Campbell's GHG inventory are identified in the sections below.

2.1 Methodology

Protocol

Campbell's 2022 Community GHG Inventory was developed in alignment with accounting protocols provided by ICLEI. ICLEI protocols are designed for local-scale accounting of GHG emissions and provide authoritative guidance for accuracy and consistency. The ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 (Community Protocol) serves to guide the measurement and reporting of GHG emissions in a standardized way and is used by other jurisdictions to support their own inventory, forecast, and climate action planning efforts. The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory.

Emissions Boundary

Campbell's 2022 Community GHG Inventory covers emissions sources within city limits. The inventory reflects emissions sectors over which the local government (i.e., City of Campbell) has jurisdictional control and influence, while other sectors that the City does not have control over are excluded. This approach aligns with general GHG inventory accounting principles, as well as methods set forth by the Community Protocol.

Scope

The Community Protocol recommends reporting GHG emissions from five basic reporting activities:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment

- On-road passenger and freight motor vehicle travel
- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

The Community Protocol also provides recommendations for additional GHG emissions source reporting for activities that can be influenced by the accounting agency. Based on reporting practices in California, it is recommended that GHG emissions from off-road equipment fuel combustion and wastewater treatment processes are also included in community GHG emissions inventories. Emissions from industrial sources and operations are covered under the State's Cap-and-Trade program and are not included in the inventory.[7] Additionally, emissions sources from agriculture are not included in the inventory as there are not significant agricultural land uses/production in Campbell.

The GHG emissions sources for this inventory can be categorized more generally into the following five activity sectors:

- Electricity
- Natural Gas
- Transportation
- Water and Wastewater
- Solid Waste

Campbell's 2022 Community GHG Inventory includes an assessment of the community-wide GHG emissions associated with the five sectors listed above which serve as the basis for the GHG emissions forecast and target setting. Emissions from industrial sources and operations are covered under the State's Cap and Trade program, and therefore not included in the inventory.[8] Additionally, emissions sources from agriculture are not included in the inventory as there are no agricultural land uses/production in Campbell.

2.2 2022 Community GHG Emissions Inventory

Generally, GHG emissions are calculated by multiplying the activity data in each sector (e.g., electricity, transportation, solid waste) by an associated emission factor. Activity data refer to the relevant measured or estimated energy usage or GHG-generating process data. Emission factors are observation-based conversion factors used to equate activity data to generated GHG emissions. The 2022 Community GHG Inventory leverages the latest available models and best available data in accordance with the Community Protocol. The inventory serves to provide a comprehensive understanding of the community's current GHG emissions, and as the basis for the forecast and target setting. The following sections contain further information on the inventory approach, calculation methodologies, data used, and results.

[7] https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program

2.2.1 Energy

Energy: Residential and Commercial Electricity

Campbell sources electricity from Pacific Gas & Electric (PG&E) and Silicon Valley Clean Energy (SVCE). SVCE is the community choice aggregator for 13 communities across Silicon Valley, meaning that it is a public, not-for-profit agency providing clean electricity to their service territory. SVCE is the official electricity provider for Campbell, unless customers have 'opted-out' and instead purchase electricity from PG&E. The opt-out provided by SVCE is three percent of residential accounts and five percent of nonresidential accounts (e.g., commercial, industrial). SVCE has two tiers – GreenPrime (100 percent renewable) and GreenStart (around 45 percent renewable).[9]

Certain commercial accounts purchase what is known as 'direct access' electricity, where customers purchase electricity from a competitive non-utility entity called an Energy Service Provider (ESP). Direct access electricity is typically less expensive, but more carbon intensive, than electricity options on the California grid.[10]

Emissions from residential and commercial electricity were calculated using Community Protocol Equation BE.2.1. Electricity use from EVs are captured under the transportation sector to provide a more thorough differentiation between building energy and transportation emissions. The equation has been adjusted to remove passenger car EV electricity use from residential electricity consumption and commercial and bus EV electricity consumption from commercial consumption. commercial. More information regarding electric vehicle energy use can be found in Section 2.2.2.

Equation 2-1 and Table 2 provide the adjusted equation, associated parameters, and data sources used to quantify GHG emissions associated with community electricity consumption.

EQUATION 2-1

BE.2.1 RESIDENTIAL/COMMERCIAL ELECTRICITY SECTOR EMISSIONS

$$CO_2e_{electricity,j} = \sum_i \left(Elec_{i,j} - EV_{i,j}\right) \times EF_{elec,i,j}$$

9 https://svcleanenergy.org/residential-rates/

10 https://www.cpuc.ca.gov/consumer-support/consumer-programs-and-services/electrical-energy-and-energy-efficiency/community-choice-aggregation-and-direct-access-/direct-access

Table 2 Emissions Parameters and Data Sources – Community Electricity Use

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from electricity consumption per building type	$CO_2e_{electricity,j}$	See Table 4	MT CO_2e/year	Calculated
Electricity consumption per building type per energy provider	$Elec_{i,j}$	See Table 3	kWh/year	SVCE 2022 Electricity Report; PG&E Community Report[1]
Attributed electric vehicle electricity consumption	$EV_{i,j}$	See Table 3	kWh/year	EMFAC2021[2]
Electricity emission factor based on energy provider	$EF_{elec,i,j}$	See Table 4	MT CO_2e/kWh	SVCE 2022 Electricity Report; PG&E community Report
Energy Providers	i	GWP	Categorical	
Building type	j	Residential Commercial	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

[1] Silicon Valley Clean Energy (SVCE) 2022 Electricity Report, provided by the City via SharePoint and revised via email on May 29, 2024. PG&E Community Report for 2022 provided by the City via SharePoint.

[2] California Air and Resources Board. 2023. Emission Factor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

Table 3 below shows the original electricity activity data, allocated electric vehicle adjustment, and subsequent adjusted activity data used to determine GHG emissions for the community's electricity consumption.

Table 3 Community Residential and Commercial Electricity Activity Data Adjustment

Sector	Provider	Original Activity Data [kWh]	Attributed EV[1] [kWh]	Adjusted Activity Data [kWh]
Residential	PG&E	3,701,979	288,761	3,413,218
Residential	SVCE GreenPrime	1,579,728	123,222	1,456,507
Residential	SVCE GreenStart	83,588,699	6,520,062	77,068,637
Direct Access	Direct Access	18,509,670	0	18,509,670
Commercial	PG&E	44,535	1	44,534
Commercial	SVCE GreenPrime	1,762,625	44	1,762,581
Commercial	SVCE GreenStart	93,266,368	2,343	93,264,025

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; EV = electric vehicles

[1] EV kWh usage from passenger vehicles is removed from residential electricity, while commercial and bus EV kWh usage is removed from commercial electricity. If multiple providers exist for a community, attributed EV allocates electric vehicle kWh consumption to each provider based on the proportion of electricity provided by each provider per building type.

Resulting activity data, emissions factors, and GHG emissions by building type and provider are summarized in Table 4.

Table 4 Community Residential and Commercial Electricity GHG Emissions Calculations

Sector	Provider	Adjusted Activity Data [kWh]	Emission Factor [MT CO_2e/kWh]	GHG Emissions [MT CO_2e]
Residential	PG&E	3,413,218	0.00002630	90
Residential	SVCE GreenPrime	1,456,507	0.00002132	31
Residential	SVCE GreenStart	77,068,637	0.00003266	2,517
Direct Access	Direct Access	18,509,670	0.00022654	4,193
Commercial	PG&E	44,534	0.00002630	1
Commercial	SVCE GreenPrime	1,762,581	0.00002132	38
Commercial	SVCE GreenStart	93,264,025	0.00003266	3,046

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent

Energy: Electricity Transmission and Distribution Losses

Electricity transmission and distribution (T&D) losses occur in the transmission of electricity and in the distribution system. Because these losses are upstream of the endpoints (i.e., buildings located within Campbell), this electricity is not captured in the activity data. T&D losses are recommended for inclusion in community GHG inventories by the Community Protocol, as these losses are associated with energy usage and directly impacted by the community's electricity consumption. Equation 2-2 and Table 5 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions associated with community T&D losses from electricity consumption. As T&D losses associated with EV electricity use are considered negligible and, therefore, are included in the quantification of residential and commercial electricity T&D.

EQUATION 2-2

BE.4 ELECTRICITY T&D LOSS SECTOR EMISSIONS

$$CO_2e_{T\&D,j} = \sum_i Elec_{i,j} \times L_{T\&D} \times EF_{elec,i,j}$$

Table 5 Emissions Parameters and Data Sources – Community Electricity T&D Loss

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from transmission and distribution losses per building type	$CO_2e_{T\&D,i}$	See Table 6	MT CO_2e/year	Calculated
Electricity consumption per energy provider and building type	$Elec_{i,j}$	See Table 6	MWh/year	SVCE 2022 Electricity Report; PG&E Community Report[1]
Electricity emissions factor per energy provider and building type	$EF_{elec,i,j}$	See Table 6	MT CO_2e/MWh	SVCE 2022 Electricity Report; PG&E Community Report
Electricity loss factor	$L_{T\&D}$	5.10%	Percent	EPA eGRID[2]
Energy Providers	i	GWP	Categorical	
Building type	j	Residential Commercial[3]	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

[1] Silicon Valley Clean Energy (SVCE) 2022 Electricity Report, provided by the City via SharePoint and revised via email on May 29, 2024. PG&E Community Report provided to the City via SharePoint in May 2022.

[2] Environmental Protection Agency (EPA). 2023. Data Explorer, grid loss rates, 2016. Available at: https://www.epa.gov/egrid/data-explorer

The activity data, emissions factors, and GHG emissions associated with electricity T&D losses are summarized in Table 6 per building type and electricity provider.

Table 6 Community Electricity T&D Loss GHG Emissions Calculations

Sector	Provider	Activity Data [kWh]	T&D Losses [kWh][1]	Emission Factor [MT CO_2e/kWh][2]	GHG Emissions [MT CO_2e]
Residential	PG&E	3,701,979	188,801	0.000026	5
	SVCE (GreenPrime)	1,579,728	80,566	0.000021	2
	SVCE (GreenStart)	83,588,699	4,263,024	0.000033	139
Commercial	PG&E	44,535	2,271	0.000026	<1
	SVCE (GreenPrime)	1,762,625	89,894	0.000021	2
	SVCE (GreenStart)	93,266,368	4,756,585	0.000033	155
	Direct Access	18,509,670	943,993	0.000227	214

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent

[1] T&D losses include the kWh consumption associated with EV charging.

Energy: Residential and Commercial Natural Gas

GHG emissions from natural gas result from stationary combustion in both residential and commercial buildings. Like industrial electricity use, industrial use of natural gas is excluded from the GHG inventory as these emissions are regulated by the Cap-and-Trade program.

PG&E supplies Campbell's natural gas and provided activity data to the City through its 2022 Community Report. Emissions from residential and commercial natural gas use were calculated using Community Protocol Equation BE.1.1.

Though the majority of natural gas emissions come from combustion, not all the natural gas used is combusted. Natural gas leaks – from processing plants, pipes, fittings, and appliances – are primarily methane, which has a higher GWP and therefore a larger GHG impact compared to combusted natural gas Therefore, the Community Protocol has been adjusted to remove this small percentage of "behind the meter" natural gas from the combustion calculation, and instead count it as leakage. More information regarding emissions associated with natural gas leaks can be found under the Energy: Natural Gas Methane Leaks subsection below. Equation 2-3 and Table 7 provide the adjusted equation, associated parameters, and data sources used to quantify GHG emissions associated with community natural gas consumption in residential and commercial buildings.

EQUATION 2-3

BE.1.1 RESIDENTIAL/COMMERCIAL NATURAL GAS SECTOR EMISSIONS

$$
\begin{aligned}
CO_2e_{NatGas,i} = {} & \left(Fuel_{NG,i} - [1 - L_{enduse}]\right) \\
& \times \left[\left(EF_{NG,CO_2} \times GWP_{CO_2}\right) + \left(EF_{NG,CH_4} \times GWP_{CH_4}\right) \right. \\
& \left. + \left(EF_{NG,N_2O} \times GWP_{N_2O}\right)\right] \times 10^{-1} \times 10^{-3}
\end{aligned}
$$

Table 7 Emissions Parameters and Data Sources – Community Natural Gas Use

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	$CO_2e_{NatGas,i}$	See Table 8	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 8	therms/year	PG&E Community Report[1]
Percent natural gas lost during consumer end-use	L_{enduse}	0.50%	Percent	Environmental Defense Fund[2]
Carbon dioxide emission factor for natural gas combustion	EF_{NG,CO_2}	53.06	kg CO_2e/mmBTU natural gas	EPA Emission Factors Hub[3]
Methane emission factor for natural gas combustion	EF_{NG,CH_4}	.001	kg CH_4/mmBTU natural gas	EPA Emission Factors Hub
Nitrous oxide emission factor for natural gas combustion	EF_{NG,N_2O}	.0001	kg N_2O/mmBTU natural gas	EPA Emission Factors Hub
Global warming potential of carbon dioxide	GWP_{CO_2}	1		IPCC Fifth Assessment Report[4]
Global warming potential of methane	GWP_{CH_4}	28		IPCC Fifth Assessment Report
Global warming potential of nitrous oxide	GWP_{N_2O}	265		IPCC Fifth Assessment Report
Conversion factor	10^{-1}	0.1	mmBTU/therm	
Conversion factor	10^{-3}	.001	MT/kg	
Building type (i.e., residential, or commercial)	i	Residential Commercial[5]	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

[1] PG&E Community Report Provided by the City via SharePoint in May 2024.

[2] Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Available at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

[3] Environmental Protection Agency (EPA). Emission Factors Hub. April 1, 2022. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

[4] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

The total natural gas consumption, combusted natural gas activity data, emissions factors, and GHG emissions associated with community natural gas use are summarized per building type and provider in Table 8.

Table 8 Community Residential and Commercial Natural Gas GHG Emissions Calculations

Sector	Activity Data [therms]	End-use Leakage [therms]	Combustion Activity Data [therms]	Emissions Factor [MT CO_2e/therm]	GHG Emissions [MT CO_2e]
Residential	5,813,399	29,067	5,784,332	0.005311	30,723
Commercial	2,813,524	14,068	2,799,456	0.005311	14,869

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

Energy: Natural Gas Methane Leaks

Natural gas methane leaks occur during delivery to the buildings and during associated end-uses in the community. Gas methane leaks from delivery occur in the pipeline distribution system and are, therefore, upstream of the delivery endpoints and not reflected in reported total natural gas usage. While natural gas pipeline distribution leakage is technically outside of Campbell's jurisdictional boundaries, the leakage is still directly impacted by natural gas consumption in the community. As leakage is directly connected to the community's natural gas consumption, it is best practice to include leakage as an emissions sector in the Campbell's 2022 Community GHG Inventory. Methane leaks from end-use – discussed previously – occur at the point-of-use in the city and occur within Campbell's jurisdictional boundaries.

Though a recommended source of emissions, the Community Protocol does not provide a specific calculation methodology for determining GHG emissions from natural gas leakage. Therefore, emissions from natural gas leaks were calculated using Equation 2-4, which estimates emissions in alignment with energy calculation principles set forth by the Community Protocol and the guidance provided under Community Protocol Section BE.5 Upstream Emissions from Energy Use. Table 9 shows the parameters and data sources associated with Equation 2-4, which were used to quantify GHG emissions from natural gas distribution and end-use leakage.

EQUATION 2-4

NATURAL GAS LEAKAGE SECTOR EMISSIONS

$$CO_2e_{leak,i} = Fuel_{NG,i} \times EF_{NG\ leak} \times (L_{enduse} + L_{dist})$$

Table 9 Emissions Parameters and Data Sources – Community Natural Gas Leaks

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from natural gas distribution leakage per building type	$CO_2e_{leak,i}$	See Table 10	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 10	therms/year	PG&E Community Report[1]
Emission factor for natural gas leakage	$EF_{NG\ leak}$	0.053067	MT CO_2e/therm	Calculated[2]
Percent natural gas lost during distribution	L_{dist}	2.3%	Percent	Alvarez, Ramón et al. (2018)[3]
Percent natural gas lost during consumer end-use	L_{enduse}	0.5%	Percent	Environmental Defense Fund[4]
Building type (i.e., residential, or commercial)	i	Residential Commercial	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit

[1] 2022 PG&E Community Report Provided by the City on May 2024 via SharePoint.

[2] Emission factor is calculated using the following equation:

$$2.85\,\frac{cubic\ meters}{therm} * 95\%\ methane\ content * 0.7\,\frac{kg}{cubic\ meter} * 28\,\frac{CO_2e}{CH_4} * 0.001\,\frac{MT}{kg}$$

[3] Alvarez, Ramón et al. (2018). Assessment of methane emissions from the U.S. oil and gas supply chain. Science. 361. Accessed January 12, 2023, at: https://www.science.org/doi/abs/10.1126/science.aar7204

[4] Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Accessed January 12,2023 at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

The total natural gas use and resulting leakage activity data, emissions factors, and GHG emissions per building type are summarized in Table 10.

Table 10 Community Natural Gas Methane Leaks GHG Emissions Calculations

Natural Gas Sector	Leakage Source	Activity Data [therms]	Methane Leakage [therms]	Emissions Factor [MT CO_2e/therm]	GHG Emissions [MT CO_2e]
Residential	Distribution	5,813,399	133,708	0.053067	8,638
	End-use	5,813,399	29,067	0.053067	
Commercial	Distribution	2,813,524	64,711	0.053067	4,181
	End-use	2,813,524	14,068	0.053067	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

2.2.2 Transportation

Transportation: On-Road

On-road vehicles produce GHG emissions from the mobile combustion of fossil fuels (i.e., internal combustion engines) and from the production of electricity used by EVs. GHG emissions from the on-road transportation sector were calculated in accordance with Community Protocols TR.1.A and TR.2.B. The methodology leverages on-road transportation data from CARB's 2021 Emission Factor (EMFAC2021) model.[11] EMFAC2021 provides data at the countywide level.

The Community Protocol recommends the use of regional travel demand models to differentiate activity data by passenger, commercial, and bus vehicle miles travelled (VMT). This assessment utilizes data provided by Replica.[12] Replica uses big data sources such as GPS, cell phone, credit card transactions, real estate data, and ground-truthing, along with powerful machine learning techniques, to generate a statewide land use and VMT model that is updated quarterly. For this assessment, Replica provided origin–destination average daily, weekday, and weekend VMT for each quarter of 2022 within Campbell. Quarterly daily VMT provided by Replica was averaged and scaled[13] to determine 2022 VMT activity data. Replica does not have Bus VMT data for 2022. Because of COVID-19 impacts to ridership, 2019 is considered the best proxy. VMT rates were averaged and scaled using the same techniques described above. The bus category includes EMFAC defined bus types such as school bus, urban bus, and other bus, which encompasses transit vehicles. 2019 bus data is considered to be the best proxy for 2022, as factors impacting bus ridership in 2019 and 2022 are most alike. Equation 2-5 and Table 11 define the equations, parameters, and data sources used to convert resulting Replica VMT activity data to GHG emissions from on-road transportation fuel combustion.

EQUATION 2-5

TR.1.A & TR.2.B ON-ROAD TRANSPORTATION COMBUSTION EMISSIONS

$$CO_2e_{onroad,i} = \left(T_i + \frac{1}{2}T_{O,i} + \frac{1}{2}T_{D,i}\right) \times EF_{auto,i}$$

[11] California Air and Resources Board. 2023. Emission Factor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

[12] https://www.replicahq.com/

[13] Weekend daily VMT is scaled assuming 104 weekend days in a year, while weekday daily VMT was scaled assuming 261 weekdays in a year.

Table 11 Emissions Parameters and Data Sources – Community On-Road Transportation

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road GHG emissions per vehicle class	$CO_2e_{Onroad,i}$	See Table 14	MT CO_2e/year	Calculated
VMT occurring within jurisdictional boundaries per vehicle class	T_i	See Table 14	miles	Replica Model[1]
VMT originating within and terminating outside of jurisdictional boundaries per vehicle class	$T_{O,i}$	See Table 14	miles	Replica Model
VMT originating outside of and terminating within jurisdictional boundaries per vehicle class	$T_{D,i}$	See Table 14	miles	Replica Model
Emissions factor for on-road vehicles per vehicle class	$EF_{auto,i}$	See Table 14	MT CO_2e/mile	EMFAC2021 v1.0.1[2]
Vehicle class	i	Passenger Commercial Bus	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

[1] Replica VMT data for the City of Campbell provided via email in May 2024

[2] California Air Resources Board (CARB). 2023. Emission Factor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

In addition to mobile combustion emissions accounted under Community Protocol Equations TR.1.A and TR.2.B, GHG emissions from electric vehicles were included in the City's 2022 Community GHG Inventory for more accurate accounting of on-road transportation trends. This was achieved through modifications to Equation 2-5 to account for local EV modeshare estimates. Because EMFAC2021 considers EV vehicles to have an emissions factor of zero, Equation 2-6 is used to account for the emissions associated with electricity for those EV vehicles. The adjusted equation, parameters, and data sources used to estimate GHG emissions attributable to on-road EV activity are provided in Equation 2-6 and Table 12 below.

EQUATION 2-6

ON-ROAD TRANSPORTATION ELECTRIC VEHICLE EMISSIONS

$$CO_2e_{onroad,EV,i} = \left(T_i + \frac{1}{2}T_{O,i} + \frac{1}{2}T_{D,i}\right) \times EV_{share,i} \times EPM_i \times EF_{elec,j}$$

Table 12 Emissions Parameters and Data Sources – Community On-Road Transportation

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road EV GHG emissions per vehicle class	$CO_2e_{Onroad,EV,i}$	See Table 14	MT CO_2e/year	Calculated
VMT occurring within jurisdictional boundaries per vehicle class	T_i	See Table 13	miles	Replica Model[1]
VMT originating within and terminating outside of jurisdictional boundaries per vehicle class	$T_{O,i}$	See Table 13	miles	Replica Model
Vehicle miles travelled originating outside of and terminating within jurisdictional boundaries per vehicle class	$T_{D,i}$	See Table 13	miles	Replica Model
Percent share of VMT attributable to EVs	$EV_{share,i}$	See Table 13	%	EMFAC2021 v1.0.1[2]
Average rate of electricity consumption per EV-mile per vehicle class	EPM_i	See Table 13	kWh/mile	EMFAC2021 v1.0.1
Weighted average electricity emissions factor per building type	$EF_{elec,j}$	See Table 13	MT CO_2e/kWh	SVCE 2022 Electricity Report; PG&E Community Report[3]
Vehicle class	i	Passenger Commercial Bus	Categorical	
Building type	j	Residential Commercial	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; EV = electric vehicles; VMT = vehicle miles travelled; kWh = kilowatt hour

[1] Replica VMT data for the City of Campbell provided via email May 2024 via Replica (and aggregated/ processed by Rincon for annualization, as described above).

[2] California Air Resources Board (CARB). 2023. Emission Factor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

[3] Silicon Valley Clean Energy (SVCE) 2022 Electricity Report, provided by the City via SharePoint and revised via email on May 29, 2024. PG&E Community Report

Table 13 shows the VMT activity data for by vehicle class, as well as the EV share of VMT used to determine the electricity consumption associated with EV activity.

Table 13 Community On-Road EV Activity Data Calculations

Vehicle Class	VMT Activity Data [miles]	EV Share [%]	EVMT [miles]	EPM [kWh/mile]	EV Activity Data [kWh]
Passenger	320,297,745	5.78%	18,523,456	0.37	6,932,044
Commercial	10,981,011	0.00%	0	0.00	0
Bus	1,096,229	0.12%	1,370	1.74	2,389

Notes: VMT = vehicle miles travelled; EV = electric vehicle; EPM = electricity per mile; EVMT = electric vehicle miles traveled; kWh = kilowatt hour

The activity data, emissions factors, and resulting GHG emissions from on-road transportation quantified in accordance with Equation 2-5 and Equation 2-6 are summarized in Table 14 below.

Table 14 Community On-Road Transportation GHG Emissions Calculations

Sector	Activity Data[1]		Emission Factor[4]		GHG Emissions [MT CO_2e]
Passenger VMT	320,297,745	VMT	0.000321	MT CO_2e/mile	102,702
Commercial VMT	10,981,011	VMT	0.001293	MT CO_2e/mile	14,195
Bus VMT	1,096,229	VMT	0.001324	MT CO_2e/mile	1,451
Passenger EVMT[1]	6,932,044	kWh	0.000032	MT CO_2e/kWh	223
Commercial EVMT[2]	0	kWh	0.000032	MT CO_2e/kWh	0
Bus EVMT[2]	2,389	kWh	0.000032	MT CO_2e/kWh	<1
Total					**118,571**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent

[1] EV activity data does not include kWh associated with T&D losses as these emissions are considered negligible and are included under energy sector emissions.

[2] Emissions factor for on-road passenger EV electricity use is weighted according to the portion of electricity supplied per provider in the residential electricity sector (see Table 4)

[3] Emissions factor for on-road commercial and bus EV electricity use is weighted according to the portion of electricity supplied per provider in the residential electricity sector (see Table 4)

[4] Emission factor does not account for electricity emissions for EVs (counts EV VMT as zero), and therefore applying this emission factor to total activity data does not result in double counting.

Transportation: Off-Road

Off-road equipment and vehicles – such as those used in agriculture, construction, lawn and garden, or recreational equipment – generate GHG emissions from the combustion of fossil fuels. Community Protocol Equation TR.8 was used to quantify GHG emissions from off-road fuel consumption and is shown in Equation 2-7 below. Table 15 lists the parameters, values, and data sources used to quantify emissions in accordance with the Community Protocol.

EQUATION 2-7

TR.8 OFF-ROAD EQUIPMENT SECTOR EMISSIONS

$$CO_2e_{offroad,j} = EF_j \times \sum_i Fuel_{offroad,i,j} \times AF_i$$

Table 15 Emissions Parameters and Data Sources – Community Off-Road Equipment

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from offroad equipment	$CO_2e_{offroad,j}$	See Table 17	MT CO_2e/year	Calculated
Annual fuel consumption in the County per sector per fuel type	$Fuel_{offroad,i,j}$	See Table 17	Gallons/year	OFFROAD2021[1]
Fuel attribution factor per equipment type	AF_i	See Table 16	Percent	Plan Bay Area 2050;[2] Department of Finance[3] 6th Cycle 2023-2031 Housing Element[4]
Emission factor per fuel type	EF_j	See Table 17	MT CO_2e/gallon	EPA Emission Factors Hub[5]
Equipment Type	i	See Table 16	Categorical	OFFROAD2021
Fuel type	j	Gasoline Diesel Natural Gas	Categorical	OFFROAD2021

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California Air Resource Board (CARB). 2023. Mobile Source Emissions Inventory Off-road (OFFROAD2021 v1.0.3). Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

[2] Plan Bay Area 2050. 2021. Growth Pattern, Projected Household and Job Growth, by County. Available at: https://planbayarea.org/sites/default/files/FinalBlueprintRelease_December2020_GrowthPattern_Jan2021Update.pdf

[3] Department of Finance (DOF). 2024. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2024. Available at: https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-counties-and-the-state-2020-2024/

[4] City of Campbell. 2023. 6th Cycle 2023-2031 Housing Element. Available at: https://www.campbellca.gov/ArchiveCenter/ViewFile/Item/2953

[5] Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

Table 16The data used for off-road equipment fuel consumption was at the countywide level. These values were scaled based on Campbell’s population, jobs, and land use. The demographic attribution metrics and percent attribution used for each off-road equipment type is shown in Table 16.

Table 16 Community Off-Road Equipment Sector Attributions

Equipment Type	Attribution Metric	Attribution	Data Source
Agricultural	Excluded - Other	0.0000	Not Applicable
Airport	Excluded - Other	0.0000	Not Applicable
Cargo	Excluded - Other	0.0000	Not Applicable
Commercial	Excluded - Other	0.0000	Not Applicable
Construction	Employment	0.0248	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[2]
Industrial	Employment	0.0248	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[2]
Lawn	Population	0.0232	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[3]
Light	Employment	0.0248	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[2]
Locomotive	Excluded - Not Under Jurisdictional Control	0.0000	Not Applicable
Ocean	Excluded - Other	0.0000	Not Applicable
Oil	Excluded - Not Under Jurisdictional Control	0.0000	Not Applicable
Outboard	Excluded - Not Under Jurisdictional Control	0.0000	Not Applicable
Pleasure	Population	0.0232	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[3]
Portable	Employment	0.0248	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[2]
Transport	Employment	0.0248	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[2]
Recreational	Households	0.0249	Plan Bay Area 2050; Department of Finance; 6th Cycle 2023-2031 Housing Element[4]
Military	Excluded - Other	0.0000	Not Applicable
Forestry	Excluded - Other	0.0000	Not Applicable

[1] Agriculture and forestry were excluded due to lack of activity within Campbell's city limits. Same for ocean-related values (Campbell is land-locked) as well as Military bases.

[2] Employment allocation was determined based on county job projects in Plan Bay Area 2050 and estimating Campbell employment estimated based on 1.62 jobs per housing unit and applying 2022 number of households as forecasted based on the City's 6th Cycle 2023-2031 Housing Element.

[3] Population allocation was determined based on county population data in the county provided by the Department of finance and forecasting the City's 2022 population using population data provided in the 6th Cycle 2023-2031 Housing Element.

[4] Household allocation was calculated using county-level household data from Plan Bay Area 2050. To estimate the number of households in the City for 2022, the 2019 persons-per-household rate, determined from the 6th Cycle 2023-2031 Housing Element, was applied to the City's estimated 2022 population

The allocated and aggregated activity data by fuel type, emission factors, and emissions results for the Campbell's off-road equipment sector are provided in Table 17.

Table 17 Community Off-Road GHG Emissions Calculations

Fuel Type	Activity Data (gallons)	Emission Factor ($MT\ CO_2e$/gallon)[1]	GHG Emissions ($MT\ CO_2e$)
Diesel	433,117	0.010469	4,534
Gasoline	492,352	0.009202	4,530
Natural Gas	402,977	0.005862	2,362
Total			**11,427**

Notes: $MT\ CO_2e$ = Metric tons of carbon dioxide equivalent; Values may not add due to rounding

[1] Emission factors per fuel type represent a weighted average based on the emissions factor and fuel consumption per off-road equipment type as determined according to EPA's Emissions Factor Hub available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

2.2.3 Solid Waste

GHG emissions associated with the waste sector result from the decomposition of waste at a landfill. Emissions from landfill processes were not available and were excluded. West Valley Collection and Recycling, LLC. (WVC&R) provides hauling for residential and commercial solid waste, recycling, and organics collection services. WVC&R is governed by the West Valley Solid Waste Authority (WVSWA), which is a joint power authority comprising the City of Campbell, Town of Los Gatos, City of Saratoga, and City of Monte Sereno. WVSWA contracts with Waste Management, which runs the Guadalupe Landfill located in San Jose, California. Recycling and organics recovery are sent offsite for processing, as per the most recent agreement signed between WVSWA and Waste Management in 2021.[14]

GHG emissions from waste decomposition were calculated using Community Protocol Method SW.4. Equation 2-8 and Table 18 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions in accordance with Community Protocol SW.4. As the City of Campbell did not have a waste categorization study to inform the proportion of total waste material per material type, the default ICLEI factor was used.

EQUATION 2-8

SW.4.1 SOLID WASTE FUGITIVE EMISSIONS

$$CO_2e_{Waste,fugitive} = GWP_{CH_4} \times (1 - CE) \times (1 - OX) \times M \times \sum_i P_i \times EF_i$$

[14] https://www.wvswma.org/uploads/2/5/7/3/25736194/2021_wm_disposal_agreement.pdf

Table 18 Emissions Parameters and Data Sources – Community Solid Waste

Definition	Parameter	Value	Unit	Data Source
Annual community generated waste GHG emissions	$CO_2e_{Waste,fugitive}$	9,388	MT CO_2e/year	Calculated
Methane global warming potential	GWP_{CH_4}	28		IPCC Fifth Assessment Report[1]
Default LFG collection efficiency	CE	0.75	Fraction	ICLEI Community Protocol
Oxidation rate	OX	0.10	Fraction	ICLEI Community Protocol
Total mass of waste entering landfill	M	24,835	Tons	West Valley Solid Waste Management Authority[2]
Proportion of total waste material per material type	P_i	1	Fraction	
Emission factor per material type[4]	EF_i	0.060	MT CH_4/ton	ICLEI Community Protocol
Material type	i	Multiple	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

[2] Tons of waste activity data provided by the City of Campbell via SharePoint in May 2024

Guadalupe Landfill is located outside of Campbell. Therefore, energy consumption for landfill processes is not incorporated under the energy sector of Campbell's 2022 GHG Inventory. Instead, Landfill process emissions were quantified according to Community Protocol SW.5, which is outlined in Equation 2-9 and Table 19 below and are included in the solid waste sector of this inventory.

Landfill processing uses either compressed natural gas (CNG) or diesel. As information was not available, the Rincon team conservatively assumed diesel is being used for processes at the landfill, as diesel has a more intensive GHG emission factor.

EQUATION 2-9

SW.5 Solid Waste Process Emissions

$$CO_2e_{Waste,process} = M \times EF_p$$

Table 19 Emissions Parameters and Data Sources – Community Solid Waste

Definition	Parameter	Value	Unit	Data Source
Annual landfill process GHG emissions	$CO_2e_{Waste,process}$	407	MT CO_2e/year	Calculated
Total mass of solid waste that enters the landfill in the inventory year	M	24,835	Wet short tons/year	WVC&R
Emissions factor for landfill process emissions	EF_p	0.0164	MT CO_2e/wet short ton	ICLEI Community Protocol- Assumed Diesel

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Tons of waste activity data provided by the City of Campbell Via SharePoint in May 2024.

The total GHG emissions from solid waste emissions sources are summarized in Table 20.

Table 20 Community Solid Waste Tonnage Allocation

Emissions Source	GHG Emissions [MT CO_2e/year]
Landfill Fugitive Emissions	9,388
Landfill Process Emissions[1]	407
Total	**9,795**

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] As Scholl Canyon Landfill is within city boundaries and is owned and operated by the City, process related emissions are anticipated to be included under energy sector GHG emissions and thus are excluded from total GHG emissions attributable to the solid waste sector.

2.2.4 Water

Campbell receives all water from the San Jose Water Company (SJWC), which is located outside of Campbell. As a result, this water is considered imported/purchased, rather than local. Rincon accounted for the energy used for water conveyance, treatment, and delivery to Campbell using SJWC reported energy intensity and total water consumed by Campbell. SJWC purchases electricity from Silicon Valley Clean Energy (GreenStart) and from San Jose Clean Energy (GreenValue).[15] The energy intensity provided as part of its most recent (2020) Urban Water Management Plan provided lifecycle kWh intensity values for water delivered to SJWC customers.

Table 21 shows the parameters and data sources associated with Equation 2-10, which were used to quantify GHG emissions from imported water sources.

EQUATION 2-10

WW.14 WATER SECTOR EMISSIONS

$$CO_2e_{Water,i} = Vol_i \times \sum_j EI_{i,j} \times EF_{elec,i,j}$$

[15] Assumed GreenStart and GreenValue as SJWC documentation did not confirm that the rate was 100% renewable. Accordingly, the less renewable intensive value was chosen. As there was no breakdown in kWh by electricity provider, an average was taken of both providers' emissions factors.

Table 21 Emissions Parameters and Data Sources – Community Water

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from water consumption	$CO_2e_{Water,i}$	98	MT CO_2e/year	Calculated
Volume of water supplied to the community per water district	Vol_i	1,493	MG [million gallon]	SJWC 2022 Report[1]
Energy intensity of water distribution	$EI_{i,j}$	1,031	kWh/MG	SJWC 2020 UWMP[2]
Electricity emissions factor per water process stage per source type	$EF_{elec,i,j}$	0.0000639566[4]	MT CO_2e/kWh	SJWC Correspondence[3] SJWC 2020 UWMP SVCE & SJCE
Water process stage	j	Distribution	Categorical	

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; AF = acre-feet; kWh = kilowatt hour; UWMP = Urban Water Management Plan

[1] San Jose Water Company 2022 Report Provided by the City in May 2024

[2] San Jose Water Company UWMP Section 6.11- Energy Use (Lifecycle): https://www.sjwater.com/sites/default/files/2021-06/2020%20UWMP%20FINAL%20with%20Appendices.pdf

[3] May correspondence with City and San Jose Water Company confirms renewable energy purchase claim made in 2020 UWMP, leading to use of SVCE GreenStart emissions factor. SJCE emissions factor obtained via published 2022 power content label: https://sanjosecleanenergy.org/wp-content/uploads/2023/09/SJCE-2022-Power-Content-Label.pdf

[4] Note that as reported data did not articulate the kwh split between SJWC, and SJCE, a 50/50 split was assumed, and an average was taken between both emissions factors.

2.2.5 Wastewater

Management of wastewater can produce emissions through every stage of the process—from collection to final use or discharge. The City of Campbell contracts the West Valley Sanitation District (WVSD) for wastewater collection, transport, and disposal services. WVSD operates and maintains the wastewater collection system serving Campbell, Los Gatos, Monte Sereno, and a portion of unincorporated Santa Clara County. Because WVSD uses gravity to convey wastewater, there are no conveyance-related emissions.[16]

WVSD contracts the Santa Clara Regional Wastewater Facility (SCRWF) for wastewater treatment and disposal, thereby conveying all collected wastewater to the SCRWF plant. SCRWF is a centralized water treatment plant featuring anaerobic digestion and using nitrification and denitrification for processing wastewater. The outfall from SCRWF is then discharged to South San Francisco Bay through the outfall channel after tertiary treatment. Currently, SCRWF processes wastewater for 1.4 million customers and 17,000 businesses in total. As the community of Campbell only represents a portion of this, the GHG emissions attributable to Campbell's community inventory are based on Campbell's proportion of the total population served by the District (a population of 42,462 Campbell residents in 2022).[17]

GHG emissions from SCRWF operations are a result of process emissions from the combustion of anaerobic digester gas, (see Equation 2-11 and Equation 2-12, which are respectively described in

[16] May 2024 Email Correspondence with City of Campbell.

[17] https://www.sanjoseca.gov/your-government/departments-offices/environmental-services/water-utilities/regional-wastewater-facility- note that the WWTP initially supplied an estimate of 42,800 customers, which is higher than the estimated number of residents in 2022 based on the City's 2023 Housing Element (https://www.campbellca.gov/ArchiveCenter/ViewFile/Item/2953). As a conservative estimate of GHG emissions associated with wastewater and to maintain consistency with population data used in the 2022 Community Inventory, 2023 Housing Element population estimates were used to allocate emissions to the City, where appropriate.

Table 22 and Table 23), nitrification/denitrification (see Equation 2-13and Table 24), wastewater outfall into San Francisco Bay (see Equation 2-14 and Table 25). Additionally, SCRWF provided electricity and natural gas consumption data, which were accounted for as well under Equation 2-15, Equation 2-16, Table 26, and Table 27.

EQUATION 2-11

WW.1.B WASTEWATER DIGESTER GAS STATIONARY COMBUSTION EMISSIONS (CH_4) – WHEN BTU CONTENT IS KNOWN

$$Annual\ CH_4\ emissions = (Digester\ Gas\ \times BTU_{digester\ Gas}\ \times\ 10^{-6} \times EF_{CH4}\ \times 10^{-3}$$

Table 22 Emissions Parameters and Data Sources – Community Wastewater WW.1B

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by devices designed to combust digester gas	$Annual\ CH_4\ emissions$	See Table 28	MT CO_2e/year	Calculated
Standard cubic feet of digester gas produced per day (std ft³/day)	$Digester\ Gas$	53,422	std ft³/day	San Jose-Santa Clara Regional Wastewater Facility Provided Data – Scaled Using Campbell 2022 Population[1]
BTU content of digester gas, higher heating value	$BTU_{Digester\ Gas}$	597	BTU/scf	San Jose- Santa Clara Regional Wastewater Provided Data[2]
Conversion factor	10^{-6}	0.000001	mmBTU/BTU	ICLEI Community Protocol
Methane emissions factor	EF_{CH4}	0.0032	kg CH_4/ mmBTU	ICLEI Community Protocol
Conversion factor	365.25	365.25	Days/year	ICLEI Community Protocol
Conversion factor	10^{-3}	0.001	MT/kg	ICLEI Community Protocol
Global warming potential of methane	GWP_{CH4}	28		IPCC Fifth Assessment Report

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; std ft³ = standard cubic feet; BTU = British thermal unit; mmBTU = one million British thermal units; kg = kilograms.

[1] Standard cubic feet of gas produced per day for entire wastewater operation provided by the San Jose Santa Clara Wastewater Facility and scaled to the size of Campbell (based on population) which was determined based on 6th Cycle 2023-2031 Housing Element population data and county-level population data provided by the Department of Finance E-5 report. Campbell's population comprises approximately 3.03% of the entire population served by the wastewater treatment plant.

[2] Provided to City staff and Project Team via email in April 2024.

EQUATION 2-12

WW.2.B WASTEWATER DIGESTER GAS STATIONARY COMBUSTION EMISSIONS (N_2O) – WHEN BTU CONTENT IS KNOWN

$$Annual\ N2O\ emissions = \left(Digester\ Gas\ \times BTU_{digester\ Gas}\ \times\ 10^{-6} \times EF_{N20}\ \times 10^{-3}\right.$$

Table 23 Emissions Parameters and Data Sources – Community Wastewater WW.2.B

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by devices designed to combust digester gas	$Annual\ N2O\ emissions$	See Table 28	MT CO_2e/year	Calculated
Standard cubic feet of digester gas produced per day (std ft^3/day)	$Digester\ Gas$	53,422	std ft^3/day	San Jose-Santa Clara Regional Wastewater Facility Provided Data – Scaled Using Campbell 2022 Population[1]
BTU content of digester gas, higher heating value	$BTU_{Digester\ Gas}$	597	BTU/scf	San Jose-Santa Clara Regional Wastewater Provided Data[2]
Rate of digester gas volume production	$Digester\ Gas$	1.00	std ft^3/ person/day	ICLEI Community Protocol
Conversion factor	10^{-6}	0.000001	mmBTU/BTU	ICLEI Community Protocol
Nitrous Oxide Emission Factor	EF_{N2O}	0.00063	kg CH_4/ mmBTU	ICLEI Community Protocol
Conversion factor	365.25	365.25	Days/year	ICLEI Community Protocol
Conversion factor	10^{-3}	0.001	MT/kg	ICLEI Community Protocol
Global warming potential of nitrous oxide	GWP_{N2O}	265		IPCC Fifth Assessment Report

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; std ft^3 = standard cubic feet; BTU = British thermal unit; mmBTU = one million British thermal units; kg = kilograms.

[1] Standard cubic feet of gas produced per day for entire wastewater operation provided by the San Jose Santa Clara Wastewater Facility and scaled to the size of Campbell (based on population) which was determined based on 6th Cycle 2023-2031 Housing Element population data and county-level population data provided by the Department of Finance E-5 report. Campbell's population comprises approximately 3.03% of the entire population served by the wastewater treatment plant.

[2] Provided to City staff and Project Team via email in April 2024.

EQUATION 2-13

WW.7 CENTRALIZED WWTP WITH NITRIFICATION/DENITRIFICATION

$$CO_2e_{WW,nit/denit,i} = ((P \times F_{ind-com}) \times EF_{nit/denit} \times 10^{-6}) \times GWP_{N2O}$$

Table 24 Emissions Parameters and Data Sources – Community Wastewater WW.7

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by WWTP processes	$CO_2e_{WW,nit/denit,i}$	See Table 28	MT CO_2e/year	Calculated
Population served[1]	P	42,462	People	6th Cycle 2023-2031 Housing Element[1]
Factor for insignificant industrial or commercial discharge	$F_{ind-com}$	1.00	–	ICLEI Community Protocol
Emissions factor for a WWTP without nitrification or denitrification	$EF_{w/o\ nit/denit}$	7.00	g N_2O/person/ year	ICLEI Community Protocol
Conversion factor	10^{-6}	0.000001	Mt/g	–
Global warming potential of nitrous oxide	GWP_{N2O}	265		IPCC Fifth Assessment Report

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; std ft^3 = standard cubic feet; BTU = British thermal unit; mmBTU = one million British thermal units; kg = kilograms.

[1] City of Campbell. 2023. 6th Cycle 2023-2031 Housing Element. Available at: https://www.campbellca.gov/ArchiveCenter/ViewFile/Item/2953

Community Protocol Equation WW.12 was used to quantify emissions associated with the San Jose-Santa Clara Regional Wastewater Treatment Facility effluent discharge into the South San Fransisco Bay. Like all other parts of the wastewater treatment facility emissions, activity data has also been scaled to represent Campbell's proportional contribution to total GHG emissions (3.14 percent of total). The equation is provided in Equation 2-14, as shown below.

EQUATION 2-14

WW.12 FUGITIVE NITROUS OXIDE EMISSIONS FROM EFFLUENT DISCHARGE

$$CO_2e_{WW,effluent} = N\ Load \times EF_{effluent,i} \times \frac{44}{28} \times 365.25 \times 10^{-3} \times GWP_{N2O}$$

Table 25 Emissions Parameters and Data Sources – Community Wastewater WW.12

Definition	Parameter	Value	Unit	Data Source
Annual N_2O emitted by effluent processes	$CO_2e_{WW,effluent}$	See Table 28	MT CO_2e/year	Calculated
Average total nitrogen per day	$N\ Load$	106	kg N/day	SJSCWWTP Report– Scaled Using Campbell 2022 Population[1,2]
Emissions factor of discharge to water body type (ocean)	$EF_{effluent,i}$	0.0025	kg N_2O-N/kg sewage-N discharged	ICLEI Community Protocol, selected for 'Ocean Discharge' as discharge point is San Francisco Bay
Molecular weight ratio of N_2O to N_2	$\frac{44}{28}$	1.57	Fraction	
Conversion factor	365.25	365.25	Days/year	
Conversion factor	10^{-3}	0.001	MT/kg	
Global warming potential of nitrous oxide	GWP_{N2O}	265	–	IPCC Fifth Assessment Report

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; std ft^3 = standard cubic feet; kg = kilograms

[1] Report provided to the City via Email and Project Team via SharePoint in April 2024.

[2] Average total nitrogen per day provided by the San Jose Santa Clara Wastewater Facility and scaled to the size of Campbell (based on population) which was determined based on 6th Cycle 2023-2031 Housing Element population data and county-level population data provided by the Department of Finance. Campbell's population comprises approximately 3.03% of the entire population served by the wastewater treatment plant.

The SJSCWWTP is located outside of Campbell, which means that electricity and natural gas used at the WRP is not captured under community commercial energy use. Community Protocol Equation WW.15 was used to determine SJSCWWTP emissions from electricity and natural gas, adjusted to allocate emissions attributable to the Campbell community. It should be noted that ICLEI does not provide a specific formula to calculate natural gas use for WWTP operations, so the same methodology used for the rest of the community inventory was repeated here as a variation on WW.15, coded as WW.15-NG.

According to data provided by SJSCWWTP, both electricity and natural gas are purchased from PG&E, rather than SVCE. Accordingly, PG&E's emission factor is used to calculate energy emissions from consumption of electricity and natural gas at the plant.

EQUATION 2-15

WW.15 ENERGY-RELATED EMISSIONS ASSOCIATED WITH WASTEWATER COLLECTION AND TREATMENT – ELECTRICITY

$$CO_2e_{WWelec} = (Elec_{WW,i} + (Elec_{WW,i} \times TD) \times EF_{elec,i})$$

Table 26 Emissions Parameters and Data Sources – Community Wastewater WW.15

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by WWTP electricity use	CO_2e_{WWelec}	See Table 28	MT CO_2e/year	Calculated
Electricity use of WWTP	$Elec_{WW,i}$	464,682	kWh	WWTP Utility Data, allocated to Campbell Population[1]
T&D Loss Factor	TD	5.1%	Percentage	EPA[2]
PG&E electricity emission factor	EF_{elec}	0.0000263	MT CO_2e/kWh	PG&E[3]

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MG = million gallons; AF = acre-feet; kWh = kilowatt hour

[1] Annual kWh purchased from PG&E provided to City via email in May 2024. Population data determined using 2023 6th Cycle housing element to forecast the City's 2022 population, as well as county-level data provided by the Department of Finance E-5 report. Original PG&E purchased electricity = 15,321 kWh, scaled by 3.03% allocated to Campbell population as a percentage of total WWTP population served.

[2] Environmental Protection Agency (EPA). 2023. Data Explorer, grid loss rates, 2016. Available at: https://www.epa.gov/egrid/data-explorer

[3] PG&E 2022 vie The Climate Registry: https://theclimateregistry.org/resources/carbon-footprint-registry/

EQUATION 2-16

WW.15-NG ENERGY-RELATED EMISSIONS ASSOCIATED WITH WASTEWATER COLLECTION AND TREATMENT – NATURAL GAS

$$CO_2e_{WWng} = (NG_{WWcons} \times EF_{ngcom}) + (NG_{WWleak} \times EF_{ngleak})$$

Table 27 Emissions Parameters and Data Sources – Community Wastewater WW.15

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by WWTP natural gas use	CO_2e_{WWng}	See Table 28	MT CO_2e/year	Calculated
Natural gas use of WWTP – consumed natural gas	$NG_{WW}cons$	114,753	therms	WWTP Utility Data, allocated to Campbell Population[1]
Natural gas use of WWTP – combusted natural gas [minus upstream leakage]	$NG_{WW}comb$	114,179	therms	WWTP Utility Data, allocated to Campbell Population; minus upstream leakage percentage[2]
Natural gas allocated leakage from WWTP	$NG_{WW}leak$	3,213	therms	WWTP Utility Data, calculated to include upstream and downstream emissions[3]
Natural gas combustion emission factor	EF_{ngcom}	0.0053115	MT CO_2e/therm	Alvarez, Ramón et al. (2018) & Environmental Defense Fund[4]
Methane leak emission factor	EF_{ngleak}	0.05307	MT CO_2e/therm	Alvarez, Ramón et al. (2018) & Environmental Defense Fund

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MG = million gallons; AF = acre-feet; kWh = kilowatt hour

[1] PG&E purchased therms by WWTP provided to City via email in May 2024. The original 3,785,505 therms were then scaled to reflect Campbell's share of this overall total (3.03%).

[2] This value subtracts out 0.5% end-use to reflect the percentage of natural gas actually combusted in end-use. See natural gas community inventory emissions factor for full source description.

[3] This value calculates end-use leakage (0.5%) and adds it to pipeline leakage (2.3%) in order to calculate total methane leaked throughout therms consumed by the WWTP.

[4] Alvarez, Ramón et al. (2018). Assessment of methane emissions from the U.S. oil and gas supply chain. Science. 361. https://www.science.org/doi/abs/10.1126/science.aar7204.; Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Available at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

Table 28 summarizes wastewater sector activity data, emissions factors, and GHG emissions per WWTP.

Table 28 Community Wastewater GHG Emissions Calculations

Emissions Source	Protocol Equation	Activity Data & Unit		Emissions Factor[1]		GHG Emissions [MT CO_2e/year]
San Jose- Santa Clara Regional Wastewater Facility						
Stationary Combustion/ Anaerobic Digestion CH_4 and N_2O Emissions	WW.1.B; WW.2.B	20,187,204	std ft^3/yr	0.0000002	MT CO_2e/std ft^3	3
Nit/Denit Process N_2O	WW.7	43,930	service persons	0.0018550	MT CO_2e/ service pop	79
Effluent Discharge	WW.12	109	kg N/day	0.3799057	MT CO_2e/kg N/day	40
Electricity Use	WW.15	480,749	kWh	0.0000263	MT CO_2e/kWh	12
Electricity T&D Loss	WW.15	24,518	kWh	0.0000263	MT CO_2e/kWh	1
NG Use	WW.15-NG	118,127	therms	0.0053115	MT CO_2e/ therm	606
NG Leakage	WW.15-NG	3,324	therms	0.0530670	MT CO_2e/ therm	171
Total						**912**

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kg = kilograms; kWh = kilowatt hour

2022 Community GHG Emissions Inventory Results

The inventory provides the current GHG emissions estimates that follow the Community Protocol and current best practices for GHG accounting. The results of the GHG inventory are summarized in Figure 1 and Figure 2, and shown in detail in Table 29.

Figure 1 Community Inventory GHG Emissions by Sector

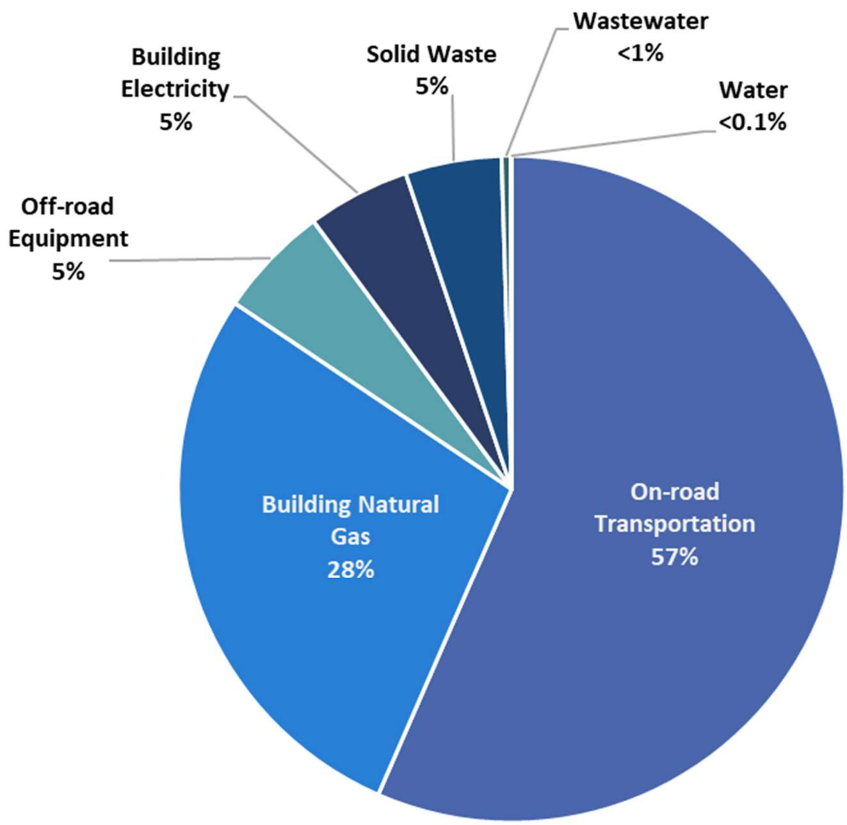


Figure 2 Community Inventory GHG Emissions by Subsector

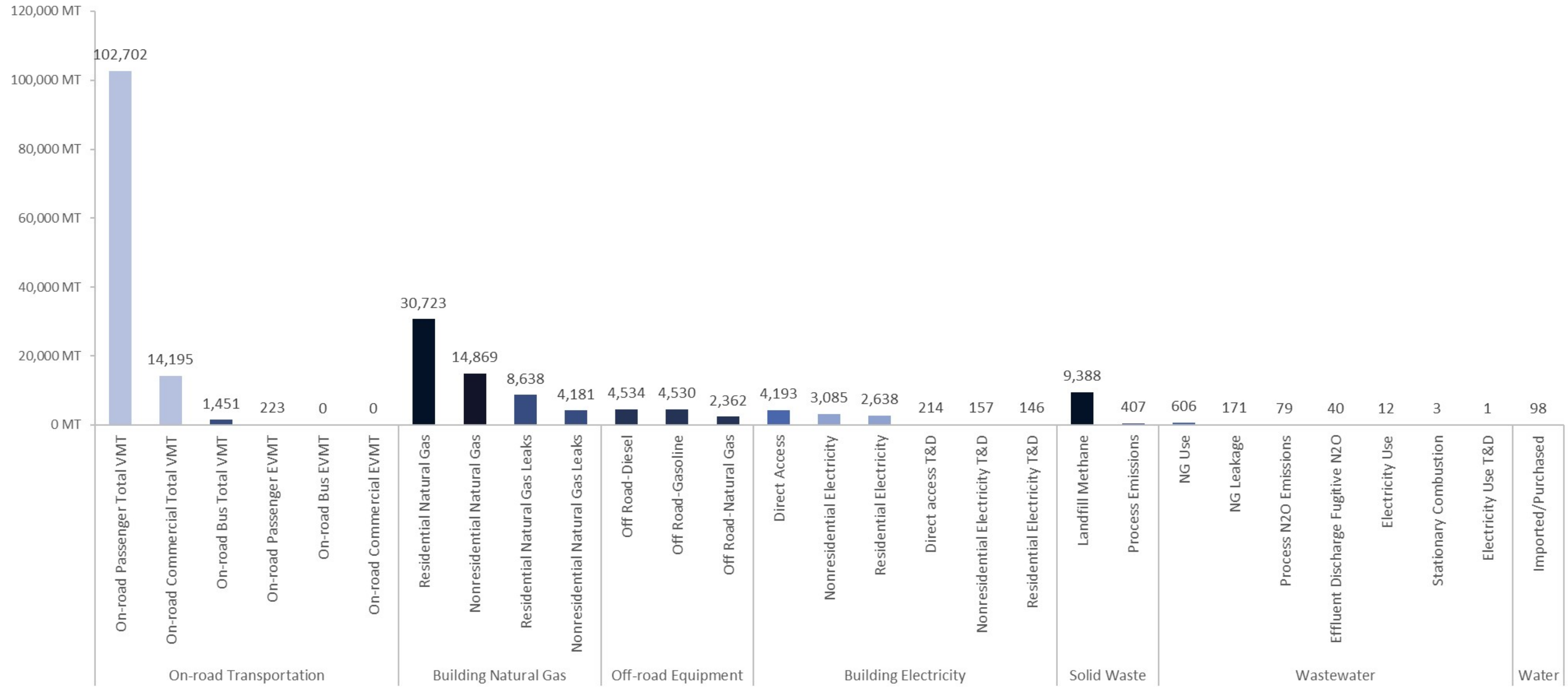


Table 29 2022 Community GHG Emissions Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy	Residential Electricity	81,938,362	kWh	0.0000322	MT CO_2e/kWh	2,638
	Residential Electricity T&D	4,532,391	kWh	0.0000322	MT CO_2e/kWh	146
	Commercial Electricity	95,071,139	kWh	0.0000324	MT CO_2e/kWh	3,085
	Commercial Electricity T&D	4,848,750	kWh	0.0000324	MT CO_2e/kWh	157
	Direct Access	18,509,670	kWh	0.0002265	MT CO_2e/kWh	4,193
	Direct access T&D	943,993	kWh	0.0002265	MT CO_2e/kWh	214
	Residential Natural Gas	5,784,332	therms	0.005311	MT CO_2e/therm	30,723
	Residential Natural Gas Leaks	162,775	therms	0.053067	MT CO_2e/therm	8,638
	Commercial Natural Gas	2,799,456	therms	0.005311	MT CO_2e/therm	14,869
	Commercial Natural Gas Leaks	78,779	therms	0.053067	MT CO_2e/therm	4,181
Transportation	On-road Passenger Total VMT	320,297,745	VMT	0.000321	MT CO_2e/mile	102,702
	On-road Commercial Total VMT	10,981,011	VMT	0.001293	MT CO_2e/mile	14,195
	On-road Bus Total VMT	1,096,229	VMT	0.001324	MT CO_2e/mile	1,451
	On-road Passenger EVMT	6,932,044	kWh	0.000032	MT CO_2e/kWh	223
	On-road Commercial EVMT	0	kWh	0.000032	MT CO_2e/kWh	0.0
	On-road Bus EVMT	2,389	kWh	0.000032	MT CO_2e/kWh	0.1
	Off Road-Diesel	433,117	Gallons	0.010469	MT CO_2e/Gallon	4,534
	Off Road-Gasoline	492,352	Gallons	0.009202	MT CO_2e/Gallon	4,530
	Off Road-Natural Gas	402,977	Gallons	0.005862	MT CO_2e/Gallon	2,362
Solid Waste	Landfill Methane	24,835	tons	0.378000	MT CO_2e/ton	9,388
	Process Emissions	24,835	tons	0.016400	MT CO_2e/ton	407
Water	Imported/Purchased	1,539,283	kWh	0.000064	MT CO_2e/kWh	98

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Wastewater	Stationary Combustion	19,512,530	std ft^3/yr	0.000000	MT CO_2e/std ft^3	3
	Process N_2O Emissions	42,462	service persons	0.001855	MT CO_2e/service pop	79
	Effluent Discharge Fugitive N_2O	106	kg N/day	0.379906	MT CO_2e/kg N/day	40
	Electricity Use	464,682	kWh	0.000026	MT CO_2e/kWh	12
	Electricity Use T&D	23,699	kWh	0.000026	MT CO_2e/kWh	1
	NG Use	114,179	therms	0.005311	MT CO_2e/therm	606
	NG Leakage	3,213	therms	0.053067	MT CO_2e/therm	171
Total						**209,646**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

3 Municipal GHG Emissions Inventory

3.1 Methodology

The City's 2022 Municipal GHG Inventory was completed using the Local Government Operations Protocol[18] (LGOP) developed by Local Governments for Sustainability (ICLEI), California Air Resources Board (CARB), California Climate Action Registry, and The Climate Registry (TCR). The LGOP methodology includes the calculation of GHG emissions that can be attributed directly to City operations in the given inventory year. The municipal inventory allows the City to track its GHG emissions resulting from its facilities, vehicles, and any equipment over which it can exert control with policies.

This means that the municipal inventory is a subset of the community inventory and can be used by the City for guidance to reduce emissions directly under the City's control (e.g., electrifying municipal fleets and buildings, conducting internal outreach to improve landfill diversion).

The results of GHG emission calculations are presented by emissions scope, relating to the degree of control the City has over emissions sources. Emissions sources are categorized as direct (i.e., Scope 1) or indirect (i.e., Scope 2 or Scope 3), in accordance with the World Resources Institute and the World Business Council for Sustainable Development's Greenhouse Gas Protocol Corporate Standard, which are summarized below:

- **Scope 1:** Direct GHG emissions from sources within a local government's operations that it owns and/or controls. This includes stationary combustion to produce electricity, steam, heat, and power equipment; mobile combustion of fuels; process emissions from physical or chemical processing; fugitive emissions that result from production, processing, transmission, storage, and use of fuels; and other sources.
- **Scope 2:** Indirect GHG emissions associated with the consumption of electricity, steam, heating, or cooling that are purchased from a utility provider that also provides energy to other jurisdictions and/or is located outside the boundaries of the city.
- **Scope 3**: All other indirect GHG emissions not covered in Scope 2, such as emissions resulting from the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the City (e.g., employee commuting and business travel, outsourced activities, waste disposal, etc.).

Scope

Similar to the community inventory, the GHG emissions sources and sectors for the municipal operations inventory are categorized into various sectors and subsectors to match the GHG emissions reporting of the community GHG emissions inventory, with the granularity required by the LGOP. The primary sectors of GHG emissions sources include:

[18] ICLEI. May 2010. Local Government Operations Protocol for the quantification and reporting of greenhouse gas emissions inventories.

- Electricity
- Natural Gas
- Transportation
- Water and Wastewater
- Solid Waste

Further granularity can be achieved by also reporting GHG emissions sources by the following subsectors when possible:

- Buildings and other facilities*
- Streetlights and traffic signals*
- Water delivery facilities*
- Port Facilities
- Airport Facilities
- Vehicle fleet*
- Transit fleet
- Power Generation Facilities
- Solid Waste Facilities
- Wastewater facilities

All categories coded with an “*” were included in the municipal inventory as they are relevant to the City of Campbell. All other categories have not been included as they are not applicable to municipal services found within jurisdictional boundaries.

The following LGOP recommended sectors have also been included in the City’s 2022 Municipal GHG Inventory:

- Employee commute

The City’s 2022 Municipal GHG Inventory includes an assessment of the City’s operational GHG emissions according to the above subsectors and categorized by scope.

Emissions Boundary

The 2022 Municipal GHG Inventory includes all emissions occurring within the City of Campbell’s direct jurisdictional authority (i.e., sources of emissions resulting from facilities that the City owns and/or operates). The City of Campbell operates and maintains multiple buildings and facilities, such as City Hall, the Campbell Community Center, and Corporate Yards. As the City does not own any utilities, emissions from purchased electricity, natural gas, and water/wastewater are treated as Scope 2 emissions.

3.2 2022 Municipal GHG Emissions Inventory

3.2.1 Buildings and Other Facilities

Buildings and facilities generate emissions that relate to the stationary combustion of natural gas (Scope 1) and the use of electricity (Scope 2) in City facilities.

Natural gas – which is used for heating and cooling buildings and facilities – is provided by PG&E. The same equations used to calculate emissions from both combusted and leaked natural gas (Equation 2-3 and Equation 2-4) are the same as described above in the Community GHG Inventory. The GHG emission calculation details associated with City facilities' natural gas usage and leakage are provided in Table 30.

Table 30 Municipal Buildings and Facilities Sector Natural Gas GHG Emissions Calculations

GHG Emissions Source	Adjusted Activity Data [therms]	Emissions Factor [MT CO_2e/therm]	Emissions [MT CO_2e]	Scope
Natural Gas Consumption	107,817	0.005311	573	Scope 1
Natural Gas Methane Leaks	3,034	0.053067	161	Scope 1
Total			**734**	**Scope 1**

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

The City purchases its electricity from the same providers described in the Community Inventory (PG&E and SVCE). The 2022 Municipal GHG Inventory considers the electricity consumed to operate City-owned buildings and facilities as a subset of the 2022 Community GHG Inventory and is thereby included as Scope 2 emissions. Additionally, T&D electricity losses are included in the City's 2022 Municipal GHG Inventory to align with the 2022 Community GHG Inventory.

Emissions factors for PG&E, SVCE GreenStart, and SVCE GreenPrime were provided by PG&E and SVCE. SVCE additionally provided a 2022 municipal report with addresses and coding for service type, as well as NAICS codes further describing end-uses for each City account. According to SVCE, all City buildings and facilities used SVCE GreenStart and SVCE GreenPrime, while streetlights and traffic signals used PG&E, SVCE GreenPrime, and SVCE GreenStart. Electricity T&D losses were calculated based on a 5.1 percent loss rate as specified by eGRID.[19] The GHG emission calculation details associated with buildings and other facilities' electricity usage are provided in Table 31.

[19] Environmental Protection Agency (EPA). 2023. eGRID Data Explorer 2022 Western Energy Grid. Available at: https://www.epa.gov/egrid/data-explorer

Table 31 Municipal Buildings and Facilities Sector Electricity GHG Emission Calculations

GHG Emissions Source	Utility Provider	Activity Data [kWh]	Emissions Factor [MT CO_2e/kWh][1]	Emissions [MT CO_2e]	Scope
Electricity Consumption	SVCE GreenPrime & GreenStart	2,161,896	0.000021	46	Scope 2
Electricity Consumption T&D	SVCE GreenPrime & GreenStart	110,257	0.000021	2	Scope 2
Total				**49**	**Scope 2**

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Emissions factor is a weighted average of SVCE GreenPrime and GreenStart rates. Note that over 99% of energy use is allocated to SVCE GreenPrime.

3.2.2 Streetlights and Traffic Signals

The City's streetlights and traffic signals also generate Scope 2 emissions and T&D losses. Activity data and emissions factors were included in the SVCE municipal report provided to the City.[20] Electricity T&D loss was calculated based on a 5.1 percent loss rate as specified by eGRID.[21] The GHG emission calculation details associated with streetlights and traffic signals are provided in Table 32.

Table 32 Municipal Streetlights and Traffic Signals Sector Electricity GHG Emission Calculations

GHG Emissions Source	Utility Provider	Activity Data [kWh]	Emissions Factor [MT CO_2e/kWh][1]	Emissions [MT CO_2e]	Scope
Streetlights & Traffic Signals	PG&E; SVCE GreenPrime & GreenStart	630,171	0.000022	14	Scope 2
Streetlights & Traffic Signals T&D	PG&E; SVCE GreenPrime and GreenStart	32,139	0.000022	0.7	Scope 2
Total				**14**	**Scope 2**

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent

[1] Note that emission factor is a weighted average that reflects kwh consumption split across electricity providers.

3.2.3 Water Delivery

Water consumption typically generates Scope 3 GHG emissions from the electricity used to deliver water to City-owned facilities, as well as the energy used to treat and convey the water prior to delivery. All water is purchased from the San Jose Water Company (SJWC), consistent with the Community GHG Inventory. Water delivery by SJWC is considered Scope 3 as the City does not control the electricity used to extract, convey, treat, and transport water. The municipal inventory uses the same energy intensity [kWh/MG] as the Community GHG Inventory, along with the SVCE

[20] Municipal report is a separate spreadsheet from SVCE, while emissions factors use the same values used by the Community Inventory provided by SVCE and PG&E

[21] Environmental Protection Agency (EPA). 2023. eGRID Data Explorer 2021 Western Energy Grid. Available at: https://www.epa.gov/egrid/data-explorer

GreenStart and San Jose Clean Energy weighted emissions factor, as described in the Community Inventory. Specific 2022 MG usage was provided by San Jose Water, and validated using data provided by the Campbell Finance Department (water bills paid in Fiscal Years 2022 and 2023).

The GHG emission calculations details are provided in Table 33.

Table 33 Municipal Water Consumption GHG Emissions Calculations

Water District	Activity Data [MG]	Energy Intensity Factor [kWh/MG]	Electricity Usage [kWh]	Emission Factor [MT CO_2e/kWh]	GHG Emissions [MT CO_2e]	Emission Source Scope
Imported/Purchased Water	42	1,031	43,302	0.000064	3	Scope 3
Total					**3**	**Scope 3**

Notes: kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; MG= million gallons Values may not add due to rounding

3.2.4 Vehicle Fleet

Vehicle fleet emissions include Scope 1 sources that relate to the mobile combustion of fossil fuels in the City's fleet vehicles. Information was not available for Scope 2 emissions from the charging of EVs and is not included in the total. Fleet vehicles include light- and medium-duty vehicles and trucks. The data provided by the Public Works Department represents fuel usage of diesel and gasoline in 2022, as well as an estimate of percentage of vehicles which were on-road vs. off-road. Approximately 85 percent of vehicles were estimated as on-road and 15 percent as off-road. Emission factors for diesel, gasoline, and compressed natural gas were obtained from the EPA Emission Factors for Greenhouse Gas Inventories report.[22] The GHG emission calculation details associated with vehicle fleet sources are provided in Table 34.

As the City does own a transit fleet (e.g., buses, light rail), there were no emissions calculated from this sector. Employee commutes account for emissions generated by City employees' trips to and from work and is treated as separate from the use of personal vehicles for work, as discussed in the section below.

[22] Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

Table 34 Municipal Vehicle Fleet Sector GHG Emission Calculations

GHG Emission Source	Activity Data		Emissions Factor		Emissions [MT CO_2e]	Scope
On-Road Diesel[1]	2,550	Gallons	0.010254	MT CO_2e/gal	26	Scope 1
On-Road Gasoline[1]	43,333	Gallons	0.008808	MT CO_2e/gal	382	Scope 1
Off-Road Diesel[2]	450	Gallons	0.010467	MT CO_2e/gal	5	Scope 1
Off-Road Gasoline[2]	7,647	Gallons	0.009207	MT CO_2e/gal	70	Scope 1
Total					**483**	**Scope 1**

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons; kWh = kilowatt hour; Values may not add due to rounding

[1] On-road diesel and gasoline were calculated by taking EPA estimates of MPG and emissions factors/gas and diesel and applying the average of model years to the mpg calculated x gallons of fuel provided.

[2] Off-Road diesel emissions factors were taken by applying the kg CO2 factors provided by the EPA for Diesel and Gasoline. The values from EPA average emissions factors by fuel type and off-road equipment type were then taken for both gasoline and diesel for 'light commercial' categories and applied.

3.2.5 Solid Waste from City Facilities

Emissions calculations from solid waste from City facilities uses the same methodologies and emissions factors as detailed above in the Community Inventory in Equation 2-8 and Equation 2-9.

The GHG emissions calculations for municipal solid waste fugitive emissions and process emissions are shown in Table 35.

Table 35 Municipal Solid Waste GHG Emission Calculations

Sector	Activity Data [wet short ton]	Emission Factor [MT CO_2e/wet short ton]	GHG Emissions [MT CO_2e]	Emission Source Scope
Municipal landfill Decomposition	694	0.3780	262	Scope 3
Municipal landfill Process	694	0.0164	11	Scope 3
Total			**274**	**Scope 3**

3.2.6 Wastewater from City Facilities

Wastewater management and processing at SCRWF are considered Scope 3 emissions, as they are located outside of Campbell's boundaries and are not owned or operated by the City. Although West Valley Sanitation District (WVSD) does have offices in Campbell and could be considered Scope 1 emissions, wastewater is conveyed to SCRWF with gravity and, thus, does not have any associated emissions.

GHG emissions for wastewater treatment were calculated using the same Community Protocol methodology described above in the Community Inventory in Wastewater. Like the Community Inventory, total wastewater emissions from SCRWF were attributed to City operations.[23]

[23] Total 2022 FTE employees for 2022 were used to scale emissions to reflect the share of wastewater emissions borne by municipal staff: 219. This is equal to 0.5% of the total Campbell population used to calculate community wastewater emissions (43,930).

Table 36 Municipal Wastewater GHG Emissions

GHG Emission Source	Adjusted Activity Data[1]		Emissions Factor		Emissions [MT CO_2e]	Scope
Stationary Combustion	100,638	std ft^3/yr	0.0000002	MT CO_2e/std ft^3	0.01	Scope 3
Process N_2O Emissions	219	service persons	0.0018550	MT CO_2e/ service pop	0.40	Scope 3
Effluent Discharge Fugitive N_2O	1	kg N/day	0.3799057	MT CO_2e/kg N/day	0.20	Scope 3
Electricity Use	2,397	kWh	0.0000263	MT CO_2e/kWh	0.06	Scope 3
Electricity Use T&D	122	kWh	0.0000263	MT CO_2e/kWh	<0.00	Scope 3
NG Use	589	therms	0.0053115	MT CO_2e/ therm	3.12	Scope 3
NG Leakage	17	therms	0.0530670	MT CO_2e/ therm	0.87	Scope 3
Total					**4.7**	**Scope 3**

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; AF = acre-feet; kg = kilogram; kWh = kilowatt hour; Values may not add due to rounding

[1] Adjusted activity data reflects 0.5% of the total activity data to account for the contribution of FTE City employes to the community total.

3.2.7 Employee Commute

Emissions from employee commutes include Scope 3 GHG emissions sources from the mobile combustion of fossil fuels generated by the City of Campell's employee vehicles as employees commute to and from work. The City provided underpinning data in the form of employee type, schedule (Flexible 9/80[24] and telework) and estimated one-way trip to commute into the City of Campbell.[25] Average daily commute was scaled to working days in a year (including 9/80 employees). The community emission factor for 2022 passenger vehicles was then applied to annual milage to calculate MT CO_2e/Year.

The GHG emissions associated with the employee commute sector are provided in Table 37.

24 A 9/80 work schedule is a two-workweek schedule of eight 9-hour days, one 8-hour day, and one day off.

25 One-way trip lengths were calculated by City staff from the middle of the provided zip code on Google Maps. Zip codes 95228, 95321, and 95678 were excluded as outliers due to a calculated daily trip of over 100 miles.

Table 37 Municipal Employee Commute GHG Emissions

GHG Emission Source	City Employees – FTW	Average Daily Round Trip Distance [mi/vehicle/day]	Workdays [commuting days] per Year[1]	Annual Mileage	Emissions Factor [MT CO_2e/mi][2]	Emissions [MT CO_2e]	Emission Source Scope
Single Occupancy – 9/80 Employees	30	107	171	550,124	0.00032	176	Scope 3
Single Occupancy – Non-9/80 Employees	189	107	234	4,742,648	0.00032	1,521	Scope 3
Total						**1,697**	**Scope 3**

[1] Assumed that 9/80 employees worked 171 days (commuted); non-9/80 employees worked 234 days (commuted). Note that the City does not have a telework policy, and an estimated 30-35 employees work a 9/80 schedule.

[2] Emissions factor uses on-road emissions factor used in Community inventory.

3.3 2022 Municipal GHG Emissions Inventory Results

The inventory provides the City with current GHG emissions estimates that follow the Community Protocol and current best practices for GHG accounting at the municipal level. The results of the GHG inventory are summarized in Figure 3 and shown in detail in Table 38.

Figure 3 Municipal 2022 GHG Inventory

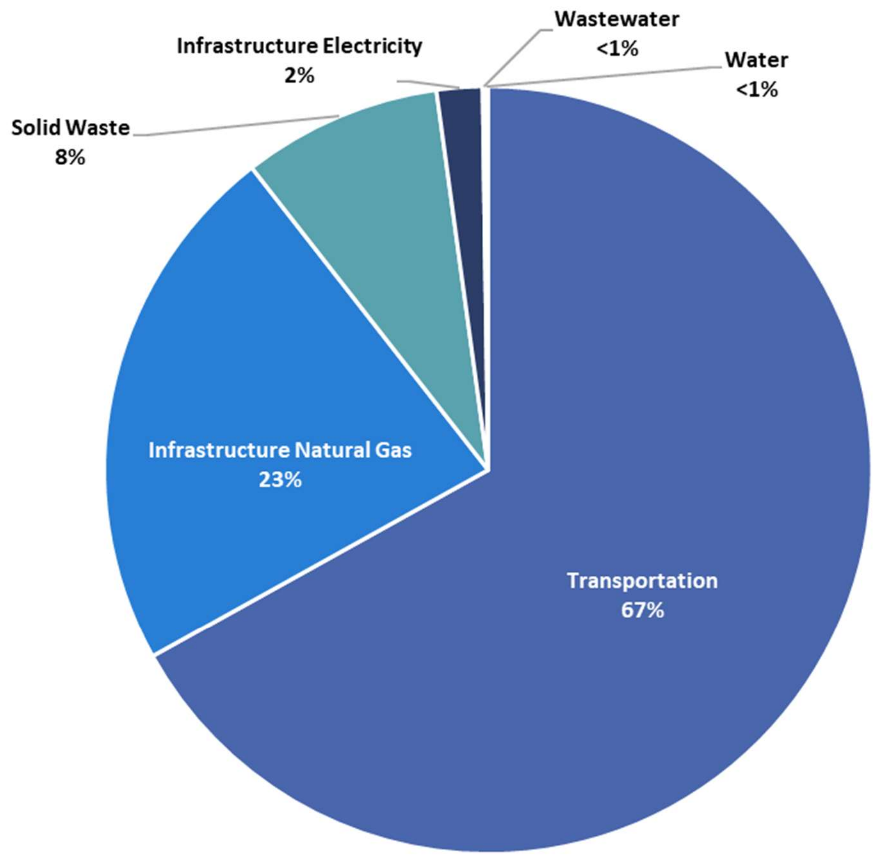


Figure 4 2022 Municipal GHG Inventory Subsector Breakdown

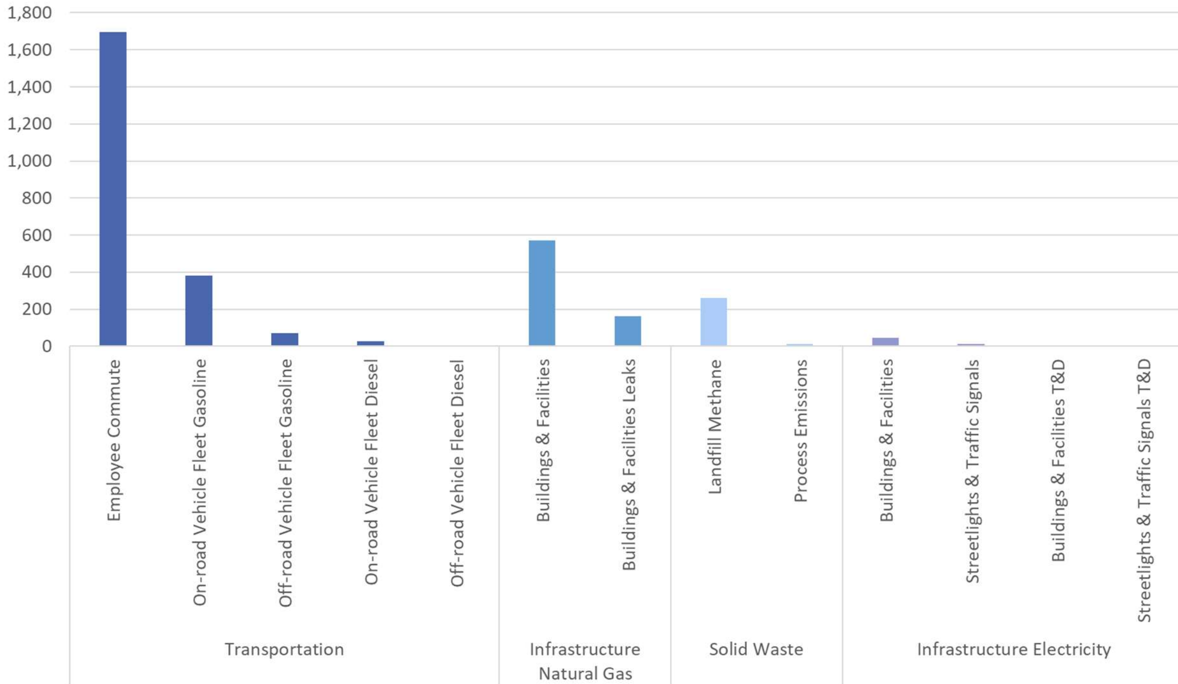


Table 38 2022 Municipal GHG Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Energy	Electricity – Buildings & Facilities	2,161,896	kWh	0.000021	MT CO_2e/kWh	46
	Electricity – Buildings & Facilities T&D	110,257	kWh	0.000021	MT CO_2e/kWh	2
	Electricity – Streetlights & Traffic Signals	630,171	kWh	0.000022	MT CO_2e/kWh	14
	Electricity – Streetlights & Traffic Signals T&D	32,139	kWh	0.000022	MT CO_2e/kWh	0.7
	Natural Gas – Buildings & Facilities	107,817	therms	0.005311	MT CO_2e/ therm	573
	Natural Gas – Buildings & Facilities Leaks	3,034	therms	0.053067	MT CO_2e/ therm	161
Transportation	On-road Vehicle Fleet Diesel	2,550	gallons	0.010254	MT CO_2e/gal	26
	On-road Vehicle Fleet Gasoline	43,333	gallons	0.008808	MT CO_2e/gal	382
	Off-road Vehicle Fleet Diesel	450	gallons	0.010467	MT CO_2e/gal	5
	Off-road Vehicle Fleet Gasoline	7,647	gallons	0.009207	MT CO_2e/gal	70
	Employee Commute	5,292,773	miles/ yr	0.000321	MT CO_2e/mile	1,697
Solid Waste	Landfill Methane	694	tons	0.378000	MT CH_4/ton	262
	Process Emissions	694	tons	0.016400	MT CO_2e/ton	11
Water	Imported/Purchased	43,302	kWh	0.000064	MT CO_2e/kWh	3
Wastewater	Stationary Combustion	100,638	std ft^3/ yr	0.000000	MT CO_2e/std ft^3	0.0
	Process N_2O Emissions	219	service persons	0.001855	MT CO_2e/ service pop	0.4
	Effluent Discharge Fugitive N_2O	1	kg N/ day	0.379906	MT CO_2e/kg N/day	0.2
	Electricity Use	2,397	kWh	0.000026	MT CO_2e/kWh	0.1
	Electricity Use T&D	122	kWh	0.000026	MT CO_2e/kWh	0.0
	Natural Gas Use	589	therms	0.005311	MT CO_2e/ therm	3.1
	Natural Gas Leakage	17	therms	0.053067	MT CO_2e/ therm	0.9
Total						**3,258**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

4 GHG Emissions Forecast

A GHG emissions inventory sets a reference point for a single year; however, annual GHG emissions change over time due to factors such as population and job growth, as well as new technologies and policies. A GHG emissions forecast estimates future GHG emission changes by accounting for projected community growth and changes. Calculating the difference between the GHG emissions forecast and GHG emissions reduction targets determines the gap that needs to be closed through the implementation of local GHG reduction policies. This section includes an estimate of the future emissions for Campbell in the years 2030, 2035, 2040 and 2045 in a business-as-usual scenario (BAU) forecast and a legislative adjusted scenario (adjusted) forecast, which are defined as follows:

- **Business-as-Usual Forecast.** Provides a forecast of how future GHG emissions would change if consumption trends continued as they did in 2022 and projected changes in population, housing, employment, and transportation activity over time consistent with planned projects within Campbell boundaries. The BAU does not include any GHG reductions associated with State regulations.
- **Legislative Adjusted Forecast.** Provides a forecast of how currently adopted state legislation would reduce GHG emissions from the business-as-usual scenario. The legislative adjusted scenario represents the State's contribution to reducing local GHG emissions to meet state goals.

Because the adjusted forecast incorporates the impact of State regulations that provide GHG emission reduction potential, the legislative adjusted scenario offers a more accurate picture of future GHG emission growth and the responsibility of Campbell for GHG reductions through local and regional actions.

4.1 Business-as-Usual Forecast

Demographic projections from 2022 to 2045 for population, employment, and households were developed using data from the City of Campbell's 6th Cycle 2023-2031 Housing Element to align with the City's General Plan.[26] The Housing Element provides population data for 2015 and 2020, household counts for 2019, and job numbers for 2018, along with Regional Housing Needs Allocation (RHNA) requirements for new housing units from 2023 to 2031. Population projections from 2020 to 2023 were calculated by analyzing population trends from 2015 to 2020, which was then applied to the 2019 persons-per-household rate (2.61) to estimate household growth from 2019 to 2023. From 2023 to 2031, the RHNA targets were applied to forecast the number of households needed by 2035. The resulting household data from 2019 to 2035 was then extended to project households through 2045. This household estimate, combined with the 2019 persons-per-household rate, was used to project population figures for 2023-2045. Employment projections were based on the Housing Element's job-to-housing unit ratio of 1.62, allowing for a forecast of employment growth parallel to household development.

A summary of the resulting demographics and projection metrics for each forecast year are provided in Table 39.

[26] https://www.campbellca.gov/DocumentCenter/View/20007/4th-HCD-Submittal-Draft-of-the-6th-Cycle-Housing-Element---Redlines

Table 39 BAU Forecast Demographic and Projection Metrics by Forecast Year

Metric	Data Source	2022	2030	2035	2040	2045
Population	6th Cycle Housing Element[1]	42,462	47,083	50,321	52,568	55,233
Households	6th Cycle Housing Element[1]	16,263	18,033	19,273	20,133	21,154
Employment	6th Cycle Housing Element[1]	26,346	29,213	31,222	32,616	34,270
Population Serviced	Calculated[2]	68,807	76,295	81,543	85,184	89,503
Off-road gasoline usage (gallons)	CARB OFFROAD2021	492,352	546,216	574,944	604,634	614,785
Off-road diesel usage (gallons)	CARB OFFROAD2021	433,117	472,009	502,115	533,476	567,663
Off-road natural gas usage (gallons)	CARB OFFROAD2021	402,977	449,083	479,378	512,912	512,916

[1] City of Campbell. 2023. 6th Cycle 2023-2031 Housing Element. Available at: https://www.campbellca.gov/ArchiveCenter/ViewFile/Item/2953

[2] Service population is equal to jobs + population.

A description of the demographic metrics used to project activity data and associated growth factors for each forecasted GHG emission source in the 2022 Community GHG Inventory are provided in Table 40.

Table 40 GHG Emission Sources and Growth Factors for BAU Scenario Forecast

GHG Emissions Source	Demographic Projection Metric	Growth Factor	Value
Energy			
Residential Electricity	Households	Electricity Consumption (kWh)/Household	5,038.41
Commercial Electricity	Employment	Electricity Consumption (kWh)/Job	3,608.61
Direct Access	Population	Electricity Consumption (kWh)/Job	702.57
Residential Natural Gas	Households	Natural Gas Consumption (therms)/Household	355.68
Residential Natural Gas Leaks	Households	Natural Gas Consumption (therms)/Household	10.01
Commercial Natural Gas	Employment	Natural Gas Consumption (therms)/Job	106.26
Commercial Natural Gas Leaks	Employment	Natural Gas Consumption (therms)/Job	2.99
Transportation			
On-Road Passenger Total VMT	Households	Annual VMT attributed to on-road vehicles using EMFAC2021 and Replica[1]	19,695.20
On-Road Commercial Total VMT	Employment	Annual VMT attributed to on-road vehicles using EMFAC2021 and Replica[1]	416.81
On-Road Bus Total VMT	Service Population	Annual VMT attributed to on-road vehicles using EMFAC2021 and Replica[1]	15.93
Off-Road Emissions[2]	N/A	Modeled by OFFROAD2021 and applied to Campbell populations	
Solid Waste			

GHG Emissions Source	Demographic Projection Metric	Growth Factor	Value
Solid Waste Disposal	Service Population	Solid Waste Emissions (MT CO_2e)/Service Person	0.14
Water			
Water Consumption	Service Population	Water Consumption-Associated Electricity Consumption (kWh)/Service Population	22.37
Wastewater			
Wastewater Treatment	Service Population	Wastewater Emissions (MT CO_2e)/Service Person	0.01
Wastewater Treatment – Electricity	Service Population	Wastewater Emissions (kWh)/Service Person	7.10

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kWh = kilowatt-hour; VMT = vehicle miles traveled; N/A = Not Applicable; Service Population = the combined total number of employees and residents in Campbell; MG = million gallons

[1] Annual VMT for on-road vehicles are calculated from average weekday VMT data provided by Replica for Campbell and interpolated for the forecast years. Average weekday data is converted to annual VMT using CARB's VMT annualization factor (i.e., 347 days per year). Annual VMT data is then appropriated to each fuel (i.e., gasoline, diesel, and natural gas) using on EMFAC2021 data analysis.

[2] Off-road fuel usage is calculated by applying the attribution metrics from the 2022 GHG inventory to the OFFROAD2021 model outputs for the forecast years to attribute the county-level outputs to Campbell and thus does not have its own growth indicator listed here.

Using the above demographic and projection metrics in Table 39, multiplied by the growth factors in Table 40 and the 2022 Campbell Community GHG inventory emission factors, the BAU forecast can be calculated. In the BAU forecast, GHG emissions are expected to increase through 2045 due to anticipated regional growth from both population and jobs. A summary of the BAU forecast results by GHG emission sector is provided in Table 41 and summarized in Figure 5.

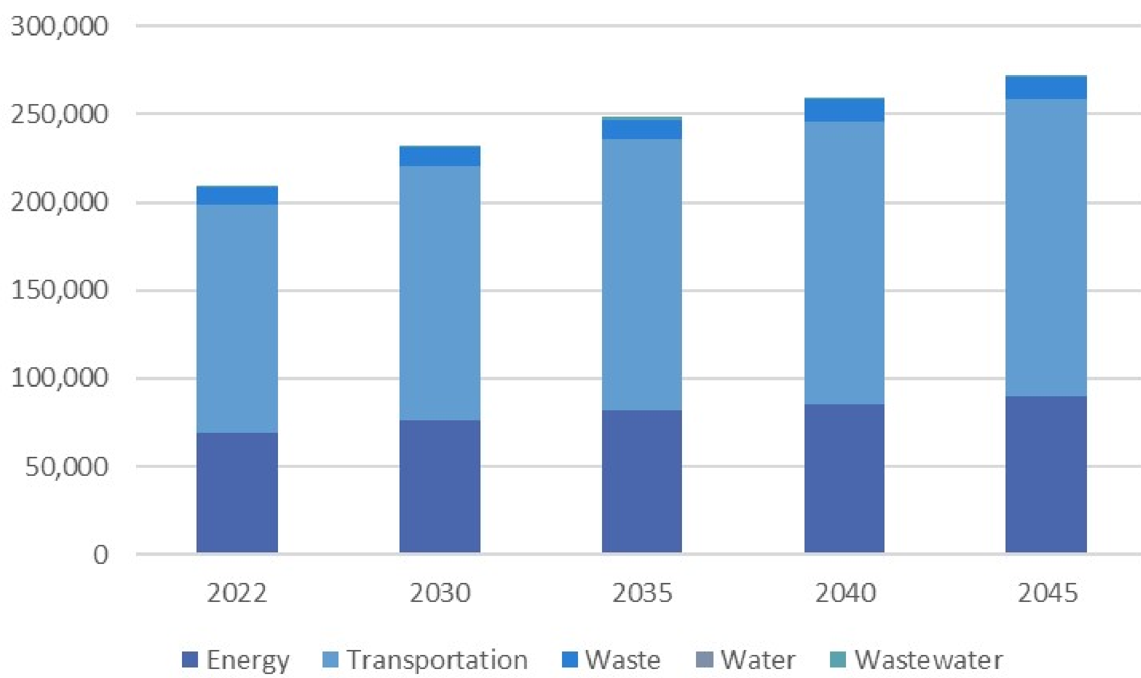
Table 41 BAU Forecast Results Summary by Emission Sector

GHG Emissions Source	2022	2030	2035	2040	2045
Energy	**68,843**	**76,336**	**81,586**	**85,229**	**89,550**
Residential Electricity + T&D	2,784	3,087	3,299	3,446	3,621
Commercial Electricity + T&D	3,242	3,595	3,842	4,014	4,217
Direct Access + T&D	4,407	4,887	5,223	5,456	5,732
Residential Natural Gas	30,723	34,067	36,410	38,036	39,964
Residential Natural Gas Leaks	8,638	9,578	10,237	10,694	11,236
Commercial Natural Gas	14,869	16,487	17,621	18,408	19,341
Commercial Natural Gas Leaks	4,181	4,636	4,954	5,176	5,438
Transportation	**129,998**	**144,075**	**153,875**	**160,947**	**168,840**
On-road Passenger Vehicles	102,925	114,126	121,977	127,422	133,882
On-road Commercial Vehicles	14,195	15,739	16,822	17,573	18,464
On-road Buses	1,451	1,609	1,720	1,796	1,887
Off-road Equipment	11,427	12,600	13,357	14,155	14,607

GHG Emissions Source	2022	2030	2035	2040	2045
Water and Wastewater	**1,010**	**1,120**	**1,197**	**1,251**	**1,314**
Wastewater Process and Fugitive Emissions & Energy Use	912	1,011	1,080	1,129	1,186
Water Conveyance Energy	98	109	117	122	128
Solid Waste	**9,795**	**10,861**	**11,608**	**12,126**	**12,741**
Solid Waste Disposal	9,795	10,861	11,608	12,126	12,741
Total GHG Emissions	**209,646**	**232,391**	**248,267**	**259,553**	**272,445**

Notes: All values are presented in metric tons of carbon dioxide equivalent (MT CO_2e). Totals may not add up due to rounding.

Figure 5 BAU Forecast Results Summary by Emission Sector (MT CO_2e)



4.2 Legislative Adjusted Forecast

Several State regulations have been enacted that would reduce Campell's GHG emissions below the BAU forecasted levels in 2030, 2035, 2040 and 2045. The impact of these regulations was quantified and incorporated into the adjusted forecast to provide a more realistic depiction of future emissions growth and the GHG emission reduction responsibility of local governments. The State legislation included in the adjusted forecast reduces GHG emissions associated with transportation, building energy efficiency, and renewable electricity. A brief description of each regulation and the methodology used to calculate associated reductions is provided in the following, as well as an explanation of any legislation excluded from the analysis.

4.2.1 Legislative Reduction Programs

Additional legislative programs are expected to reduce GHG emissions in specific sectors throughout California, as identified in the 2017 and 2022 Scoping Plans. Many of these programs were incorporated into the forecast analysis and are summarized in the subsections below.

Transportation Legislation

Advanced Clean Cars Programs

Prior to 2012, mobile emissions regulations were implemented on a case-by-case basis for GHG and criteria pollutant emissions separately. In January 2012, CARB approved a new emissions-control program (the Advanced Clean Cars program) combining the control of smog, soot-causing pollutants, and GHG emissions into a single coordinated package of requirements for passenger cars and light trucks model years 2017 through 2025. The Advanced Clean Cars program coordinated the goals of the Low Emissions Vehicles, Zero Emissions Vehicles, and Clean Fuels Outlet programs, and was more stringent than the federal Corporate Average Fuel Economy (CAFE) standards. The new standards will reduce California's GHG emissions by 34 percent in 2025, which is modeled under the CARB Emission Factor (EMFAC) Model and included in the GHG forecast as shown in Table 42.[27]

Advanced Clean Cars II was approved by CARB in August 2022 and expands the program's roadmap so that by 2035 all new cars and passenger trucks will be zero-emission vehicles (ZEV). This regulation effectively binds the State to EO N-79-20. The executive order was passed by the governor in 2020 and requires all new cars and passenger trucks sold in California be ZEV by 2035. While these legislations will lead to an expedited timeline for ZEV adoption in California, modeling data is not yet available in CARB's EMFAC Model. Emissions reductions attributable to the Advanced Clean Cars II program were excluded from the GHG forecast.

Advanced Clean Trucks was approved by CARB in June 2020 and sets a zero-emission vehicle (ZEV) percent-of-sales requirement on medium- and heavy-duty vehicle manufacturers to promote increased truck ZEV sales from 2024 to 2035. The standard is intended to reduce NO_x pollution and GHG emissions – which are disproportionately high in medium- and heavy-duty vehicle classes compared to passenger vehicles – as well as promote first-wave ZEV truck technology penetration in the market.[28] EMFAC models the effect of the Advanced Clean Trucks regulation on ZEV truck penetration and associated GHG emissions and is included in the forecast.

Table 42 Emission Factors Over Time by Vehicle Type (MT CO_2e/VMT)

Metric	2022	2030	2035	2040	2045
Passenger	0.000321	0.000266	0.000249	0.000240	0.000236
Commercial	0.001293	0.001066	0.000897	0.000781	0.000719
Buses	0.001324	0.001167	0.000853	0.000737	0.000644

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT= vehicle miles traveled

[27] California Air and Resource Board (CARB). 2019. Advanced Clean Cars Summary. Available at: https://ww2.arb.ca.gov/sites/default/files/2019-12/acc%20summary-final_ac.pdf

[28] California Air and Resource Board (CARB). 2023. Advanced Clean Trucks. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks/about

Assembly Bill 1493

Signed into law in 2002, AB 1493 (Pavley Standards) required vehicle manufacturers to reduce GHG emissions from new passenger vehicles and light trucks from 2009 through 2016. Regulations were adopted by CARB in 2004 and took effect in 2009 when the United States Environmental Protection Agency (USEPA) issued a waiver confirming California's right to implement the bill. This standard required automakers to reduce GHG emissions from new California passenger vehicles by about 30 percent by 2016, while simultaneously improving fuel efficiency and reducing motorists' costs.[29] The impacts of the Pavley Standards on ZEV market penetration was incorporated into the EMFAC model starting in 2014 and are included in the forecast assessment.

Innovative Clean Transit

Public transit GHG emissions will be reduced in the future through the Innovative Clean Transit (ICT) regulation, which was adopted in December 2018. It requires all public transit agencies to gradually transition to a 100-percent zero-emission bus fleet by 2040. Under ICT, large transit agencies are expected to roadmap towards zero-emission public transit buses.[30] The effects of the ICT regulation on GHG emissions are modeled in EMFAC2021 and are therefore captured in the emissions factor for buses and inherently included in the forecast for the bus category.

Energy Legislation

California Code of Regulations – Title 24

Although it was not originally intended to reduce GHG emissions, California Code of Regulations Title 24, Part 6: California's Energy Efficiency Standards for Residential and Commercial Buildings, was adopted in 1978 to reduce California's energy consumption, which in turn reduced fossil fuel consumption and associated GHG emissions. The standards are updated triennially to allow consideration and possible incorporation of new energy-efficient technologies and methods. Starting in 2020, new residential developments had to include on-site solar generation and near-zero net energy use. For projects implemented after January 1, 2020, the California Energy Commission (CEC) estimated that the 2019 standards would reduce electricity consumption by 53 percent for residential buildings and 30 percent for nonresidential buildings, relative to the 2016 standards. The CEC further estimated residential natural gas efficiency increases of 7 percent for residential end-uses.[31] No efficiency increases were estimated for commercial natural gas end-uses, based on lack of requirements in this sector in the 2019 standards. These percentage savings relate to heating, cooling, lighting, and water heating only and do not include other appliances, outdoor lighting not attached to buildings, plug loads, or other energy uses. In December 2022, the CEC published the new Title 24 2022 Building Efficiency Standards.[32]

Due to the complexity of the new code, there is currently no available model establishing projected efficiency increases. Therefore, the updated 2022 code was not included in the forecast. This

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[29] CARB. Clean Car Standards – Pavley, Assembly Bill 1493. May 2013. Accessed November 14, 2022, at: http://www.arb.ca.gov/cc/ccms/ccms.htm

[30] Innovative Clean Transit. Approved August 13, 2019. Accessed November 14, 2022 at: https://ww2.arb.ca.gov/sites/default/files/2019-10/ictfro-Clean-Final_0.pdf?utm_medium=email&utm_source=govdelivery

[31] California Energy Commission. 2019 Building Energy Efficiency Standards Frequently Asked Questions. January 1, 2020. Accessed November 8, 2022 at: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf

[32] California Energy Commission (CEC). 2023. 2022 Building Energy Efficiency Standards. Available at: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency

provides a conservative estimate of forecasted GHG emission reductions resulting from efficiency increases.

Renewables Portfolio Standard, Senate Bills 1078, 100, 350, and 1020

Established in 2002 under SB 1078, enhanced in 2015 by SB 350, and accelerated in 2018 under SB 100, California's Renewable Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 50 percent of total procurement by 2026, and 60 percent of total procurement by 2030. The RPS program further requires that by 2045, 100 percent of total energy procured be a combination of eligible renewable energy resources and zero-carbon resources.

California's RPS was further accelerated in 2022 by SB 1020 which established additional requirements that procurement from eligible renewable energy resources and zero-carbon resources increase to 90 percent of total procurement by 2035 and 95 percent of total procurement by 2040. The requirements of SB 1020 do not affect those previously set forth – they are to be considered additional to the existing RPS requirements. The RPS program and SB 1020 were incorporated into the GHG forecast by adjusting the electricity emissions factors for future years, as discussed in Section 4.4.

PG&E as well as RCEA currently provide electricity to Campbell and are subject to the RPS requirements. Weighted emission factors adjusted for RPS requirements were used to project emissions through 2045. Table 43 provides the estimated electricity emission factors that would result from RPS

Table 43 Forecasted RPS and Weighted Electricity Emission Factor

Metric	2022	2030	2035	2040	2045
Renewables Portfolio Standard Percentage (PG&E)	38%	60%	90%	95%	100%
Renewables Portfolio Standard (SVCE)[1]	46%	65%	90%	95%	100%
SVCE GreenPrime	95%	–	–	–	–
SVCE GreenStart	45%	–	–	–	–
California Grid (eGRID; CAMX)	34%	60%	90%	95%	100%
San Jose Clean Energy Green Value	40%	60%	90%	95%	100%
Residential Weighted EF (MT CO_2e/kWh)	**0.0000321923**	**0.0000208012**	**0.0000059260**	**0.0000029630**	**0.0000000000**
Commercial Weighted EF (MT CO_2e/kWh)	**0.0000324455**	**0.0000209648**	**0.0000059726**	**0.0000029863**	**0.0000000000**
SVCE GreenStart Weighted EF (MT CO_2e/kwh)	0.00003266	0.0000207451	0.0000059272	0.0000029636	0.0000000000
PG&E EF (MT CO_2e/kWh)	0.00002630	0.0000170510	0.0000042627	0.0000021314	0.0000000000

Metric	2022	2030	2035	2040	2045
San Jose Clean Energy GreenValue EF (MT CO_2e/kWh)	0.00009525	0.0000637154	0.0000159288	0.0000079644	0.0000000000
Weighted Water (SJCE and SVCE) EF MT CO_2e)	0.00006396	0.0000422302	0.0000109280	0.0000054640	0.0000000000

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kWh = kilowatt-hour; EF = emissions factor.

[1] Weighted average calculated off kWh split across GreenPrime and GreenStart Rates observed for 2022 Community Inventory.

Waste Legislation

Assembly Bill 939 and Assembly Bill 341

In 2011, AB 341 set the target of 75 percent recycling, composting, or source reduction of solid waste by 2020, calling for the California Department of Resources Recycling and Recovery (also known as CalRecycle) to take a statewide approach to decreasing California's reliance on landfills. This target was an update to the former target of 50 percent waste diversion set by AB 939.

As actions under AB 341 are not assigned to specific local jurisdictions, potential future reductions from the bill were conservatively not included in the GHG forecast analysis.

Assembly Bill 1826

In 2014, AB 1826 set regulations in place requiring California businesses to recycle all their organic waste starting in April 2016. The bill also required jurisdictions across the State to provide organic waste recycling programs to accommodate diverted waste from local businesses. Campbell has already implemented a residential and commercial organics collection program (further described below under Senate Bill 1383).[33] Because of this, AB 1826 compliance is reflected in the community's inventory and is thereby included in the BAU and adjusted forecast.

Senate Bill 1383

SB 1383 established a methane emission reduction target for short-lived climate pollutants in various sectors of the economy, including waste. Specifically, SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025.[34] Additionally, SB 1383 requires a 20 percent reduction in "current" edible food disposal by 2025.[35] Although SB 1383 has been signed into law, compliance with this Senate Bill must occur at the local level. Reductions in organics diversion in 2022 are already included in base data that was used to forecast future emissions from landfilled waste in 2023. As of 2022, 20 percent of Campbell's total generated waste was diverted green waste (17 percent) and mixed organics (2 percent). As only landfilled waste was included in the inventory, the level of organic diversion that occurred in 2022 is captured in both the BAU and Adjusted Forecast. Due to the difficulty of local jurisdictions meeting the organic waste targets set by SB 1838, anticipated emissions reductions attributable to SB 1383 beyond current diversion rates observed in 2022 data are conservatively excluded from the forecast. However, estimated impacts associated with achieving SB 1383 with increased organics diversion will be included in the GHG reduction measures in the CAAP.

4.2.2 Legislative Adjusted Scenario Forecast Results

In the adjusted emissions forecast, all sectors are expected to increase except for water energy conveyance. While electricity shows a downward trend approaching zero in 2045 due to stringent RPS requirements from SB 100 and SB 1020, this is counteracted by natural gas consumption

[33] https://www.campbellca.gov/508/Garbage-Recycling-Services

[34] CalRecycle. California's Short-Lived Climate Pollutant Reduction Strategy. https://calrecycle.ca.gov/organics/slcp/

[35] SB 1383 does not specify a baseline year for the 20 percent food recovery target; however, CalRecycle's 2018 statewide waste characterization studies will be used to help measure the baseline for the State to meet its SB 1383 goals. See CalRecycle FAQ accessed November 14, 2022 for more information:https://calrecycle.ca.gov/organics/slcp/faq/foodrecovery/#:~:text=SB%201383%20requires%20the%20state,for%20individual%20jurisdictions%20to%20achieve.

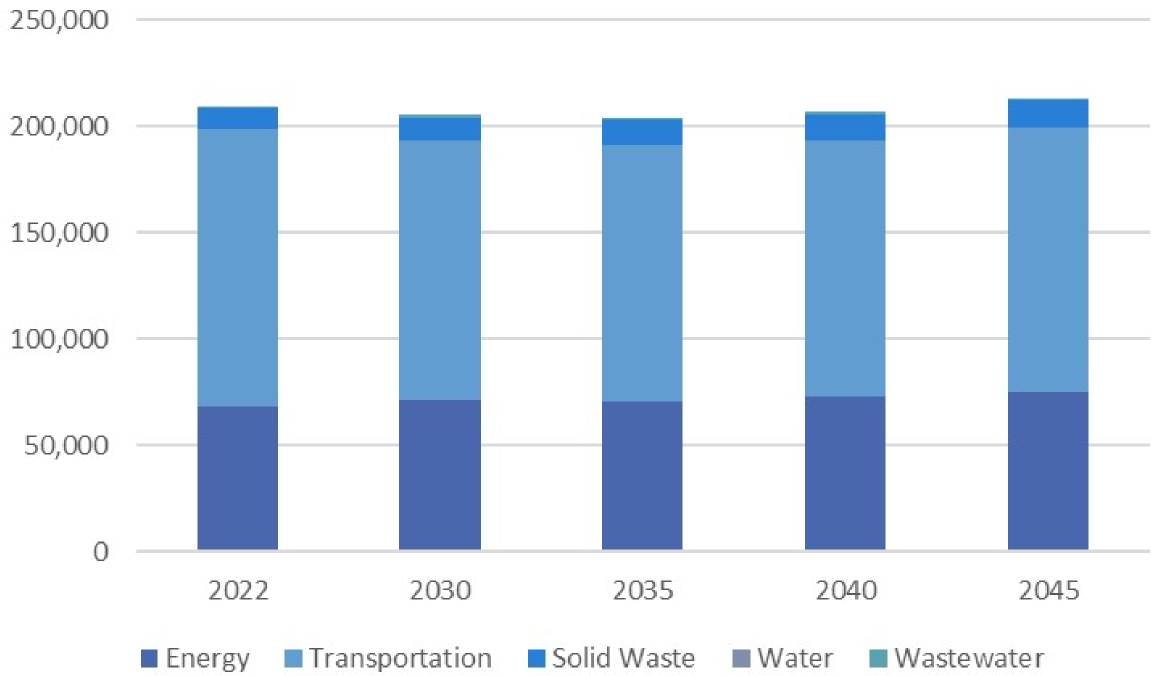
growth. Anticipated decreases in per capita transportation emissions (due to fuel efficiency requirements, fleet turnover rates, and increased electric vehicle penetration) are offset by anticipated population growth. As most current regulations expire in 2025 or 2030, emissions standards will experience diminishing returns while VMT continue to increase. A detailed summary of Campbell's projected GHG emissions by sector under the adjusted forecast through 2045 can be found in Table 44 and shown in a data visualization in Figure 6.

Table 44 Legislative Adjusted Scenario Forecast Results

GHG Emissions Source	2022	2030	2035	2040	2045
Energy	**68,843**	**71,489**	**70,700**	**72,681**	**75,151**
Residential Electricity + T&D	2,784	1,895	559	286	0
Commercial Electricity + T&D	3,242	2,256	675	349	0
Direct Access + T&D	4,407	2,870	753	389	0
Residential Natural Gas	30,723	33,833	36,012	37,524	39,317
Residential Natural Gas Leaks	8,638	9,512	10,125	10,550	11,054
Commercial Natural Gas	14,869	16,487	17,621	18,408	19,341
Commercial Natural Gas Leaks	4,181	4,636	4,954	5,176	5,438
Transportation	**129,998**	**121,820**	**120,728**	**121,019**	**124,224**
On-road Passenger Vehicles	102,925	94,799	94,576	95,234	98,430
On-road Commercial Vehicles	14,195	13,000	11,683	10,627	10,269
On-road Buses	1,451	1,421	1,112	1,002	918
Off-road Equipment	11,427	12,600	13,357	14,155	14,607
Solid Waste	**9,795**	**10,861**	**11,608**	**12,126**	**12,741**
Solid Waste Disposal	9,795	10,861	11,608	12,126	12,741
Water and Wastewater	**1,010**	**1,078**	**1,088**	**1,124**	**1,169**
Wastewater Process and Fugitive Emissions & Energy Use	912	1,006	1,068	1,114	1,169
Water Conveyance Energy	98	72	20	10	0
Total GHG Emissions	**209,646**	**205,248**	**204,124**	**206,951**	**213,285**
Change Since 2022	**0%**	**-2%**	**-3%**	**-1%**	**2%**

Notes: all values are presented in MT CO_2e = Metric tons of carbon dioxide equivalent, N/A = not applicable. Totals may not add up due to rounding.

Figure 6 Adjusted Forecast Results



4.2.3 Legislative GHG Emission Reduction Contribution

A summary of the reductions from the BAU forecast due to the contribution of legislation described above that can be expected under the adjusted forecast are provided in Table 45.

Table 45 Summary of Legislative GHG Emissions Reductions (MT CO_2e)

Legislation	2022	2030	2035	2040	2045
California RPS	0	4,327	10,225	11,683	13,269
Title 24	0	708	1,215	1,563	1,976
Transportation Legislation (Pavley, Innovative Clean Transit, etc.)	0	22,107	32,703	39,356	43,915
Total	**0**	**27,143**	**44,143**	**52,602**	**59,160**

Notes: all values are presented in MT CO_2e = Metric tons of carbon dioxide equivalent. Totals may not add up due to rounding.

5 GHG Emissions Targets

GHG reduction targets are used in climate action planning to help measure a community's commitment and progress. CARB encourages local agencies to take ambitious, coordinated climate action that is consistent with and supportive of the state's reduction goals for 2030 and 2045.[36] CARB has issued several guidance documents concerning the establishment of GHG emission reduction targets for CAPs to comply with California Environmental Quality Act (CEQA) Guidelines § 15183.5(b). Even if a plan is not CEQA-qualified, CARB has long recommended that local targets be a part of the process of developing, monitoring, and updating a CAP.

5.1 1990 Level GHG Emissions Backcast

Campbell does not have a 1990 GHG emissions inventory from which to develop GHG reduction targets consistent with SB 32, however, this can be estimated for the community relative to Campbell's 2022 inventory using a state-level emissions change metric.

As the State's 2022 GHG emissions inventory has not yet been published, Rincon used the 2021 inventory[37] to calculate approximate percent reduction in the Campbell community since 1990.

The calculation is developed using emissions results from CARB[38]—removing emissions from sectors not included in Campbell's inventory (e.g., non-specified, industrial point sources, agricultural and forestry land management practices). This approach assumes that Campbell's community activities and associated GHG emissions have generally tracked with statewide trends as shown in Table 46.

Table 46 1990 Backcast for Campbell

Entity	1990	2021 (State) / 2022 (Campbell)	Percent Difference
State (MMT CO_2e)[1]	255	305	16%
Campbell (MT CO_2e)[2]	250,861	209,646	16%

[1] State Emissions are expressed in Million Metric Tons (MMT) of CO_2e. 2021 emissions inventory source: https://ww2.arb.ca.gov/ghg-inventory-data; 1990 Inventory source: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/staff_report_1990_level.pdf

[2] 2022 Inventory results consistent with community inventory, with a 16% increase applied to back-cast 1990 levels. Units are expressed in MT CO_2e, consistent with the community inventory.

[36] California Air Resources Board. 2022. California's Climate Change Scoping Plan, p.268. https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

[37] The State's 2020 GHG emissions inventory was used as this is the most recently available statewide inventory from CARB. It is assumed that the 1990-2020 Statewide GHG emissions change is similar to the 1990-2021 Statewide GHG emissions change, therefore it can be used to estimate 1990 level GHG emissions for Campbell based on the 2022 Campbell GHG Inventory.

[38] California Air Resources Board. 2023. California GHG Emission Inventory Program. https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

5.2 GHG Emissions Reduction Target Setting

Setting targets can help develop a trajectory that can allow for deep decarbonization in an incremental, cost-effective manner. CARB guidance is for jurisdictions to first strive to exceed the SB 32 targets of reducing GHG emissions 40 percent below 1990 levels, while establishing a policy framework to achieve the long-term target of carbon neutrality by 2045.

Target setting is an iterative process which must be informed by the reductions that can realistically be achieved through the development of feasible GHG reduction measures. As such, the targets identified herein should remain provisional until the quantification and analysis of potential measures have been completed.

Achieving the established targets will require major shifts in how communities within California obtain and use energy, transport themselves and goods, and how the population lives and builds.

Campbell's provisional GHG emission reduction targets are:

- Reduce GHG emissions to 40 percent below 1990 levels by 2030 (SB 32 target year)
- Make substantial progress towards carbon neutrality by 2045 (AB 1279 target year)

Campbell's GHG emissions reduction gap is based on the difference between the Adjusted Forecast, discussed previously, and the established GHG emission reduction targets. Table 47 provides a summary of the GHG emission reduction targets in mass emissions.

Table 47 GHG Emissions Reduction Targets and Gap Analysis

Metric	2022	2030	2035	2040	2045
Adjusted Forecast (State Legislation)	209,646	205,248	204,124	206,951	213,285
SB 32 Mass Emissions Pathway	209,646	150,516	100,344	50,172	0
Remaining Emissions Gap	0	54,731	103,780	156,779	213,285

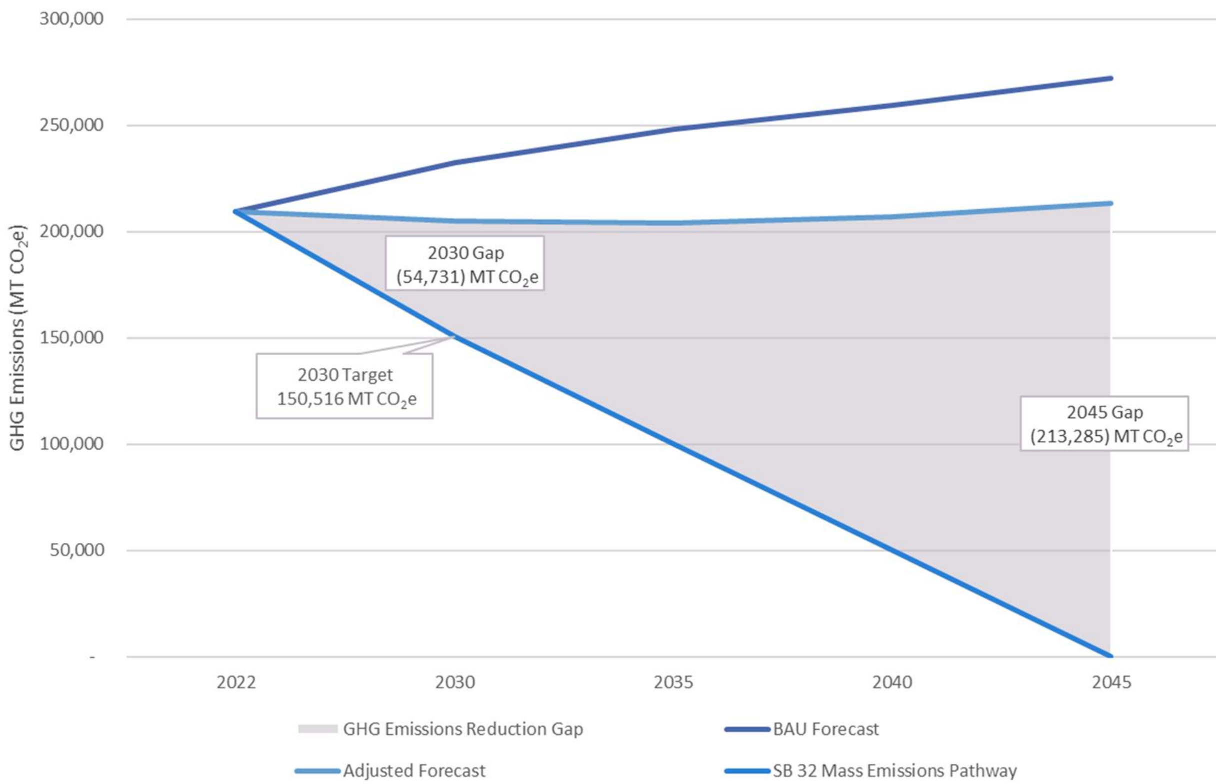
Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

Emissions have been rounded to the nearest whole number and therefore sums may not match.

[1] The target pathway is calculated by reducing 1990 mass emissions by 40% in 2030 and to 0 in 2045. This provisional target pathway is consistent with both SB 32 and a trajectory set forth to achieve AB 1279.

As demonstrated in Figure 7, Campbell will need to reduce 54,731 MT CO_2e by 2030, and 213,285 MT CO_2e by 2045 in order to meet State targets.

Figure 7 GHG Emissions Forecast and Provisional Target Pathways (Mass Emissions)



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Appendix E

Measures, Actions, and Implementation Plan

Measures, Actions, and Implementation Plan

The City of Campbell has developed key measures and actions to establish the basis for the City of Campbell Climate Action and Adaptation Plan (CAAP) based on the existing conditions analyses, the climate change vulnerability assessment, current trends and technologies in greenhouse gas (GHG) emissions reduction, feedback received from the Community Advisory Committee, broad community outreach (i.e., community surveys, pop-up events, and focus groups) and City Council.

This document details tangible measures and supporting actions that can help the City reduce its emissions to meet the established target in line with the State of California's goals and the Campbell 2040 General Plan. Additionally, they address climate vulnerabilities in Campbell and include adaptation measures and supporting actions to increase the City and community's resilience to climate impacts. These measures and supporting actions are organized into five systems that, when collectively implemented, will help put Campbell on a path towards carbon neutrality. The strategies are organized in the following framework:

- **Systems**. A group of related elements that can be directly influenced by the City of Campbell.
- **Measures.** Long-range goals that the City has established to reduce emissions and/or improve resilience. Measures marked with an asterisk (*) indicate high community support based on engagement efforts, while those marked with a double asterisk (**) reflect the highest level of support.
- **Actions.** Discrete steps to take to achieve the measures. Annually, the City will need to consider CAAP implementation as part of the priority-setting and budgeting process, as well as ongoing long-range financial forecasting, weighing climate action with other needs of the City to ensure they can be funded both today and into the future. Over time, the CAAP will be reviewed, and additional actions will need to be added to make greater progress on the established measures.

The selection of measures and actions for the CAAP was an iterative process with City staff, key interested groups, and the broader Campbell community. In general, the measures were designed to encompass actions that align with six Climate Policy Pillars that are essential to effective climate policy implementation:

- **Feasibility.** Actions that help the City understand the costs, benefits, obstacles, and opportunities associated with programs, policies, and ordinances to make decisions that best serve the community.
- **Education.** Actions to increase community awareness of programs available to reduce individual contributions to GHG emissions, increase resilience, and/or to establish or strengthen communication channels between the City and the community it serves. This includes reaching out to Campbell elementary and high schools to ensure climate literacy is addressed, fostering a well-informed and proactive younger generation.
- **Equity.** Actions that engage vulnerable populations in the decision-making process and establish policies and programs that provide vulnerable populations with the resources to benefit from each measure's objectives in an equitable manner.
- **Funding.** Actions that provide the financial backing (e.g., grant funding, rebates, financial incentives) and adequate City staffing to establish, implement, and maintain a program. Funding for any actions will be evaluated on an annual basis as part of the City's budgeting process as well as ongoing long-range financial forecasting.

- **Partnerships.** Actions that establish partnerships with external entities, including other government agencies, Tribes, school districts, and community-based organizations to leverage their expertise, resources, and networks to implement programs and policies the City would not be able to achieve alone.
- **Structural Change.** Actions that change existing City programs, policies, and ordinances to allow the City and community to reach the target established within a measure.

The measures and actions developed for the City of Campbell prioritize those activities which provide both mitigation (GHG emissions reductions) and resilience (preparedness for climate change) benefits. Campbell is already seeing the impacts of climate change and each measure taken to address local emissions should also prepare the community for future challenges. Areas for increased focus on resilience include:

- Extreme Heat
- Poor Air Quality
- Drought
- Riverine Flooding

The measures and actions have been developed to be implemented over time to reduce emissions and increase the City's resilience in a thoughtful, achievable, and stepwise process. Therefore, the actions are anticipated to be completed in phases, as outlined below. These phases are recommendations and subject to the adoption of workplans and budgets on an annual basis as well as ongoing long-range financial forecasting.

- Phase 1: 2026 – 2027
- Phase 2: 2028 – 2030
- Phase 3: 2031 – 2033
- Ongoing

A lead is assigned to each action to clearly indicate which Department is responsible for implementing the action. Some actions require partnership or leadership from additional Departments or Divisions within the City of Campbell or with outside agencies. Any action that requires City funds or grant funding will require close partnership with the City of Campbell Finance Department. The identified implementation lead in this document refers to the Campbell staff that will lead the action or support the outside agency. Implementation leads include:

- City Manager's Office
- Community Development Department
- Finance Department
- Police Department
- Public Works Department
- Recreation and Community Services Department

Finally, a "Feedback from Community/CAC" column is included in the tables to indicate the action's consistency, or alignment, with feedback received from the CAAP Community Advisory Community or general public received during engagement efforts throughout the CAAP's development.

Systems, Measures, and Actions

Table 1 Climate Action and Adaptation Plan Systems and Measures

Measure ID	Measure Text
Urban Eco-Systems and Sustainable Foods	
*UE-1	Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.
**UE-2	Increase tree canopy to 17.1% from 17.0% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.
*UE-3	Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016), sponsored by Senator Ricardo Lara.
UE-4	Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.
UE-5	Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.
UE-6	Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.
Social and Governance System	
**SG-1	Support the development of a Resilience Hub to offer refuge to vulnerable populations from extreme heat conditions, poor air quality, and flooding, while also serving as community resource center year-round.
SG-2	Enhance the Campbell community’s awareness of climate hazards by educating residents and staff about existing emergency alert services (e.g., AlertSCC) and how to sign up for them. Provide staff with climate change communication training and deliver health alert and evacuation messages in English and Spanish, and in multiple forms (e.g., online, brochure, radio). All messaging protocols and hazard mitigation measures should align with Campbell’s Emergency Operations Plan and its annexes, which serve as the primary reference for emergency communications and procedures.
*SG-3	Increase community resilience through internal capacity building, ongoing collaboration with community-based organizations, and continued community outreach and implementation related to the CAAP.
Building System	
BLD-1	Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.
*BLD-2	Require new buildings to be safe, decarbonized, and resilient by 2025.
**BLD-3	Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.

Measure ID	Measure Text
BLD-4	By 2033 decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.
Transportation System	
**TR-1	Decrease dependence on single-occupancy vehicles by incentivizing high-density transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.
TR-2	Improve the transit system to be more convenient, accessible, and resilient to climate impacts, in order to increase mode share to 10% by 2030 and 15% by 2045.
*TR-3	Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.
TR-4	Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.
TR-5	Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.
TR-6	Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.

Note:
*: High community support based on survey responses
**: Highest community support based on survey responses

Urban Ecosystems and Sustainable Foods

*Measure-UE-1 (high community support)

Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.

Metrics

- # of infrastructure sites flooded

Table 2 Measure UE-1 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-1.1	Support Valley Water in a feasibility study to address recurring flood damage and/or erosion in high-risk areas. Incorporate native plants and sustainable landscaping to strengthen flood protection while offering accessible recreational and educational opportunities for the community. Consider the implementation of nature-based solutions, including setback levees, water quality improvements, and strategic retreat of vulnerable city assets, ensuring long-term resilience	Public Works Department	Phase 1	Feasibility, Partnership	Flooding	CAC Feedback Meeting #2, CBO Engagement
UE-1.2	Secure state or federal funding to adopt a phased, adaptive approach to flood risk management with clear triggers and thresholds for action. In partnership with Valley Water, implement a monitoring system to track extreme weather trends, such as 100-year storms, guiding proactive planning and community outreach in coordination with Campbell Police Department.	Public Works Department, Police Department	Phase 2	Feasibility, Partnership	Flooding	
UE-1.3	Use the outcomes from the monitoring program (Action UE-1.1) to guide adaptive management, inform strategic relocation efforts, and keep the community informed about risks and adaptation strategies. In partnership with Valley Water prioritize investments in resilient infrastructure or relocate assets that are repeatedly damaged and in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, to ensure long-term resilience and alignment with adaptive climate strategies.	Public Works Department	Phase 2+ Ongoing	Structural Change, Equity, Partnership		

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-1.4	Encourage Valley Water to upgrade creek-side trails and bike paths as flood-resilient infrastructure, allowing them to function also as elevated flood barriers. Incorporate native plants and sustainable landscaping for flood protection and partner with community-based organizations to provide educational opportunities along trails. Consider implementing nature-based solution restoration techniques, such as beaver dam analogs, live vegetation, and brush packing, to slow stormwater and mitigate runoff impacts near creek-adjacent areas.	Public Works Department	Phase 3	Structural Change, Education, Equity, Partnership	Flooding	CBO Engagement

**Measure UE-2 (highest community support)

Increase tree canopy from 17.0% to 17.1% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.

Metrics

- Achieve 17.1% tree canopy cover by 2030

Table 3 Measure UE-2 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-2.1 – Community Priority Action	Prioritize planting 40 trees annually in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, with the lowest tree equity score, along safe routes to school, and near bus stops. Partner with a community-based organization to host a community planting event to promote community building and the Campell Climate Action and Adaptation Plan.	Public Works Department	Phase 1+ Ongoing	Structural Change, Equity	Extreme Heat	CAC Feedback Meeting #2 and #4, CBO Engagement
UE-2.2	Conduct a comprehensive analysis on success rates for trees planted over the past five years (planted 2019 – 2024). This analysis will consider factors such as species selection, soil conditions, and maintenance practices to determine the survival rate. The findings will inform future tree planting initiatives and promote sustainable urban forestry practices.	Public Works Department	Phase 1	Feasibility	Extreme Heat	
UE-2.3	Evaluate and update the "Official Street Tree List" for canopy potential and future climate conditions.	Public Works Department	Phase 1	Feasibility	Extreme Heat	
UE-2.4	Pursue and obtain grant funding for tree planting and maintenance. Identify and apply for Federal and State grants annually to meet the tree planting goal identified in Action UE-1.1 (e.g., USDA, California ReLeaf, Affordable Housing and Sustainable Communities Program, Cal Fire's Urban and Community Forestry Program, and the California Natural Resources Agency's Urban Greening Program). Regularly monitor trees for potential risk due to tree branches falling.	Public Works Department	Phase 1+ Ongoing	Funding	Extreme Heat	

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-2.5	Update and regularly maintain the City's website to include a webpage for trees that provides information such as best practices for watering and fertilizing trees, guidelines for pruning and maintenance, information on local tree species, and resources for reporting tree damage or disease. Additionally, provide information on the benefits of a healthy tree canopy, including improved air quality, reduced urban heat island effects, and increased property values.	Public Works Department	Phase 1+ Ongoing	Education	Extreme Heat	
UE-2.6	Conduct site assessments along the creeks to evaluate thermal comfort, availability of shade (over land and the creek), and landscape features. Based on these assessments, collaborate with Valley Water to strategically direct tree planting to enhance shade.	Public Works Department	Phase 2	Feasibility, Partnership	Extreme Heat	City Council Feedback, CBO Engagement
UE-2.7	Partner with schools in the city to develop a plan to reduce the heat islands in and around schools, including along walking routes. This plan will focus on removing impervious surfaces, planting trees, and increasing shade structures. Prioritize schools located in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment.	Public Works Department	Phase 2+ Ongoing	Partnership	Extreme Heat, Flooding	CBO Engagement
UE-2.8	Update the City's tree removal policy to require the replacement of removed trees with species that are resilient to Campbell's projected future climate conditions, including increased heat, drought, and extreme weather. For trees removed without a permit, apply a replacement penalty requiring new trees to be planted at a minimum of two times the standard replacement ratio for unlawfully removed trees from developed single-family residential properties, and four times the standard replacement ratio for all other properties. As part of this update, establish a fund, supported by permit fees or other sources, to subsidize the cost of replacement trees for low-income residents located in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment..	Public Works Department	Phase 1 + Ongoing	Structural Change	Extreme Heat	CAC Feedback

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-2.9	Develop a community tree planting outreach and engagement initiative that combines incentives, education, and engagement to expand Campbell's urban canopy. The program will share information on financial assistance or free trees to low-income residents (e.g., existing programs led by community-based organizations such as Our City Forest), prioritize climate-resilient species, and include educational workshops on tree care, planting techniques, and the environmental benefits of urban forestry. The City will partner with schools, neighborhood groups, and community-based organizations to host planting events and promote stewardship, with a focus on areas with low tree cover and high heat vulnerability.	Public Works Department	Phase 1 + Ongoing	Education	Extreme Heat	CAC Feedback

*Measure UE- 3 (high community support)

Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016), sponsored by Senator Ricardo Lara.

Metrics

- 80% reduction in organic material sent to landfill compared to 2014
- Tons of organic material procured per year
- % reduction in edible food waste

Table 4 Measure UE-3 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-3.1	Continue to participate in the Santa Clara County edible food recovery program which collaborates with all food generators and food recovery organizations across the county. Update the City website to promote the program.	Public Works Department	Ongoing	Education, Partnership,		SB 1383, CBO Engagement
UE-3.2	Continue to participate in the West Valley Solid Waste Management Authority to develop and distribute educational materials describing options for disposal of construction and demolition debris, home composting, residential organics collection, and source reduction and recycling for schools.	Public Works Department	Ongoing	Partnership, Education		
UE-3.3	Continue to implement the City's organics program with equitable and clearly defined enforcement mechanisms and penalties, as required by Article 16 in SB 1383 (2016), sponsored by Senator Ricardo Lara. Maintain records, including an initial compliance report, annual report, and implementation record as required by Articles 3, 14, and 16 of SB 1383 for (1) the organic waste collection program and (2) the edible food recovery program. Additionally, develop an organics procurement tracking program.	Public Works Department	Ongoing	Equity, Structural Change		SB 1383, CBO Engagement
UE-3.4	Continue to collaborate with regional partners including Santa Clara County, Solid Waste Joint Power Authority, and Waste Management to provide compost to be applied on agricultural and working lands countywide to meet procurement requirements.	Public Works Department	Ongoing	Partnership		

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-3.5	Require all new multi-story residential buildings to incorporate dedicated chutes or collection systems for trash, recycling, and organic waste. This design standard will support compliance with SB 1383 by making it easier for residents to properly sort and dispose of organic material.	Public Works Department	Phase 2	Structural Change		

Measure UE-4

Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.

Metrics

- 10% reduction in per capita water use

Table 5 Measure UE-4 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-4.1	Partner with community-based organizations and Valley Water to provide native and drought tolerant landscape educational workshops and trainings to multi-family and single-family residents and homeowner associations to increase use of low-maintenance, native landscaping and high efficiency irrigation. Additionally, use these workshops to promote Valley Water's Landscape Rebate Program.	Public Works Department, Community Development Department	Phase 1+ Ongoing	Partnerships		CAC Feedback Meeting #1, CBO Engagement
UE-4.2	Partner with local community-based organizations to create a community garden with edible fruits and vegetables in a climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.	Community Development	Phase 2	Partnership		CAC Feedback Meeting #4
UE-4.3	Collaborate with Valley Water to adopt and implement a Model Water Efficient New Development Ordinance (MWENDO) to help reduce water use in Campbell.	Community Development	Phase 1	Partnership, Structural Change		

Measure UE-5

Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.

Metrics

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Table 6 Measure UE-4 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-5.1	Identify low lying areas in Campbell and implement stormwater mitigation strategies in those areas, prioritizing nature-based solutions.	Public Works Department	Phase 1	Feasibility	Flooding	City Council Feedback, CBO Engagement

Measure UE-6

Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.

Metrics

- # of Sq. ft. of non-functional turf remaining on City maintained land annually
- # of new bioswales constructed
- % total reduction in municipal water use

Table 7 Measure UE-5 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
UE-6.1	Develop and implement a procurement policy for all City-hosted and sponsored meetings and events, encouraging increased locally-sourced, plant-based, and other climate smart food options, as well as the use of plastic-free materials. Provide information on health, environmental, and carbon benefits of these choices.	Public Works Department	Phase 1	Structural Change		CAC Feedback Meeting #1, CBO Engagement
UE-6.2	In partnership with the Solid Waste Authority, conduct annual audits of bin location and signage for landfill, recycle, and compost waste in municipal buildings and municipally-owned land. Verify that bins have clear signage and are placed together for proper disposal.	Public Works Department	Phase 1+ Ongoing	Feasibility, Structural Change, Partnerships		
UE-6.3	Complete a municipal water use analysis and, in partnership with San Jose Water Company, implement recommendations resulting from the analyses to reduce total water use by 10%, compared to 2022 water use, by 2030.	Public Works Department	Phase 1	Feasibility, Partnerships		
UE-6.4	Update the Campbell Municipal Code to prohibit the installation of non-functional turf.	Public Works Department	Phase 2	Structural Change		
UE-6.5	Identify and replace non-functional turf at City-owned and operated locations to comply with AB 1572. Additionally, replace non-native vegetation with native and drought tolerant species in Campbell parks, medians, and other landscapes. Secure funding to create bioswales on City	Public Works Department	Phase 2	Feasibility, Structural Change, Funding	Flooding, Drought	

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
	land and along roadway right-of-way to increase stormwater capture and groundwater recharge. Explore adoption of a local ordinance requiring adjacent property owners to maintain landscaping, particularly where such obligations are already established as conditions of approval for land use entitlements, to support long-term sustainability and reduce municipal maintenance burdens.					
UE-6.6	Assess the feasibility of adding more farmers market locations and/or introducing rotating pop-up markets to increase access to fresh, local produce.	City Manager's Office	Phase 2	Feasibility		CAC Feedback Meeting #4
UE-6.7	Conduct a comprehensive update to the City's purchasing policies to integrate sustainability criteria into procurement decisions. This update will include standards for minimum recycled content in office supplies (e.g., paper products), prioritization of vendors with low-carbon operations, and evaluation tools to assess environmental impacts across product lifecycles. Train staff on sustainable purchasing practices to ensure consistent implementation and alignment with climate-smart goals.	Finance	Phase 2	Structural Change		

Social and Governance Systems

**Measure SG-1 (highest community support)

Support the development of a Resilience Hub to offer refuge to vulnerable populations from extreme heat conditions, poor air quality, and flooding, while also serving as community resource center year-round.

Metrics

- Resilience Hub Opened

Table 8 Measure SG-1 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
SG-1.1	Conduct a study to identify potential partners and locations for establishing a Resilience Hub in Campbell, including but not limited to school districts, religious organizations, community centers, and other City or County facilities. The study should include a list of criteria for the Resilience Hub.	Recreation & Community Services Department	Phase 1	Feasibility	Extreme Heat, Poor Air Quality, Flooding	
SG-1.2	Following the feasibility study (SG-1.1), conduct a detailed needs assessment of the selected site to evaluate infrastructure suitability and climate resilience (e.g., the potential for all-electric systems with solar panels and battery storage) along with staffing needs and opportunities to distribute cooling resources like fans and rentable coolers. This needs assessment should be conducted with the identified partners identified as part of Action SG-1.1.	Public Works Department	Phase 2	Feasibility	Extreme Heat, Poor Air Quality, Flooding	
SG-1.3	Coordinate with the identified partners in action SG-1.1 to secure external funding sources (e.g., grant funding) to facilitate the necessary infrastructure improvements and resource needs of the Resilience Hub identified in Action SG-1.2.	Recreation & Community Services Department	Phase 3	Partnership, Funding	Extreme Heat, Poor Air Quality, Flooding	
SG-1.4	Partner with community-based organizations to launch outreach programs and advertise the Resilience Hub and recruit volunteers to support the Hub. Coordinate with local law enforcement to maintain safety and facilitate communication during Hub activation.	Recreation & Community Services Department	Phase 3 + Ongoing	Education, Partnership	Extreme Heat, Poor Air Quality, Flooding	
SG-1.5	Monitor and evaluate the Resilience Hub's performance, including	Recreation &	Phase 3 +	Feasibility	Extreme Heat,	

infrastructure effectiveness, community utilization, and climate resilience outcomes, while gathering community feedback to guide future improvements	Community Services Department	Ongoing	Poor Air Quality, Flooding

Measure SG-2

Enhance the Campbell community's awareness of climate hazards by educating residents and staff about existing emergency alert services (e.g., AlertSCC) and how to sign up for them. Provide staff with climate change communication training and deliver health alert and evacuation messages in English and Spanish, and in multiple forms (e.g., online, brochure, radio). All messaging protocols and hazard mitigation measures should align with Campbell's Emergency Operations Plan and its annexes, which serve as the primary reference for emergency communications and procedures.

Metrics

- Regular staff training formalized
- # of people reached through health alert and evacuation messaging
- All alerts and evacuation messages provided in English and Spanish

Table 9 Measure SG-2 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
SG-2.1	Partner with the County of Santa Clara Office of Emergency Management and community-based organizations to establish coordinated notification and response services to provide timely dissemination of critical information through multiple channels (e.g., mobile notifications, social media platforms, community alerts systems).	Police Department	Phase 1	Partnerships, Structural Change, Equity	Extreme Heat, Poor Air Quality, Flooding	
SG-2.2	Conduct emergency alert notifications, including extreme heat warnings and poor air quality days, in English and Spanish. Distribute information via alerting systems in English and Spanish in areas of high climate vulnerability.	Police Department	Ongoing	Structural Change, Education, Equity	Extreme Heat, Poor Air Quality, Flooding	
SG-2.3	Secure funding to enhance the redundancy of emergency evacuation communication systems during power outages. This might include providing backup power for telecommunication towers (e.g., the police tower) and other critical facilities, disseminating information through radio channels, encouraging the use of hand-cranked radios, and other methods. Additionally, conduct regular tests of alert systems to ensure readiness for potential evacuation scenarios.	Police Department	Phase 1	Structural Change, Funding	Extreme Heat, Poor Air Quality, Flooding	
SG-2.4	Develop a training program to raise awareness among all City staff about climate risks to the community, GHG contributions, the significance of the CAAP and its relevance to the City, as well as available internal and	Community Development Department	Phase 2	Structural Change, Education	Extreme Heat, Poor Air Quality, Drought,	CBO Engagement

	external resources. The program could include a handout with customized information on integrating climate change considerations into the agency's processes, regular formal training sessions, and onboarding training for new employees. The program may by based on existing trainings such as the United States Environmental Protection Agency Local Government Climate Adaptation Training or be developed in-house with support from a consultant as needed.				Flooding
SG-2.5	Develop and formalize specific climate hazard thresholds that trigger emergency response protocols, such as activation of the Emergency Operations Center (EOC). For example, define temperature thresholds (e.g., when heat exceeds a certain temperature) or flood levels (e.g., a 100-year flood event) that require staff mobilization. These thresholds should be integrated into Campbell's Emergency Operations Plan and communicated clearly to relevant departments to ensure timely and coordinated action.	Police Department	Phase 2	Structural Change	Extreme Heat, Poor Air Quality, Drought, Flooding

*Measure SG-3 (high community support)

Increase community resilience through internal capacity building, ongoing collaboration with community-based organizations, and continued community outreach and implementation related to the CAAP.

Metrics

- # of community-based organizations engaged
- $ disbursed to community-based organizations for CAAP outreach support

Table 10 Measure SG-3 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
SG-3.1	In the first year after CAAP adoption, staff will present to Council a study session to evaluate and identify means of funding the implementation of the CAAP	Community Development Department	Phase 1	Funding		
SG-3.2	Build from the existing Campbell Building Effective Partnerships with Non-Governmental Organizations resource to draft a framework for ongoing and capacity building with community-based organizations that builds off the collaboration during CAAP development. The framework will include: ▪ Establishing regular communication to discuss ongoing projects, challenges, and opportunities for collaboration ▪ Identify and seek to obtain funding and resources to support community-based organizations' initiatives that align with implementation of the CAAP ▪ Collaborative planning so community-based organizations are included in the decision-making process ▪ Implementing a monitoring and evaluation system to measure the effectiveness of partnerships with community-based organizations, including by collecting feedback from the organizations to continuously improve the collaboration process	Community Development Department	Phase 1	Structural Change, Partnership	Extreme Heat, Poor Air Quality, Drought, Riverine Flooding	
SG-3.3	Secure grant funding, in partnership with community-based organizations, to support broad CAAP implementation.	Community Development Department	Phase 1+ Ongoing	Funding, Partnership	Extreme Heat, Poor Air Quality, Drought, Riverine Flooding	

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
SG-3.4	Institute a Cool Block Program in partnership with community-based organizations to encourage residents to get to know their neighbors and to organize events that foster community and address issues such as safety, climate hazards, and improving quality of life. Launch the first Cool Block Program in a highly climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.	Community Development Department	Phase 2	Structural Change, Education, Equity, Partnership	Extreme Heat, Poor Air Quality, Drought, Riverine Flooding	

Building Systems

Measure BLD-1

Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.

Metrics

- % of community using carbon-free and renewable electricity

Table 11 Measure BLD-1 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-1.1	Partner with Silicon Valley Clean Energy to conduct an annual analysis of direct access electricity users within the City. Contact direct access electricity users and provide information on the benefits of upgrading to GreenStart/GreenPrime with Silicon Valley Clean Energy.	Community Development Department	Phase 1+ Ongoing	Partnership, Feasibility, Equity		
BLD-1.2	Continue partnering with Silicon Valley Clean Energy to conduct educational campaigns, such as tabling at community events or hosting an annual Earth Day event. Establish comprehensive informational resources on the City’s website, regularly post on social media, and develop energy bill inserts. These efforts will highlight the benefits of 100% carbon-free and renewable energy and promote the available incentives.	Community Development Department	Ongoing	Partnership, Educations, Funding		CBO Engagement
BLD-1.3	Provide education and outreach to Campbell residents and businesses on the value of installing solar and battery storage for both GHG emissions reduction and resilience. Additionally, educate and guide residents and businesses on the fire rating requirements for battery storage systems, including the necessity for installation on 1-hour fire-rated walls, to ensure safe and compliant installations. Promote Silicon Valley Clean Energy incentives, federal tax credit programs, and other statewide and regional incentives to reduce costs.	Community Development Department	Phase 1+ Ongoing	Education Funding	Extreme Heat	CBO Engagement

*Measure BLD-2 (high community support)

Require new buildings to be safe, decarbonized, and resilient by 2025.

Metrics

- Zero new construction permitted with NOx emitting appliances after 2025
- 95% of new construction with cool roofs or at least 50% of roof with solar panels
- 100% of new construction with indoor cooling

Table 12 Measure BLD-2 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-2.1	Continue enforcing the Campbell Air Quality Ordinance which prohibits NO_x emissions from appliances in all new buildings and major remodels (with exemptions for some industrial and commercial uses), as defined in the municipal code.	Community Development Department	Ongoing	Structural Change	Poor Air Quality	
BLD-2.2	Adopt a reach code to require CALGreen Tier 2 Voluntary Standards Section A5.106.11.2 for cool roofs and Section A5.106.7.2 for cool walls for new residential and non-residential buildings. Include an alternative option allowing buildings to install solar roofing shingles or solar PV and increase attic insulation instead of a cool roof, which can generate electricity while also enhancing thermal comfort.	Community Development Department	Phase 1	Structural Change	Extreme Heat	
BLD-2.3	Adopt a reach code to require indoor cooling in new multi-family buildings. Monitor the California Department of Public Health guidance regarding indoor cooling which will inform the 2025 California building code update cycle.	Community Development Department	Phase 1	Structural Change	Extreme Heat	
BLD-2.4	Collaborate with regional partners including Silicon Valley Clean Energy to host and promote workforce development programs for installers, local contractors, and building owners/operators to provide technical requirements and financial resources, including information on new electric appliances, approaches to electrification, and rebates available. Partner with community-based organizations to connect members of climate vulnerable communities, as defined in Campbell's Climate Change Vulnerability Assessment, to these training programs.	Community Development Department	Phase 2+ Ongoing	Education, Funding, Equity, Partnership		

**Measure BLD-3 (highest community support)

Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.

Metrics

- 18% reduction of natural gas use in existing residential buildings
- 15% reduction of natural gas use in existing non-residential buildings

Table 13 Measure BLD-3 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-3.1	Conduct a high-level existing building electrification analysis for City-owned and private properties to identify the specific costs and potential hurdles for building electrification in Campbell. Assess the return on investment of electrification to encourage building owners to comply and participate. Use the results of the analysis to fine tune education and outreach as well as policy directives associated with building decarbonization.	Community Development Department	Phase 1	Feasibility		
BLD-3.2	Collaborate with Silicon Valley Clean Energy to increase Campbell resident participation in programs that support residents going all-electric, like the Go Electric Advisory program, a free live service to help Silicon Valley Clean Energy customers go electric. Additionally, connect low-income homeowners and renters with the Department of Energy's Weatherization Assistance Program to install weatherization measures. Focus outreach on climate vulnerable areas first, including in mobile home parks, as defined in Campbell's Climate Change Vulnerability Assessment.	Community Development Department	Phase 1	Education, Funding, Equity	Extreme Heat, Poor Air Quality	CAC Feedback Meeting #1
BLD-3.3	Adopt an ordinance requiring new roof replacements for existing residential and non-residential buildings to utilize cool roof materials, as defined by CALGreen Tier 2 Voluntary Standards Section A5.106.11.2, by 2026 to minimize absorption of solar energy and reduce building energy use. Include an alternative option allowing buildings to install solar roofing shingles or traditional PV and increased attic insulation instead of a cool roof, which can generate electricity while also enhancing thermal comfort.	Community Development Department	Phase 2	Structural Change	Extreme Heat	CBO Engagement

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-3.4	Partner with community-based organizations to launch an education and outreach campaign to help people in Campbell prepare for, and understand the benefits of, the Bay Area Air Quality Management District (BAAQMD) zero-NO_x threshold which phases out natural gas appliances over time, beginning with water heaters in 2027.	Community Development Department	Phase 2	Education, Partnership		
BLD-3.5	Implement streamlined permitting processes for electrification projects (e.g., installing electric heat pumps, solar panels, battery storage, heat pump HVAC systems), such as offering instant online permitting and bundling similar permit types to reduce costs. This will simplify the application process, making it faster and more affordable for individuals and businesses to adopt sustainable energy solutions.	Community Development Department	Phase 1	Structural Change		
BLD-3.6	Develop educational materials outlining opportunities to avoid panel upgrades when cost prohibitive. Make this information readily available on the City's website. This information will help residents and business owners identify the most efficient and cost-effective solutions for their electrical needs, ensuring a smooth transition to sustainable energy systems.	Community Development Department	Phase 1	Education		
BLD-3.7	Amend the municipal code to require all newly installed HVAC units for existing buildings to have two-way air conditioning unit capabilities to provide heating and cooling.	Community Development Department	Phase 1	Structural Change	Extreme Heat, Poor Air Quality	
BLD-3.8	Partner with Silicon Valley Clean Energy and community-based organizations to provide solar and storage installation resources and technical support to building owners and residents.	Community Development Department	Phase 1+ Ongoing	Structural Change, Funding		CAC Feedback Meeting #1, CBO Engagement
BLD-3.9	Adopt a phased approach to commercial building performance standards, with the first phase requiring buildings of a certain size to report energy consumption, the second phase requiring a building retro-commissioning (process of evaluating and optimizing the performance of an existing building's systems and equipment), and the third phase requiring a reduction in GHG emissions below an identified threshold (such as MT CO_2e per sq. ft.). Collaborate with regional partners to develop a consistent methodology and set of requirements for the building performance standard.	Community Development Department	Phase 1	Structural Change, Partnership		
BLD-3.10	Work with PG&E to identify opportunities for decommissioning unnecessary natural gas lines and transitioning neighborhoods to electric systems to maximize cost savings.	Community Development Department	Phase 1	Partnership		

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-3.11	Adopt an existing building retrofit checklist which requires large-scale building retrofit/remodel projects to include additional cost-effective energy efficiency and/or electrification upgrades (such as heat pumps, enhanced insulation, air sealing, ductwork improvements).	Community Development Department	Phase 1	Structural Change		

Measure BLD-4

By 2033, decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.

Metrics

- 80% of municipal buildings electrified
- 70% of upgraded/retrofitted municipal buildings with cool roofs, solar shingles, or PV solar

Table 14 Measure BLD-4 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
BLD-4.1	Complete an energy audit and retro-commissioning (fine-tuning building systems to ensure a building is running at optimal performance) of all existing municipal buildings and facilities and inventory all fossil fuel-powered building equipment. Identify zero carbon replacement technology and develop a prioritized short- and long-term replacement schedule for equipment. Through this process, confirm a list of critical municipal buildings that should be prioritized for battery back-up.	Public Works Department	Phase 2	Feasibility		
BLD-4.2	Based on the energy audit results in Action BLD-3.1, maximize solar installations on City-owned buildings.	Public Works Department	Phase 3	Structural Change	Extreme Heat	
BLD-4.3	Develop and adopt an electrification first policy for City-owned fossil fuel equipment (e.g., back-up generators and HVAC units) that outlines a strategy for addressing cost impacts of future equipment purchases and supports a fiscally responsible equipment transition.	Community Development Department	Phase 1	Structural Change		
BLD-4.4	Seek to add energy storage, such as battery back-up, to all critical municipal buildings, identified as part of Action BLD-4.1.	Public Works Department	Phase 3	Structural Change	Extreme Heat	

Transportation

**Measure TR-1(highest community support)

Decrease dependence on single-occupancy vehicles by incentivizing high-density, transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.

Metrics

- # of mobility hubs constructed
- # of active transportation infrastructure projects in and adjacent to large shopping centers
- % mode shift from single-occupancy vehicles to walking

Table 15 Measure TR-1

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-1.1	Conduct a feasibility study to determine commercial areas, including downtown, where curbside parking spaces can be converted into mini or pocket parks, sidewalk extensions, or bicycle infrastructure, which provides more space and amenities for people.	Public Works	Phase 1	Feasibility		
TR-1.2	Conduct site assessments to understand current pedestrian conditions and challenges in large shopping centers including downtown and the Pruneyard. These assessments will evaluate parameters such as: ▪ **Safety**: Assess the presence of crosswalks, pedestrian signals, lighting, and visibility to ensure safe pedestrian movement. ▪ **Mobility**: Evaluate the width and condition of sidewalks, the availability of ramps, and the ease of access for individuals with disabilities.	Community Development Department	Phase 1+ Phase 2	Feasibility		

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
	▪ **Comfort**: Measure the availability of seating, shade, and shelter, as well as the overall cleanliness and maintenance of pedestrian pathways. ▪ **Connectivity**: Examine the connectivity between pedestrian pathways on private property and public rights-of-way (ROW), ensuring seamless transitions and accessibility. ▪ **Aesthetics**: Assess the visual appeal of the pedestrian environment, including landscaping, public art, and the overall ambiance. To guide these assessments, a set of pedestrian-supportive amenities will be identified under each parameter. Areas will then be scored based on the presence, quality, and accessibility of these amenities. Challenges for pedestrians may include obstacles such as uneven surfaces, lack of signage, high vehicle traffic, and inadequate crossing facilities. The action will address pedestrian circulation on the public right-of-way.					
TR-1.3	Based on the findings of the site assessment (TR-1.2), implement one pilot project that improves pedestrian infrastructure (e.g., widening or improving sidewalks, installing high-visibility crosswalks, providing seating areas and shelters, adding greenery and shade trees). Implement the pilot project in a climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment.	Public Works Department	Phase 2	Structural Change, Equity	Extreme Heat	
TR-1.4	Encourage property owners of large shopping centers (greater than 100,000 square feet of building space) to build active transportation infrastructure on their properties. This may include amenities such as bike racks, bike repair stations, shaded seating areas, water fountains, and improved sidewalk connections.	Community Development Department	Phase 2	Partnerships		
TR-1.5	As part of the outreach associated with the City of Campbell Multimodal Transportation Plan and other City initiatives, continue to engage with members of the community, landowners, local businesses, and community organizations to gather input and educate the public on the benefits of	Community Development Department	Phase 1+ Ongoing	Education		

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
	increased density and mixed-use development on reducing single-occupancy vehicles and greenhouse gas reduction.					

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-1.6	As the City works through future Land Use Element and Housing Element updates, continue to identify appropriate locations in residential areas and near parks to implement targeted zoning changes that promote new mixed use commercial development (e.g., corner stores and cafés) to create more vibrant and walkable neighborhoods.	Community Development Department	Ongoing	Feasibility		CAC Feedback Meeting #4
TR-1.7	Partner with developers, property owners of shopping centers, residents, and employers to expand the reach of the City's Transportation Demand Management program to target the shift from single-occupancy vehicles to alternative modes of transportation, including by offering discounted transit cards and promoting remote work.	Community Development Department	Phase 2	Partnerships		
TR-1.8	Seek funding opportunities to explore the feasibility of a Transportation Management Association which works with large employers in the region to organize resident commute trips for work. Consider leveraging existing Transportation Management Associations in the region or partner with one to reduce implementation costs.	Community Development Department	Phase 3	Feasibility, Funding		
TR-1.9	Create a citywide carpooling system to encourage residents to share rides to work.	Community Development Department	Phase 2	Structural Change		
TR-1.10	Coordinate with regional partners and service providers to pilot and implement mobility hubs with docked e-bikes in and around downtown, the Pruneyard, Community Center, and along Hamilton Avenue, Winchester Boulevard, San Tomas Expressway, Virginia Avenue, and Dell Avenue, where there are high vehicle miles traveled from single-occupancy vehicles.	Community Development Department	Phase 2	Partnership		CAC Feedback Meeting #2, CBO Engagement
TR-1.11	Align local parking requirements with AB 2097 by removing parking minimums citywide, which require a certain number of parking spaces for new developments. Developers may still propose parking if they choose.	Community Development Department	Phase 1	Structural Change		
TR-1.12	As part of the City of Campbell Multimodal Transportation Plan, consider identifying roads for lane removal and replace lanes with linear parks, walking/biking routes, and trees. Consider targeting implementation at San Tomas Expressway,	Public Works Department	Phase 1	Feasibility		CBO Engagement, CAC Feedback Meeting #4

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
	Campbell Avenue, and Winchester Boulevard for initial analysis.					

Measure TR-2

Improve the transit system to be more convenient, accessible, and resilient to climate impacts, to increase mode share to 10% by 2030 and 15% by 2045.

Metrics

- % mode shift to transit
- % of total transit stops in the City with shade features
- # new mobility hubs constructed near transit stops

Table 16 Measure TR-2

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-2.1	Partner with Santa Clara Valley Transportation Authority to survey all transit stops in Campbell and identify the top priority locations for installation of shade structures and other bus stop amenities based on average use of the transit stop, location in climate vulnerable area, as defined in Campbell's Climate Change Vulnerability Assessment, and proximity to parks and schools.	Community Development Department, Public Works Department	Phase 1	Partnerships, Feasibility, Equity	Extreme Heat	
TR-2.2	Coordinate with Santa Clara Valley Transportation Authority to identify opportunities to improve transit options (e.g., new stops, shade features at existing stops) in Campbell, particularly in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment.	Community Development Department	Phase 1	Partnerships, Feasibility, Equity		
TR-2.3	Partner with Santa Clara Valley Transportation Authority to educate the community on available transit opportunities through informational pop-up events at existing community events, highlighting the benefits and convenience of public transportation options, including the Santa Clara Valley Transportation Authority Guaranteed Ride Home program and reduced fares for seniors over 65, youth, and individuals with disabilities.	Community Development Department	Phase 1+ Ongoing	Partnerships, Education		CBO Engagement
TR-2.4	Identify funding and partnership opportunities (such as public private partnerships, Santa Clara Valley Transportation Authority, and grant funding) to offer an electric shuttle to various high-traffic locations, including the Valley Transportation Authority Downtown Campbell Station (Green Line), for individuals traveling within Campbell and those traveling out of Campbell.	Community Development Department	Phase 2	Funding, Structural Change, Partnership		CAC Feedback Meeting #2

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-2.5	Secure grant funding to add a mobility hub, or location with docked e-bikes, and end of use facilities, near the Valley Transportation Authority Downtown Campbell Station for first and last mile commute to the Green Line going to San Jose. This will provide convenient and sustainable transportation options, making it easier for people to use public transportation and reduce reliance on single occupancy vehicles.	Public Works Department	Phase 2	Funding, Structural Change		CAC Feedback Meeting #2, CBO Engagement
TR-2.6	As part of the City of Campbell Multimodal Transportation Plan, consider planning, securing funding for, and building protected bicycle lanes within two miles of light rail stations.	Public Works Department	Phase 2	Structural Change, Funding		CBO Engagement
TR-2.7	Explore opportunities to establish a City shuttle services connecting Campbell residents to key commuter destinations, including Santa Clara, Los Gatos, and Palo Alto. Explore potential partnerships with companies in key commuter destinations and demand for this type of service.	Community Development Department		Feasibility		

*Measure TR-3 (high community support)

Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.

Metrics

- 28% of total passenger vehicles in Campbell are zero-emission
- 25% of total commercial vehicles in Campbell are zero-emission
- # of publicly accessible electric vehicle chargers in Campbell

Table 17 Measure TR-3 Actions

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-3.1	Maintain building and site development standards for new commercial and multi-family residential construction, as well as for major renovations to parking areas (including when parking spaces, electrical systems, or lighting systems are added or altered) that meet the most recent CALGreen Tier 2 requirements for electric vehicle charging infrastructure.	Community Development Department	Phase 1	Structural Change		CBO Engagement
TR-3.2	Adopt an ordinance that creates an expedited, streamlined permitting process (e.g., electronic submissions, permitting checklist, and administrative approval) for electric vehicle charging stations in alignment with California Government Code Section 65850.7 (as amended by AB 1236 in 2015), and develop a permitting checklist with permitting requirements and guidance for applicants. Score a “green rating” on the CA Electric Vehicle Charging Station Permit Streamlining Map by 2027.	Community Development Department	Phase 1	Structural Change		
TR-3.3	Evaluate opportunities for installation of electric vehicle charging stations at City-owned facilities and in the public right-of-way. The feasibility study will assess electrical capacity, electrical demand, financial constraints, and parking utilization to provide a prioritized list of locations to install new publicly accessible electric vehicle charging stations. In the feasibility study, include evaluation of opportunities and prioritization of locations to increase the equitable distribution of publicly available electric vehicle chargers to residents of multi-family homes in climate vulnerable areas (as defined in Campbell’s Climate Change Vulnerability Assessment) and residents living on low- and moderate-incomes, as well as consideration for optimizing daytime charging.	Public Works Department	Phase 1	Feasibility, Equity		CBO Engagement

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-3.4	After identifying locations for publicly accessible chargers (action TR-3.3), leverage public-private partnerships and secure grants to install 224 chargers by 2030.	Public Works Department	Phase 1+ Phase 2	Structural Change		CBO Engagement
TR-3.5	Partner with community-based organizations to conduct at least one annual zero-emission vehicle education event for residents. Prioritize events for residents living on low- and moderate- incomes as well as residents living in multi-family buildings. City staff hosting these events will evaluate the barriers to zero-emission vehicle adoption, promote information on the costs and benefits of owning zero-emission vehicles, and detail the steps on how to receive incentives for zero-emission vehicles.	Community Development Department	Phase 2	Education, Equity, Funding, Partnership		
TR-3.6	Update zoning codes to reflect state law requirements for streamlined permitting of electric vehicle charging stations as an accessory use. Allow electric vehicle charging stations as permitted accessory use in all zones and establish an administrative use permit process for standalone electric vehicle charging stations, where feasible.	Community Development Department	Phase 1	Structural Change		
TR-3.7	Maintain streamlined permitting practices for electric vehicle charging stations by continuing to allow installations with only an electrical permit, without requiring planning review or setbacks. Preserve the existing expedited process and support the use of online permitting tools, to provide clarity and consistency for applicants.	Community Development Department	Phase 1	Structural Change		

Measure TR-4

Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.

Metrics

- 5% shift to walking and biking

Table 18 Measure TR-4

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-4.1	As part of the City of Campbell Multimodal Transportation Plan, consider planning and building protected bicycle lanes within a 2-mile radius of parks and schools in the city, in alignment with the City's Safe Routes to School Program.	Public Works Department	Phase 1+ Ongoing	Structural Change		CAC Feedback Meeting #1, CBO Engagement
TR-4.2	Secure funding to implement Campbell Priority Development Area Enhancement projects for pedestrian and bicycle safety improvements including accessibility ramps, curb extensions, sidewalk installation, traffic calming (e.g., lane narrowing, flashing beacon systems), signal modifications, sharrows, crosswalks, bike striping and signs, and guide signs (signs that provide information to pedestrians and cyclists about routes, directions, and distances to nearby locations).	Public Works Department	Phase 1	Funding		CBO Engagement
TR-4.3	As part of the City of Campbell Multimodal Transportation Plan, consider implementing traffic calming strategies (e.g., curb extensions, textured or colored pavement to visually cue drivers to slow down, speed feedback signs) and pedestrian infrastructure improvements from the Pruneyard to Downtown Campbell and along Winchester Boulevard to create safer streets for pedestrians and cyclists.	Public Works Department	Phase 2	Structural Change		CBO Engagement, CAC Feedback Meeting #4
TR-4.4	Explore opportunities to enhance active transportation facilities and around public transit station, building on existing infrastructure such as electronic bike lockers. This may include evaluating the useability and capacity of current lockers and assessing the need for additional amenities to secure short-term bike parking, bike share docks, or wayfinding signage to support first-and last-mile connections.	Public Works Department	Phase 2	Feasibility		Replica Analysis, CBO Engagement

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-4.5	Evaluate future options to increase active transportation and reduce vehicular traffic in the Downtown area, including street modifications or temporal street closures. The City will coordinate with Downtown interested parties, including the Downtown Campbell Business Association (DCBA) and the Chamber of Commerce, as well as Campbell Police Department and Santa Clara County Fire Department so that any changes maintain emergency access and public safety, address parking and circulation considerations, and reflect community needs while supporting a vibrant, accessible downtown environment.	Public Works Department	Phase 1	Structural Change		CAC Feedback Meeting #2, CBO Engagement

Measure TR-5

Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.

Metrics

- 15% zero-emission municipal fleet

Table 19 Measure TR-5

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-5.1	Complete and regularly update the Fleet Electrification Plan to identify the needs and constraints involved in transitioning to a zero-emission municipal fleet, including specialized vehicles such as police patrol units and other emergency response vehicles.	Public Works Department	Phase 1+ Ongoing	Feasibility		
TR-5.2	Install battery backups combined with onsite solar panels and renewable diesel generators to enhance the resilience of the municipal fleet.	Public Works Department	Phase 2	Structural Change	Poor Air Quality, Extreme Heat	
TR-5.3	Secure funding from state programs (e.g., the California Air Resources Board's Clean Vehicle Rebate Project and the Truck and Bus Voucher Incentive Program, Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project) and federal sources to increase procurement of zero-emission vehicles and installation of zero-emission vehicle charging/fueling infrastructure at municipal facilities. Additionally, explore opportunities for Low Carbon Fuel Standard credit generation from use of low carbon fuels/electricity for fleet vehicles.	Public Works Department	Phase 1	Funding		
TR-5.4	Meet the advanced clean fleet rules for medium- and heavy-duty vehicles.	Public Works Department	Phase 2	Structural Change	Poor Air Quality	
TR-5.5	Showcase the City's transition to zero-emission vehicle fleet at community events to demonstrate its commitment to climate action and resilience. Highlight the benefits of electric vehicles, such as lower air pollution, reduced noise levels, and positive health impacts.	Public Works Department	Phase 1+ Ongoing	Education		
TR-5.6	Install EV charging infrastructure needed to support a zero-emission vehicle fleet based on the results of the Fleet Electrification Plan (action TR-5.1). Work collaboratively with Silicon Valley Clean Energy and regional partners to identify funding and technical support.	Public Works Department	Phase 2+ Ongoing			

Measure TR-6

Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.

Metrics

- 25% of off-road equipment decarbonized

Table 20 Measure TR-6

Action		Implementation Lead	Phase	Pillar	Climate Hazard	Feedback from Community/CAC
TR-6.1	Identify off-road equipment fleets in the City with the highest decarbonization potential and those lacking zero-emission alternatives. Provide technical assistance and/or incentives to fleet owners to support the transition to cleaner technologies (Action TR-6.3).	Public Works Department	Phase 1	Feasibility		
TR-6.2	Develop and adopt a phased series of ordinances that exceed AB 1346 to ban local operation of specific types of gasoline and diesel-powered off-road equipment (e.g., lawn and garden, construction). Update the ordinances based on a regular review of relevant state regulations, regional rules, and available technology.	Community Development	Phase 1	Structural Change	Poor Air Quality	
TR-6.3	Partner with community-based organizations to promote Bay Area Air Quality Management District off-road equipment resources and funding opportunities to contractors and residents in the City. Include educational resources on public health and safety benefits of using decarbonized off-road equipment. Prioritize education and outreach in climate vulnerable areas of the City, as defined in Campbell's Climate Change Vulnerability Assessment.	Community Development	Phase 2	Funding, Education, Partnership, Equity		
TR-6.4	Work to achieve 100% decarbonization of off-road equipment operated by the City before 2040 and require zero-emission off-road equipment in all City contracts by 2030.	Public Works Department	Phase 1+ Ongoing	Structural Change		

Appendix F

Measure Substantial Evidence Report

Greenhouse Gas Emissions Reductions Technical Report

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RINCON CONSULTANTS, INC. SINCE 1994

CITY OF CAMPBELL
Climate Action & Adaptation Plan

Table of Contents

Tables

Figures

1 Introduction

This report presents the technical quantification and evidence supporting the greenhouse gas (GHG) emissions reduction potential of the City of Campbell's Climate Action and Adaptation Plan (CAAP). The CAAP is Campbell's plan to reduce GHG emissions and address climate change through implementation of measures and actions in the community. While the CAAP is not considered a "qualified GHG reduction plan" under California Environmental Quality Act (CEQA) guidelines, the strategies are still based on technical evidence. This document provides calculations and documentation that were used to estimate the GHG emission reductions which would result from the implementation of the CAAPs measures and actions. Based on the evidence contained in this document, the GHG emissions reductions associated with the CAAP's measures and actions put Campbell on track towards achieving its fair share of GHG emissions consistent with the 2030 reduction target established by Senate Bill (SB) 32. Achieving these targets also allows the City to progress towards its target for carbon neutrality by 2045 which aligns with California's 2045 carbon neutrality goal established by Assembly Bill (AB) 1279.[1]

The quantification in this report is intended to illustrate a path to achieving GHG emission reductions consistent with the SB 32 2030 target. Mechanisms to monitor the CAAP's progress toward achieving the GHG emissions reduction targets have been established through the CAAP development process. If routine monitoring shows the City is not on track to reach its 2030 GHG reductions consistent with SB 32, the CAAP as a whole or specific measures and actions will be amended or updated to achieve alignment with SB 32. This report quantifies GHG reductions associated with the City's 2045 carbon neutrality target based on specified goals; however, it does not provide substantial evidence of how the City will achieve these long-term, aspirational targets. Future iterations of the CAAP will address these long-term goals.

1.1 GHG Emissions Reduction Targets

GHG emissions reduction targets are used for climate action planning to establish measurable metrics to guide the community's commitment to reduce GHG emissions and help gauge progress on reducing emissions over time. Pursuant to state guidance, local jurisdictions should provide their fair share GHG emission reductions to support the State's climate goals.[2] Thus, Campbell will aim to reduce communitywide emissions to 40 percent below 1990 levels by 2030 and achieve carbon neutrality communitywide by 2045, consistent with the State's goals in SB 32 and AB 1279.

Campbell's short- and long-term GHG emissions reduction targets are:

- Reduce GHG emissions 40 percent below 1990 levels by 2030; and,
- Achieve carbon neutrality by 2045.

[1] SB 32 established the State goal to reduce GHG emission 40 percent below 1990 levels by 2030. AB 1279 established the State goal to achieve carbon neutrality by 2045. The State defines carbon neutrality as net zero carbon emissions, which is achieved by reducing GHG emissions at least 85 percent below 1990 levels and removing the remaining emissions through carbon capture and sequestration strategies.

[2] Association of Environmental Professionals (AEP). 2016. Final White Paper, Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California. Available at: https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf

1.2 Measures and Actions Organization

As part of the CAAP process, the City of Campbell has developed a comprehensive set of Measures and Actions to reduce communitywide GHG emissions in all sectors to put Campbell on track towards achieving its GHG emissions reduction target pathways. The Measures are organized around a set of four **Systems** to reduce GHG emissions. Each **Measure** is then supported by a set of **Actions**. The structure of the Systems, Measures, and Actions are as follows:

- **Systems:** A group of related elements that can be directly influenced by the City of Campbell.
- **Measures:** Long-range goals that the City has established to reduce emissions and/or improve resilience in line with the State's emission reduction goals and local resilience goals.
- **Actions:** Discrete steps to take to achieve the measures. Over time, the CAAP will be reviewed, and additional actions will need to be added to make greater progress on the established measures.

The Measures and Actions can be either quantitative or supportive, defined as follows:

- **Quantitative:** Quantitative Measures result in direct and measurable GHG emissions reductions when their Actions are implemented. Quantitative Measures can be summed to quantify how Campbell will meet its 2030 GHG emission reduction target and demonstrate progress towards the 2045 target.
- **Supportive:** Supportive Measures have not been quantified and often do not contribute directly to achieving Campbell's GHG emissions reduction targets. Despite not being quantified, supportive Measures are nevertheless critical to the overall success of the CAAP and provide support so that the quantitative Measures will be successfully implemented.

This report identifies the CAAP's quantitative Measures and provides a complete description of their contribution to achieving Campbell's 2030 GHG emissions reduction target and making substantial progress towards Campbell's 2045 target. Similarly, this report only details the quantitative Actions that enable each Measure. The supportive Actions are excluded from this report because they do not contribute directly to achieving and making progress towards Campbell's GHG emissions reduction targets. Details on these supportive Actions can be found in the CAAP.

1.3 GHG Emissions Reductions

Table 1 summarizes the Measures and the GHG emissions reduction they would achieve in 2030 and 2045 upon the implementation of their Actions.

Table 1 Campbell CAAP GHG Emissions Reduction Summary by Measure

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
Urban Eco-Systems and Sustainable Foods			
UE-1	Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.	Supportive	Supportive

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
UE-2	Increase tree canopy to 17.1% from 17.0% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.	30	327
UE-3	Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016), sponsored by Senator Ricardo Lara.	9,191	13,302
UE-4	Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.	Supportive	Supportive
UE-5	Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.	Supportive	Supportive
UE-6	Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.	Supportive	Supportive
Social and Governance System			
SG -1	Support the development of a Resilience Hub to offer refuge to vulnerable populations from extreme heat conditions, poor air quality, and flooding, while also serving as community resource center year-round.	Supportive	Supportive
SG-2	Enhance the Campbell community's awareness of climate hazards by educating residents and staff about existing emergency alert services (e.g., AlertSCC) and how to sign up for them. Provide staff with climate change communication training and deliver health alert and evacuation messages in English and Spanish, and in multiple forms (e.g., online, brochure, radio). All messaging protocols and hazard mitigation measures should align with Campbell's Emergency Operations Plan and its annexes, which serve as the primary reference for emergency communications and procedures.	Supportive	Supportive
SG-3	Increase community resilience through internal capacity building, ongoing collaboration with community-based organizations, and continued community outreach and implementation related to the CAAP.	Supportive	Supportive
Building System			

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
BLD-1	Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.	8,301	0[1]
BLD-2	Require new buildings to be safe, decarbonized, and resilient by 2025.	3,672	14,468
BLD-3	Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.	10,003	60,682
BLD-4	By 2033 decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.	Supportive	Supportive
Transportation System			
TR-1	Decrease dependence on single-occupancy vehicles by incentivizing high-density transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.	Supportive	Supportive
TR-2	Improve the transit system to be more convenient, accessible, and resilient to climate impacts, in order to increase mode share to 10% by 2030 and 15% by 2045.	4,248	7,219
TR-3	Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.	18,819	99,558
TR-4	Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.	263	1,923
TR-5	Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.	Supportive	Supportive
TR-6	Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.	3,150	14,607
Total		**57,677**	**212,086**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Values may not add up to totals due to rounding.

[1] SB 100 (2018) requires the State's electricity sector to achieve 100 percent renewable and zero-carbon electricity by 2045. By that time, the electricity GHG emission factor will be 0 MT CO2e per kilowatt-hour (kWh), resulting in no additional reductions beyond the State-mandated baseline.

Together, the Measures and Actions in the CAAP provide Campbell with the GHG emissions reduction necessary to achieve Campbell's 2030 GHG emissions reduction target (see Table 2). However, the 2045 GHG emissions reductions quantified in this report are not currently enough to meet Campbell's 2045 target of carbon neutrality. Achieving carbon neutrality will require new technologies, new State regulations, and additional Measures and Actions that incorporate lessons learned from implementing this CAAP. Future CAAP updates will account for these emerging technologies and new State regulations and include new Measures and Actions that Campbell will implement to close the remaining gap to achieve carbon neutrality.

Table 2 City of Campbell's GHG Emissions Reductions Pathway

GHG Emission Forecast or Reduction Target	2030 GHG Emissions [MT CO_2e]	2045 GHG Emissions [MT CO_2e]
Projected GHG Emissions (Adjusted Forecast)[1]	205,248	213,285
GHG Emissions Reduction from Measure Implementation	57,677	212,086
GHG Emissions Remaining[2]	147,572	1,199
GHG Emissions Reduction Target Pathway	150,516	0
Remaining GHG Emissions Reduction Gap[3]	-2,945	1,199
Target anticipated to be met?	**Yes**	**No**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Numeric numbers denoted in parentheses represent negative numbers. Values may not add up to totals due to rounding.

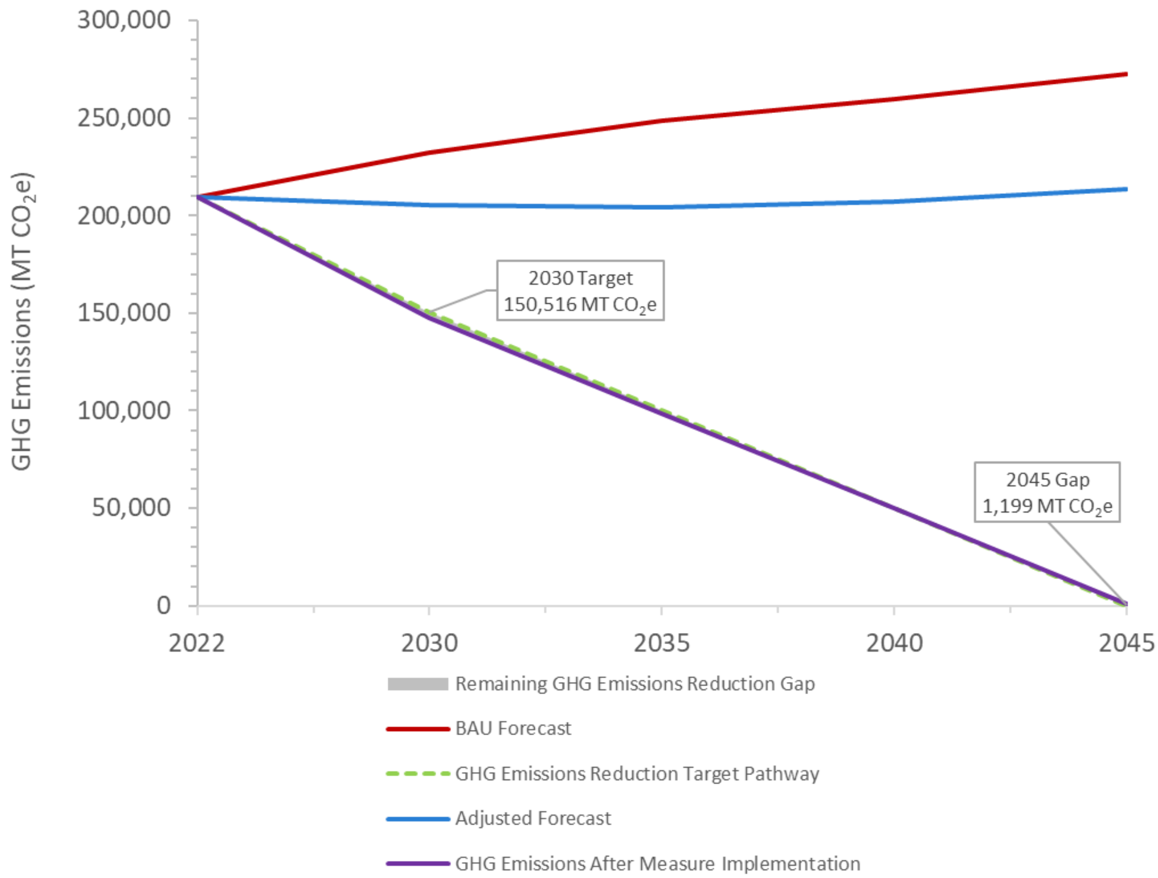
[1] See CAAP, Appendix C: Greenhouse Gas Inventory Analysis Report for more information on the adjusted forecast.

[2] GHG Emissions Remaining reflects the subtraction of GHG Emissions Reduction from Measure Implementation from Projected GHG Emissions.

[3] Remaining GHG Emissions Reduction Gap reflects the difference between GHG Emissions Reduction Target and the GHG Emissions Remaining after measure implementation. Negative values signify that measures achieve GHG reductions beyond the set GHG target.

Figure 1 shows Campbell's GHG emissions reduction targets in relation to Campbell's GHG emissions after implementation of the Measures and Actions included in the CAAP. A complete description of each Measure and the quantitative Actions is included in the remainder of the report.

Figure 1 City of Campbell's GHG Emissions Reduction Pathway



2 Urban Eco-Systems and Sustainable Foods

Measures and Actions within Campbell's Urban Eco-Systems and Sustainable Foods strategy focus on restoring natural systems, improving resource efficiency, and supporting climate-resilient communities while reducing GHG emissions. The strategy supports this vision through nature-based flood mitigation, increased tree canopy, organic waste diversion, water conservation, and the promotion of local and climate-smart food systems. Together, these efforts aim to enhance ecosystem services, improve community health, and reduce the community's vulnerability to climate hazards like extreme heat, flooding, and drought.

Some of the actions in this strategy are primarily designed to strengthen resilience and reduce individual carbon footprints (which have not been quantified), rather than deliver significant communitywide GHG reductions. However, achieving high levels of organic waste diversion, particularly through compliance with SB 1383, will lead to meaningful emissions reductions by preventing the anaerobic decomposition of organic material in landfills, which produces methane (CH_4), a potent greenhouse gas. Similarly, nature-based flood protection and water-efficient landscaping will help the City adapt to more extreme climate conditions while reducing the energy intensity of water use and transportation.

This approach recognizes the dual importance of mitigation and adaptation in Campbell's climate strategy. Based on this framework, the CAAP's Urban Ecosystems and Sustainable Foods strategy consists of the Measures presented in Table 3. The table also indicates which Measures are quantitative and which are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Measures and the role of the supportive Measures.

Table 3 Urban Eco-Systems and Sustainable Foods GHG Emissions Reduction Summary

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
Urban Eco-Systems and Sustainable Foods			
UE-1	Support Valley Water and the County of Santa Clara in the implementation of nature-based solutions along the Los Gatos Creek and San Tomas Aquinas Creek to mitigate flooding and support the riparian ecosystem.	Supportive	Supportive
UE-2	Increase tree canopy to 17.1% from 17.0% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.	30	327
UE-3	Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016), sponsored by Senator Ricardo Lara.	9,191	13,302
UE-4	Reduce per capita water use by 10% by 2030 and 20% by 2045 through enhanced water conservation actions, using the 2022 baseline of 96 gallons per person per day.	Supportive	Supportive
UE-5	Improve water quality and increase climate resilience to climate hazards by upgrading stormwater facilities.	Supportive	Supportive

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
UE-6	Demonstrate municipal leadership by increasing landfill diversion rates, adopting climate-smart food and purchasing practices, and improving water efficiency. These efforts should be part of a comprehensive update to City purchasing policies, which could include standards for recycled content in office supplies (e.g., minimum recycled content in paper products), prioritization of low-carbon vendors, and integration of sustainability criteria into procurement decisions.	Supportive	Supportive
Total		**9,221**	**13,629**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Values may not add up to totals due to rounding.

UE-2: Increase tree canopy from 17.0% to 17.1% by 2030 and 17.4% by 2045, with a focus on communities most vulnerable to extreme heat.

Measure UE-2 aims for Campbell to increase tree canopy from 17.0 percent to 17.1 percent by 2030 and 17.4 percent by 2045. Carbon sequestration quantification and tracking is a developing field, with ongoing efforts to refine methodologies. While carbon sequestration will be vital in achieving both the State's and Campbell's carbon neutrality goals, many communities, including Campbell, are adopting a conservative approach to quantification until more definitive guidance from the State becomes available. AB 1757 requires the California Natural Resources Agency to establish carbon sequestration targets by 2024 and develop tracking methodologies by 2025.[3] Once these targets and methods are finalized, the City will incorporate them into this Measure and its associated Actions, as needed. The primary Actions that enable this Measure include:

- **Action UE-2.1** Prioritize planting 40 trees annually in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment, with the lowest tree equity score, along safe routes to school, and near bus stops. Partner with a community-based organization to host a community planting event to promote community building and the Campell Climate Action and Adaptation Plan;
- **Action UE-2.3** Evaluate and update the "Official Street Tree List" for canopy potential and future climate conditions; and,
- **Action UE-2.4** Pursue and obtain grant funding for tree planting and maintenance. Identify and apply for Federal and State grants annually to meet the tree planting goal identified in Action UE-1.1 (e.g., USDA, California ReLeaf, Affordable Housing and Sustainable Communities Program, Cal Fire's Urban and Community Forestry Program, and the California Natural Resources Agency's Urban Greening Program). Regularly monitor trees for potential risk due to tree branches falling.

These Actions put Campbell on track to meet its target of increasing its tree canopy from 17.0 percent to 17.1 percent by 2030 and 17.4 percent by 2045. Table 4 shows the parameters and data sources that support GHG emissions reductions associated with planting trees, and Table 5 shows the calculations as outlined in Equations 1 through 1.2.

Tree Planting Equations

Equation 1 $CO_2e\ Sequestration = Rate_{trees} * CSF_{Tree} * N_e$

Equation 1.1 $N_e = (Y_n * (Y_n + 1))/2$

Equation 1.2 $Y_n = (Year_T - Year_b)+1$

Table 4 Tree Planting Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 1				
CO_2e Sequestration$_y$	Carbon sequestered from tree plantings	See Table 5	MT CO_2e	Calculated
$Rate_{trees}$	Rate of trees planted per year	See Table 5	trees/year	Measure UE-2 target

[3] CARB. Assembly Bill 1757 (2022). Accessed at: https://ww2.arb.ca.gov/2022-assembly-bill-1757-garcia-cristina-california-global-warming-solutions-act-2006-climate-goal

Variable	Definition	Value	Unit	Data Source
CSF_{Tree}	Carbon sequestration factor for tree seedlings	0.035	MT CO_2e/tree /year	CAPCOA[1]
Equation 1.1				
N_e	Effective number of years carbon is being sequestered[2]	See Table 5	years	Calculated
Equation 1.2				
Y_n	Total number of years in which trees are planted	See Table 5	years	Calculated
$Year_b$	Baseline tree planting year	2025	year	Assume tree planting starts this year
$Year_T$	Target emissions reduction year	See Table 5	year	–

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows; MT CO_2e = metric tons of carbon dioxide.

[1] Default annual CO_2e sequestration per tree per year with a maximum lifespan of 20 years per tree is 0.0354 MT CO_2e/tree/year was obtained from CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. Accessed at: https://www.aqmd.gov/docs/default-source/ceqa/handbook/capcoa-quantifying-greenhouse-gas-mitigation-measures.pdf

[2] The effective number of years of carbon sequestration represents the total cumulative years during which a given number of trees sequester carbon. Since the goal is based on the number of trees planted annually, this metric captures the cumulative sequestration time for each annual planting cohort. This calculation leverages the Gaussian summation principle, which simplifies summing sequences by recognizing patterns or symmetry, enabling efficient calculation of consecutive or structured series.

Table 5 Tree Planting GHG Emissions Reduction Calculations

Variable	Definition	Units	2030	2045
Equation 1.2				
$Year_b$	Baseline tree planting year	year	2025	2025
Y_n	Total number of years in which trees are planted	years	6	21
Equation 1.1				
N_e	Effective number of years carbon is being sequestered	year	21	231
Equation 1				
$Rate_{trees}$	Rate of trees planted per year	tree	40	40
CSF_{tree}	Carbon sequestration factor for tree seedlings	MT CO_2e/tree	0.0354	0.0354
CO_2e Sequestration	**Carbon sequestration from tree plantings**	**MT CO_2e**	**30**	**327**

UE-3: Achieve an 80% diversion of organic material by 2030 and reach 100% diversion by 2045 in compliance with SB 1383 (2016), sponsored by Senator Ricardo Lara.

Measure UE-1 aims for Campbell to exceed SB 1383 requirements to recover 20 percent of disposed edible food for human consumption and reduce landfilled organic waste—and its associated GHG emissions —by 80 percent by 2030, compared to 2014 levels. The primary Actions that enable this Measure include:

- **Action UE-3.1** Continue to participate in the Santa Clara County edible food recovery program which collaborates with all food generators and food recovery organizations across the county. Update the City website to promote the program;
- **Action UE-3.2** Continue to participate in the West Valley Solid Waste Management Authority to develop and distribute educational materials describing options for disposal of construction and demolition debris, home composting, residential organics collection, and source reduction and recycling for schools; and,
- **Action UE-3.3** Continue to implement the City's organics program with equitable and clearly defined enforcement mechanisms and penalties, as required by Article 16 in SB 1383 (2016), sponsored by Senator Ricardo Lara. Maintain records, including an initial compliance report, annual report, and implementation record as required by Articles 3, 14, and 16 of SB 1383 for (1) the organic waste collection program and (2) the edible food recovery program. Additionally, develop an organics procurement tracking program.

These Actions encompass the activities the California Department of Resources Recycling and Recovery (CalRecycle) requires for compliance with SB 1383.[4] Continuing to implement these activities is expected to provide the levels of diversion, composting, and food donations needed to reduce Campbell's landfilled organic waste 80 percent by 2030.[5] This level of landfilled organic waste reduction is expected to directly reduce solid waste disposal GHG emissions 80 percent because nearly all GHG emissions result from the anaerobic decay of organic waste in landfills. Table 6 shows the parameters and data sources that support the GHG emissions reductions associated with organics diversion and Table 7 shows the calculations as outlined in Equation 2.

Landfilled Organic Waste Reduction Equations

Equation 2 $$CO_2e\ Reduction_{LOW,y} = CO_2e\ Emissions_y * Reduction\ Target_{LOW,y}$$

Table 6 Landfilled Organics Reduction Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 2				
$CO_2e\ Reduction_{LOW,y}$	Landfilled organic waste GHG emission reductions	See Table 7	MT CO_2e	Calculated
$CO_2e\ Emissions_y$	Landfilled organic waste GHG emissions	See Table 7	MT CO_2e	Calculated

[4] CalRecycle. SB 1383 Jurisdiction Responsibilities. Accessed at: https://www2.calrecycle.ca.gov/Docs/Web/119160#:~:text=Beginning%20in%202022%2C%20SB%201383,is%20automatically%20provided%20the%20service

[5] According to the Local Governments for Sustainability (ICLEI) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendix E – Solid Waste Emission Activities and Sources, GHG emissions are generated by non-biologic wastes only if they are combusted.

Variable	Definition	Value	Unit	Data Source
Reduction Target $_{LOW,y}$	Landfilled organic waste reduction target	—	—	Goal to exceed compliance with CalRecycle's SB 1383 requirements for solid waste.[1, 2]
Reduction Target $_{LOW,2030}$	—	80%	percentage	
Reduction Target $_{LOW,2045}$	—	100%	percentage	
y	Year	2030 or 2045	–	–

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. MT CO_2e = metric tons of carbon dioxide equivalent.

[1] CalRecycle. SB 1383 Jurisdiction Responsibilities. Accessed at: https://www2.calrecycle.ca.gov/Docs/Web/119160

[2] According to the ICLEI U.S. Community Protocol, Appendix E, GHG emissions are generated by non-biologic wastes only if they are combusted.

Table 7 Landfilled Organics Reduction GHG Emissions Reduction Calculations

Variable	Definition	Units	2030	2045
Equation 2				
CO_2e Emissions$_y$	Landfilled organic waste GHG emissions	MT CO_2e	10,861	12,741
Reduction Target $_{LOW,y}$	Landfilled organic waste reduction target	percentage	80%	100%
CO_2e Reduction$_{LOW,y}$	**Landfilled organic waste GHG emission reductions**	**MT CO_2e**	**8,689**	**12,741**

Measure UE-3 also puts Campbell on a path to meet the City's SB 1383 procurement target. SB 1383 requires each jurisdiction in California to procure recovered organics waste products to meet annual procurement targets developed by CalRecycle.[6] Recovered organic waste products include compost, mulch, renewable energy generated from anaerobic digestion (e.g., transportation fuel, electricity, and gas for heating), and electricity generated from biomass conversion. While a jurisdiction has the option to procure any combination of recovered organic waste products to fulfill 100 percent of its procurement target, Campbell aims to meet their procurement target primarily through the procurement of compost to leverage the carbon sequestration benefits it provides when applied to community lands. The primary Actions that enable this part of the Measure include:

- **Action UE-3.3** (listed above); and,
- **Action UE-3.4** Continue to collaborate with regional partners including Santa Clara County, Solid Waste Joint Power Authority, and Waste Management to provide compost to be applied on agricultural and working lands countywide to meet procurement requirements.

These Actions will allow Campbell to establish the supply, procurement, and application of compost to meet their annual procurement targets and comply with SB 1383. Additionally, partnerships and outreach efforts will help expand compost application areas over time as demand and program participation grow. Table 8 shows the parameters and data sources that support the annual procurement targets and landfill organic waste diversion GHG emissions reductions associated with this Action. Table 9 shows the calculations as outlined in Equation 3 through 3.1.

Compost Procurement Equations

[6] CalRecycle. Procurement Targets and Recovered Organic Waste Products. Accessed at: https://calrecycle.ca.gov/organics/slcp/procurement/recoveredorganicwasteproducts/

Equation 3 $CO_2e\ Sequestration_y = (Compost\ Required_y * CSF_{Compost}) * Compliance\ Target_y$

Equation 3.1 $Compost\ Required_y = Population_y * (Procurement\ Required/Capita * CF_{OW\ to\ Compost})$

Table 8 Compost Procurement Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 3				
$CO2e\ Sequestration_y$	Carbon sequestered from compost procurement and application	See Table 9	MT CO_2e	Calculated
$Compost\ Required_y$	Compost procurement required to meet organic waste procurement target	See Table 9	tons	Calculated
$CSF_{Compost}$	Carbon sequestration factor for mixed organic compost application	0.23	MT CO_2e/ ton	CARB's Method for Estimating Greenhouse Gas Emission Reductions from Diversion Of Organic Waste from Landfills to Compost Facilities[1]
$Compliance\ Target_y$	Compliance target with procurement requirement	100%	percentage	State required compliance[2]
y	Year	2030 or 2045	year	–
Equation 3.1				
$Population_y$	Forecasted population	See Table 9	people	Appendix C: Greenhouse Gas Inventory Analysis Report
Procurement Required/Capita	Organic waste procurement required per capita	0.08	tons/people	CalRecycle, SB 1383 Procurement[2]
$CF_{OW\ to\ Compost}$	Conversion factor to convert organic waste procurement target into compost quantity	0.58	compost tons/organic waste tons	CalRecycle Procurement Calculator Tool[3]

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. MT CO_2e = metric tons of carbon dioxide equivalent.

[1] CARB. Method for Estimating Greenhouse Gas Emission Reductions from Diversion Of Organic Waste from Landfills to Compost Facilities (2017). Accessed at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/waste/cerffinal.pdf.

[2] CalRecycle. Procurement Targets and Recovered Organic Waste Products. Accessed at: https://calrecycle.ca.gov/organics/slcp/procurement/recoveredorganicwasteproducts/

[3] CalRecycle. Procurement Calculator Tool. Accessed at: https://calrecycle.ca.gov/organics/slcp/reporting/

Table 9 Compost Procurement GHG Emissions Reduction Calculations

Variable	Definition	Units	2030	2045
Equation 3.1				
$Population_y$	Forecasted population	people	47,083	52,568
Procurement Required/Capita	Organic waste procurement required per capita	tons/people	0.08	0.08
$CF_{OW\ to\ Compost}$	Conversion factor to convert organic waste procurement target into compost quantity	compost ton/organic waste ton	0.58	0.58

Variable	Definition	Units	2030	2045
Compost Required$_y$	Compost procurement required to meet organic waste procurement target	ton	2,185	2,439
Equation 3				
Compliance Target$_y$	Compliance target with procurement requirement	percentage	100%	100%
CO_2e Sequestration$_y$	**Carbon sequestered from compost procurement and application**	**MT CO_2e**	**502**	**561**

3 Building System

The City of Campbell's Building System focuses on transitioning both new and existing residential, commercial, and municipal buildings to zero-emission, all-electric buildings powered by carbon-free and renewable electricity. This transformation is central to Campbell's climate strategy, as buildings account for a significant share of communitywide GHG emissions. The Building System includes measures to phase out natural gas infrastructure, electrify appliances and HVAC systems, improve energy efficiency, and increase on-site solar and battery storage installations. Partnering with Silicon Valley Clean Energy, the City will support outreach and workforce development to promote community access to technical assistance, rebates, and other resources. The system also includes policies to strengthen climate resilience by requiring cooling in new buildings, retrofitting municipal buildings, and providing critical facilities with battery storage. Through these actions, Campbell aims to eliminate operational emissions from its building stock and enhance occupant comfort and safety in the face of rising temperatures and poor air quality. Based on this approach, the CAAP's Building System consists of the Measures presented in Table 10. The table also indicates which Measures are quantitative and which Measures are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Measures and the role of the supportive Measures.

Table 10 Building System GHG Emissions Reduction Summary

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
Building System			
BLD-1	Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.	8,301	0[1]
BLD-2	Require new buildings to be safe, decarbonized, and resilient by 2025.	3,672	14,468
BLD-3	Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.	10,003	60,682
BLD-4	By 2033 decarbonize and make municipal buildings resilient to climate impacts, in particular extreme heat and poor air quality.	Supportive	Supportive
Total		**21,976**	**75,150**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Values may not add up to totals due to rounding.

[1] SB 100 (2018) requires the State's electricity sector to achieve 100 percent renewable and zero-carbon electricity by 2045. By that time, the electricity GHG emission factor will be 0 MT CO2e per kilowatt-hour (kWh), resulting in no additional reductions beyond the State-mandated baseline.

BLD-1: Partner with Silicon Valley Clean Energy to provide carbon-free and renewable electricity to 100% of the community by 2030.

Measure BLD-1 aims to increase Silicon Valley Clean Energy's (SVCE) share of renewable energy to provide carbon-free and renewable electricity to 100 percent of the community by 2030. The primary Actions that enable this target include:

- **Action BLD-1.1** Partner with Silicon Valley Clean Energy to conduct an annual analysis of direct access electricity users within the City. Contact direct access electricity users and provide information on the benefits of upgrading to GreenStart/GreenPrime with Silicon Valley Clean Energy; and,
- **Action BLD-1.2** Continue partnering with Silicon Valley Clean Energy to conduct educational campaigns, such as tabling at community events or hosting an annual Earth Day event. Establish comprehensive informational resources on the City's website, regularly post on social media, and develop energy bill inserts. These efforts will highlight the benefits of 100 percent carbon-free and renewable energy and promote the available incentives.

In 2022 (i.e., Campbell's GHG inventory year), Silicon Valley Clean Energy (SVCE) provided electricity to 89 percent of the community. Of this, 87 percent received GreenStart and 2 percent received GreenPrime. The remaining electricity was directly provided by Pacific Gas & Electric (PG&E) (two percent) and direct access electricity (nine percent).[7] In order for Campbell to meet its Measure BLD-2 target, it needs to first encourage direct access electricity users to enroll in SVCE's GreenStart or GreenPrime procurement programs (**Action BLD-1.1**); second, encourage PG&E electricity users to opt-up to SVCE; and finally, promoting the continued use of SVCE electricity by existing customers, who's electricity is planned to be carbon free by 2030.[8] **Action BLD-1.2** addresses these last two points, by directing the City to partner with SVCE to conduct educational campaigns, as well as establish informational resources on the City's website and social media, with the goal being to encourage as much of the community as possible to switch to the carbon-free and renewable electricity rate option.

Currently, electricity customers in Campbell are automatically enrolled in SVCE's GreenStart electricity option, which has a near-zero GHG emissions factor. Customers may opt-up to GreenPrime, opt-out to PG&E, or opt-out to procure electricity at wholesale directly from electricity generators (i.e., direct access). In 2022, opt-out rates were relatively low—4.17 percent for residential and 0.05 percent for nonresidential customers. For the purposes of estimating GHG reductions, this Measure assumes that by 2030, 100 percent of electricity customers—including current direct access and PG&E customers—will be served by SVCE's carbon-free and renewable electricity. This includes the assumption that all direct access customers will transition to SVCE by 2030 through targeted outreach and education (**Action BLD-1.1**), and that opt-out rates will fall to zero by 2030. **Action BLD-1.2** supports this transition by promoting communitywide awareness and enrollment in SVCE services through educational campaigns, website resources, energy bill inserts, and social media outreach. These Actions collectively position Campbell to achieve its goal of reaching 100 percent carbon-free and renewable electricity by 2030. Table 11 shows the parameters

[7] These statistics are calculated from Campbell's 2022 community GHG inventory.

[8] GreenPrime has a GHG emissions factor of 0 as of 2023. In 2022 (i.e., Campbell's GHG inventory year), GreenPrime had a GHG emissions factor of 0.00002132 MT CO_2e/kWh, but it is assumed that moving forward, GreenPrime's emissions factor will remain 0.
California Energy Commission (CEC). 2022 Power Content Label. Silicon Valley Clean Energy (SVCE). Available at: https://www.energy.ca.gov/filebrowser/download/6070
CEC. 2023 Power Content Label. SVCE. Available at: https://www.energy.ca.gov/filebrowser/download/7360

and data sources that support these carbon-free GHG emissions reductions, and Table 12 shows the calculations as outlined in Equations 4 through 4.1.

Carbon-Free Electricity Equations

Equation 4 $CO_2e\ Reduction_{Elec,y,i} = Total\ Elec_{y,i} * Carbon\text{-}free\ Percent_{y,i} * (1 - Opt\text{-}Out\ Rate_i) * (EF_{elec,y,i} - EF_{carbon\text{-}free\ elec,y})$

Equation 4.1 $Total\ Elec_{y,i} = (Elec_{y,i} * (1 + L_{T\&D})) + Total\ Elec\ Converted_{y,i}$

Table 11 Carbon-Free Electricity Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 4				
$CO_2e\ Reduction_{Elec,y,i}$	Electricity GHG emission reductions	See Table 12	MT CO_2e	Calculated
$Total\ Elec_{y,i}$	Total electricity consumption	See Table 12	therms	Calculated
$Carbon\text{-}free\ Percent_{y,i}$	Percent of electricity obtained from carbon-free sources	See Table 12	percentage	Measure BLD-1 target
$Opt\text{-}Out\ Rate_i$	Target opt-out rate of carbon-free electricity	See below	–	–
$Opt\text{-}Out\ Rate_{residential}$	Target residential opt-out rate of carbon-free electricity	0%	percentage	Measure BLD-1 target
$Opt\text{-}Out\ Rate_{nonresidential}$	Target nonresidential opt-out rate of carbon-free electricity	0%	percentage	Measure BLD-1 target
$Opt\text{-}Out\ Rate_{direct\ access}$	Target direct access opt-out rate of carbon-free electricity	0%	percentage	Measure BLD-1 target
$EF_{elec,y,i}$	Forecasted electricity emission factor	See Table 12	MT CO_2e/kWh	Appendix C: Greenhouse Gas Inventory Analysis Report
$EF_{carbon\text{-}free\ elec,y}$	Electricity emission factor of carbon-free electricity	0.00	MT CO_2e/kWh	Assume CCA transition to 100% renewable
y	Year	2030 or 2045	year	–
i	Subsector	Residential Nonresidential Direct Access	–	–
Equation 4.1				
$Elec_{y,i}$	Forecasted electricity consumption	See Table 12	kWh	Appendix C: Greenhouse Gas Inventory Analysis Report
$Elec\ Converted_{y,i}$	Electricity usage from conversions, including T&D losses (i.e., building energy and transportation measures)	See Table 12	kWh	Calculated

Variable	Definition	Value	Unit	Data Source
$L_{T\&D}$	Electricity transmission and distribution loss percentage	5.10%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. kWh = kilowatt hour; MT CO_2e = metric tons carbon dioxide equivalent.

Table 12 Carbon-Free Electricity GHG Emissions Reduction Calculations

Variable	Definition	Units	Sector	2030	2045[1]
Equation 4.1					
$Elec_{y,i}$	Forecasted electricity consumption	kWh	Residential	97,932,098	109,336,398
			Nonresidential	103,392,395	120,998,871
			Direct Access	19,919,719	22,406,724
$Elec\ Converted_{y,i}$	Total electricity usage from conversions, including T&D losses	kWh	Residential	39,781,559	222,140,356
			Nonresidential	8,787,092	53,867,012
			Direct Access	0	0
$Total\ Elec_{y,i}$	Total electricity consumption	kWh	Residential	142,708,194	337,052,910
			Nonresidential	117,452,499	181,036,825
			Direct Access	20,935,624	23,549,467
Equation 4					
$Carbon\text{-}free\ Percent_{y,i}$	Percent of electricity obtained from carbon-free sources	percentage	Residential	100%	100%
			Nonresidential	100%	100%
			Direct Access	100%	100%
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000208	0.00
			Nonresidential	0.0000210	0.00
			Direct Access	0.0001371	0.00
$\boldsymbol{CO_2e\ Reduction_{Elec,y,i}}$	**Electricity GHG emission reductions**	**MT CO_2e**	**Residential**	**2,845**	**0**
			Nonresidential	**2,461**	**0**
			Direct Access	**2,870**	**0**

Notes:
[1] SB 100 requires the State's electricity sector to achieve 100% renewable and zero-carbon electricity by 2045. By that time, the electricity emission factor will be 0 $MTCO_2e$/kWh. As estimated emissions reductions are based on reductions applicable in the target year, as opposed to cumulative GHG emissions reductions, this results in no additional reductions in 2045 beyond the State-mandated baseline.

BLD-2: Require new buildings to be safe, decarbonized, and resilient by 2025.

Measure BLD-2 commits the City to electrify new construction in the community starting in 2025. The primary Action that enables this Measure is:

- **Action BLD-2.1** Continue enforcing the Campbell Air Quality Ordinance which prohibits NO_x emissions from appliances in all new buildings and major remodels (with exemptions for some industrial and commercial uses), as defined in the municipal code.

In September 2024, the City of Campbell adopted an Air Quality Ordinance that prohibits NOx emissions from appliances and equipment in all new residential and commercial buildings.[9] **Action BLD-2.1** directs the City to enforce this ordinance. By prohibiting appliances that emit NO_x, the ordinance targets combustion-based systems—which include virtually all natural gas-powered space heaters, water heaters, stoves, and dryers. So, while the ordinance does not ban natural gas outright, the only way to comply is to use electric appliances, as they do not emit NO_x. Limited exemptions are provided for specific uses, permitting some new construction to be built with natural gas. These exceptions are expected to be minimal because of the cost effectiveness of new building electrification and the available incentives in the region that will help continue the natural growth in electric space and water heater installations seen in California over the past decade.

Thus, the GHG emissions reduction from this Measure are based on the forecasted residential and nonresidential building growth and assumes that all new buildings constructed beginning in 2025 will be all-electric or otherwise decarbonized. This estimate assumes full compliance with requirements for all-electric HVAC and water heating systems.

9 City of Campbell. 2024. Ordinance No. 2316. Available at: https://www.campbellca.gov/DocumentCenter/View/23889/ORDINANCE-NO-2316---ZERO-NOX-STANDARDS

Table 13 shows the parameters and data sources that support these electrification ordinance GHG emissions reductions, and Table 14 shows the calculations as outlined in Equations 5 through 5.3.

All-electric New Construction Equations

Equation 5	$CO_2e\ Reduction_{NG,y,i}=(Fuel\ Avoided_{NG,y,i}*EF_{NG})+(Fuel\ Avoided_{NGL,y,i}*EF_{NGL})-(Elec\ Converted_{y,i}*EF_{elec,y,i})$
Equation 5.1	$Fuel\ Avoided_{NG,y,i}=Fuel_{NG,y,i}-Fuel_{NG,imp.yi}$
Equation 5.2	$Fuel\ Avoided_{NGL,y,i}=(Fuel\ Avoided_{NG,y,i}*(1+L_{End\text{-}use\ NGL}))*(L_{Pipeline\ NGL}+L_{End\text{-}use\ NGL})$
Equation 5.3	$Elec_{convert,y,i} = Fuel\ _{AvoidedNG,y,i}*CF_{elec}/Eff_{elec}*(1+L_{T\&D})$

Table 13 All-electric New Construction Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 5				
$CO2e\ Reduction_{NG,y,i}$	Natural gas GHG emission reductions	See Table 14	MT CO_2e	Calculated
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	See Table 14	therms	Calculated
EF_{NG}	Natural gas emission factor	0.005311	MT CO_2e/therm	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel\ Avoided_{NGL,y,i}$	Natural gas leakage avoided	See Table 14	therms	Calculated
EF_{NGL}	Natural gas leakage emission factor	0.053067	MT CO_2e/therm	Appendix C: Greenhouse Gas Inventory Analysis Report
$Elec\ Converted_{y,i}$	Electricity usage from conversion	See Table 14	kWh	Calculated
$Ef_{elec,y,i}$	Forecasted electricity emission factor	See Table 14	MT CO_2e/kWh	Appendix C: Greenhouse Gas Inventory Analysis Report
Y	Year	2030 or 2045	year	–
I	Subsector	Residential or Nonresidential	–	–
Equation 5.1				
$Fuel_{NGy,i}$	Forecasted natural gas consumption	See Table 14	therms	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel_{NG,imp.y}$	Forecasted natural gas in implementation year	See Table 14	therms	Calculated
imp.yi	Ordinance implementation year	See Table 14	year	BLD-2 target
Equation 5.2				
$L_{Pipeline\ NGL}$	Natural gas pipeline leakage percentage	2.3%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report
$L_{End\text{-}use\ NGL}$	Natural gas end-use leakage percentage	0.5%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 5.3				
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions[1]
Eff_{elec}	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	Leonardo Energy[2] and European Copper Institute[3]

Variable	Definition	Value	Unit	Data Source
$L_{T\&D}$	Electricity transmission and distribution loss percentage	5.10%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. kWh = kilowatt hour; MT CO_2e = metric tons carbon dioxide equivalent.

[1] Metric Conversions. Therms (US) to Kilowatt-hours. Available at: https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm

[2] Leonardo Energy - Knowledge Base. 2023. How efficient is a heat pump? Available at: https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump

[3] European Copper Institute. 2018. Heat Pumps: Integrating technologies to decarbonize heating and cooling. Accessed at: https://www.ehpa.org/wp-content/uploads/2022/10/White_Paper_Heat_pumps-1.pdf

Table 14 All-electric New Construction GHG Emissions Reduction Calculations

Variable	Definition	Units	Sector	2030	2045
Equation 5.1					
$Fuel_{NG,y,i}$	Forecasted natural gas consumption	therms	Residential	6,369,760	7,402,322
			Nonresidential	3,104,113	3,641,459
imp.y	Ordinance implementation year	year	Residential	2025	2025
			Nonresidential	2025	2025
$Fuel_{NG,imp,i}$	Forecasted natural gas in implementation year	therms	Residential	6,003,868	6,003,868
			Nonresidential	2,913,703	2,913,703
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	therms	Residential	365,893	1,398,455
			Nonresidential	190,411	727,756
Equation 5.2					
$Fuel\ Avoided_{NGL,y,i}$	Natural gas leakage avoided	therms	Residential	10,296	39,353
			Nonresidential	5,358	20,479
Equation 5.3					
$Elec\ Convert_{y,i}$	Electricity usage from conversion	kWh	Residential	3,573,551	13,658,241
			Nonresidential	1,859,677	7,107,753
Equation 5					
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000208	0.000000
			Nonresidential	0.0000210	0.000000
$\boldsymbol{CO_2e\ Reduction_{NG,y,i}}$	**Natural gas GHG emission reductions**	**MT CO_2e**	**Residential**	**2,415**	**9,516**
			Nonresidential	**1,257**	**4,952**

BLD-3: Retrofit existing residential buildings to reduce natural gas usage by 18% and non-residential buildings to reduce natural gas usage by 15% by 2030. Retrofit all existing buildings to be zero-carbon and resilient to extreme heat and poor air quality by 2045.

Measure BLD-3 puts Campbell on a path to reduce residential and commercial natural gas consumption by 18 percent and 15 percent, respectively, by 2030, to reduce GHG emissions through mandatory Actions. The primary Actions that enable this level of adoption include:

- **Action BLD-3.4** Partner with community-based organizations to launch an education and outreach campaign to help people in Campbell prepare for, and understand the benefits of, the Bay Area Air District (Air District) zero-NOx threshold which phases out natural gas appliances over time, beginning with water heaters in 2027;
- **Action BLD-3.5** Implement streamlined permitting processes for electrification projects (e.g., installing electric heat pumps, solar panels, battery storage, heat pump HVAC systems), such as offering instant online permitting and bundling similar permit types to reduce costs. This will simplify the application process, making it faster and more affordable for individuals and businesses to adopt sustainable energy solutions; and,
- **Action BLD-3.7** Amend the municipal code to require all newly installed HVAC units for existing buildings to have two-way air conditioning unit capabilities to provide heating and cooling.

Action BLD-3.7 directs the City to amend the municipal code to require all newly installed HVAC units for existing buildings to have two-way air conditioning unit capabilities to provide heating and cooling. Because heat pumps are the only technology that provide two-way heating and cooling, requiring all central air conditioning replacements to be two-way makes heat pump adoption the most likely option. In buildings that currently have both a central air conditioning unit and a natural gas furnace, replacing the air conditioning unit with a heat pump eliminates the need for the gas furnace, directly reducing natural gas consumption from the furnace. This action is expected to reduce GHG emissions by 6 percent by 2030 based on the expected lifespan of furnaces.[10] The success of the Measure is strengthened by SVCE encouraging this type of ordinance as a solution for existing building electrification.[11] SVCE offers rebates to upgrade gas equipment to electric options for both residential and commercial buildings, incentivizing the switch to electric.[12,13]

This amendment to the municipal code will be made successful with the support of **Action BLD-3.4**, which educates residents on the Air District's zero-NOx rules. Campbell is under the Air District's jurisdiction and will be affected by the amendments adopted for the Air District's Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters and Rule 9- 4: Nitrogen Oxides from Natural Gas-Fired Furnaces. These amendments, referred to herein as 'zero-NOx rules,' govern point of sale emission standards for water heating systems starting January 1, 2027, and furnaces starting January 1, 2029. The updated rule applies to small water heaters first, which most homes

[10] Calculated based on appliance prevalence, appliance lifespan, and the Restock/Comstock model. Detailed calculations can be found in the Campbel Reach Code Tool.

[11] Bay Area Reach Codes. Existing Buildings. Accessed at: https://bayareareachcodes.org/model-reach-codes/#:~:text=AC%20to%20Heat%20Pump,of%20designated%20energy%20efficiency%20measures.

[12] Silicon Valley Clean Energy (SCVE). Incentives Finder. Available at: https://ehub.svcleanenergy.org/incentives

[13] SCVE. Business & Contractors Resources. Available at: https://ehub.svcleanenergy.org/business

employ.[14] The only technologies currently available that meet the amended rule are electric-based water heating systems and furnaces. Although there are a range of electric alternatives (e.g., electric resistance space heating), heat pumps are the most cost-effective option on the market due to their significantly higher efficiency (300 to 400 percent) and resulting lower operating costs. The City will support this rule with education on the requirements and what technologies (i.e., heat pumps) meet the requirements (**Action BLD-3.4**). This action if fully implemented by the air district is expected to reduce natural gas use in Campbell by an estimated 5 percent.[11]

The effectiveness of this Measure is further strengthened by streamlined permitting processes through **Action BLD-3.5**. Streamlining the process for installing electric heat pumps, solar panels, battery storage, and heat pump HVAC systems will encourage the community to go through the permitting process, ensuring compliance with the amended municipal code. This addresses a common challenge faced by jurisdictions—unpermitted HVAC replacements. Studies show that typically only eight to 30 percent of HVAC installations are permitted, limiting the enforceability of ordinances.[15] However, by streamlining the process, Campbell can expect higher levels of compliance. This effort is enhanced by other supportive measures in the CAAP to achieve the additional required 7% of natural gas reduction through voluntary adoption of electric appliances including water heaters and furnaces ahead of the BAAD Zero-NOx rules as well as stoves and dryers. This is supported by strong market performance of heat pumps versus natural gas equipment both in California and nationally.[16]

Together, these Actions will help contribute to Campbell's goal of reducing residential natural gas consumption by 18 percent and commercial natural gas consumption by 15 percent by 2030 through electrify-on-replacement amendments. The GHG reductions associated with this Measure are quantified based on the assumption that the combined implementation of **Actions BLD-3.4**, **BLD-3.5**, and **BLD-3.7** will effectively support achieving these levels of natural gas consumption reduction. Table 15 shows the parameters and data sources that support this Measure's GHG emissions reductions, and Table 16 shows the calculations as outlined in Equations 6 through 6.3.

Existing Building Electrification Ordinance Equations

Equation 6 $CO_2e\ Reduction_{NG,y,i}=(Fuel\ Avoided_{NG,y,i}*EF_{NG})+(Fuel\ Avoided_{NGL,y,i}*EF_{NGL})-(Elec\ Converted_{y,i}*EF_{elec,y,i})$

Equation 6.1 $Fuel\ Avoided_{NG,y,i}=Fuel_{NG,y,i}*Reduction_{NG,y,i}$

Equation 6.2 $Fuel\ Avoided_{NGL,y,i}=(Fuel\ Avoided_{NG,y,i}*(1+L_{End\text{-}use\ NGL}))*(L_{Pipeline\ NGL}+L_{End\text{-}use\ NGL})$

Equation 6.3 $Elec_{convert,y,i} = Fuel_{\ AvoidedNG,y,i}*CF_{elec}/Eff_{elec}*(1+L_{T\&D})$

Table 15 Existing Building Electrification Ordinance Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 6				

[14] Rule 9-6 affects the future sale of NOx emitting water heaters and boilers with a rated heat capacity of 75,000 British thermal units per hour or less. This threshold equates to an upper limit of NOx emitting water heaters with a 75-gallon tank capacity. Water heaters of these size are typically found in single-family homes, duplexes, and low-rise multi-family homes. Higher capacity water heaters will be regulated starting January 1, 2031.

[15] California Public Utilities Commission (CPUC). Final Report: 2014-16 HVAC Permit and Code Compliance Market Assessment (Work Order 6) Volume I – Report (2017). Accessed at: http://www.calmac.org/publications/HVAC_WO6_FINAL_REPORT_VolumeI_22Sept2017.pdf

[16] https://rmi.org/insight/tracking-the-heat-pump-water-heater-market-in-the-united-states/ https://rmi.org/insight/tracking-the-heat-pump-water-heater-market-in-the-united-states/

Variable	Definition	Value	Unit	Data Source
$CO2e\ Reduction_{NG,y,i}$	Natural gas GHG emission reductions	See Table 16	MT CO_2e	Calculated
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	See Table 16	therms	Calculated
EF_{NG}	Natural gas emission factor	0.005311	MT CO_2e/therm	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel\ Avoided_{NGL,y,i}$	Natural gas leakage avoided	See Table 16	therms	Calculated
EF_{NGL}	Natural gas leakage emission factor	0.053067	MT CO_2e/therm	Appendix C: Greenhouse Gas Inventory Analysis Report
$Elec\ Converted_{y,i}$	Electricity usage from conversion	See Table 16	kWh	Calculated
$Ef_{elec,y,i}$	Forecasted electricity emission factor	See Table 16	MT CO_2e/kWh	Appendix C: Greenhouse Gas Inventory Analysis Report
Y	Year	2030 or 2045	year	–
I	Subsector	Residential or Nonresidential	–	–
Equation 6.1				
$Fuel_{NGy,i}$	Forecasted natural gas consumption	See Table 16	therms	Appendix C: Greenhouse Gas Inventory Analysis Report
$Reduction_{NG,y,i}$	Natural gas reduction percent	See Table 16	percentage	BAAD Zero NOx AC-Heat Pump Voluntary Adoption
Equation 6.2				
$L_{Pipeline\ NGL}$	Natural gas pipeline leakage percentage	2.3%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report
$L_{End\text{-}use\ NGL}$	Natural gas end-use leakage percentage	0.5%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 6.3				
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions[1]
Eff_{elec}	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	Leonardo Energy[2] and European Copper Institute[3]
$L_{T\&D}$	Electricity transmission and distribution loss percentage	5.10%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. kWh = kilowatt hour; MT CO_2e = metric tons carbon dioxide equivalent.

Variable	Definition	Value	Unit	Data Source

[1] Metric Conversions. Therms (US) to Kilowatt-hours. Available at: https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm

[2] Leonardo Energy - Knowledge Base. 2023. How efficient is a heat pump? Available at: https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump

[3] European Copper Institute. 2018. Heat Pumps: Integrating technologies to decarbonize heating and cooling. Accessed at: https://www.ehpa.org/wp-content/uploads/2022/10/White_Paper_Heat_pumps-1.pdf

Table 16 Existing Building Electrification Ordinance GHG Emissions Reduction Calculations

Variable	Definition	Units	Sector	2030	2045
Equation 6.1					
$Fuel_{NG,y,i}$	Forecasted natural gas consumption after new building electrification	therms	Residential	6,003,868	6,003,868
			Nonresidential	2,913,703	2,913,703
$Reduction_{NG,y,i}$	Natural gas reduction percent	percentage	Residential	18%	100%
			Nonresidential	15%	100%
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	therms	Residential	1,080,696	6,003,868
			Nonresidential	437,055	2,913,703
Equation 6.2					
$Fuel\ Avoided_{NGL,y,i}$	Natural gas leakage avoided	therms	Residential	30,411	168,949
			Nonresidential	12,299	81,992
Equation 6.3					
$Elec\ Convert_{y,i}$	Electricity usage from conversion	kWh	Residential	11,093,094	61,628,300
			Nonresidential	4,486,272	29,908,479
Equation 6					
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000208	0.0000000
			Nonresidential	0.0000210	0.0000000
$CO_2e\ Reduction_{NG,y,i}$	**Natural gas GHG emission reductions**	**MT CO_2e**	**Residential**	**7,123**	**40,855**
			Nonresidential	**2,880**	**19,827**

4 Transportation System

The City of Campbell's Transportation System Measures and Actions aim to reduce GHG emissions by lowering vehicle miles traveled (VMT), increasing use of public and active transportation, and accelerating the transition to zero-emission vehicles (ZEVs). Campbell will reduce VMT by encouraging transit-oriented, mixed-use development and redesigning the built environment to be more walkable and bikeable. Measures include removing parking minimums, converting vehicle-oriented spaces into pedestrian infrastructure, implementing protected bike lanes, and enhancing safety and connectivity through traffic calming and mobility hubs. Public transit use will be supported through improvements to bus and rail accessibility, electric shuttle service, and community education. The City will also boost EV adoption by streamlining permitting, requiring EV infrastructure in new development, installing public chargers, and conducting outreach in priority communities. Campbell's municipal fleet will transition to ZEVs through strategic planning and investment in charging infrastructure and clean fuel technologies. Finally, off-road equipment will be decarbonized through local ordinances, education, and incentives. Table 17 summarizes the Transportation System Measures, including which are quantitative and which are supportive. The following subsections describe the calculation methodologies for quantitative Measures and the roles of supportive Measures.

Table 17 Transportation System GHG Emissions Reduction Summary

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
Transportation System			
TR-1	Decrease dependence on single-occupancy vehicles by incentivizing high-density transit-oriented development, increasing zoning diversity, and promoting vibrant pedestrian-friendly zones. Collaboration with the business community, ensuring that changes support local economic vitality and reflect shared goals for accessibility, mobility, and livability.	Supportive	Supportive
TR-2	Improve the transit system to be more convenient, accessible, and resilient to climate impacts, in order to increase mode share to 10% by 2030 and 15% by 2045.	4,248	7,219
TR-3	Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.	18,819	99,558
TR-4	Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.	263	1,923
TR-5	Transition to 15% zero-emission municipal fleet by 2030 and 100% by 2040, consistent with the Fleet Electrification Plan.	Supportive	Supportive

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential [MT CO_2e]	2045 GHG Emissions Reduction Potential [MT CO_2e]
TR-6	Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.	3,150	14,607
Total		**26,480**	**123,306**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent. Values may not add up to totals due to rounding.

TR-2: Improve the transit system to be more convenient, accessible, and resilient to climate impacts, in order to increase mode share to 10% by 2030 and 15% by 2045.

Measure TR-2 aims to increase Campbell's transit mode share to 10 percent by 2030 and to 15 percent by 2045. The primary Actions that enable this Measure include:

- **Action TR-2.2** Coordinate with Santa Clara Valley Transportation Authority to identify opportunities to improve transit options (e.g., new stops, shade features at existing stops) in Campbell, particularly in climate vulnerable areas, as defined in Campbell's Climate Change Vulnerability Assessment;
- **Action TR-2.4** Identify funding and partnership opportunities (such as public private partnerships, Santa Clara Valley Transportation Authority, and grant funding) to offer an electric shuttle to various high-traffic locations, including the Valley Transportation Authority Downtown Campbell Station (Green Line), for individuals traveling within Campbell and those traveling out of Campbell;
- **Action TR-2.5** Secure grant funding to add a mobility hub, or location with docked e-bikes, and end of use facilities, near the Valley Transportation Authority Downtown Campbell Station for first and last mile commute to the Green Line going to San Jose. This will provide convenient and sustainable transportation options, making it easier for people to use public transportation and reduce reliance on single occupancy vehicles; and,
- **Action TR-2.6** As part of the City of Campbell Multimodal Transportation Plan, consider planning, securing funding for, and building protected bicycle lanes within two miles of light rail stations.

In 2022 (i.e., Campbell's inventory year), Campbell's public transit mode share was 1.7 percent.[17] However, other cities in the Bay area exhibit higher public transit mode shares. In 2022, the City of Berkeley had a public transit mode share of 17.6 percent, and the City of San Francisco had one of about 24 percent.[18] However, these are both standout transit cities. On average 7 percent of commuters took transit in 2023 across the bay area, meaning Campbell's goal is within reach.[19] Key strategies employed by cities looking to increase public transportation mode share include significant expansions of public transportation service lines, designated streets or lanes for bus lines to decrease headways, implementation of taxes to support transit, and reduced parking availability. Studies have shown that expanding transit coverage through service routes and schedules can increase public transit mode share in a city. Specifically, studies which incorporated factors such as elasticity of transit demand and average mode shift factors have estimated that doubling transit coverage in a city can reduce VMT—and associated GHG emissions—up to 4.6 percent.[20] Furthermore, increasing transit service frequency can reduce VMT, and associated GHG emissions,

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[17] U.S. Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table/ACSST5Y2022.S0801?q=Campbell+city,+California&t=Commuting

[18] U.S. Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?q=Campbell+city,+California&t=Commuting&g=160XX00US0606000,0667000

[19] https://vitalsigns.mtc.ca.gov/indicators/commute-mode-choice

[20] California Air Pollution Control Officers Association (CAPCOA). Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021). Measure T-25. Accessed at: https://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf

up to 11.3 percent.[21] With the focus of **Action TR-2.2** and **Action TR-2.4** on creating a more connected, reliable and frequent network of transit, it is reasonable to estimate that Campbell can expect a 4.5 percent reduction in passenger VMT in the City which would result from a 8.3 percent increase in public transit mode share. This mode shift is further supported by **Action TR-2.5** and **Action TR-2.6** which plan to close the first-last mile gap by building protected bicycle lanes within two miles of light rail stations and adding a mobility hub, e-bike docking stations and end of use facilities near the Valley Transportation Authority Downtown Campbell Station for first and last mile commute to the Green Line going to San Jose. This will provide convenient and sustainable transportation options, making it easier for community members to use public transportation and reduce reliance on single occupancy vehicles.

Together, these Actions put Campbell on the right path to achieve a public transit mode share of 10 percent by 2030 and 15 percent by 2045. For the purpose of estimating GHG reductions, these percentages are made under the conservative assumption that the VMT reduction from public transit actions would occur after the active transportation actions (Measure TR-4) with diminishing returns rather than have an aggregated effect on total VMT. GHG reductions are also estimated assuming that the additional mode shift to public transit will be serviced by a decarbonized or low-emission transit fleet. Table 18 shows the parameters and data sources that support the GHG emissions reductions associated with reducing vehicle miles traveled through public transit mode shifts, and Table 19 shows the calculations as outlined in Equations 7 through 7.4.

Public Transit Mode Share Equations

Equation 7	$CO_2e\ Reduction = VMT\ Avoided_{Passenger} * EF_{VMT,\ Passenger}$
Equation 7.1	$VMT\ Avoided_{Passenger}$ = *New Public Transit Trips * Public Transit Trip Length*
Equation 7.2	*New Public Transit Trips = Passenger Trips * Public Transit Mode Share Increase*
Equation 7.3	*Passenger Trips =* $Adjusted\ VMT_{Passenger}$ ** PTPM*
Equation 7.4	*Public Transit Mode Share Increase = Public Transit Mode Share Target - Existing Public Transit Mode Share*

Table 18 Public Transit Mode Share Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 7				
CO_2e Reduction	Passenger ICE GHG Emission Reductions	See Table 19	MT CO_2e	Calculated
$VMT\ Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Public Transit Trips	See Table 19	VMT	Calculated
$EF_{VMT,\ Passenger}$	PVMT emission factor	See Table 19	MT CO_2e/VMT	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 7.1				

[21] California Air Pollution Control Officers Association (CAPCOA). Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021). Measure T-26. Accessed at: https://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf

Variable	Definition	Value	Unit	Data Source
New Public Transit Trips	New Public Transit Trips Substituted for Vehicle Trips	See Table 19	trips	Calculated
Public Transit Trip Length	Average Public Transit Trip Length	3.80	miles	Used regular bus trip to remain conservative from American Public Transportation Association's Public Transportation Fact Book[1]
Equation 7.2				
Passenger Trips	Forecasted Passenger Trips	See Table 19	trips	Calculated
Public Transit Mode Share Increase	Public Transit Mode Share Increase from Baseline	See Table 19	%	Calculated
Equation 7.3				
Adjusted $VMT_{Passenger}$	Forecasted passenger VMT adjusted for VMT reductions from active transportation improvement	See Table 19	miles	Calculated
PTPM	Average Passenger Trips per Mile	See Table 19	passenger trips/mile	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 7.4				
Public Transit Mode Share Target	Public Transit Mode Share Target	See Table 19	%	TR-2 target
Existing Public Transit Mode Share	Existing Public Transit Mode Share	1.70%	%	US Census[2]

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. PVMT = passenger vehicle miles traveled; VMT = vehicle miles traveled; ICE = internal combustion engine; MT CO_2e = metric tons carbon dioxide equivalent.

[1] American Public Transportation Association. Public Transportation Fact Book (2022). Accessed at: https://www.apta.com/wp-content/uploads/APTA-2022-Public-Transportation-Fact-Book.pdf

[2] U.S. Census Bureau. 2022. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table/ACSST5Y2022.S0801?q=Campbell+city,+California&t=Commuting

Table 19 Public Transit Mode Share GHG Emissions Reduction Calculations

Variable	Definition	Units	VMT Type	2030	2045
Equation 7.1					
New Public Transit Trips	New Public Transit Trips Substituted for Vehicle Trips	Trips	Passenger	4,198,572	8,040,964
Public Transit Trip Length	Average Public Transit Trip Length	Miles	Passenger	3.8	3.8
VMT $Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Public Transit Trips	VMT	Passenger	15,954,573	30,555,664
Equation 7.2					

Variable	Definition	Units	VMT Type	2030	2045
Passenger Trips	Forecasted passenger trips	Trips	Passenger	50,585,204	60,458,378
Public Transit Mode Share Increase	Public Transit Mode Share Increase from Baseline	%	Passenger	8.30%	13.30%
New Public Transit Trips	New Public Transit Trips Substituted for Vehicle Trips	Trips	Passenger	4,198,572	8,040,964
Equation 7.3					
Adjusted $VMT_{Passenger}$	Forecasted passenger VMT adjusted for VMT reductions from active transportation improvement	VMT	Passenger	354,165,683	408,495,336
PTPM	Average Passenger Trips per Mile	PTMP	Passenger	0.142829	0.148003
Passenger Trips	Forecasted passenger trips	Trips	Passenger	50,585,204	60,458,378
Equation 7.4					
Public Transit Mode Share Target	Public Transit Mode Share Target	%	Passenger	10%	15%
Existing Public Transit Mode Share	Existing Public Transit Mode Share	%	Passenger	1.70%	1.70%
Public Transit Mode Share Increase	Public Transit Mode Share Increase from Baseline	%	Passenger	8.30%	13.30%
Equation 7					
VMT $Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Public Transit Trips	VMT	Passenger	15,954,573	30,555,664
$EF_{VMT,\ Passenger}$	PVMT emission factor	MT CO_2e/VMT	Passenger	0.000266	0.000236
CO2e Reduction	**Passenger Internal Combustion Engine (ICE) GHG Emission Reductions**	**MT CO_2e**	**Passenger**	**4,248**	**7,219**

TR-3: Boost the adoption of zero-emission passenger vehicles to 28% by 2030 and 100% by 2045 and commercial vehicles to 25% by 2030 and 100% by 2045.

Measure TR-3 aims to increase passenger and commercial zero-emission vehicle (ZEV) adoption in Campbell to 28 percent and 25 percent by 2030, respectively, and 100 percent by 2045. The state has established a goal of putting 5 million ZEVs on the road by 2030 and, according to executive order N-79-20, 100 percent of passenger vehicle sales are to be zero emission by 2035. This new executive order puts the total number of ZEVs on the road by 2035 at approximately 15 million.[22] Based on the current number of vehicles registered in California and a 2 percent growth rate per year, 15 million ZEVs accounts for 35 percent of total passenger vehicles in 2035. Currently, the State is anticipated to reach 26 percent ZEV adoption across all vehicles by 2030.[23,24] In recognition of the pressing need to decarbonize the transportation sector, Measure TR-3 sets a goal of 28 percent passenger ZEV adoption and 25 percent commercial ZEV adoption by 2030 and 100 percent by 2045 through ample public and private investments in electric vehicle charging infrastructure. The primary Actions that are designed to drive these investments and enable this Measure include:

- **Action TR-3.1** Maintain building and site development standards for new commercial and multi-family residential construction, as well as for major renovations to parking areas (including when parking spaces, electrical systems, or lighting systems are added or altered) that meet the most recent CALGreen Tier 2 requirements for electric vehicle charging infrastructure;
- **Action TR-3.2** Adopt an ordinance that creates an expedited, streamlined permitting process (e.g., electronic submissions, permitting checklist, and administrative approval) for electric vehicle charging stations in alignment with California Government Code Section 65850.7 (as amended by AB 1236 in 2015), and develop a permitting checklist with permitting requirements and guidance for applicants. Score a "green rating" on the CA Electric Vehicle Charging Station Permit Streamlining Map by 2027;
- **Action TR-3.4** After identifying locations for publicly accessible chargers (action TR-3.3), leverage public-private partnerships and secure grants to install 224 chargers by 2030;
- **Action TR-3.6** Update zoning codes to reflect state law requirements for streamlined permitting of electric vehicle charging stations as an accessory use. Allow electric vehicle charging stations as permitted accessory use in all zones and establish an administrative use permit process for standalone electric vehicle charging stations, where feasible; and,
- **Action TR-3.7** Maintain streamlined permitting practices for electric vehicle charging stations by continuing to allow installations with only an electrical permit, without requiring planning review or setbacks. Preserve the existing expedited process and support the use of online permitting tools, to provide clarity and consistency for applicants.

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[22] Susan Carpenter. Spectrum News 1. October 2020. What it will take to get 100% EV sales in California. Accessed at: https://spectrumnews1.com/ca/la-west/transportation/2020/10/05/what-it-will-take-to-sell-100--evs-in-california

[23] Crisostomo, Noel et al. Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment: Analyzing Charging Needs to Support Zero-Emission Vehicles in 2030. Accessed at: https://calmatters.org/environment/2023/03/california-electric-cars-demographics/?utm_id=91724&sfmc_id=4863450

[24] Based on the zero-emission vehicle goals for passenger vehicles established by Executive Order N-79-20, eight million zero-emission vehicles are anticipated statewide by 2030. Campbell calculated that these eight million zero-emission vehicles represent 26 percent of the total passenger vehicles expected statewide by 2030 (based on statewide passenger car and light-duty truck counts in 2016 and population estimates for 2016 and 2030).

These Actions enable zero-emission vehicle adoption because studies have consistently found that limited charging infrastructure is one of the primary barriers to electric vehicle adoption.[25,26] Publicly accessible electric vehicles chargers make owning an electric vehicle convenient for all drivers — including those who cannot charge at home or drive daily distances longer than their electric vehicle battery range. To this point, it is expected that 20 percent of electric vehicle charging nationally will occur at publicly accessible chargers in 2030.[27] Estimation of EV infrastructure necessary to meet this Measure's goal is based on the U.S. Department of Energy's Electric Vehicle Infrastructure Projection Tool outputs for the San Jose-Sunnyvale-Santa Clara Metropolitan Area.[28] The tool is used to calculate the number of publicly accessible EV chargers needed in Campbell to support a 28 percent ZEV adoption in 2030. The quantification assumes all ZEVs will be EVs to remain conservative in the plan for EV chargers.[29] Table 20 shows the parameters and data sources used to calculate the publicly accessible EV chargers needed in 2030 and 2045 with the Department of Energy's Electric Vehicle Infrastructure Projection Tool and Table 21 shows the calculations as outlined in Equations 8 through 8.1.

Publicly Accessible Electric Vehicle Chargers Equations

Equation 8 $\quad CO_2e\ Reduction = VMT\ Avoided_{Passenger} * EF_{VMT,\ Passenger}$

Equation 8.1 $\quad VMT\ Avoided_{Passenger} = New\ Public\ Transit\ Trips * Public\ Transit\ Trip\ Length$

Table 20 Publicly Accessible Electric Vehicle Charger Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 8				
PEV Chargers$_y$	New publicly accessible electric vehicle chargers needed	See Table 21	chargers	Calculated
EVs$_y$	Electric vehicles targeted	See Table 21	electric vehicles	Calculated
PEV Charger Factor	Electric vehicles per publicly accessible electric vehicle charger	34	electric vehicles per charger	Estimated based on current city vehicle population and projected public EV charging infrastructure needed (1,002 Lvl 2, 62 DC)[1]
Existing PEV Chargers$_{by}$	Existing publicly accessible electric vehicle chargers	106	chargers	PlugShare[2]
Y	Year	2030 or 2045	year	–
By	Baseline year	2022	year	–

[25] Kumar, Rajeev Ranjan and Kumar Alok. Adoption of Electric Vehicle: A Literature Review and Prospects for Sustainability (2020). Accessed at: https://www.sciencedirect.com/science/article/abs/pii/S095965261934781X

[26] Winjobi, Olumide and Kelly, Jarod. Used Plug-in Electric Vehicles as a Means of Transportation Equity in Low-Income Households (2021). Accessed at: https://www.osti.gov/biblio/1658592

[27] Kampshoff, Philipp et al. Building the Electric-Vehicle Charging Infrastructure America Needs (2022). Accessed at: https://www.mckinsey.com/industries/public-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs

[28] U.S. Department of Energy. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite. Accessed at: https://afdc.energy.gov/evi-x-toolbox#/evi-pro-ports?region_type=cbsa&charging-state=CA&cbsa-id=41940&vehicles=36192

[29] Zero-emission vehicles (ZEVs) can include electric vehicles (EVs), hydrogen fuel cell vehicles, and others. To be conservative, the quantification assumes all ZEVs will be EVs.

Variable	Definition	Value	Unit	Data Source
Equation 8.1				
Population$_y$	Forecasted population	See Table 21	people	Appendix C: Greenhouse Gas Inventory Analysis Report
Vehicles$_{by}$	Vehicles in baseline year	36,192	vehicles	Estimated based on light duty vehicle populations in zip code 95008[3]
Population$_{by}$	Population in baseline year	42,462	people	Appendix C: Greenhouse Gas Inventory Analysis Report
EV Target$_{Pass,y}$	Electric vehicle adoption target	See Table 21	percentage	Measure TR-3 passenger zero-emission vehicle adoption target

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows.

[1] U.S. Department of Energy. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite.

[2] PlugShare. EV Charging in Campbell, CA. Accessed at: https://www.plugshare.com/directory/us/california/campbell

[3] California Energy Commission (CEC). Light-Duty Vehicle Population in California. Accessed at: https://www.energy.ca.gov/data-reports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics-collection/light

Table 21 Publicly Accessible Electric Vehicle Charger Calculations

Variable	Definition	Units	Sector	2030	2045
Equation 8.1					
Population$_y$	Forecasted population	people	Passenger	47,083	55,233
EV Target$_{Pass,y}$	Electric vehicle adoption target	percentage	Passenger	28%	100%
EVs$_y$	Electric vehicles targeted	electric vehicles	Passenger	11,237	47,078
PEV Charger Factor	Vehicles per Charger	Chargers	Passenger	34	34
Equation 8					
PEV Chargers$_y$	**New publicly accessible electric vehicle chargers needed**	**chargers**	**Passenger**	**224**	**1,278**

Through public-private funding and partnerships, such as those specified in **Action TR-3.4**, Campbell will facilitate the installation of 224 publicly accessible EV chargers by 2030 at prioritized locations on City-owned properties and across the community. While the City will play a key role in identifying strategic sites and providing support, the majority of these installations will be carried out by private companies, which will also maintain the chargers.[30] The City will focus on installing chargers in locations not well served by market forces including in disadvantaged communities and areas with low, but increasing, EV adoption. Additionally, these ZEVs will be supported by private electric vehicle chargers in new developments and existing buildings.

To support implementation of this EV charging infrastructure target, **Action TR-3.1** directs the City to start requiring new commercial and multi-family residential construction and major parking areas conduct renovations (adding spaces or electrical systems, or lighting systems are added or altered) to install electric vehicle charging infrastructure in line with the most recent Tier 2 voluntary measures of the California Green Building Standards Code—Part 11, Title 24, California Code of Regulations—known as CalGreen, through an ordinance. The current requirements mandate that 45

[30] Public-private funding and partnerships are expected due to the large amount of state and federal funding available to support California's need for over one million public and shared chargers by 2030 to meet Executive Order B-48-18's ZEV goals.

percent of total parking spaces in new commercial developments be equipped for EV charging and 40 percent of total parking spaces in new multi-family residential constructions equipped for EV charging.[31] The ordinance will be further supported by **Action TR-3.2** and **Action TR-3.7**, which direct the City to maintain streamlined permitting processes for electric vehicle charging stations. **Action TR-3.6** complements these efforts by updating zoning codes to reflect state law requirements for streamlined EV charger permitting and allowing electric vehicle charging stations as a permitted accessory use in all zones. It also establishes an administrative use permit process for standalone EV charging installations and incorporates performance-based design standards to enable flexible and context-sensitive infrastructure deployment, including future opportunities for primary-use charging sites where feasible.

These Actions will enable Campbell to install as many privately owned EV chargers in existing buildings and new developments as practical to support a 28 percent ZEV adoption by 2030 and a 100 percent ZEV adoption by 2045. Table 22 shows the parameters and data sources that support GHG emissions reductions from ZEV adoption, and Table 23 shows the calculations as outlined in Equations 9 through 9.4.

Electric Vehicle Adoption Equations

Equation 9 $$CO_2e\ Reduction_i = Emissions\ Avoided_i - EV\ Elec\ Emissions_i$$

Equation 9.1 $$Emissions\ Avoided_i = VMT_i * EF_{VMT,\ i} * EV\ Adopt_i$$

Equation 9.2 $$EV\ Adopt_i = EV\ Target_i - EV\ Base_i$$

Equation 9.3 $$EV\ Elec\ Emissions_i = EV\ Elec_i * EF_{Elec}$$

Equation 9.4 $$EV\ Elec_i = VMT_i * EV\ Adopt_i * EPMi*(1+L_{T\&D})$$

Table 22 Electric Vehicle Adoption Parameter and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 9				
$CO2e\ Reduction_i$	Internal combustion engine VMT GHG emission reductions	See Table 23	MT CO_2e	Calculated
$Emissions\ Avoided_i$	Emissions Reductions from Increased EV Adoption	See Table 23	MT CO_2e	Calculated
$EV\ Elec\ Emissions_i$	Emissions from New EV Electricity Usage	See Table 23	MT CO_2e	Calculated
I	VMT category	Passenger or Commercial	–	–
Equation 9.1				
VMT_i	Forecasted VMT	See Table 23	VMT	Appendix C: Greenhouse Gas Inventory Analysis Report
$VMT_{Passenger}$	Forecast passenger VMT adjusted for active transportation	See Table 23	miles	Calculated

[31] CalGreen Energy Services. 2022. The 2022 CalGreen Tier 1 and 2 EV Requirements. Available at: https://calgreenenergyservices.com/2022/08/24/2022-calgreen-tier-1-and-2-ev-requirements

Variable	Definition	Value	Unit	Data Source
	and public transit measures			
$VMT_{Commercial \& Bus}$	Forecasted commercial and bus VMT	See Table 23	miles	Appendix C: Greenhouse Gas Inventory Analysis Report
$EF_{VMT, i}$	Forecasted VMT Emission Factor by Transportation Category	See Table 23	MT CO_2e/VMT	Appendix C: Greenhouse Gas Inventory Analysis Report
$EV\ Adopt_i$	EV Adoption Beyond Baseline by Transportation Category	See Table 23	percentage	Calculated
Equation 9.2				
$EV\ Target_i$	EV Adoption Target by Transportation Category	See Table 23	percentage	TR-3 target
$EV\ Base_i$	EV Adoption Baseline by Transportation Category	See Table 23	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 9.3				
$EV\ Elec_i$	EV Electricity Usage by Transportation Category	See Table 23	miles	Calculated
EF_{Elec}	Electricity EF	See Table 23	passenger trips/mile	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 9.4				
VMT_i	VMT by Transportation Category	See Table 23	VMT	Calculated
$EV\ Adopt_i$	EV Adoption Beyond Baseline by Transportation Category	See Table 23	percentage	Calculated
EPM_i	Forecasted electricity usage per mile of electric vehicles	See Table 23	kWh/mile	Calculated
$L_{T\&D}$	Electricity transmission and distribution loss percentage	5.10%	percentage	Appendix C: Greenhouse Gas Inventory Analysis Report

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. VMT = vehicle miles traveled; EV = electric vehicle; kWh = kilowatt hour; MT CO_2e = metric tons carbon dioxide equivalent.

Table 23 Electric Vehicle Adoption GHG Emissions Reduction Calculations

Variable	Definition	Units	Sector	2030	2045
Equation 9.1					
VMT_i		miles	Passenger	338,211,110	377,939,672

Variable	Definition	Units	Sector	2030	2045
	Forecasted VMT by transportation category		Commercial	12,176,044	14,283,809
$EF_{VMT, i}$	Forecasted VMT Emission Factor by Transportation Category	MT CO_2e/VMT	Passenger	0.000266	0.000236
			Commercial	0.001066	0.000719
EV Adopt$_i$	EV Adoption Beyond Baseline by Transportation Category	percentage	Passenger	19.04%	100.00%
			Commercial	17.26%	100.00%
Emissions Avoided$_i$	Emissions Reductions from Increased EV Adoption	VMT	Passenger	17,147	89,288
			Commercial	2,240	10,269
Equation 9.2					
EV Target$_i$	EV Adoption Target by Transportation Category	percentage	Passenger	28%	100%
			Commercial	25%	100%
EV Base$_i$	EV Adoption Baseline by Transportation Category	percentage	Passenger	8.96%	10.27%
			Commercial	7.74%	35.62%
EV Adopt$_i$	EV Adoption Beyond Baseline by Transportation Category	percentage	Passenger	19.04%	100.00%
			Commercial	17.26%	100.00%
Equation 9.3					
EV Elec$_i$	EV Electricity Usage by Transportation Category	kWh	Passenger	25,114,914	146,853,815
			Commercial	2,191,027	14,497,500
EF_{Elec}	Electricity EF	MT CO_2e/kWh	Passenger	0.0000208	0.0000000
			Commercial	0.0000210	0.0000000
EV Elec Emissions$_i$	Emissions from New EV Electricity Usage	MT CO_2e	Passenger	522	0
			Commercial	46	0
Equation 9.4					
VMT_i	Forecasted VMT by transportation category	VMT	Passenger	338,211,110	377,939,672
			Commercial	12,176,044	14,283,809
EV Adopt$_i$	EV Adoption Beyond Baseline by Transportation Category	percentage	Passenger	19.04%	100.00%
			Commercial	17.26%	100.00%
EPM_i	Forecasted electricity usage per mile of electric vehicles	kWh/mile	Passenger	0.3710	0.3697
			Commercial	0.9920	0.9657
EV Elec$_i$	EV Electricity Usage by Transportation Category	kWh	Passenger	25,114,914	146,853,815
			Commercial	2,191,027	14,497,500
Equation 9					
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e	Passenger	17,147	89,288
			Commercial	2,240	10,269
EV Elec Emissions$_i$	Emissions from New EV Electricity Usage	MT CO_2e	Passenger	522	0
			Commercial	46	0
CO_2e Reduction$_{y,i}$	**Internal combustion engine VMT GHG emission reductions**	**MT CO_2e**	**Passenger**	**16,624**	**89,288**
			Commercial	**2,194**	**10,269**

TR-4: Increase the percentage of people using active transportation (walking and biking) to 2.5% by 2030 and 10% in 2045 by enhancing the safety and availability of the transportation system to support walking and biking.

Measure TR-4 aims to increase Campbell's active transportation mode share to 2.5 percent by 2030 and to 10 percent by 2045. The primary Actions that enable this Measure include:

- **Action TR-4.1** As part of the City of Campbell Multimodal Transportation Plan, consider planning and building protected bicycle lanes within a 2-mile radius of parks and schools in the city, in alignment with the City's Safe Routes to School Program;
- **Action TR-4.2** Secure funding to implement Campbell Priority Development Area Enhancement projects for pedestrian and bicycle safety improvements including accessibility ramps, curb extensions, sidewalk installation, traffic calming (e.g., lane narrowing, flashing beacon systems), signal modifications, sharrows, crosswalks, bike striping and signs, and guide signs (signs that provide information to pedestrians and cyclists about routes, directions, and distances to nearby locations); and,
- **Action TR-4.4** Explore opportunities to enhance active transportation facilities and around public transit stations, building on existing infrastructure such as electronic bike lockers. This may include evaluating the useability and capacity of current lockers and assessing the need for additional amenities to secure short-term bike parking, bike share docks, or wayfinding signage to support first-and last-mile connections.

Currently, Campbell has low bicycle and walking mode shares. In 2022 (i.e., Campbell's inventory year), Campbell's bicycle and pedestrian mode shares were 1.5 percent and 2.2 percent, respectively.[32] However, studies show that investments in active transportation infrastructure, such as those directed by this Measure, have demonstrated significant improvements in active transportation mode shifts and GHG emissions reductions.[33] For example, urban cities that make a strong commitment to bicycle travel can see up to an 11 percent reduction in vehicle miles traveled and associated GHG emissions.[34] Such reductions can be reasonably expected because in 2017, about 16 percent of vehicle trips made nationally were one mile or less—a distance easily travelled by foot or bicycle.[35]

To estimate the mode shift potential of building protected bicycle lanes (**Action TR-4.1**), implementing Campbell Priority Development Area Enhancement projects (**Action TR-4.2**) and including active transportation facilities at public transit stations (**Action TR-4.4**) in Campbell, other cities' bicycle and road networks were analyzed. The City of Berkeley leads the State with an 18 percent active transportation mode share in 2022 (i.e., 4.9 percent bicycle mode share and 13.4 percent pedestrian mode share) followed by the City of Davis with a 16 percent active transportation mode share in 2022 (i.e., 13.5 percent bicycle mode share and 2.6 percent pedestrian

[32] U.S. Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801: Commuting Characteristics by Sex. Available at: https://data.census.gov/table?q=Campbell%20city,%20California&t=Commuting

[33] Glazener, Andrew and Khreis, Haneen. Transforming our Cities: Best Practices Towards Clean Air and Active Transportation (2019). Accessed at: https://link.springer.com/article/10.1007/s40572-019-0228-1

[34] Jacob Mason et al., Institute for Transportation & Development Policy and the University of California, Davis. A Global High Shift Cycling Scenario (2015). Accessed at: https://itdpdotorg.wpengine.com/wp-content/uploads/2015/11/A-Global-High-Shift-Cycling-Scenario_Nov-2015.pdf

[35] National Household Travel Survey. Population Vehicle Trips Statistics (2021). Accessed at: https://nhts.ornl.gov/vehicle-trips

mode share).[36,37] For Campbell's 2030 quantification, an active transportation mode share of 2.5 percent (more specifically a reduction of 989,166 VMT) has been targeted with the increase coming from bicycle mode share while walking mode share is conservatively assumed to remain constant. While standout bicycle cities like Berkeley and Davis have been able to reach high levels of bicycle mode share, their demographics are different than Campbel's. However, neighboring cities like Sunnyvale have achieved over 3% bicycle mode share with similar demographics, demonstrating the feasibility of achieving a higher bicycle mode share if infrastructure and other programs identified in the CAAP are deployed.[38] Like 2030, the 2045 quantification assumes the increases would be attributable to bicycle mode share, while walking mode share remains constant. These active transportation mode share estimates also provide VMT reductions for Campbell well within the reductions shown in the cited studies. Table 24 shows the parameters and data sources that support the GHG emissions reductions from active transportation mode shifts and Table 25 shows the calculations as outlined in Equations 10 through 10.3.

Active Transportation Mode Share Equations

Equation 10 $CO_2e\ Reduction = VMT\ Avoided_{Passenger} * EF_{VMT,\ Passenger}$

Equation 10.1 $VMT\ Avoided_{Passenger} = New\ Bike\ Trips * Bike\ Trip\ Length$

Equation 10.2 *New Bike Trips = Passenger Trips * Active Transport Mode Share Increase*

Equation 10.3 $Passenger\ Trips = VMT_{Passenger} * PTPM$

Equation 10.4 *Active Transport Mode Share Increase = Bike Mode Share Target - Existing Bike Mode Share*

Table 24 Active Transportation Mode Share Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 10				
CO_2e Reduction	Passenger ICE GHG Emission Reductions	See Table 25Table 25	MT CO_2e	Calculated
$VMT\ Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Bike Trips	See Table 25	VMT	Calculated
$EF_{VMT,\ Passenger}$	PVMT emission factor	See Table 25	MT CO_2e/VMT	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 10.1				
New Bike Trips	New Bike Trips Substituted for Vehicle Trips	See Table 25	trips	Calculated
Bike Trip Length	Average Bike Trip Length	1.50	miles	CARB Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle

[36] US Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?t=Commuting&g=160XX00US0618100.

[37] US Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?t=Commuting&g=160XX00US0606000.

[38] Replica Dataset Spring 2025 (Sunnyvale Bicycle Mode Share 3.24%)

Variable	Definition	Value	Unit	Data Source
				Tracks: Technical Documentation[1]
Equation 10.2				
Passenger Trips	Passenger Trips	See Table 25	trips	Calculated
Active Transport Mode Share Increase	Public Transit Mode Share Increase from Baseline	See Table 25	%	Calculated
Equation 10.3				
$VMT_{Passenger}$	Forecasted passenger VMT	See Table 25	miles	Calculated
PTPM	Average Passenger Trips per Mile	See Table 25	passenger trips/mile	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 10.4				
Bike Mode Share Target	Bike Mode Share Target	See Table 25	%	TR-2 target
Existing Bike Mode Share	Existing Bike Mode Share	1.20%	%	US Census[2]

Notes: "–" means either reference not applicable or see references for disaggregated parameter in the following table rows. PVMT = passenger vehicle miles traveled; VMT = vehicle miles traveled; ICE = internal combustion engine; MT CO_2e = metric tons carbon dioxide equivalent.

[1] CARB. Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks: Technical Documentation (2019). Accessed at: https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/bicycle_facilities_technical_041519.pdf

[2] U.S. Census Bureau. 2022. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table/ACSST5Y2022.S0801?q=Campbell+city,+California&t=Commuting

Table 25 Active Transportation Mode Share GHG Emissions Reduction Calculations

Variable	Definition	Units	VMT Type	2030	2045
Equation 10.1					
New Bike Trips	New Bike Trips Substituted for Vehicle Trips	Trips	Passenger	659,444	5,426,348
Bike Trip Length	Average Bike Trip Length	Miles	Passenger	1.5	1.5
$VMT\ Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Bike Trips	VMT	Passenger	989,166	8,139,522
Equation 10.2					
Passenger Trips	Forecasted passenger trips	Trips	Passenger	50,726,486	61,663,049
Active Transport Mode Share Increase	Active Transport Mode Share Increase from Baseline	%	Passenger	1.30%	8.80%
New Bike Trips	New Bike Trips Substituted for Vehicle Trips	Trips	Passenger	659,444	5,426,348
Equation 10.3					
$VMT_{Passenger}$	Forecasted passenger VMT	VMT	Passenger	355,154,850	416,634,858
PTPM	Average Passenger Trips per Mile	PTMP	Passenger	0.142829	0.148003
Passenger Trips	Forecasted passenger trips	Trips	Passenger	50,726,486	61,663,049

Variable	Definition	Units	VMT Type	2030	2045
Equation 10.4					
Bike Mode Share Target	Bike Mode Share Target	%	Passenger	2.5%	10%
Existing Bike Mode Share	Existing Bike Mode Share (2022)	%	Passenger	1.20%	1.20%
Active Transport Mode Share Increase	Active Transport Mode Share Increase from Baseline	%	Passenger	1.30%	8.80%
Equation 10					
$VMT\ Avoided_{Passenger}$	Passenger Vehicle Miles Traveled Avoided from New Bike Trips	VMT	Passenger	989,166	8,139,522
$EF_{VMT,\ Passenger}$	PVMT emission factor	MT CO_2e/VMT	Passenger	0.000266	0.000236
CO2e Reduction	**Passenger Internal Combustion Engine (ICE) GHG Emission Reductions**	**MT CO_2e**	**Passenger**	**263**	**1,923**

TR-6: Decarbonize 25% of off-road equipment (e.g., lawnmowers, leaf blowers, and chainsaws) operations by 2030 and 100% by 2045.

Measure TR-6 creates the goal for Campbell to decarbonize 25 percent of off-road equipment use in the community by 2030 and 100 percent by 2045. The primary Actions that enable this Measure include:

- **Action TR-6.2** Develop and adopt a phased series of ordinances that exceed AB 1346 to ban local operation of specific types of gasoline and diesel-powered off-road equipment (e.g., lawn and garden, construction). Update the ordinances based on a regular review of relevant state regulations, regional rules, and available technology;
- **Action TR-6.3** Partner with community-based organizations to promote the Air District off-road equipment resources and funding opportunities to contractors and residents in the City. Include educational resources on public health and safety benefits of using decarbonized off-road equipment. Prioritize education and outreach in climate vulnerable areas of the City, as defined in Campbell's Climate Change Vulnerability Assessment; and,
- **Action TR-6.4** Work to achieve 100 percent decarbonization of off-road equipment operated by the City before 2040 and require zero-emission off-road equipment in all City contracts by 2030.

Action TR-6.2's phased ordinance will initially ban the operation of small off-road engines (SORE)—gasoline- and diesel-powered equipment under 25 horsepower—as defined by the CARB. These include tools such as lawnmowers, leaf blowers, pressure washers, and portable generators.[39] This ordinance will go beyond AB 1346 (2021), which only bans the sale of SORE equipment statewide starting in 2024, by also restricting operation of such equipment in Campbell. The City will review and update the ordinance periodically to account for evolving state regulations, regional efforts, and technological advancements. However, according to CARBS Offroad2021 model SORE covered engines (up to 25HP) only make up 12% of total offroad emissions in Campbell. Therefore, additional GHG emission reductions will need to come from additional sources like the In-Use Off-Road Diesel-Fueled Fleets Regulation discussed below.

These local actions align with and support state-level regulations, such as CARB's In-Use Off-Road Diesel-Fueled Fleets Regulation, which now mandates that most covered fleets use R99 or R100 renewable diesel as of January 1, 2024. While this regulation helps reduce the carbon intensity of diesel use, the GHG reductions quantified under this Measure assume only fossil-based fuels are displaced and therefore do not incorporate the lower emissions factor of renewable diesel—providing a conservative estimate. Renewable diesel has a lifecycle emission factor which can be 86 percent lower than conventional diesel since the CO2 emissions associated with the fuel is carbon neutral.[40] Since over 30 percent of Campbell's offroad emissions are from diesel fuel (OFFROAD2021), this supporting legislation could achieve the GHG reduction target for offroad emissions if fully implemented and supported by the City.

Compliance with the ordinance will be supported by **Action TR-6.3**, which focuses on outreach and education. The City will work with community-based organizations to promote financial incentives such as CARB's Clean Off-Road Equipment Voucher Incentive Project (CORE) and the Air District grant programs. Educational materials will highlight both the health benefits of reduced air pollution and the economic advantages of switching to electric equipment. **Action TR-6.4** commits the City to

39 California Air Resources Board. SORE Applicability Fact Sheet (2021). Accessed at: https://ww2.arb.ca.gov/resources/fact-sheets/sore-applicability-fact-sheet

40 https://www.bakerinstitute.org/research/what-know-about-renewable-diesel-and-biodiesel

transition 100 percent of its own off-road equipment to zero-emission models by 2040. In addition, all City contracts involving off-road equipment will require zero-emission alternatives beginning in 2030.

As such, the Actions outlined in this Measure, along with other regulations discussed above, puts Campbell on the right path to decarbonize 25 percent of off-road equipment operations by 2030. Table 26 shows the parameters and data sources that support off-road ordinance GHG emissions reductions, and Table 27 shows the calculations outlined in Equations 11 through 11.2.

Off-road Decarbonization Equations

Equation 11 $CO_2e\ Reduction_y = (Fuel\ Avoided_y * Weighted\ EF_y)$

Equation 11.1 $Weighted\ EF_y = CO2e\ Emissions_y / (Fuel_{Gas,\ y} + Fuel_{Diesel,\ y} + Fuel_{NG,\ y})$

Equation 11.2 $Fuel\ Avoided_y = (Fuel_{Gas,\ y} + Fuel_{Diesel,\ y} + Fuel_{NG,\ y}) * Fuel\ Reduction\ Target_y$

Table 26 Off-road Decarbonization Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 11				
$CO2e\ Reduction_y$	Offroad fuel GHG emission reductions	See Table 27	MT CO_2e	Calculated
$Fuel\ Avoided_y$	Off-road fuel avoided	See Table 27	gallon	Calculated
$Weighted\ EF_y$	Weighted emission factor for all off-road fuels	See Table 27	MT CO_2e/gallon	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 11.1				
$CO2e\ Emissions_y$	Forecasted off-road GHG emissions	See Table 27	MT CO_2e	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel_{Gas,\ y}$	Forecasted gasoline fuel usage	See Table 27	gallon	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel_{Diesel,\ y}$	Forecasted diesel fuel usage	See Table 27	gallon	Appendix C: Greenhouse Gas Inventory Analysis Report
$Fuel_{NG,\ y}$	Forecasted natural gas fuel usage	See Table 27	gallon	Appendix C: Greenhouse Gas Inventory Analysis Report
Equation 11.2				
$Fuel\ Reduction\ Target_y$	Fuel reduction target for all off-road fuels	See Table 27	percentage	TR-6 target

Notes: MT CO_2e = metric tons carbon dioxide equivalent.

Table 27 Off-road Decarbonization GHG Emissions Reductions Calculations

Variable	Definition	Units	2030	2045
Equation 11.1				
$CO2e\ Emissions_y$	Forecasted off-road GHG emissions	MT CO_2e	12,600	14,607
$Fuel_{Gas,\ y}$	Forecasted gasoline fuel usage	gallon	546,216	614,785
$Fuel_{Diesel,\ y}$	Forecasted diesel fuel usage	gallon	472,009	567,663

Variable	Definition	Units	2030	2045
$Fuel_{NG, y}$	Forecasted natural gas fuel usage	gallon	449,083	512,916
Weighted EF_y	Weighted emission factor for all off-road fuels	MT CO_2e/gallon	0.008587	0.008616
Equation 11.2				
Fuel Reduction $Target_y$	Fuel reduction target for all off-road fuels	percentage	25%	100%
Fuel $Avoided_y$	Off-road fuel avoided	gallon	366,827	1,695,364
Equation 11				
CO_2e $Reduction_{Offroad,y}$	**Offroad fuel GHG emission reductions**	**gallon**	**3,150**	**14,607**