ATTACHMENT 4

EXHIBIT B

City of Manteca Climate Action Plan Update

Prepared for
City of Manteca

July 2025

Prepared by

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City of Manteca Climate Action Plan Update

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1. Introduction

1. INTRODUCTION

California has affirmed the need for action to reduce Statewide greenhouse gas (GHG) emissions through the adoption of multiple executive orders under Governors Arnold Schwarzenegger, Jerry Brown, and Gavin Newsom, as well as legislative actions including Assembly Bill (AB) 32, Senate Bill (SB) 32, and Executive Order (EO) B-55-18. Both AB 32 and SB 32 establish Statewide GHG reduction goals, while EO B-55-18 commits to carbon neutrality. The majority of the reductions mandated by AB 32 and SB 32 would be accomplished through Statewide programs; however, implementation of local measures to reduce GHG emissions will likely be needed to achieve the Statewide reductions mandated by AB 32, SB 32, and EO B-55-18. The City of Manteca's efforts regarding GHG emissions reductions are intended to work in concert with the efforts being undertaken on a Statewide level. Thus, the City of Manteca has prepared an update to their existing Climate Action Plan (CAP), implementation of which would establish consistency between the City of Manteca's policies and Statewide reduction requirements.

1.1 PURPOSE AND SCOPE OF THE CAP UPDATE

This CAP Update is intended to support the sustainable development of the City and continued economic prosperity of the region by reducing GHG emissions in an attempt to curtail the anticipated impacts resulting from climate change. In doing so, the CAP Update would streamline future environmental review of development projects in the City of Manteca by following the California Environmental Quality Act (CEQA) Guidelines for a Qualified GHG Reduction Strategy. The CAP Update will also identify how the City will achieve consistency with the Statewide emissions limits and the 2022 Scoping Plan Update prepared by the California Air Resources Board (CARB).

Public Outreach

As a part of the planning process of the CAP Update, the City conducted public outreach efforts in order to incorporate input from the community. The City increased engagement through public meetings, online surveys, and recommendations from the Climate Action Plan Advisory Committee (CAPAC). The CAPAC was created by the City Council selecting five members of the community to generate feedback from the community about various topics, and act as the primary channel for the community to provide input for the CAP Update. The CAPAC met regularly from September 2023 to March 2025 which allowed for regular discussion on the appropriate goals and actions for the City of Manteca.

The following sections summarize the content included in the chapters of this CAP Update.

Expected Regional Climate Change Impacts

The City of Manteca has identified potential climate change impacts specific to the City and the surrounding region. In general, climate change has begun shifting precipitation patterns and surface temperatures away from the reliable historic patterns that human society has come to rely on. For instance, climate change may result in increased surface air temperatures throughout the City of Manteca and surrounding regions. Increased surface air temperatures can result in human health effects such as heat exhaustion and heat stroke, as well as increased rates of respiratory

problems related to exacerbated air pollution and increased costs to businesses related to higher demands for landscaping or agricultural irrigation. Increased surface air temperatures represent only one of many potential regional impacts related to climate change. Other potential impacts may include, but are not necessarily limited to, reduced agricultural productivity, increased public health risks, and decreased availability of water resources. An in-depth discussion of such regional impacts is included in Chapter 4 of this CAP Update.

GHG Baseline Inventory

In 2013, the City of Manteca adopted a CAP in which a 2005 GHG inventory was used to generate forecasted emissions. The GHG inventory contained emissions from municipal government operations and the community. Emission inventories compile the variety of emissions generated within a geographic area during a given period. These inventories provide quantifiable insights into emissions of a variety of sectors, such as transportation, solid waste, energy, and wastewater. The baseline inventory presented in the City's 2013 CAP estimated emissions for the year 2005, which will be presented in Chapter 5, Emissions Quantification, of this CAP Update.

Since the preparation of the 2013 CAP, the City of Manteca recognized the need for up-to-date and accurate emissions data. Significant progress has been made to refine and improve the methodology for emissions estimation since the previous CAP. The most recent 2020 GHG inventory relied on the most up-to-date methodology provided by the Statewide Energy Efficiency Collaborative (SEEC). SEEC is an alliance of private companies, public utility companies, and non-governmental organizations that provide information and technical assistance to California cities and counties to aid in the reduction of GHG emissions and increase in energy efficiency.

To facilitate such goals, the SEEC prepared ClearPath California. ClearPath California is a suite of tools designed to measure and track GHG emissions within communities in California. Based on user-provided data such as community energy use, vehicle use, water consumption, wastewater treatment, and solid waste generation, ClearPath provides GHG inventories for both the operation of municipal governments and the larger community that such municipalities serve. The CAP Update relies on information provided by various departments within the City of Manteca, including regarding the City's vehicle fleet, solid waste division, water and wastewater infrastructure, and facilities. Further information used in drafting this CAP Update was provided by Cal-Waste, Medical and Transportation Management (MTM) Transit, and the South San Joaquin Irrigation District (SSJID).

In addition to the inventory of GHG emissions, ClearPath provides a centralized platform for forecasting future GHG emissions and planning for the control and reduction of emissions. Further discussions regarding emissions forecasting is provided in Chapter 5 of this CAP Update, while information regarding the control and reduction of GHG emissions is presented in Chapter 6 of this CAP Update.

GHG Emissions Forecasting and Reduction Targeting

Forecasting of future emissions for the City of Manteca is based on buildout of the City's adopted General Plan.[1] Buildout of the City's adopted General Plan will involve growth within the City in the form of new development and population growth. Based on the City's estimated growth rates, future population, and existing GHG emissions, ClearPath can generate emissions estimates for

[1] City of Manteca. *2043 Manteca General Plan*. February 2024.

various future dates. In compliance with Statewide reduction targets set by AB 32, SB 32, and EO B-55-18, and in keeping with the methodology for emissions estimations presented in the State's 2022 Scoping Plan Update, emissions estimates for the years 2030 and 2045 were prepared for the City of Manteca.

As further discussed in Chapter 5, of this CAP Update, the State's 2022 Scoping Plan Update recommends that local governments set future emissions goals in alignment with achieving carbon neutrality. Specifically, the 2022 Scoping Plan Update aims for 2030 emissions to not exceed 40 percent below 1990 levels, and for Statewide emissions to reach carbon neutrality by 2045. The 2022 Scoping Plan Update builds upon and remains consistent with the Statewide emissions limits established by AB 32, SB 32, SB 391, and EO S-3-05 and EO B-55-18.[2] Based on the City's adopted General Plan, the future population of the City of Manteca was estimated for the years 2030 and 2045, which, when combined with the expected thresholds presented in the 2022 Scoping Plan Update, allowed for the establishment of maximum emissions levels for the years 2030 and 2045.

The difference between the estimated emissions for the years 2030 and 2045, as forecasted by ClearPath and discussed above, and the maximum emissions quantified in compliance with the State's 2022 Scoping Plan Update provides a level of GHG emissions reductions necessary to ensure that growth within the City of Manteca occurs in compliance with State-identified emissions reduction goals. Achievement of such emissions reduction goals is a crucial means of protecting the City from the potential negative effects of climate change discussed in Chapter 4 of this CAP Update.

Details regarding the methodologies, calculations, and results of emissions forecasting and reduction targeting are presented in Chapter 5 of this CAP Update.

GHG Emissions Reduction Measures and Implementation

This CAP Update includes measures to reduce GHG emissions that could otherwise result from local government and community-wide activities within the City of Manteca. The measures are organized into focus areas, each of which address the major sources of emissions associated with the City.

Emissions reduction measures included in Chapter 6 of this CAP Update will be implemented through actions undertaken by the municipal government of the City of Manteca, or by private landowners and developers within the City. Requirements for future development to adhere to this CAP Update will be identified in a Sustainability Checklist prepared in compliance with this CAP Update. The Sustainability Checklist will be included within the City's project review process.

1.2 PLAN AREA AND LOCAL SETTING

The City of Manteca is located at the intersection of State Route (SR) 99 and State Route (SR) 120 in California's Central Valley, between the cities of Stockton and Modesto. The City was formally incorporated May 28th, 1918, with historical roots in agriculture that continue to play an important role in Manteca's economy to this day. Alive with opportunity, the City of Manteca takes pride in being the Family City. Manteca is one of California's fastest growing cities with an expanding community.

[2] California Air Resources Board. *2022 Scoping Plan for Achieving Carbon Neutrality*. December 2022.

Major commercial growth is located along the SR 120 and SR 99 interchange, and along the SR 120 corridor. The downtown area, the traditional main street development, remains along East Yosemite Avenue and North Main Street. Residential development continues to expand to accommodate the increasing rate of population growth. The majority of agricultural land remains around the boundaries of the City, which can be seen in Figure 1 below.

This CAP Update pertains to all areas of the City included within the City of Manteca's General Plan Boundary, as shown in Figure 1 below, which is coterminous with the City's Sphere of Influence. Generally, the General Plan Boundary extends from Ripon Road and Sedan Road in the south, French Camp Road in the north, Prescott Road and unnamed roads in the east, and the Union Pacific Railway in the west.

1.3 LOCAL AND REGIONAL PLANNING

New development and redevelopment within the City of Manteca must adhere to a number of City policy documents, building code requirements, development standards, design guidelines, and standard practices that collectively further the goals and actions included in the CAP Update. Below is a non-exhaustive list of those measures, which are applied on a project-by-project basis, and which will aid in implementing the CAP Update:

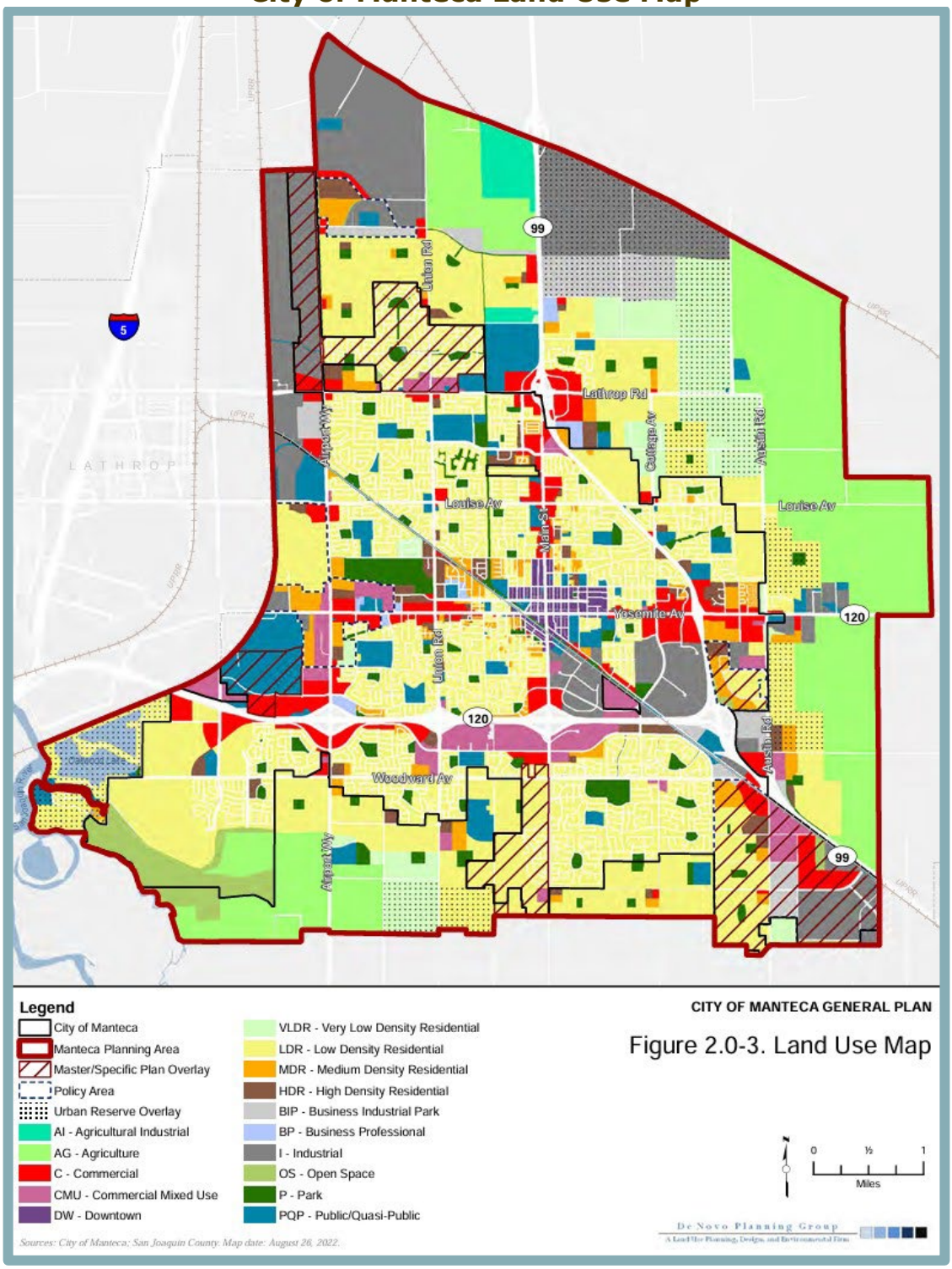
- Compliance with California's Title 24 Building Energy Efficiency Standards for Residential and Non-Residential Buildings;
- Compliance with Section 12.08.120 of the City's Municipal Code and General Plan Policy RC-8.6 related to tree preservation;
- Incorporation of street trees and landscaping consistent with the City's Municipal Code;
- Consistency with the State's Water Efficient Landscape Ordinance (AB 1881); and
- Provision of bicycle facilities and pedestrian infrastructure consistent with the City's 2020 Active Transportation Plan.

Within the broader region, San Joaquin Valley Air Pollution Control District (SJVAPCD) adopted the Climate Change Action Plan: Addressing GHG Emissions Impacts under CEQA (Communitywide CAP) in August of 2008.[3]

In addition to the City and SJVAPCD, various other local agencies provide guidance and regulations pertaining to air quality and GHG emissions. The City of Manteca is within the boundaries of the San Joaquin Valley Air Basin (SJVAB) and under the jurisdiction of the SJVAPCD. The SJVAPCD is responsible for monitoring air pollution within the SJVAB and for developing and administering programs to reduce air pollution levels below the health-based standards established by the State and federal governments. As part of SJVAPCD's efforts to reduce GHG emissions within the district in compliance with AB 32 and SB 32, SJVAPCD has adopted thresholds of significance for GHG emissions from new projects based on a three-tiered approach related to project size. SJVAPCD's thresholds for land development and construction projects range within each tier, dependent on the project's units and square footage.

[3] San Joaquin Valley Air Pollution Control District. *Climate Change Action Plan: Addressing GHG Emissions Impacts under CEQA.* August 2008.

Figure 1
City of Manteca Land Use Map



Source: City of Manteca. *2043 Manteca General Plan*. February 2024.

Development in the City of Manteca is also subject to the regulations of the San Joaquin Council of Governments (SJCOG). SJCOG is an association of local governments in San Joaquin County. Its members include the cities of Stockton, Lodi, Manteca, Mountain House, Tracy, Ripon, Escalon, and Lathrop. As the designated metropolitan planning organization for the region, SJCOG is responsible for ensuring that transportation projects and plans do not impede the region's clean air goals.

In addition, SJCOG is responsible for publishing and regularly updating the San Joaquin Valley region's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). Consistent with SB 375, the RTP/SCS is intended to integrate land use and transportation planning to ensure that new and existing development is able to meet the GHG reduction goals established in relevant State legislation, including AB 32 and SB 32. Projects that are consistent with the adopted RTP/SCS are eligible for CEQA streamlining. The environmental analysis for projects that are consistent with the adopted MTP/SCS need not analyze GHG emissions from cars and light duty truck trips related to the project.

1.4 USING THE CAP

To ensure the success of this CAP Update, the City will integrate the goals and strategies of this CAP Update into other local plans, programs, and activities, as feasible. As the City moves forward with updates to the Municipal Code, various specific plans, updates to the City's Housing Element, and other planning documents, City staff will ensure that such documents support and are consistent with the CAP Update. Implementation of the CAP Update will also require City leadership to execute strategies and report on the progress of implementation.

For measures to be implemented by the municipal government, this CAP Update identifies the responsible department for each measure and offers time frames for implementing each strategy. Successful implementation requires regular monitoring and reporting. City staff will rely on ClearPath's long-term implementation monitoring tools to track implementation progress and report to the City Council. Details regarding future updates to this CAP Update, as well as the incorporation of CAP consistency analyses in future development projects, are presented in Chapter 7, Implementation, of this CAP Update.

2. EXECUTIVE SUMMARY

2. EXECUTIVE SUMMARY

The following chapter is a comprehensive executive summary of the City of Manteca's greenhouse gas emission (GHG) data, results of projected emissions forecasts, and GHG reduction measures presented within the Climate Action Plan (CAP) Update.

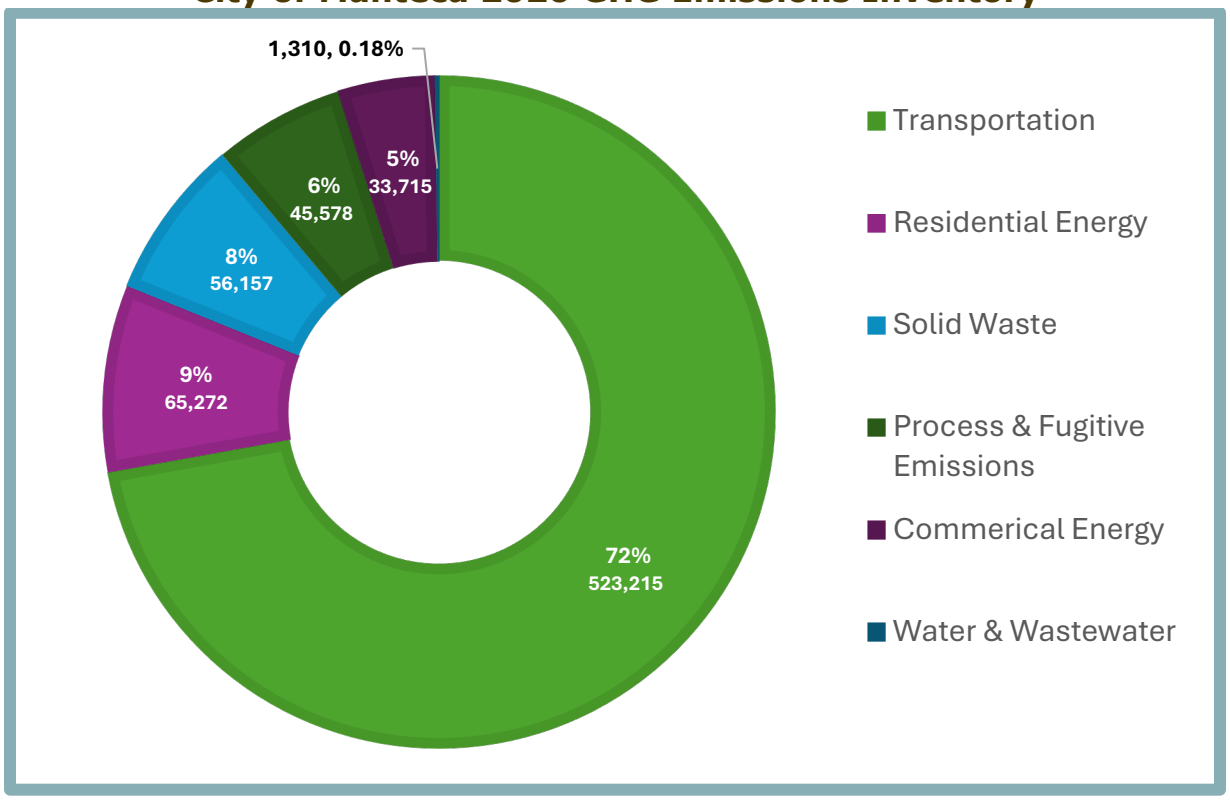
2.1 CITY OF MANTECA CAP OVERVIEW

The City of Manteca has identified the need for a CAP Update to reduce GHG emissions; thus, limiting the City's contribution to climate change impacts and ensuring continued prosperity, public health, and economic growth. Through the continual application of the CAP Update measures, contained within Chapter 6, the City aims to achieve the State's GHG reduction targets.

GHG Emissions Inventory

The 2020 GHG Inventory update concluded the City of Manteca resulted in a total of 730,202 metric tons of carbon dioxide equivalent ($MTCO2_e$) in 2020. Figure 2 below shows a breakdown of the MTCO2e by sector.

Figure 2
City of Manteca 2020 GHG Emissions Inventory

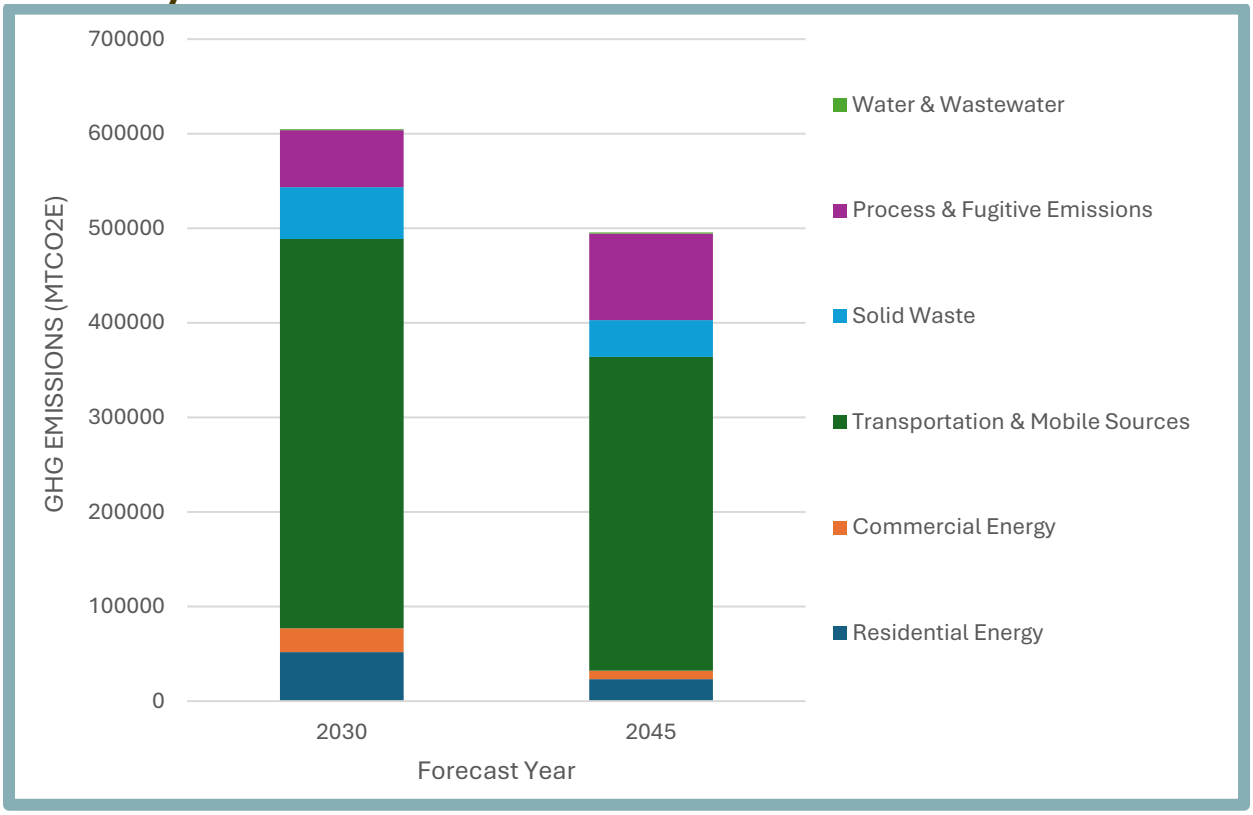


Source: Clearpath, 2024.

Manteca Projected GHG Emissions Forecasts

Projected future emissions for Manteca were created through data collected on estimated population growth, sector related emissions, and emission rate factors. Current federal, state and local regulations and policies were accounted for and incorporated into the projections. Forecasted emissions are shown below for the target years 2030 and 2045 in Figure 3 below.

Figure 3
City of Manteca 2030 and 2045 GHG Emissions Forecasts



Note: Regulations and policies were accounted for and incorporated into the projections.
Source: Clearpath, 2024.

Manteca GHG Emissions Targets

The City of Manteca has set the following GHG emissions reduction goals in alignment with the State's climate goals, using the 2020 GHG Inventory as the baseline. The following targets were established by Senate Bill (SB) 32, Assembly Bill (AB) 32, and various executive orders.

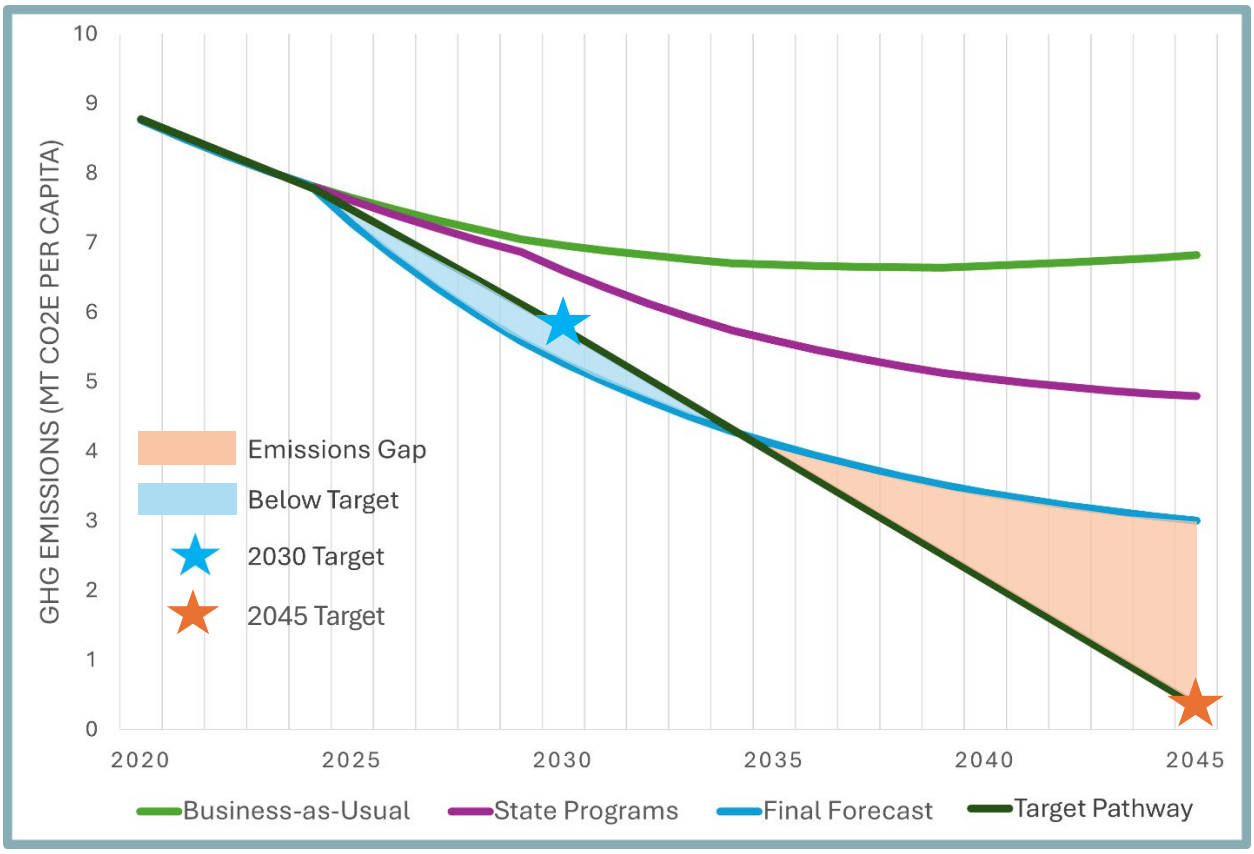
- Reduce GHG emissions by 40 percent below 1990 levels by 2030; and
- Aim to achieve carbon neutrality by 2045.

Additionally, during the development of the CAP Update the Climate Action Plan Committee (CAPAC) developed State-recommended efficiency metrics (MTCO2e/capita) in alignment with the previously stated targets.

- Reduce GHG emissions to 6 MTCO2e/Capita by 2030; and
- Aim to achieve carbon neutrality by 2045.

The measures and actions within the CAP Update provide the GHG emissions reduction to achieve the 2030 goal. In the longer term, these measures do not yet achieve the 2045 goal of net neutrality. The Manteca CAP shall continually update the CAP on a five-year basis, therefore the future additions of new measures, actions, and legislation would be implemented to close the gap to achieve carbon neutrality. A comparison of the resulting emissions from each forecast are shown below in Figure 4.

Figure 4
City of Manteca Per Capita CAP Update Forecasts



Source: Clearpath, 2024.

Reduction Measures Summarized

The goals and measures listed below in Table 1 summarize the actions which have been reviewed and developed by the CAPAC to reach the reductions targets discussed above.

Table 1 CAP Goals and Measures Summary		
GOALS	**MEASURES**	**Total Reductions**
Transportation (TR)		
Promote Alternative Transportation	TR.3: Increase Use of Alternative Transportation TR.4: Promote Alternative Transportation Through Updated Parking Standards	TR.3: 1,330 $MTCO2_e$ TR.4: 71,011 $MTCO2_e$
Implement Electric Vehicle Infrastructure	TR.5: Optimize City Fleet TR.6: Support Electric Vehicle Adoption, Charging Infrastructure, and Alternative Fuels.	TR.5: 1,815 $MTCO2_e$ TR.6: 213,034 $MTCO2_e$
Work to Increase Active Mobility	TR.1: Bicycle and Pedestrian Infrastructure Improvement TR.9: Safe Routes to School	TR.1: 148 $MTCO2_e$ TR.9: 89 $MTCO2_e$
Reduce Single Occupant Vehicle Use and Emissions	TR.2: Congestion Management TR.7: Establish a Transportation Management Association TR.8: Mobile and Area Source Emissions Reductions	TR.2: 142,022 $MTCO2_e$ TR.7: 798 $MTCO2_e$ TR.8: 31,417 $MTCO2_e$
Land Use (LU)		
Encourage Sustainable Growth	LU.1: Encourage Adaptive Reuse LU.2: Comply with State Affordable Housing Requirements LU.3: Sustainable Growth of New Development LU.4: Urban Tree Management Plan	LU.1: 1,605 $MTCO2_e$ LU.2: Supportive LU.3: 4,816 $MTCO2_e$ LU.4: Supportive
Energy and Building Design (EG)		
Expand Renewable Energy	EG.1: Renewable Energy Production Plan EG.3: Renewable Energy Requirement for Private Development EG.4: Participate in Energy Programs	EG.1: 8,025 $MTCO2_e$ EG.3: 38,747 $MTCO2_e$ EG.4: 1,711 $MTCO2_e$
Increase Lighting Efficiency	EG.8: Improve Lighting Efficiency	EG.8: 169 $MTCO2_e$
Improve Building Design	EG.2: Resource Efficiency Improvements for City Buildings EG.5: Enforce CALGreen EG.6: Energy Efficient Design EG.7: Efficient Design of City Structures	EG.2: 27 $MTCO2_e$ EG.5: 11,180 $MTCO2_e$ EG.6: 61,390 $MTCO2_e$ EG.7: 38,149 $MTCO2_e$
Water Conservation (WC)		
Increase Water Efficiency	WC.1: Community Wide Water Use Efficiency WC.2: Water Efficient Landscape WC.3: Sustainable Water Service	WC.1: 585 $MTCO2_e$ WC.2: 91 $MTCO2_e$ WC.3: 606 $MTCO2_e$
Solid Waste Management (SW)		
Increased Waste Diversion	SW.1: Expand Municipal Recycling Program SW.2: Expand Yard Waste and Other Organics Composting SW.3: Improve Waste Management Practices.	SW.1: 115 $MTCO2_e$ SW.2: 34,758 $MTCO2_e$ SW.3: 26,752 $MTCO2_e$

Source: Clearpath, 2024.

3. CLIMATE CHANGE SCIENCE AND BACKGROUND

3. CLIMATE CHANGE SCIENCE AND BACKGROUND

The following chapter provides a brief overview of the scientific understanding of the Earth's climate system, with specific focus on the principles of climate change. The regulatory framework on a federal, state, and local level are described below.

3.1 PRINCIPLES OF THE EARTH'S CLIMATE

Although sometimes used interchangeably, the terms "climate" and "weather" represent two related, but different concepts. Weather refers to the immediate state of the atmosphere. Questions such as, "is it hot or cold outside right now"; "what is the humidity today; and how cloudy will it be this afternoon" are all concerned with the day-to-day conditions of the atmosphere. Climate, on the other hand, is the average of a given location's weather over time. Because climate information is considered on a longer temporal time scale than weather, climate is often discussed in statistical terms and can be used to answer such questions as "what is the average temperature in the City of Manteca during the month of June"; "how many inches of rain does the City of Manteca receive each year"; and "what month is usually the coldest month of the year in the City of Manteca?" Because climate is the pattern of weather over a given time, questions regarding climate can be spatially and temporally broad. For instance, discussions on climate can focus on the City of Manteca, California, North America, or the entire globe, and can concern periods of weeks, years, decades, millennia, and beyond.[4]

Understanding a region's climate provides important insights into a region's average weather, as well as a region's likelihood of experiencing extreme weather events such as heat waves, storms, floods, and droughts.[5] Extreme weather events are often the most attention-grabbing features of a region's climate (consider drought in California or hurricanes in Florida); however, average climactic conditions can also greatly impact a region's suitability for agriculture, forestry, and general human habitation. For instance, California's Mediterranean-type climate, with mild wet winters and dry summers, makes the State uniquely suited to agricultural activities.

Factors Controlling Earth's Climate

Considering the importance of the region's climate to our society, we must understand the factors that affect climate. The City of Manteca's climate is interconnected with the climate of the State, continent, and globe in what is called a climate system. The main driver of the Earth's climate system, and, thus, the continent's, State's, and City's climate, is energy radiated by the sun hitting the Earth.[6] Several factors can alter the amount of solar energy hitting the earth such as the

[4] National Snow & Ice Data Center. *Artic Weather and Climate*. Accessible at: https://nsidc.org/learn/parts-cryosphere/arctic-weather-and-climate#anchor-what-is-the-difference-between-weather-and-climate-. Accessed December 2024.

[5] U.S. Global Change Research Program. *GlobalChange.gov*. Accessible at: http://www.globalchange.gov/. Accessed November, 2024.

[6] Masson-Delmotte, V., M. Schulz, A. Abe-Ouchi, J. Beer, A. Ganopolski, J.F. González Rouco, E. Jansen, K. Lambeck, J. Luterbacher, T. Naish, T. Osborn, B. Otto-Bliesner, T. Quinn, R. Ramesh, M. Rojas, X. Shao and A.

distance of the earth from the sun, the intensity of solar activity, and the tilt of the earth on the earth's axis. However, these factors are generally stable and act on what is known as a geologic timescale, often discussed in hundreds of thousands, to millions and billions of years. Because such factors are stable and predictable, the amount of solar energy hitting the earth is known and has been relatively constant over much of human history.[7]

Although humans cannot change the amount of solar energy reaching the Earth, humans can alter how much of this incoming heat remains. The Earth's atmosphere functions as a natural heat regulation system by balancing incoming solar energy from the sun and outgoing thermal radiation, which is first absorbed from the sun and then re-emitted by the land, oceans, and atmosphere. This naturally occurring phenomenon, known as the greenhouse effect, enables the Earth to have equilibrium temperatures supportive of life.

Certain gases intensify the greenhouse effect, however, by trapping thermal radiation and not emitting them out into space again – like a blanket or the walls of a greenhouse. Greenhouse gases (GHGs) include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and fluorinated gases (such as hydrofluorocarbons or HFCs). The higher the concentration of GHGs in the atmosphere, the thicker the glass walls of the greenhouse, and the more heat is trapped on Earth. This is illustrated in Figure 5 below.

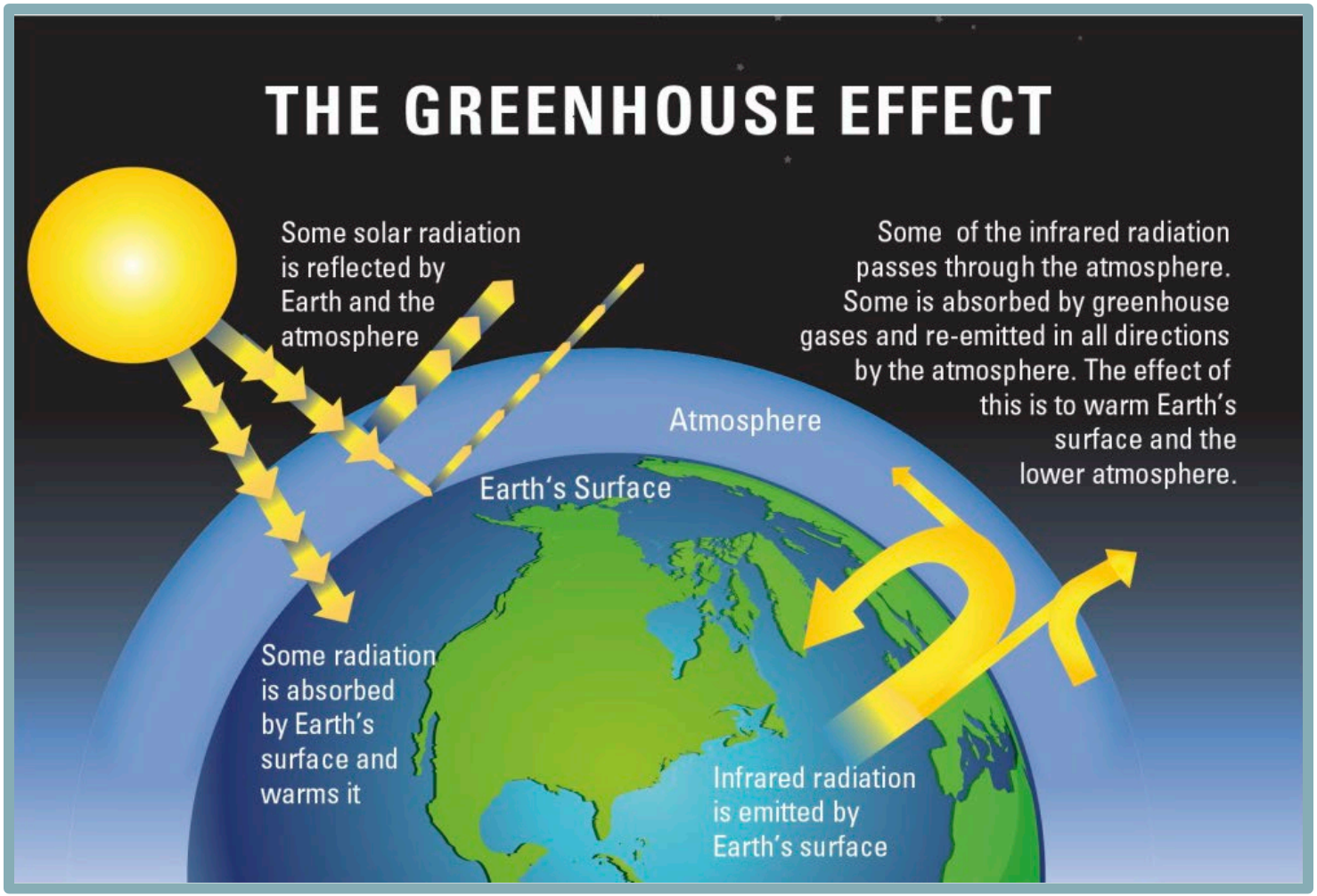
On a geological timescale, over hundreds of thousands of years, the Earth has cycled between cooler periods of glaciation (ice ages) and warmer interglacial periods. Natural changes in the atmospheric concentration of carbon dioxide and other GHGs contributed to these gradual changes in the Earth's average temperatures and climate conditions, with higher levels of GHGs associated with warmer, tropical periods and lower levels linked to ice ages.[8] While the amount of GHGs in the atmosphere has fluctuated naturally in the Earth's past, they are now rising at unprecedented rates. Human activities contributing to the rising rates include the burning of fossil fuels (coal, gasoline, and natural gas), land conversion, industrial processes (e.g., cement production and artificial nitrogen fixation for fertilizer), food production, and many other daily activities. The above human activities have been releasing vast quantities of GHGs into the atmosphere continuously since the Industrial Revolution (Figure 6 and Figure 7). The increases of GHGs in the atmosphere can be thought of as thickening the glass walls of the Earth's greenhouse, causing more and more heat to be trapped within the Earth's system. This leads to warmer global average temperatures (see Figure 7 and Figure 8), which in turn contributes to rising sea levels, more droughts, and more extreme weather conditions due to the added energy in the global climate systems (Figure 7).

Timmermann, 2013: *Information from Paleoclimate Archives. In: Climate Change 2013: The Physical Science Basis.* Contribution of Working Group I to the Fifth Assessment Report of The Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

7 National Aeronautics and Space Administration. *Paleoclimatology: Explaining the Evidence*. Available at: http://earthobservatory.nasa.gov/Features/Paleoclimatology_Evidence/. Accessed November, 2024.

8 Masson-Delmotte, V., M. Schulz, A. Abe-Ouchi, J. Beer, A. Ganopolski, J.F. González Rouco, E. Jansen, K. Lambeck, J. Luterbacher, T. Naish, T. Osborn, B. Otto-Bliesner, T. Quinn, R. Ramesh, M. Rojas, X. Shao and A. Timmermann, 2013: *Information from Paleoclimate Archives. In: Climate Change 2013: The Physical Science Basis.* Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

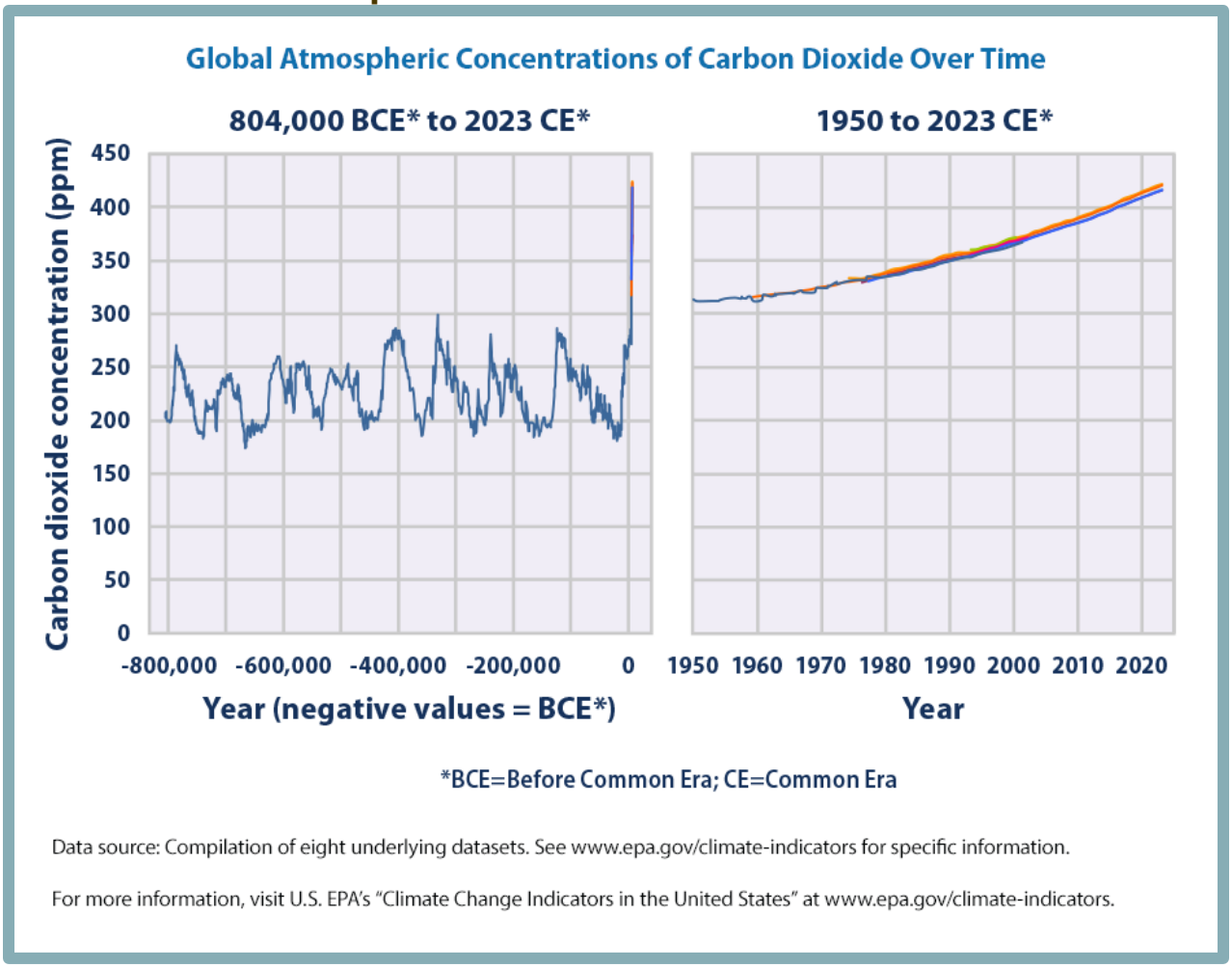
Figure 5
The Greenhouse Effect



Source: The Royal Society. The Basics of Climate Change. Available at: https://royalsociety.org/topics-policy/projects/climate-change-evidence-causes/basics-of-climate-change/. Accessed November 2024.

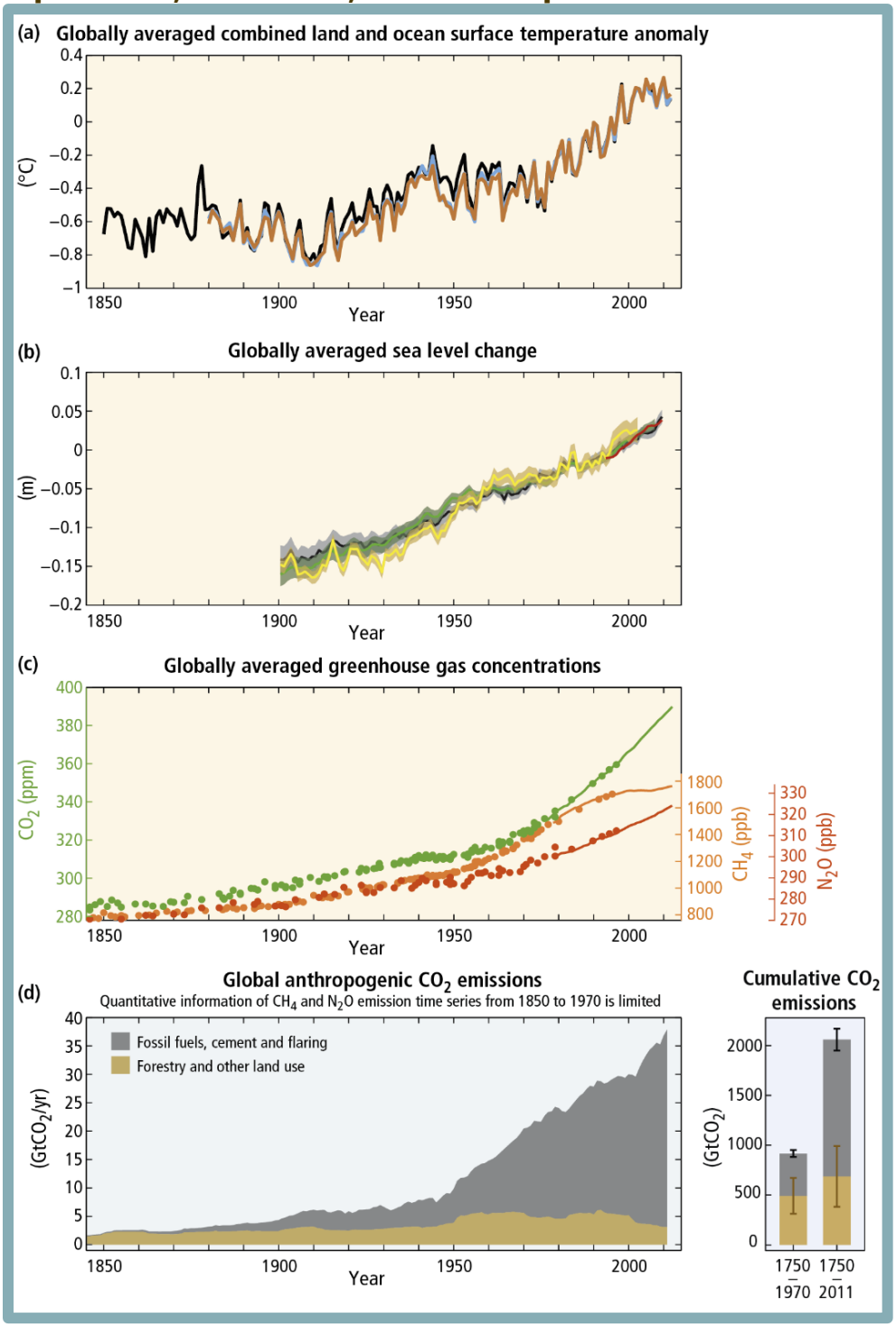
Current GHG levels are at their highest in the past 800,000 years – before modern humans appeared on Earth – and continue to increase at unprecedented rates. Human society depends on stable, predictable climate patterns. At lower concentrations, GHGs retain heat within the atmosphere to provide the stable climate that humans rely upon. However, human activities across the globe are drastically altering the Earth's atmospheric composition by causing large increases in GHG concentrations, mainly CO_2 but also methane, nitrous oxide, and fluorinated gases.

Figure 6
Global Atmospheric Concentrations of Carbon Dioxide



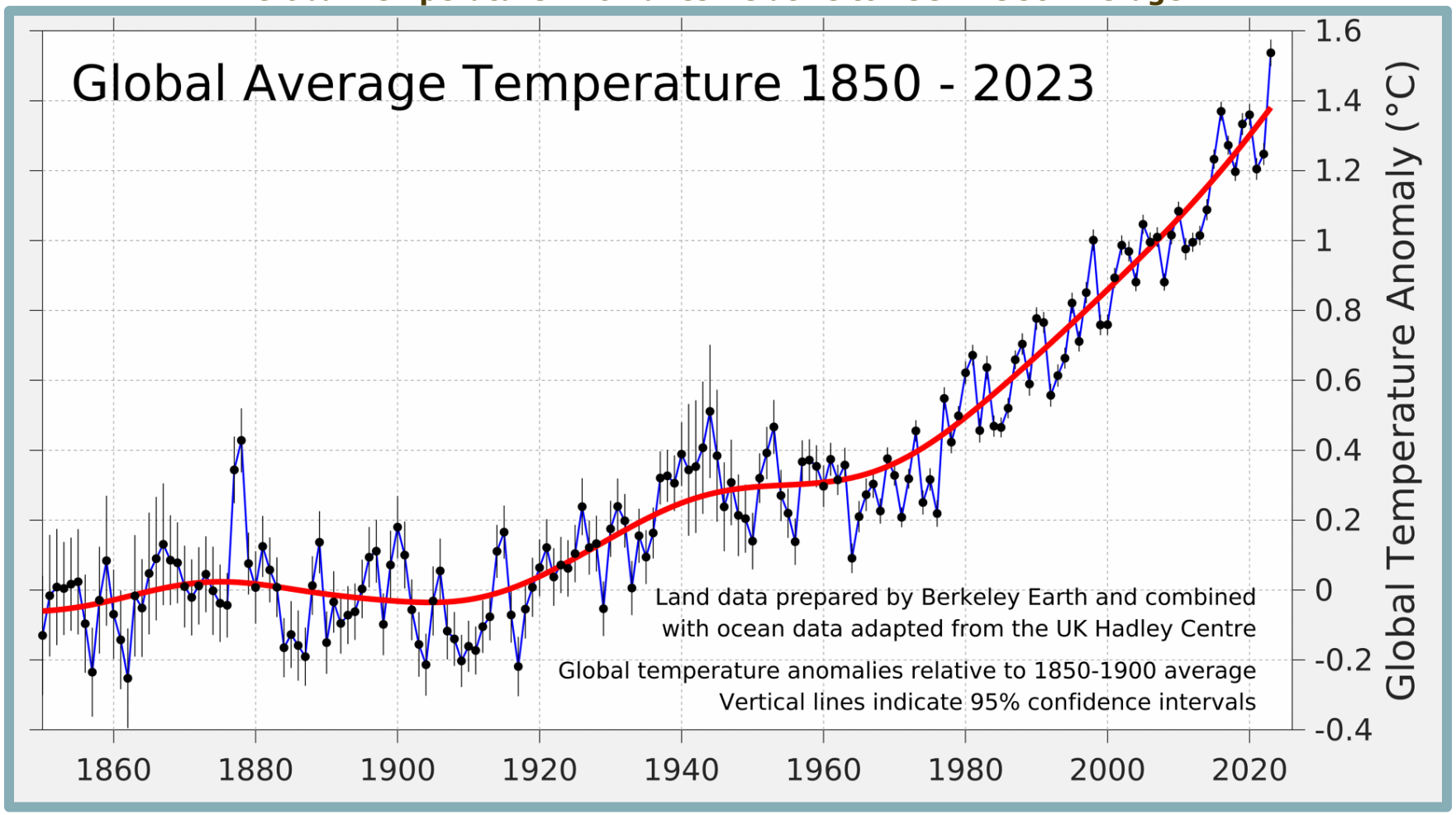
***Source:** United States Environmental Protection Agency. Climate Change Indicators: Atmospheric Concentrations of Greenhouse Gases. Available at https://www.epa.gov/climate-indicators/climate-change-indicators-atmospheric-concentrations-greenhouse-gases. Accessed December 2024.*

Figure 7
Temperature, Sea Level, and Atmospheric GHGs Since 1850



***Source:** IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. 2014.*

Figure 8
Global Temperature Anomalies Relative to 1951-1980 Average



Source: Berkeley Earth. Global Temperature Report for 2023. Available at: https://berkeleyearth.org/global-temperature-report-for-2023/ . Accessed November 2024.

Such human-induced changes to atmospheric GHG concentrations are increasing average land and ocean temperatures, contributing to rising sea levels (Figure 7), and threaten to alter the earth's climate system.[9] As a result, the last decade has been the hottest, on both land and sea, since 1880, with 2024 resulting in the warmest average surface temperature on record.[10] In addition, carbon sinks, such as the ocean, soil, and forests, thought prior to be a steady factor in climate modeling have become increasingly unreliable as widespread impacts from climate change disrupt the processes which produce the carbon sinks.[11] Unprecedented amounts of sea level rise result from the melting of ice sheets and thermal expansion of sea water as a result of rising global temperatures.[12] While the impacts are widespread, the City of Manteca plans to reduce citywide emissions and join in California's goal of carbon neutrality.

The City's CAP update will chart a course forward for the City of Manteca, which will focus on measures that will encourage growth, and economic opportunity, while also encouraging climate change protection throughout the community. In balancing the economic needs of today with the safety and prosperity of future generations, the actions of the City of Manteca, combined with Statewide and global initiatives to reduce GHG emissions, will allow for on-going prosperity without diminishing the ability of future generations to enjoy the same standard of living.

Development of Technology

Within the applicable timeline of this CAP Update, technology related to reducing GHG emissions, such as carbon sequestration, will continue to improve and become increasingly accessible. The application of these future technologies could aid in mitigating the impacts of climate change and achieving carbon neutrality as discussed below in the 2022 Scoping Plan Update. The CAP Update will be updated and amended on a five-year basis. Therefore, the application of new technology will be considered, as feasible, for the City of Manteca.

3.2 REGULATORY SETTING

The regulations listed below support the 2022 Scoping Plan Update, which lays out a path to achieve the targets for carbon neutrality by 2045, while assessing the progress toward reducing California's GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the previous 2017 Scoping Plan. GHG emissions are monitored and regulated through the efforts of various international, federal, State, and local government agencies. Agencies work jointly and individually to reduce GHG emissions through legislation, regulations, planning, policymaking, education, and a variety of programs. The agencies responsible for regulating GHG emissions within the City of Manteca's Planning Area are discussed below.

9 IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

10 NASA. *Temperatures Rising: NASA Confirms 2024 Warmest Year on Record.* Available at https://www.nasa.gov/news-release/temperatures-rising-nasa-confirms-2024-warmest-year-on-record/#:~:text=Global%20temperatures%20in%202024%20were,records%20%E2%80%94%20an%20unprecedented%20heat%20streak. Accessed April, 2025.

11 The Guardian. *Trees and land absorbed almost no CO2 last year. Is nature's carbon sink failing?* Available at https://www.theguardian.com/environment/2024/oct/14/nature-carbon-sink-collapse-global-heating-models-emissions-targets-evidence-aoe Accessed April, 2025.

12 NASA. *NASA Analysis Shows Unexpected Amount of Sea Level Rise in 2024.* Available at https://sealevel.nasa.gov/news/282/nasa-analysis-shows-unexpected-amount-of-sea-level-rise-in-2024/#:~:text=Global%20sea%20level%20rose%20faster,(0.43%20centimeters)%20per%20year. Accessed April, 2025

Federal Regulations

The most prominent federal regulation related to GHG emissions is the Federal Clean Air Act (FCAA), which is implemented and enforced by the United States Environmental Protection Agency (USEPA). Due to uncertainties related to federal regulations, as the CAP Update is applied and updated on a five-year basis, applicable federal regulations will be updated as developments occur.

State Regulations

The Statewide GHG emissions regulatory framework is summarized below. The following text describes Executive Orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues. The following discussion does not include an exhaustive list of applicable regulations; rather, only the most prominent and applicable California legislation related to GHG emissions. An exhaustive list and extensive details of California air quality legislation can be found at the California Air Resources Board (CARB) website.[13] Additionally, due to uncertainties related to state regulations, as the CAP Update is applied and updated on a five-year basis, applicable state regulations will be updated as developments occur.

Assembly Bill (AB) 1007

AB 1007, State Alternative Fuels Plan (Pavley, Chapter 371, Statutes of 2005), required development and adoption of a State plan to increase the use of alternative fuels. The final *State Alternative Fuels Plan* was adopted on December 5, 2007 and presented strategies and actions California must take to increase the use of alternative, non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. Examples of such strategies include establishment of government incentive programs for alternative fuels, creation of a Low Carbon Fuel Standard to reduce the carbon intensity of transportation fuels, and the allowance of GHG emissions credits to entities using alternatively fueled vehicles. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality. The Plan recommended goals for alternative fuel use as well as reductions in the carbon intensities of fuels such as gasoline and diesel, and lays a foundation for building a multi-fuel transportation energy future for California by 2050. As of 2017, decreases in the carbon intensity of conventional fuels have met or exceeded the compliance targets, and the use of alternative fuels has increased by approximately 800 million gallons of gas equivalence units.[14]

Assembly Bill 1493

AB 1493 (Pavley) (July 2002) was enacted in response to the transportation sector accounting for more than half of California's CO2 emissions. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the State

[13] California Air Resources Board. *Laws and Regulations*. Available at: http://www.arb.ca.gov/html/lawsregs.htm. Accessed November 2024.

[14] California Air Resources Board. *Low Carbon Fuel Standard Data Dashboard*. Available at: https://www.arb.ca.gov/fuels/lcfs/dashboard/dashboard.htm. Accessed: December 2024.

board to be vehicles that are primarily used for non-commercial personal transportation in the State. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. When fully phased in, the near-term (2009–2012) standards would result in a reduction of approximately 22 percent of GHG emissions compared to the emissions from the 2002 fleet, and the mid-term (2013–2016) standards would result in a reduction of approximately 30 percent.

Renewable Portfolio Standard (RPS), Senate Bill 350, and Senate Bill 100

Established in 2002 under SB 1078, accelerated in 2006 under SB 107, and expanded in 2011 under SB 2, California's RPS is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. Since the inception of the RPS program, the program has been extended and enhanced multiple times. In 2015, SB 350 extended the State's RPS program by requiring that publicly owned utilities procure 50 percent of their electricity from renewable energy sources by 2030. The requirements of SB 350 were expanded and intensified in 2018 through the adoption of SB 100, which mandated that all electricity generated within the State by publicly owned utilities be generated through carbon-free sources by 2045. In addition, SB 100 increased the previous renewable energy requirement for the year 2030 by 10 percent; thus, requiring that 60 percent of electricity generated by publicly owned utilities originate from renewable sources by the year 2030.

Executive Order S-3-05

Executive Order (EO) S-3-05 (June 2005) established California's GHG emissions reduction targets and laid out responsibilities among the State agencies for implementing the EO and for reporting on progress toward the targets. The EO established the following targets:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

EO S-3-05 also directed CalEPA to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issues yearly GHG reduction report cards to track the progress of emission reduction strategies. Each report card documents the effectiveness of measures to reduce GHG in California, presents GHG emissions from State agencies' operations, and shows reductions that have occurred in the two years prior to publication.

Assembly Bill 32

In furtherance of the goals established in EO S-3-05, the Legislature enacted AB 32 (Núñez and Pavley). The bill is referred to as the California Global Warming Solutions Act of 2006 (September 27, 2006). AB 32 provided initial direction on creating a comprehensive, multi-year program to limit California's GHG emissions to 1990 levels by 2020 and initiate the transformations required to achieve the State's long-range climate objectives. AB 32 also required that the CARB prepare a "scoping plan" for achieving the maximum technologically feasible and cost-effective GHG emissions reductions by 2030. The CARB's Scoping Plan is described in further detail below.

Senate Bill 32 and Assembly Bill 197

Senate Bill (SB) 32 and AB 197 (enacted in 2016) are companion bills. SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that Statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, to provide ongoing oversight over implementation of the State's climate policies. AB 197 also added two members of the Legislature to the Board as non-voting members; requires CARB to make available and update (at least annually via the CARB's website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and requires CARB to identify specific information for GHG emissions reduction measures when updating the Scoping Plan.

CARB's Climate Change Scoping Plan

One specific requirement of AB 32 is for CARB to prepare a scoping plan for achieving the maximum technologically feasible and cost-effective GHG emission reductions by 2020 (Health and Safety Code Section 38561[a]), and to update the Scoping Plan at least once every five years. In 2008, CARB approved the first Scoping Plan. The Scoping Plan included a mix of recommended strategies that combined direct regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs calculated to meet the 2020 Statewide GHG emission limit and initiate the transformations needed to achieve the State's long-range climate objectives. The key elements of the Scoping Plan include the following:

1. Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
2. Achieving a Statewide renewable energy mix of 33 percent;
3. Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85 percent of California's GHG emissions;
4. Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets;
5. Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard (LCFS) (17 CCR, Section 95480 et seq.); and
6. Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

The Scoping Plan also identified local governments as essential partners in achieving California's goals to reduce GHG emissions because they have broad influence and, in some cases, exclusive authority over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations. Specifically, the Scoping Plan encouraged local governments to adopt a reduction goal for municipal operations and for community emissions to reduce GHGs by approximately 15 percent from 2008 levels by 2020. Many local governments developed community-scale local GHG reduction plans based on this Scoping Plan recommendation.

In 2014, CARB approved the first update to the Scoping Plan. The First Update to the Climate Change Scoping Plan: Building on the Framework (First Update) defined the State's GHG emission reduction priorities for the next five years and laid the groundwork to start the transition to the post-2020 goals set forth in EO S-3-05 and EO B-16-2012. The First Update concluded that California is on track to meet the 2020 target but recommended a 2030 mid-term GHG reduction target be established to ensure a continuation of action to reduce emissions. The First Update recommended a mix of technologies in key economic sectors to reduce emissions through 2050, including energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies. As part of the First Update, CARB recalculated the State's 1990 emissions level using more recent GWPs identified by the IPCC, from 427 $MMTCO_2e$ to 431 $MMTCO_2e$.

In 2015, as directed by EO B-30-15, CARB began working on an update to the Scoping Plan to incorporate the 2030 target of 40 percent below 1990 levels by 2030 to keep California on a trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80 percent below 1990 levels by 2050, as set forth in EO S-3-05. In summer 2016, the Legislature affirmed the importance of addressing climate change through passage of SB 32 (Pavley, Chapter 249, Statutes of 2016).

In December 2017, the Scoping Plan was once again updated. The 2017 Scoping Plan built upon the successful framework established in the initial Scoping Plan and First Update, while identifying new, technologically feasible and cost-effective strategies that would serve as the framework to achieve the 2030 GHG target as established by SB 32 and define the State's climate change priorities to 2030 and beyond. For local governments, the 2017 Scoping Plan replaced the initial Scoping Plan's 15 percent reduction goal with a recommendation to aim for a communitywide goal of no more than six $MTCO_2e$ per capita by 2030, and no more than two $MTCO_2e$ per capita by 2050, which are consistent with the State's long-term goals. The 2017 Scoping Plan recognized the benefits of local government GHG planning (e.g., through Climate Action Plans [CAPs]) and provided more information regarding tools to support those efforts. The 2017 Scoping Plan also recognized the CEQA streamlining provisions for project-level review where a legally adequate CAP exists.

When discussing project-level GHG emissions reduction actions and thresholds in the context of CEQA, the 2017 Scoping Plan stated that "achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development" for project-level CEQA analysis, but also recognized that such a standard may not be appropriate or feasible for every development project. The 2017 Scoping Plan further provided that "the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."

The most recent update to the Scoping Plan, the 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan Update) was adopted by the CARB in December 2022.[15] The 2022 Scoping Plan Update builds upon previous efforts to reduce GHG emissions and is designed to continue to shift the California economy away from dependence on fossil fuels. The 2022 Scoping

[15] California Air Resources Board. *2022 Scoping Plan for Achieving Carbon Neutrality*. November 16, 2022.

Plan Update, the most comprehensive and far-reaching Scoping Plan developed to date, identifies a technologically feasible and cost-effective path to achieve carbon neutrality by 2045 while also assessing the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan. The 2030 target is an interim but important stepping stone along the critical path to the broader goal of deep decarbonization by 2045. The relatively longer path assessed in the Scoping Plan incorporates, coordinates, and leverages many existing and ongoing efforts to reduce GHGs and air pollution, while identifying new clean technologies and energy.

The 2022 Scoping Plan Update lays out a path to achieve targets for carbon neutrality and reduce GHG emissions by 85 percent below 1990 levels by 2045, as directed by AB 1279. The actions and outcomes in the plan will achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on NWL to reduce emissions and sequester carbon, and the capture and storage of carbon.

Executive Order S-1-07

EO S-1-07, otherwise known as the LCFS, was adopted in 2009 and requires transportation fuels such as gasoline and diesel sold within the state to be less carbon intensive. These policies reduce emissions from on-road transportation and off-road equipment use.

Senate Bill 375

SB 375 (Steinberg) (September 2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 requires CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035, and to update those targets every eight years. SB 375 requires the State's 18 regional metropolitan planning organizations to prepare a sustainable communities strategy as part of their Regional Transportation Plans that will achieve the GHG reduction targets set by CARB. If a metropolitan planning organization is unable to devise a sustainable communities strategy to achieve the GHG reduction target, the metropolitan planning organization must prepare an alternative planning strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to California Government Code Section 65080(b)(2)(K), a sustainable communities strategy does not (1) regulate the use of land, (2) supersede the land use authority of cities and counties, or (3) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with the sustainable community strategy. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the State-mandated housing element process.

Executive Order S-13-08

EO S-13-08 (November 2008) is intended to hasten California's response to the impacts of global climate change, particularly sea-level rise. Therefore, the EO directs State agencies to take specified actions to assess and plan for such impacts. The final 2009 California Climate Adaptation Strategy report was issued in December 2009, and an update, Safeguarding

California: Reducing Climate Risk, followed in July 2014. To assess the State's vulnerability, the report summarizes key climate change impacts to the State for the following areas: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water. Issuance of the Safeguarding California: Implementation Action Plans followed in March 2016. In January 2018, the CNRA released the Safeguarding California Plan: 2018 Update, which communicates current and needed actions that the State government should take to build climate change resiliency.

Assembly Bill 197

AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, to provide ongoing oversight over implementation of the State's climate policies. AB 197 also added two members of the Legislature to the Board as non-voting members; requires CARB to make available and update (at least annually via the CARB's website) emissions data for GHGs, criteria air pollutants, and TACs from reporting facilities; and requires CARB to identify specific information for GHG emissions reduction measures when updating the Scoping Plan.

Executive Order B-55-18/Assembly Bill 1279

EO B-55-18 (September 2018) establishes a Statewide policy for California to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net-negative emissions thereafter. The goal is an addition to the existing Statewide targets of reducing the State's GHG emissions. CARB intends to work with relevant State agencies to ensure that future scoping plan updates identify and recommend measures to achieve the carbon neutrality goal. On September 16, 2022, AB 1279, also known as the California Climate Crisis Act, codified the carbon neutrality goal established by EO B-55-18.

Senate Bill 1383

SB 1383 establishes specific targets for the reduction of short-lived climate pollutants (SLCPs) (40 percent below 2013 levels by 2030 for CH_4 and HFCs, and 50 percent below 2013 levels by 2030 for anthropogenic black carbon), and provides direction for reductions from dairy and livestock operations and landfills. Accordingly, CARB adopted its SLCP Reduction Strategy in March 2017. The SLCP Reduction Strategy establishes a framework for the Statewide reduction of emissions of black carbon, CH_4, and fluorinated gases.

Title 24, Part 6

Title 24 of the CCR, which is known as the California Building Standards Code (CBSC), was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically established Building Energy Efficiency Standards that are designed to ensure new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality. These energy efficiency standards are reviewed periodically, and revised if necessary, by the Building Standards Commission and CEC (PRC Section 25402[b][1]). The regulations receive input from members of industry, as well as the public, with the goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (PRC Section 25402). The regulations are scrutinized and analyzed for technological and economic feasibility (PRC Section 25402[d]) and cost effectiveness (PRC Sections 25402[b][2] and [b][3]). As a result, the standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2022 Title 24 standards are the currently applicable building energy efficiency standards and became effective on January 1, 2023. Compliance with the 2022 Title 24 Building Energy Efficiency Standards will reduce energy use and associated GHG emissions compared to structures built in compliance with the previous 2019 Title 24 standards.

Title 24, Part 11

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CALGreen, and establishes minimum mandatory standards and voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and interior air quality. The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and State-owned buildings and schools and hospitals. The original CALGreen standards have been updated several times. The CALGreen 2022 standards, which are the current standards, improved upon the 2019 CALGreen standards, and went into effect on January 1, 2023. The 2022 CALGreen Code focuses on four key areas in newly constructed homes and businesses:[16]

- Encouraging electric heat pump technology for space and water heating, which consumes less energy and produces fewer emissions than gas-powered units.
- Establishing electric-ready requirements for single-family homes to position owners to use cleaner electric heating, cooking and electric vehicle (EV) charging options whenever they choose to adopt those technologies.
- Expanding solar PV system and battery storage standards to make clean energy available onsite and complement the state's progress toward a 100 percent clean electricity grid.
- Strengthening ventilation standards to improve indoor air quality.

The CALGreen standards also include voluntary efficiency measures that are provided at two tiers and implemented at the discretion of local agencies and applicants. According to Section A4.602 of Appendix A4 of the CALGreen Code, CALGreen's Tier 1 standards call for a 15 percent improvement in energy requirements, stricter water conservation, 65 percent diversion of construction and demolition waste, 10 percent recycled content in building materials, 20 percent permeable paving, 20 percent cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30 percent improvement in energy requirements, stricter water conservation, 80 percent diversion of construction and demolition waste, 15 percent recycled content in building materials, 30 percent permeable paving, 25 percent cement reduction, and cool/solar-reflective roofs.

Title 20

Title 20 of the CCR requires manufacturers of appliances to meet State and federal standards for energy and water efficiency. The CEC certifies an appliance based on a manufacturer's

[16] California Energy Commission. *Energy Commission Adopts Updated Building Standards to Improve Efficiency, Reduce Emissions From Homes and Businesses.* Available at: https://www.energy.ca.gov/news/2021-08/energy-commission-adopts-updated-building-standards-improve-efficiency-reduce-0. Accessed March 2024.

demonstration that the appliance meets the standards. New appliances regulated under Title 20 include refrigerators, refrigerator-freezers, and freezers; room air conditioners and room air-conditioning heat pumps; central air conditioners; spot air conditioners; vented gas space heaters; gas pool heaters; plumbing fittings and plumbing fixtures; fluorescent lamp ballasts; lamps; emergency lighting; traffic signal modules; dishwaters; clothes washers and dryers; cooking products; electric motors; low-voltage dry-type distribution transformers; power supplies; televisions and consumer audio and video equipment; and battery charger systems. Title 20 presents protocols for testing each type of appliance covered under the regulations, and appliances must meet the standards for energy performance, energy design, water performance, and water design. Title 20 contains three types of standards for appliances: federal and State standards for federally regulated appliances, State standards for federally regulated appliances, and State standards for non-federally regulated appliances.

Fleet Rule for Transit Agencies

On December 14, 2018, the CARB unanimously approved the Innovative Clean Transit regulation. The Innovative Clean Transit regulation requires transit agencies to begin transitioning existing fleets to zero-emission vehicles, and requires that future vehicle purchases be zero-emission vehicles. The result of the Innovative Clean Transit regulation will be that by 2040, all transit vehicles within California will be zero-emissions vehicles.

Advanced Clean Trucks Regulation

The Advanced Clean Trucks Regulation was approved in March 2021 and was codified in the California Code of Regulations. The Advanced Clean Trucks Regulation is a sales requirement for manufacturers ZEV production and requires that from 2024 to 2035 manufacturers are required to sell zero-emission trucks as an increasingly large percentage of their annual sales. Fleet owners are required to report about their existing fleet operations to aid in the transition of medium to heavy duty vehicles to be zero-emissions. The increasing percentage of required ZEV has support through funding programs and provides a greater variety of ZEV to consumers.

Local Regulations

The following are the regulatory agencies and regulations pertinent to the proposed project on a local level.

San Joaquin Valley Air Pollution Control District

Various local, regional, State and federal agencies share the responsibility for air quality management in the Central Valley. The San Joaquin Valley Air Pollution Control District (SJVAPCD) operates at the local level with primary responsibility for attaining and maintaining the federal and State Ambient Air Quality Standards (AAQS) in Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties, and portions of Kern County. The SJVAPCD is tasked with implementing programs and regulations required by the FCAA and the California Clean Air Act (CCAA), including preparing plans to attain federal and State AAQS. The SJVAPCD works jointly with the USEPA, CARB, SACOG, other air districts in the Central Valley region, county and city transportation and planning departments, and various non-governmental

organizations to improve air quality through a variety of programs. Programs include the adoption of regulations, policies and guidance, extensive education and public outreach programs, as well as emission reducing incentive programs.

Nearly all development projects in the Central Valley region have the potential to generate air pollutants and GHG emissions. Therefore, for most projects, evaluation of air quality and GHG emissions impacts is required to comply with CEQA. In order to help public agencies evaluate air quality impacts, the SJVAPCD has developed the *Guidance for Assessing and Mitigating Air Quality Impacts*.[17] The SJVAPCD's guide includes recommended thresholds of significance, including mass emission thresholds for construction-related and operational GHG emissions as well as GHG emissions from stationary sources. Projects resulting in emissions in excess of the SJVAPCD's mass emissions thresholds are required to implement all feasible mitigation to reduce GHG emissions.

San Joaquin Council of Governments

Under SB 375, SJCOG adopted the 2022 RTP/SCS.[18] The RTP/SCS applies the goals of SB 375 and is intended to reduce GHG emissions through coordination between transportation and land use planning. One of the key goals of the RTP/SCS, is the reduction of GHG emissions from passenger vehicles. To accomplish such reductions, the RTP/SCS seeks to improve connections between the housing stock and employment centers within the planning area through compact and mixed-use developments. Should development within the SJCOG region advance in a manner consistent with the RTP/SCS forecasts, SJCOG anticipates that the region would meet the GHG emissions reductions goals for the region while simultaneously reducing the emissions of certain criteria pollutants. Additionally, SJCOG uses the RTP/SCS as a means of prioritizing infrastructure investment within SJCOG's jurisdictions. Investment in infrastructure is split between large regional projects, such as highway interchange improvements and high occupancy vehicle lanes, as well as focused local projects such as investments in bicycle, pedestrian, and transit infrastructure.

Regional Transportation Plan/Sustainable Communities Strategy Update

The Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) is on a four-year update and adoption cycle. Consequently, SJCOG has prepared various staff reports, research documents, and draft preferred scenarios as part of the process of preparing the 2022 RTP/SCS. On December 24, 2020, SJCOG released a Notice of Preparation notifying the public that an Environmental Impact Report would be prepared to analyze potential impacts from implementation of the 2022 MTP/SCS. Following the environmental review, the 2022 RTP/SCS was subsequently adopted on August 25, 2022.

City of Manteca General Plan

The City's General Plan includes the following applicable goals, performance objectives, and policies related to air quality, GHG emissions, and energy.

[17] San Joaquin Valley Air Quality Management District. *Guidance for Assessing and Mitigating Air Quality Impacts*. Adopted March 2015.

[18] San Joaquin Council of Governments. *2022 Regional Transportation Plan and Sustainable Communities Strategy*. August 25, 2022.

Resource Conservation Chapter

Goal RC-4 Improve climate resiliency through reducing greenhouse gas emissions through sustainable energy, transportation, land use, and local governments actions that maximize energy efficiency and reduce energy usage and greenhouse gas emissions.

Policy RC-4.1 Support the conservation of energy through comprehensive and sustainable land use transportation, and energy planning, implementation greenhouse gas reduction measures, and inclusive public education and outreach regarding climate adaptation and greenhouse gas emissions to address opportunities to decrease emissions associated with growth, development, and local government operations.

Policy RC-4.2 Support and actively participate with the state, regional, and local agencies and stakeholders toward State greenhouse gas emission reduction goals.

Policy RC-4.3 Maintain an updated Climate Action Plan that addresses State adopted GHG reduction goals and provides effective measures to meet GHG targets.

Policy RC-4.4 Ensure that land use and circulation improvements are coordinated to reduce the number and length of vehicle trips.

Policy RC-4.5 Require private development to incorporate non-traditional nonpolluting renewable energy sources such as co-generation, wind, and solar, where feasible, to reduce dependence on fossil fuels and meet climate goals.

Policy RC-4.6 Require all new public and privately constructed buildings to exceed, where feasible, and comply with construction and design standards that promote energy conservation, including the most current “green” development standards in the California Green Building Standards Code.

Policy RC-4.7 Require expanded innovative and green building best practices, where feasible, including, but not limited to, LEED certification for all new development and retrofitting existing uses, and encourage public and private projects to exceed the most current “green” development standards in the California Green Building Standards Code.

Policy RC-4.8	Increase energy efficiency and conservation in public buildings and infrastructure.
Policy RC-4.9	Encourage the conservation of public utilities and use of renewable energy technologies in new development, rehabilitation projects, and in City buildings and facilities.
Policy RC-4.10	Encourage measures, including building siting and shading and use of shade trees, to reduce urban heat island effects
Policy RC-4.11	Support state efforts to power electricity with renewable and zero-carbon resources, such as solar and wind energy.
Policy RC-4.12	Encourage the conservation of petroleum products.
Policy RC-4.13	Encourage the installation of renewable energy technologies serving agricultural operations.

4. Regional Impacts of Climate Change

4. REGIONAL IMPACTS OF CLIMATE CHANGE

The following chapter will discuss the potential environmental impacts, such as temperature, precipitation, and wildfires, of climate change on the City of Manteca and surrounding areas. Additionally, specific local effects such as water supply, local agriculture, and public health are discussed beneath.

4.1 INTRODUCTION TO REGIONAL IMPACTS AND EFFECTS

Executive Order (EO) S-13-08 directed the Natural Resources Agency to prepare a climate adaptation strategy identifying the potential risks to California posed by climate change.[16] The initial climate adaptation strategy was prepared in 2009, with updates published in 2014 and 2018. The 2018 publication from the Natural Resources Agency titled Safeguarding California Plan: 2018 Update, known as the Safeguarding California Plan,[17] is the most recently published climate adaptation strategy for California.

The Safeguarding California Plan focuses on the increasingly visible effects of climate change, with specific focus on how climate change is currently impacting, and will continue to impact, some of California's most valuable assets. In addition to the Safeguarding California Plan, the State of California invests in scientific research related to the changing climate and identifies vulnerabilities and actions to reduce the resulting impacts to people and infrastructure. The most current information is documented in *California's Fourth Climate Change Assessment* (4th Assessment),[18] which contains reports for nine geographic regions of the State, including the San Joaquin Valley,[19] in which the City of Manteca is located. A companion to the 4th Assessment, the Cal-Adapt Snapshot Tool,[20] provides a platform for agencies to extract local data, which can be used to inform policy and program decisions. The potential impacts from the Local Climate Change Snapshot for Manteca (Manteca Snapshot) are summarized within this chapter. The full report is included as Attachment C to this CAP Update.

While many of the climate change impacts identified in the Safeguarding California Plan and the 4th Assessment occur on a Statewide or global scale, this section of the CAP Update will focus

16 State of California, Office of Governor Arnold Schwarzenegger. *Executive Order S-3-08*. November 2008.
17 State of California, *Natural Resources Agency. Safeguarding California Plan*: 2018 Update. January 2018.
18 State of California Governor's Office of Planning and Research, *State of California Energy Commission, and California Natural Resources Agency*. Available at: https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf. Accessed September 2023.
19 State of California Governor's Office of Planning and Research, State of California Energy Commission, and California Natural Resources Agency. California's Fourth Climate Change Assessment, *San Joaquin Valley Region Report*. Available at: https://www.energy.ca.gov/sites/default/files/2022-01/CA4_CCA_SJ_Region_Eng_ada.pdf. Accessed September 2023.
20 Cal-Adapt. *Local Climate Change Snapshot Tool.* Available at: https://cal-adapt.org/tools/local-climate-change-snapshot. Accessed August 2023.

on those impacts that could directly impact Manteca. Based on the Safeguarding California Plan, 4th Assessment, and Manteca Snapshot, global climate change may impact the following local conditions: temperature increases, precipitation changes, and wildfires.

Temperature Increases

Temperature is analyzed in multiple ways for climate impacts: annual average maximums, extreme heat days, warm nights, and annual average minimums.

The Manteca Snapshot reports that California expects increases in temperature in the twenty-first century. For Manteca specifically, the annual average maximum temperature is 74.4 degrees Fahrenheit (observed over 30 years) and by mid-century (2035-2064) is expected to increase 3.8 degrees to 78.2 degrees Fahrenheit under the Representative Concentration Pathway (RCP) 4.5, which is described by the Intergovernmental Panel on Climate Change as a moderate scenario in which GHG emissions peak around 2040 and then decline. Another scenario, RCP 8.5, is the highest baseline GHG emissions scenario in which emissions continue to rise throughout the twenty-first century without declining. For the RCP 8.5 scenario, the annual average maximum temperature is expected to increase 4.7 degrees to 79.1 degrees Fahrenheit by mid-century.

Extreme heat days are defined as days with temperatures greater than the threshold temperature, which is the 98th percentile value of the historical daily maximum temperatures from 1961-1990, between April and October. The historical number of extreme heat days for Manteca is four days each year (observed over 30 years), and by mid-century (2035-2064) is expected to increase by 11 days under the RCP 4.5 scenario and 16 days under the RCP 8.5 scenario.

The annual average minimum temperature in Manteca is 48.1 degrees Fahrenheit (observed over 30 years), and by mid-century (2035-2064) is expected to increase 3.3 degrees to 51.3 degrees Fahrenheit under the RCP 4.5 scenario. For the RCP 8.5 scenario, the annual average minimum temperature is expected to increase 4.2 degrees to 52.2 degrees Fahrenheit.

Warm nights are considered when daily minimum temperatures are above a threshold temperature. The default warm night threshold temperature is the 98th percentile of historical overnight minimum temperatures from 1961-1990, between April and October. The historical number of warm nights for Manteca is four nights each year (observed over 30 years), and by mid-century (2035-2064) is expected to increase by 12 nights under the RCP 4.5 scenario and 19 nights under the RCP 8.5 scenario.

Temperature changes within the City of Manteca could impact:

- Irrigation requirements for businesses, residences, and City facilities (i.e., parks);
- Agricultural production;
- Biodiversity in parks, open spaces, and agricultural lands;
- Energy and expenditures required to keep businesses, residences, and City facilities cool;
- Demand on emergency services to respond to heat-related health incidences; and
- Exposure to potential increases in air pollution.

Precipitation Changes

Precipitation is analyzed in a few different ways for climate impacts: maximum single-day precipitation; maximum length of dry spell; and annual precipitation.

The Manteca Snapshot reports that the dry years will become drier and wet years will become wetter. Dry years could occur consecutively, creating drought conditions. Storms will become more intense but have shorter wet seasons. For Manteca, the maximum single-day precipitation is 1.093 inches (observed over 30 years), and by mid-century (2035-2064) is expected to increase by 0.05 inches under the RCP 4.5 scenario and 0.064 inches under the RCP 8.5 scenario.

Maximum length of dry spell is the maximum number of consecutive days each year with precipitation less than one millimeter. For Manteca, the maximum length of dry spell observed over 30 years is 125 days, and by mid-century (2035-2064) is expected to increase by six days under the RCP 4.5 scenario and seven days under the RCP 8.5 scenario.

Lastly, precipitation is measured by annual inches. Manteca's annual precipitation observed over 30 years is 12.1 inches, and by mid-century (2035-2064) is expected to decrease by 0.2 inches under the RCP 4.5 scenario. The RCP 8.5 scenario would not result in a change.

Precipitation changes within the City of Manteca could impact:

- Availability of surface water and groundwater for potable sources;
- Irrigation requirements for businesses, residences, and City facilities;
- Agricultural production;
- Flooding; and
- Drought.

Wildfires

Wildfires in California have been more severe and frequent in part as a result of the changing climactic conditions. Although wildfires are not expected to occur within the City limits, the consequences of wildfires are still experienced in Manteca. Wildfires in surrounding areas could lead to the following impacts within the City of Manteca:

- Increase in public health impacts such as asthma and other respiratory ailments due to exposure to air pollution;
- Cancellation of sporting events and school physical education classes; and
- Increased demand for medical services and fire protection services.

4.2 EFFECTS OF CLIMATE CHANGE WITHIN MANTECA

The foregoing changes are expected to directly influence the residents, employees, and visitors of Manteca. Specific regional effects related to widescale changes in temperature, precipitation, and wildfire are discussed in further detail below.

Effects on Water Resources

Water is of crucial importance to all facets of everyday life. Potential effects on water supply due to changes in precipitation frequency and timing (from both rainfall and snowmelt) due to climate change could be a future threat to supply. Although uncertainty exists regarding the specific

outcomes of climate change on precipitation patterns within the State, scientists agree that climate change will alter the hydrologic patterns. In particular, climate change is anticipated to affect the frequency, magnitude, and duration of extreme weather events, and result in declining snowpack, as well as more frequent and longer droughts.[21] Furthermore, an increased proportion of winter precipitation is anticipated to fall as rain, rather than snow, and the snow that does accumulate is anticipated to melt earlier in the year. The combined effect of less overall snowfall and earlier melting will be a change in the timing and volume of snowmelt, which will alter streamflow. Such changes to precipitation regimes could also result in reduced or irregular groundwater recharge within the watershed.

Manteca's water supply consists of both surface water and groundwater. The City of Manteca requires potable water for sinks, toilets, and drinking fountains in its buildings, and water for irrigating landscaped areas, including parks and sports fields, trails, landscape corridors, roadway medians, and more. The 2020 Urban Water Management Plan[22] indicates Manteca purchases treated surface water from South San Joaquin Irrigation District (SSJID) conveyed from the Stanislaus River, and groundwater pumped by the City from City-owned and operated wells. The City also uses irrigation wells for non-potable water demands such as landscaping, and recycled water from the City's Wastewater Quality Control Facility. Considering the link between precipitation, surface water, and groundwater, future supply is dependent on climactic trends and precipitation patterns within the San Joaquin Valley Basin, Eastern San Joaquin Subbasin, and the State.

In addition to altering surface water and groundwater, changes in precipitation patterns could affect the risk of flooding within the City. Extreme weather events such as heavy precipitation events can stress existing flood control infrastructure resulting in both localized and regional flooding. Localized flooding could result from stormwater drainage systems being overwhelmed by extreme rainfall events, and can result in routine disruptions to City life, as streets, businesses, and/or homes can be damaged. Regional flooding issues can be caused when stormwater overwhelms larger infrastructure such as levees or dams. Major regional flood control infrastructure within California was designed based on historic precipitation patterns within the State. Climate change induced changes to precipitation patterns within the State could pose threats to such infrastructure. For instance, when rain falls on previously accumulated snow, the runoff from such precipitation events can overwhelm the storage capacity of dams requiring large amounts of water discharge. High discharge rates can lead to levee overtopping or degradation and rivers overtopping natural banks.[23] Regional flooding poses a risk to many communities within California, including the City of Manteca.

As temperatures change (including extreme heat events, higher minimum and maximum temperatures, etc.) in the northern San Joaquin Valley, a higher volume of water would be required to sustain healthy vegetation in landscaped areas and parks. During future droughts, the

[21] State of California, Natural Resources Agency. *Safeguarding California Plan: 2018 Update*. January 2018.

[22] City of Manteca. June 2023. *2020 Urban Water Management Plan*. Available at: https://www.manteca.gov/home/showpublisheddocument/5814/638236309616300000. Accessed September 8, 2023.

[23] State of California Department of Justice. *Climate Change Impacts in California*. Available at: https://oag.ca.gov/environment/impact. Accessed September 25, 2023.

ground water level in the Eastern San Joaquin Subbasin could deepen and surface waters from the Stanislaus River could be reduced, which could lead to increase costs of water collection. The increased demand for water compounded with decreased water availability could present a challenge for the City and require reductions in water usage.

A decrease in water availability for agriculture due to temperature and precipitation changes may lead to a reduction in crop production. Temperature and precipitation change also directly effect agriculture production by reducing chill hours for crops, and decreasing photosynthesis and pollination, among other biological impacts. A decrease in tule fog may reduce the dormancy that some fruit and nut trees require. Carbon dioxide concentrations also may directly affect nitrogen fixation, water use efficiency, and yield production.[24]

The changes in water resources, temperature, precipitation, and agriculture may impact biodiversity in the open spaces, parks, and areas surrounding Manteca. Biodiversity refers to the variety of living things in an ecosystem, including plants, animals, microbes, habitats, and even genetic diversity within a species. A diverse ecosystem is considered to be a robust and resilient ecosystem. Genetic diversity allows organisms to adapt to their environment as the environment changes or new diseases come into play. Climate change can cause a decline in biodiversity by altering the availability of water and nutrient resources, creating an environment suitable for new plant and animal diseases, and leading to a decrease in the overall resilience of ecosystems. A warming earth can also cause plants to flower earlier in the year and shift the timing of bird migration, which can subsequently affect other inter-related natural processes. In addition, humans often depend on biodiversity in local parklands and open space areas for spirituality, inspiration, aesthetic enjoyment, and recreation. Humans benefit from the ecosystem services provided by biodiverse habitats, which include nutrient cycling, pollination, air purification, stormwater control, and others.[25, 26]

Effects on Public Health

Climate change poses multiple threats to public health, including risks related to extreme heat events, wildfire smoke, and declining air quality. Increases in average and maximum air temperatures would contribute to increased risk of dehydration, heat exhaustion, heat stroke, and other heat-related illnesses throughout the City of Manteca.

In addition to the direct physical effects that can occur due to excessive heat exposure, higher temperatures have the potential to degrade air quality, which can affect the respiratory health of residents. Higher temperatures increase the formation of unhealthy air pollutants such as ozone and particulate matter; thus, while the emission of pollutants may remain constant, the quality of

[24] State of California Governor's Office of Planning and Research, State of California Energy Commission, and California Natural Resources Agency. 2022. California's Fourth Climate Change Assessment, San Joaquin Valley Region Report. Pages 47-52. Available at: https://www.energy.ca.gov/sites/default/files/2022-01/CA4_CCA_SJ_Region_Eng_ada.pdf. Accessed September 5, 2023.

[25] United Nations Environment Programme. *Global Environment Outlook GEO4 Environment for Development*. 2007. Available at: https://wedocs.unep.org/handle/20.500.11822/7646;jsessionid=E5E3FA788FF9552735D898F9D76359BE. Accessed September 25, 2023.

[26] Center for Health and the Global Environment at Harvard Medical School. *Biodiversity: Its Importance to Human Health*. 2002. Available at: http://www.dcnanature.org/wp-content/uploads/fundraising/Biodiversity-Importance-to-Human-Health.pdf. Accessed September 25, 2023.

the air is still degraded due to the increased formation of harmful air pollutants. Ozone and particulate matter contribute to a variety of health problems such as asthma, acute respiratory diseases, cardiovascular diseases, and decreased lung capacity.[27]

Groups vulnerable to the negative health effects of poor air quality include infants, the elderly, and people working or recreating outdoors. Young athletes may prove to be especially vulnerable, as young adults typically perceive themselves to be healthier and more resilient, and because negative effects of poor air quality may not express themselves immediately, athletes may wrongly assume that poor air quality is not affecting their health. In reality, effects of poor air quality can increase with long-term exposure, and may not manifest immediately upon initial exposure. Consequently, any resident that works, recreates, or spends any substantial amount of time outside would be impacted by decreased air quality. Although these various pollutants are not addressed as part of this CAP Update, the pollutants are continually regulated by the SJVAPCD.

Although the City does not have an increased threat of wildfires due to its urban nature, increases in wildfires in the State have a negative effect on air quality, and can emit substantial amounts of volatile organic compounds, as well as particulate matter. Youth sporting events, including practices, and other outdoor events could be cancelled or postponed in the event of poor air quality days due to fire. Outdoor workers are similarly exposed, but due to economics, outdoor work is not generally cancelled or delayed due to poor air quality. Decreased air quality most severely impacts individuals with existing respiratory ailments, such as asthma, and can result in increased demand for emergency health services.

Conclusion of Local Effects

Many members of the community rely on agriculture and related services for economic productivity, and the municipality of Manteca is tasked with protecting the health and prosperity of the residences of the community and its employees and visitors. Considering the potential effects of climate change on water resources, agriculture, and public health, the State has enacted various laws in an attempt to curb such impacts of climate change. Laws including AB 32, SB 97, SB 375, SB 32, and SB 743 establish Statewide efforts to reduce GHG emissions in order to avoid the anticipated effects of climate change. In an effort to work towards implementing the foregoing State laws and various executive orders, and achieving State climate goals, the City of Manteca is doing its part to protect environmental health, human safety, and prosperity within the region. Such actions, taken on a community level, will work in concert with the actions taken by the County, SJVAPD, SJCOG, the State, and the federal government, to reduce the impacts and threat of climate change.

[27] California Air Resources Board. *Common Air Pollutants*. Available at: https://ww2.arb.ca.gov/resources/common-air-pollutants. Accessed September 11, 2023.

5. EMISSIONS QUANTIFICATION

5. EMISSIONS QUANTIFICATIONS

The following chapter will provide an overview of the planning background, target setting, inventories, and methodology for emissions quantifications used in the CAP Update.

5.1 PLANNING BACKGROUND AND TARGET SETTING

The City of Manteca's City Council appointed members of the Manteca Climate Action Plan Advisory Committee (CAPAC) in 2023 to advise during the CAP Update process. The CAPAC met regularly over the course of late 2023 and 2024 to set GHG reduction goals, discuss public outreach, the feasibility of goals, and reduction strategies. Over this period of planning the CAPAC set emission reduction targets to 6 MTCO2e per capita by 2030 and carbon neutrality by 2045, which are consistent with the State's targets.

California's GHG emissions reduction goals, as discussed in the Regulatory Setting section of this CAP Update, were established by various executive orders and legislated in AB 32 and SB 32. [28] The *California's 2022 Climate Change Scoping Plan,* adopted by the CARB on December 15, 2022, updated State objectives to reduce anthropogenic emissions by 40 percent below 1990 levels and aiming to achieve carbon neutrality by 2045.[29] The CAPAC's 6 MTCO2e per capita target is consistent with the 2022 Scoping Plan Update. Additionally, the target of carbon neutrality is in line with State goals, as legislated in EO B-55-18 and recommended in the 2022 Scoping Plan Update.

5.2 QUANTIFYING THE CAP UPDATE GHG INVENTORY

The following sections summarize efforts to quantify and inventory the City of Manteca's GHG emissions in 2020, as well as the forecasted GHG emissions for 2030 and 2045. The four key concepts relating to inventories and forecasts are as follows:

- **Baseline Inventory.** *The baseline inventory is typically the most recent year with complete data for citywide emissions. The inventory acts as the basis for the creation of emission forecasts.*

- **Business-as-Usual Forecast.** *In order to illustrate the benefits and effectiveness of the state and local regulations, business-as-usual depicts emissions without restrictions or control. The inventories aid in depicting the magnitude of the issues if action is not taken.*

- **Statewide Adjusted Forecast.** *Emission reductions through the implantation of State programs, regulations, and policies. State requirements are applied to the business-as-usual forecasts to identify the reductions remaining needed through local measures to remain consistent with AB 32 and SB 32.*

[28] California Air Resources Board. *Achieving Carbon Neutrality in California.* October 2020.
[29] California Air Resources Board. *2022 Scoping Plan for Achieving Carbon Neutrality.* December 2022.

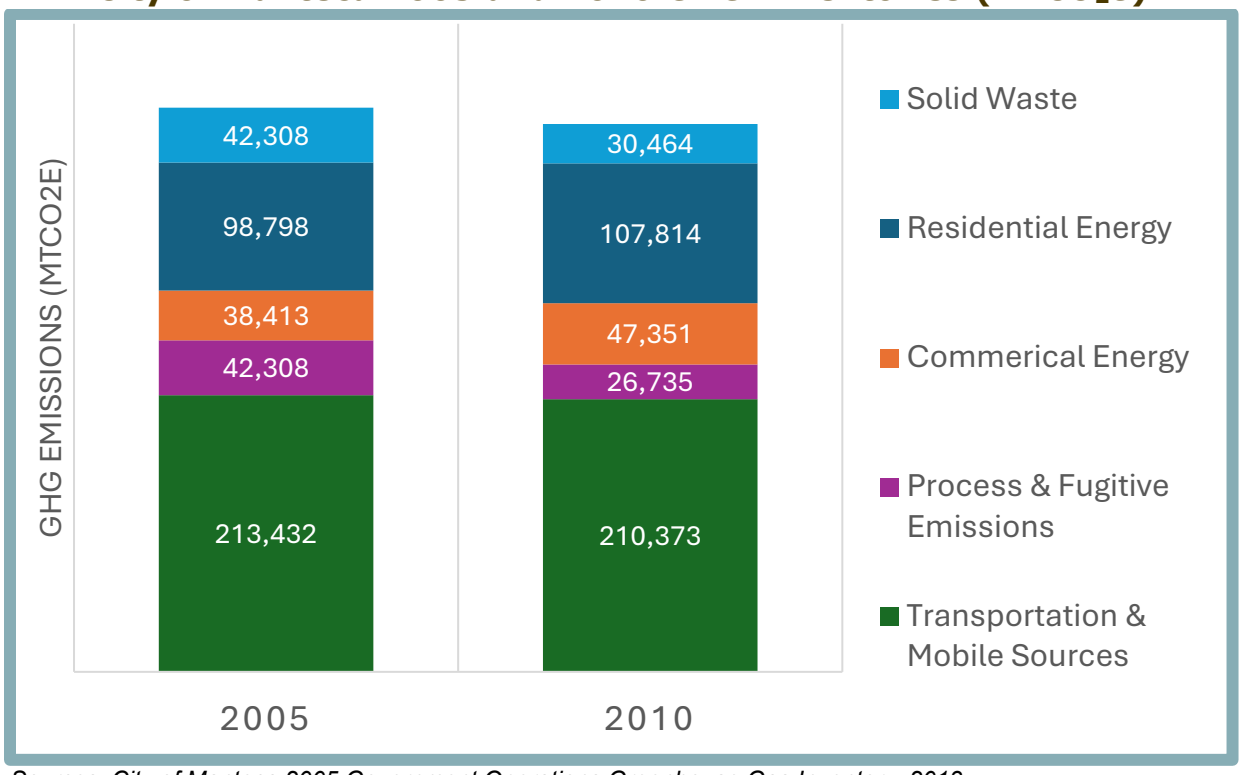
- **CAP Update Forecast**. *The CAP Update forecast demonstrates the final emissions after applying local goals and measures to the remaining emissions. The forecast illustrates the effectiveness of the CAP Update measures in reaching the intended targets.*

Emissions were estimated and calculated using the International Council for Local Environmental Initiatives (ICLEI) recommended methodologies. The following sections of this chapter present the methodology used to calculate emissions. To estimate future emissions within the City, emissions from operations and activities within the City were first inventoried and emissions quantified. Following the inventory of existing Citywide emissions in 2020, growth estimated based on population projections were used to estimate future emissions levels. The 2020 inventory was created for the CAP Update to act as a baseline update to the previous 2005 and 2010 CAP inventories.

Previous GHG Emissions Quantifications

Based on the 2013 CAP inventories for 2005 and 2010, Figure 9, shows emissions from on-road transportation, such as passenger automobiles, heavy duty trucks and service vehicles constitute the largest sector of emissions within the City. Residential, commercial, and industrial developments within the City consume energy in the form of electricity and natural gas. Although the majority of electricity, and all of the natural gas, consumed within the City of Manteca is not produced within the City limits, because such resources are consumed within the City, the emissions related to the production of electricity and the burning of natural gas are attributed to the City of Manteca. Residential, commercial, and industrial electricity consumption as well as natural gas use represent the second and third largest sources of emissions, respectively. Solid waste emissions represent the smallest portion in both inventories.

Figure 9
City of Manteca 2005 and 2010 GHG Inventories ($MTCO_2e$)



Sources: City of Manteca 2005 Government Operations Greenhouse Gas Inventory, 2013.
City of Manteca 2010 Government Operations Greenhouse Gas Inventory, 2013.

2020 Municipal Inventory

Table 2
City of Manteca 2020 Baseline Government Operations

Government Sector	Metric Tons (CO2e)	Percent of Sector Emissions
Buildings & Facilities	786	12.5%
Vehicle Fleet	2,705	43.3%
Employee Commute	792	12.6%
Solid Waste Facilities	202	3.2%
Water & Wastewater Treatment Facilities	1,304	20.8%
Street Lights & Traffic Signals	144	2.3%
Transit Fleet	332	5.3%
Total	**6,265**	**100%**

CO2e = carbon dioxide equivalents
ICLEI City of Manteca. *2020 Manteca Government Operations Baseline.* June 2023

The City of Manteca's Municipal operations total emissions of 6,265 $MTCO_2e$ the 2020 baseline inventory as shown in Table 2. The majority of emissions originated from the vehicle fleet sector and water & wastewater treatment facilities sector, which combined accrue over 64 percent of the total 2020 emissions.

2020 Community Inventory

Baseline local community emissions are presented in Table 3 below. The City of Manteca's Community emissions largely differ from municipal operations in the difference of sector percentages. The Transportation & Mobile Sources Sector constitutes 72 percent of the community baseline, with the rest of the sectors' percentages falling between five percent to nine percent.

Table 3
City of Manteca 2020 Baseline Community Emissions

Community Sector	Metric Tons (CO2e)	Percent of Sector Emissions
Residential Energy	65,272	9%
Commercial Energy	33,715	5%
Transportation & Mobile Sources	523,215	72%
Solid Waste	56,157	8%
Process & Fugitive Emissions	45,578	6%
Total	**723,937**	**100%**

CO2e = carbon dioxide equivalents
ICLEI City of Manteca. 2020 Manteca Community Baseline. June 2023

5.3 MANTECA GHG EMISSIONS FORECASTS

The City's 2043 General Plan established a vision for growth within the City's Planning area. Using the City's adopted General Plan in combination with the current and anticipated regional economic conditions, the San Joaquin Council of Governments (SJCOG) has produced growth estimates for the number of households that will be developed within the City of Manteca. Based on growth projections estimates for the number of households within the City by the year 2045, the City of Manteca's population is anticipated to increase to 165,301 residents, which would be an increase of 81,803 residents from 2020 population levels.

Rapid growth of residential and employment type development within the City of Manteca will increase GHG emitting activities such as the use of fossil fueled vehicles, the consumption of electricity, the consumption of water, the generation and treatment of wastewater, and the disposal of solid waste. Additionally, as the City of Manteca's residential, commercial, and industrial sectors grow, the size and activity of the municipal government is anticipated to grow as well. Such growth in the municipal government is anticipated to include increased electricity consumption related to new or expanded government facilities, installation and operation of new streetlights, expansion of the City's vehicle fleet, and increased wastewater treatment volumes at the City's wastewater treatment plant.

Based on the growth anticipated within the City of Manteca for the community and municipal government, future emissions within the City were estimated for the years 2030 and 2045. It should be noted that Statewide actions are anticipated to lower emissions from common sources such as electricity generation and vehicle use. Such Statewide actions include, but are not limited to, the RPS program that reduces the carbon intensity of electricity generations, programs related to AB 1007, which include the LCFS to reduce the carbon intensity of transportation fuels and promote alternatively fueled vehicles. To illustrate the efficacy of such Statewide actions, two separate emissions forecasts have been prepared for the years 2030 and 2045. The first emissions forecast, hereinafter referred to as the Business As Usual (BAU) forecast scenario, does not include any Statewide actions that may reduce GHG emissions. Thus, the BAU forecasts present a worst-case emissions scenario predicting the emissions that could occur, under the growth scenarios discussed above, should the City of Manteca and State fail to act sufficiently to control future GHG emissions.

However, as previously stated, Statewide emissions reductions strategies are in place related to electricity generation and demand, transportation, and various other emissions sources, and such strategies will work to reduce GHG emissions from activities within the City of Manteca. Therefore, a second emissions forecasting scenario has been prepared that depicts Citywide emissions that would occur in the absence of specific City policies to reduce GHG emissions, but with implementation of Statewide programs that would work to reduce emissions from activities in the City. The emissions forecast presented under the second scenario is considered more likely to occur because Statewide programs have been legislated and are currently being enacted, but the worst-case emissions forecast provided by the BAU forecast scenario is useful for analysis purposes and required for qualified CAPs.

Business-as-Usual Forecast

In the absence of Statewide emissions reductions programs and City adoption of this CAP Update, Citywide emissions are anticipated to grow in proportion to the population growth within the City. The City of Manteca Business as Usual scenario emissions are shown in Table 4 and Table 5. The anticipated growth in emissions is presented below in Figure 10 through Figure 12.

The emissions forecasts presented in Figure 10 through Figure 12 are broken down between those emissions originating from activities in the larger community, such as emissions from residential energy use, and emissions resulting from municipal government operations, such as emissions from the City of Manteca’s vehicle fleet.

Table 4
City of Manteca Business-as-Usual Government Forecast

Year	2030		2045	
Government Sector	**Metric Tons (CO2e)**	**Percent of Sector Emissions**	**Metric Tons (CO2e)**	**Percent of Sector Emissions**
Buildings & Facilities	857	14%	1,207	15%
Vehicle Fleet	2,485	41%	3115	38%
Employee Commute	728	12%	913	11%
Solid Waste Facilities	236	4%	332	4%
Water & Wastewater Treatment Facilities	1,310	22%	1989	25%
Street Lights & Traffic Signals	109	2%	153	2%
Transit Fleet	322	5%	414	5%
Total	**6,047**	**100%**	**8,123**	**100%**

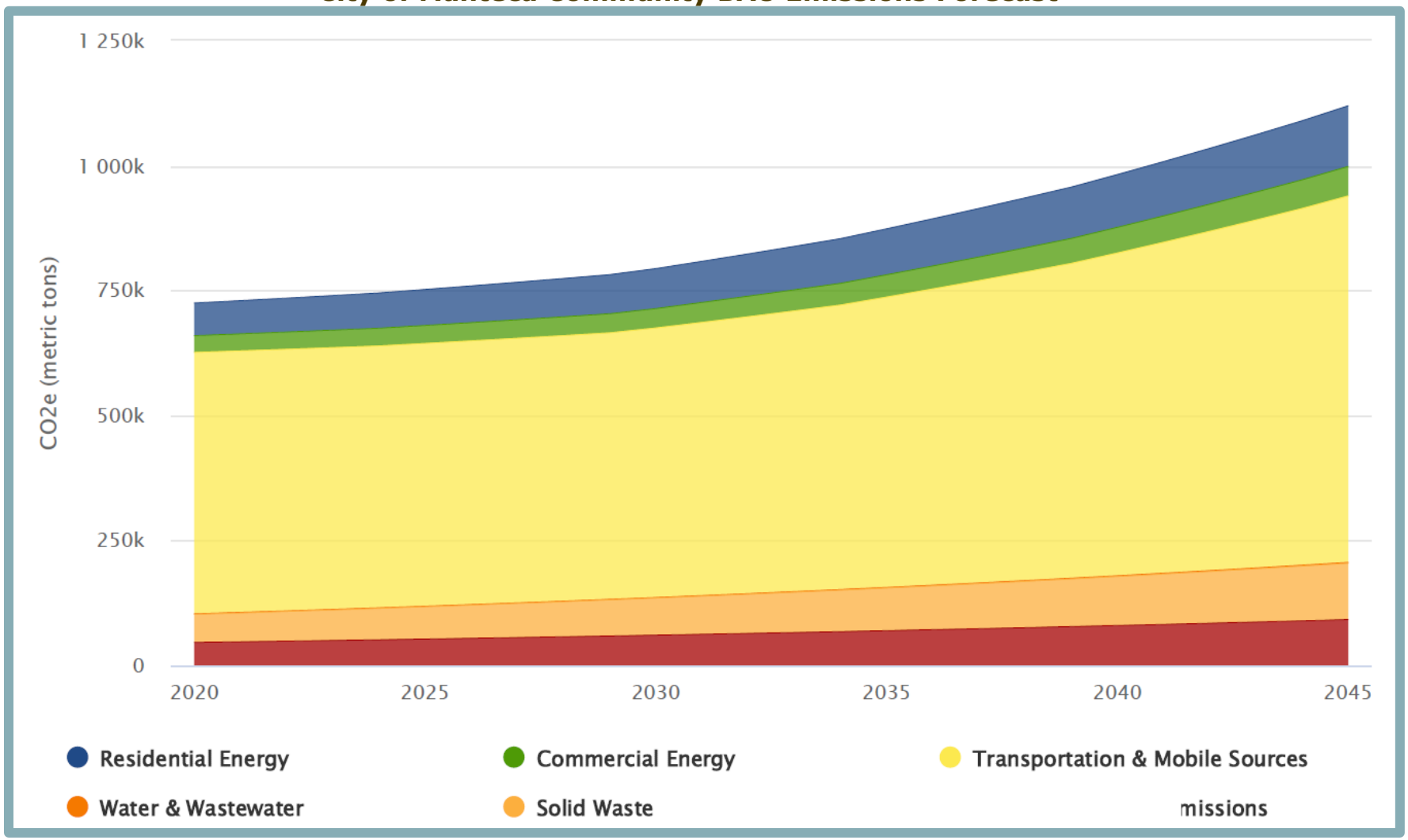
CO2e = carbon dioxide equivalents
ICLEI City of Manteca. *2045 Government Operations Forecast.* April 2025

Table 5
City of Manteca Business-as-Usual Community Forecast

Year	2030		2045	
Community Sector	**Metric Tons (CO2e)**	**Percent of Sector Emissions**	**Metric Tons (CO2e)**	**Percent of Sector Emissions**
Residential Energy	79,992	10%	121,441	11%
Commercial Energy	38,983	5%	59,182	5%
Transportation & Mobile Sources	539,526	68%	733,527	66%
Solid Waste	74,179	9%	112,616	10%
Process & Fugitive Emissions	60,205	8%	91,401	8%
Total	**792,885**	**100%**	**1,118,167**	**100%**

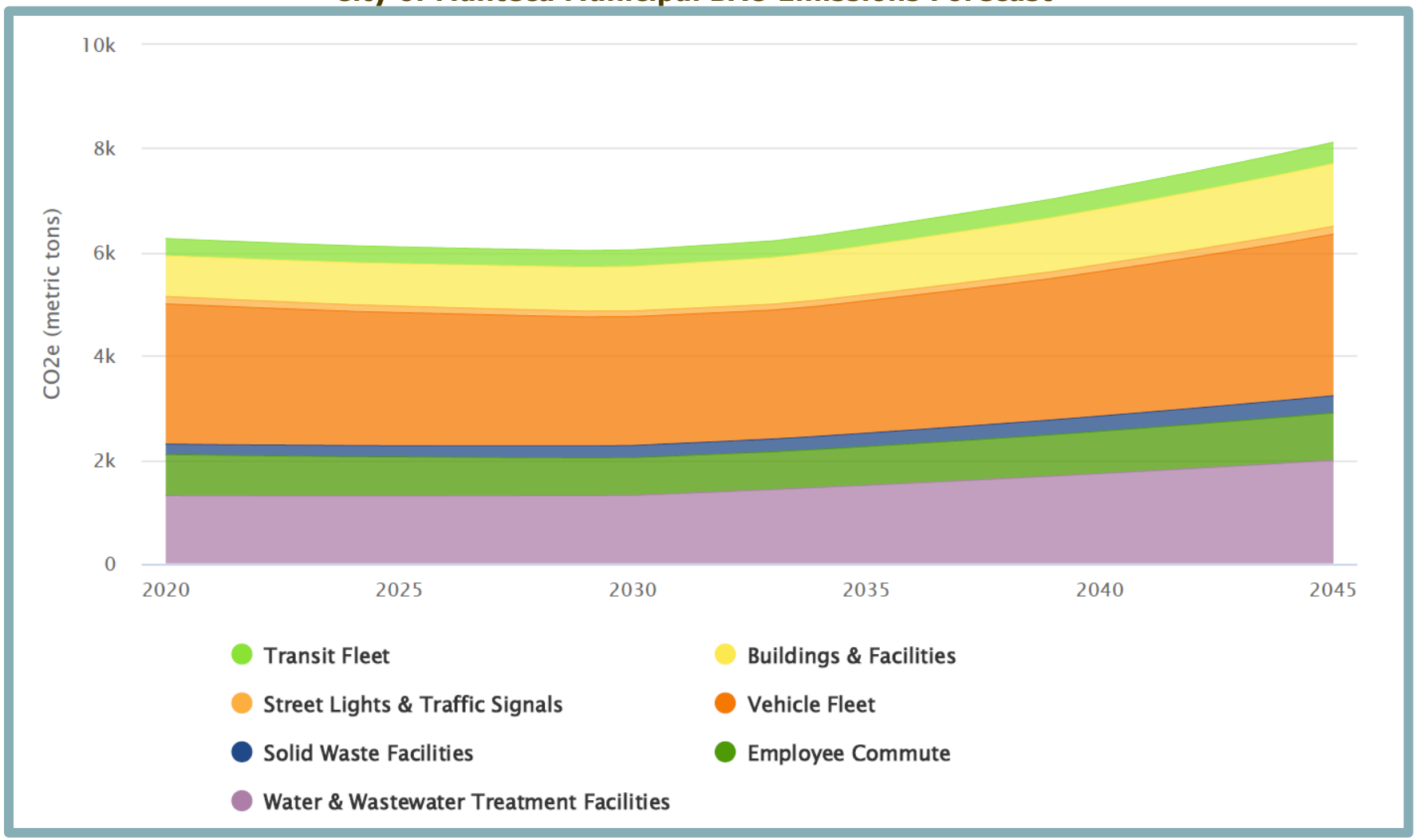
CO2e = carbon dioxide equivalents
ICLEI City of Manteca. *2045 Community Forecast.* April 2025

Figure 10
City of Manteca Community BAU Emissions Forecast



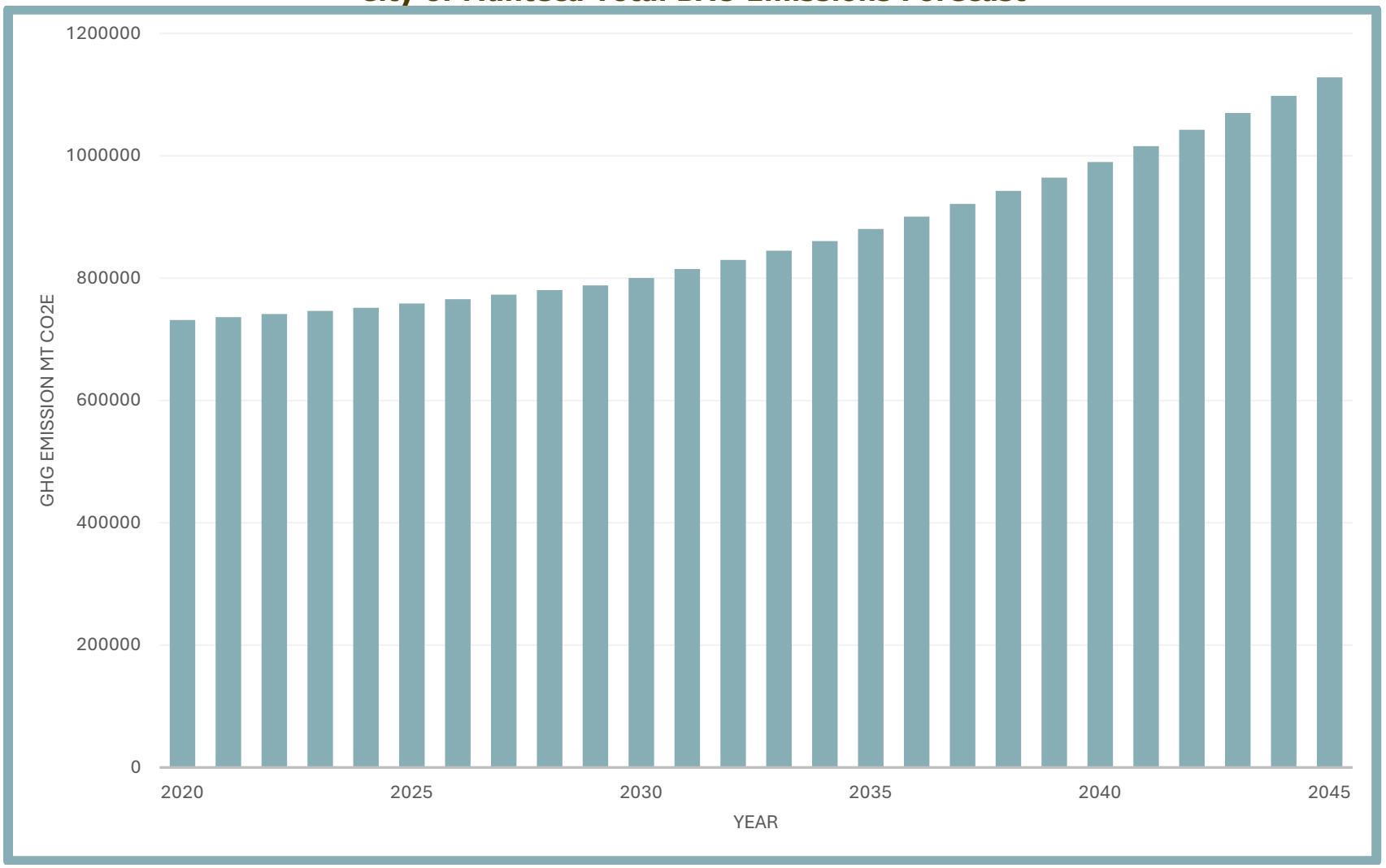
Source: Clearpath, 2024.

Figure 11
City of Manteca Municipal BAU Emissions Forecast



Source: Clearpath, 2024.

Figure 12
City of Manteca Total BAU Emissions Forecast



Source: Clearpath, 2024.

Under the assumption that neither the City's CAP Update nor Statewide emissions reductions policies were to be implemented, as shown in Table 6, the communitywide GHG emissions would rise from the inventoried level of 730,202 $MTCO_2e$ per year to 798,932 $MTCO_2e$ per year by 2030 and 1,126,290 $MTCO_2e$ by the year 2045.

Table 6
Comparison of Community Business-as-Usual Forecasts

	2020	2030	2045
Population	83,498	114,934	165,302
Total Community Emissions	730,202	798,932	1,126,290
Per Capita Emissions Rate	8.75	6.95	6.81
Exceeds Emissions Targets?	**YES**	**YES**	**YES**

Sources: Population Forecast for Manteca. November 2024; Clearpath, 2025.

The foregoing increases in total GHG emissions would occur in concert with, and in large part because of, concurrent growth in the population of the City of Manteca. Therefore, despite the total increase in GHG emissions, per capita emissions rates would fall from 8.75 $MTCO_2e$/yr/capita in 2020 to 6.95 $MTCO_2e$/yr/capita in 2030 and finally lowering to 6.81 $MTCO_2e$ per capita per year in 2045. Notwithstanding the decrease in per capita emissions rates between 2020 and 2045, the City of Manteca's anticipated per capita emission rates under the BAU scenario would exceed the emission targets shown in Table 6.

Statewide Programs Forecast

The State of California has initiated numerous programs that act to reduce GHG emissions from a variety of sources throughout the State. Such programs have been enacted irrespective of the adoption of a CAP Update by the City of Manteca and would act to reduce GHG emissions from existing and future development within the City. Actions initiated as part of existing Statewide programs would include, but are not limited to, the RPS for electric utilities, low carbon fuel standards, building energy efficiency standards, water use efficiency standards, and solid waste reduction measures.

Considering that full implementation of the State's existing programs would reduce GHG emissions from existing and future development within the State, including within the City of Manteca, future emissions within the City of Manteca will likely be lower than the emissions presented under the BAU development scenario above. Consequently, a second emissions forecast scenario has been prepared to account for such Statewide programs. It should be noted that other than the inclusion of Statewide programs, all other assumptions related to future development within the City and emissions sources remained constant between the BAU emissions forecast and the emissions forecast with Statewide programs.

Although initiated at a Statewide level, the foregoing Statewide programs would result in demonstrable emissions reductions at a local level. For instance, the State's recently updated RPS program now requires that all electricity provided to customers by public utilities within the state be sourced solely from renewable sources by the year 2045. Because Pacific Gas & Energy (PG&E) is subject to the State's RPS requirements, electricity consumption within the City of Manteca in the years 2045 and beyond will not result in GHG emissions. Considering that electricity consumption represents a large existing source of GHG emissions from City activities, the elimination of such emissions due to implementation of the RPS program will result in the

avoidance of a significant amount of GHG emissions. Similarly, Statewide requirements for low carbon fuel standards, zero emissions transit fleets, and vehicle efficiency standards will reduce the rate of emissions from vehicle use within the City of Manteca, irrespective of the City's adoption of this CAP Update.

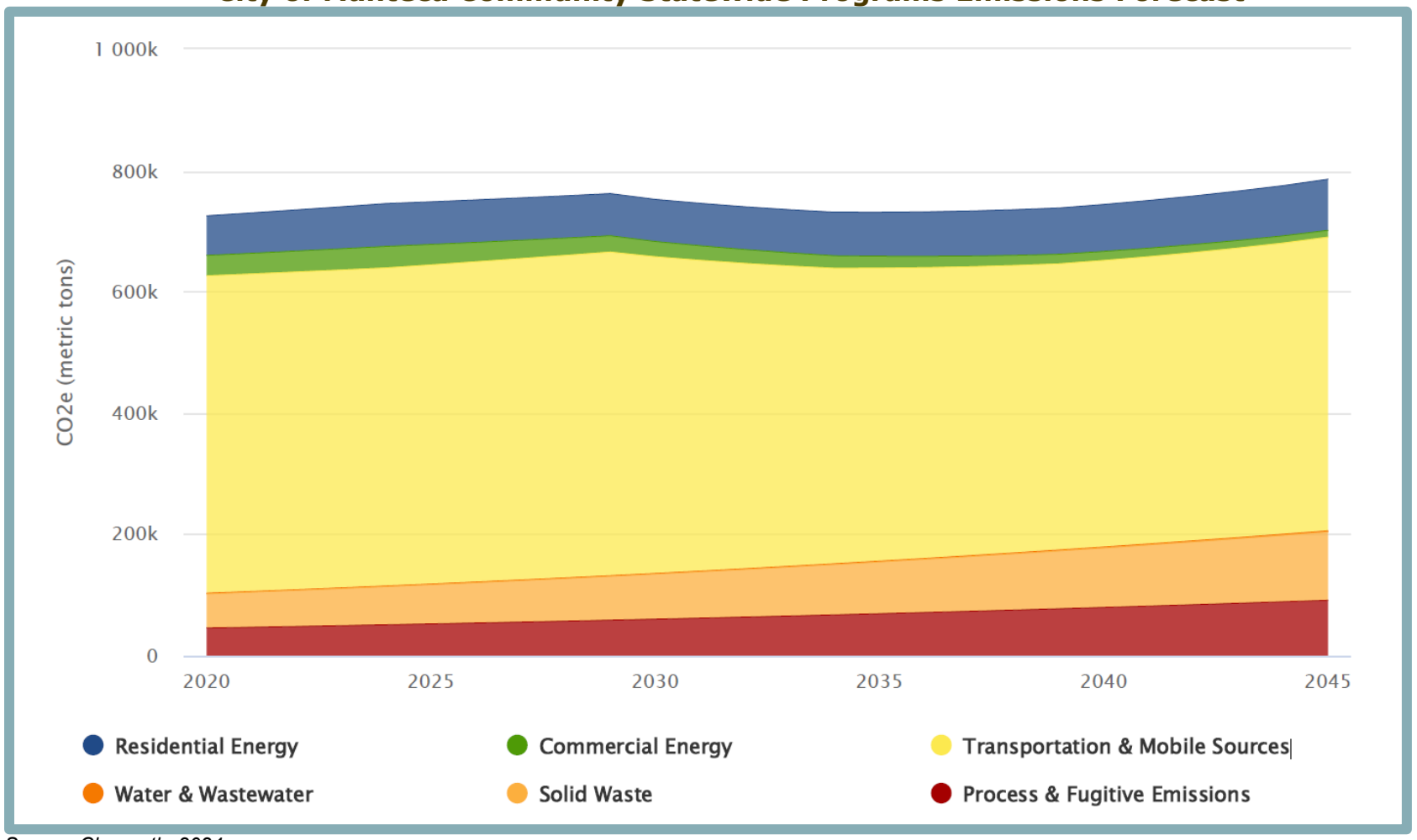
Full implementation of currently adopted Statewide policies would result in substantial reductions to existing sources of emissions while also reducing the number of emissions that would be anticipated from future development. As a result, and as shown in Figure 13 through Figure 15 below, despite the continued growth of the City of Manteca, GHG emissions are anticipated to initially begin at the 2020 inventory level of 730,202 $MTCO_2e$ per year, then increase to 757,910 $MTCO_2e$ per year by 2030. Eventually, as growth intensifies within the City of Manteca past the year 2030, emissions are anticipated to rise to 792,214 $MTCO_2e$/year in 2045. Estimated population, emissions level, and per capita emissions rates with inclusion of Statewide programs are presented in Table 7 through Table 9.

Table 7
City of Manteca Statewide Programs Government Forecast

Year	2030		2045	
Government Sector	**Metric Tons (CO2e)**	**Percent of Sector Emissions**	**Metric Tons (CO2e)**	**Percent of Sector Emissions**
Buildings & Facilities	842	15%	1,153	18%
Vehicle Fleet	2,069	37%	1,820	28%
Employee Commute	728	13%	913	14%
Solid Waste Facilities	181	3%	141	2%
Water & Wastewater Treatment Facilities	1,310	24%	1,989	30%
Street Lights & Traffic Signals	109	2%	153	2%
Transit Fleet	322	6%	414	6%
Total	**5,561**	**100%**	**6,583**	**100%**

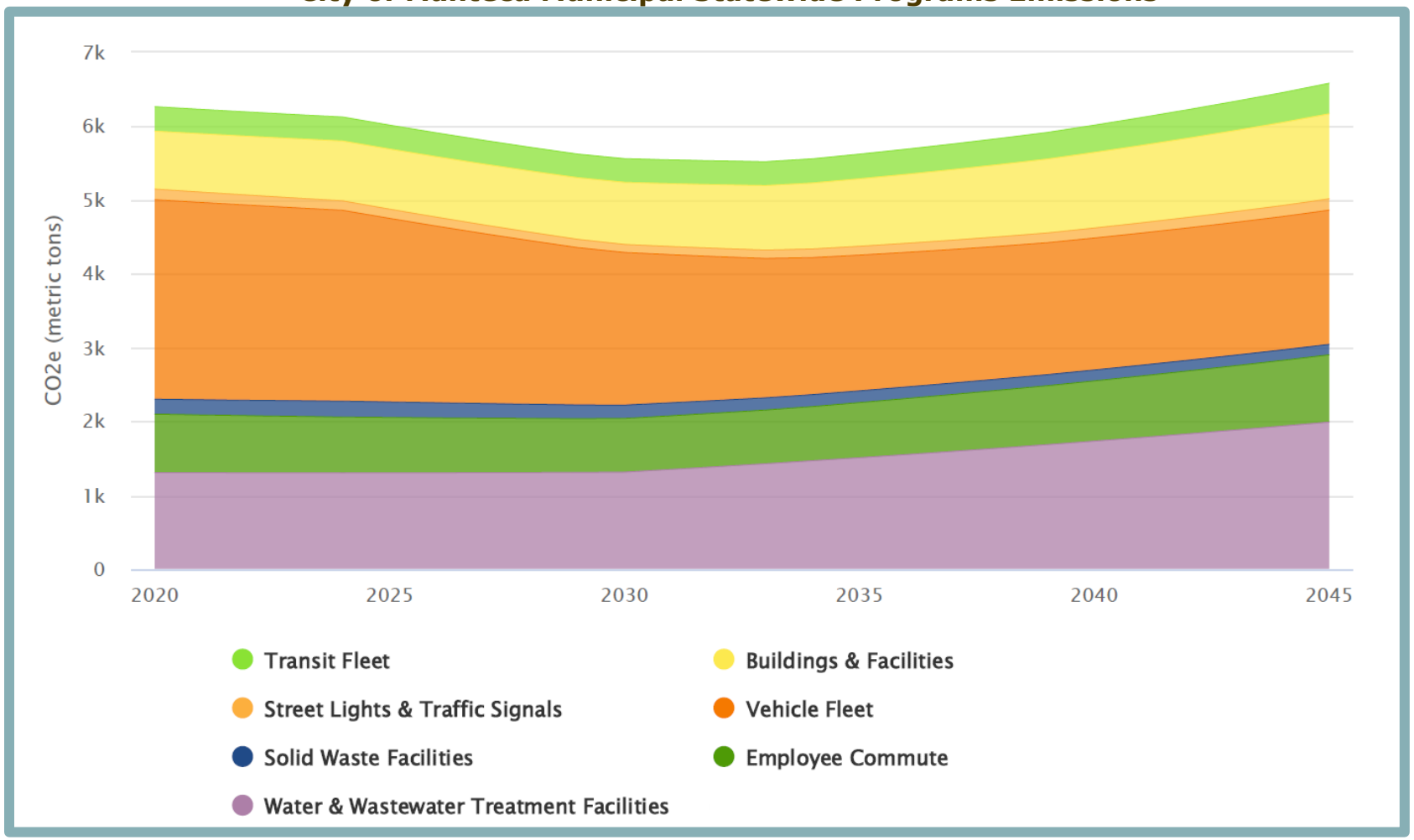
CO2e = carbon dioxide equivalents
ICLEI City of Manteca. *2045 Government Operations Forecast.* November 2024

Figure 13
City of Manteca Community Statewide Programs Emissions Forecast



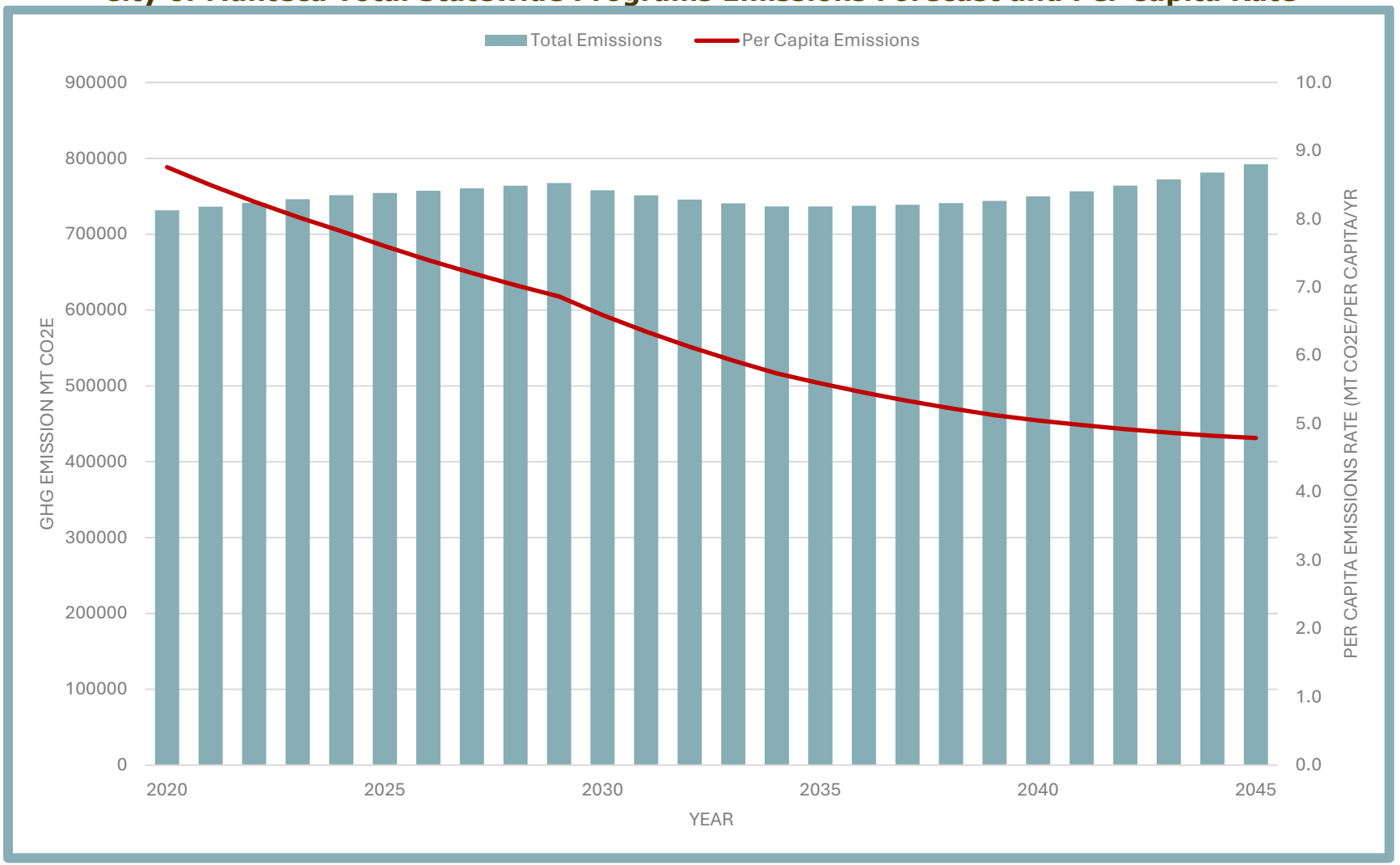
Source: Clearpath, 2024.

Figure 14
City of Manteca Municipal Statewide Programs Emissions



Source: Clearpath, 2024.

Figure 15
City of Manteca Total Statewide Programs Emissions Forecast and Per Capita Rate



Source: Clearpath. 2024

Table 8 City of Manteca Statewide Programs Community Forecast				
Year	**2030**		**2045**	
Community Sector	**Metric Tons (CO2e)**	**Percent of Sector Emissions**	**Metric Tons (CO2e)**	**Percent of Sector Emissions**
Residential Energy	69,395	9%	84,350	11%
Commercial Energy	25,279	3%	11,218	1%
Transportation & Mobile Sources	522,008	70%	484,097	62%
Solid Waste	74,179	10%	112,616	14%
Process & Fugitive Emissions	60,205	8%	91,401	12%
Total	**751,066**	**100%**	**783,682**	**100%**
CO2e = carbon dioxide equivalents ICLEI City of Manteca. *2045 Community Forecast.* November 2024				

Table 9 Comparison of Total Statewide Program Forecasts			
	2020	**2030**	**2045**
Population	83,498	114,934	165,302
Total Community Emissions	730,202	756,627	790,265
Per Capita Emissions Rate	8.75	6.58	4.78
Exceeds Emissions Targets?	**YES**	**YES**	**YES**
Sources: Population Forecast for Manteca. November 2024; Clearpath, 2024.			

The inclusion of the adopted RPS requirements for energy generation results in large reductions in electricity related GHG emissions from municipal and communitywide activities. While Statewide programs reduce the emissions from the transportation sector from 2030 to 2045, the transportation sector remains the largest percentage of emissions in the community forecast

With the rapidly increasing reduction of emissions related to electricity consumption, mobile emissions sources (such as on-road vehicles as well as off-road equipment) represent the majority of emissions on a communitywide basis. As discussed previously, various Statewide programs have been enacted to reduce the GHG emissions intensity from mobile sources. The ultimate effect of existing Statewide programs is that the average vehicle driven in the years 2030 or 2045 will result in less intense GHG emissions per mile than vehicles driven today. Despite the reduction in emissions intensity per mile driven, the estimated growth in City population and resultant increases in Citywide vehicle miles travelled (VMT) is anticipated to result in an overall increase in mobile-source emissions through the year 2045. Such increases result in mobile-source emissions representing 70 percent of total emissions within the City of Manteca by 2030, and 62 percent of total emissions within the City of Manteca by 2045.

5.4 MEETING THE EMISSIONS TARGETS

Based on the City's goal of 6 MTCO2e in 2030 and carbon neutrality by 2045, along with Manteca's forecasted population in 2030 and 2045, the City would be required to reduce emissions by 111,584 MTCO2e by 2030 and 792,214 MTCo2e by 2045 to meet the reduction targets. While activities within the City of Manteca are anticipated to result in total emissions of 1,128,238 MTCO2e/yr with Business-as-Usual, and 792,214 MTCO2e/yr with Statewide programs in 2045, the implementation of CAP measures would reduce emissions further. The City of Manteca's targets, in line with the State, and per capita emission targets are discussed below.

2030 Reduction Target

The 2030 reduction target remains achievable, with the implementation of Statewide and CAP Update measures working together to reduce emissions. Prior to the use of local measures, the per capita emissions with Statewide programs are 6.58 MTCO2e/yr/capita in 2030. The implementation of the CAP Update measures closes the gap to reach the target, and the per capita emissions drop to 5.3 MTCO2e/yr/capita, below the target 6 MTCO2e/yr/capita.

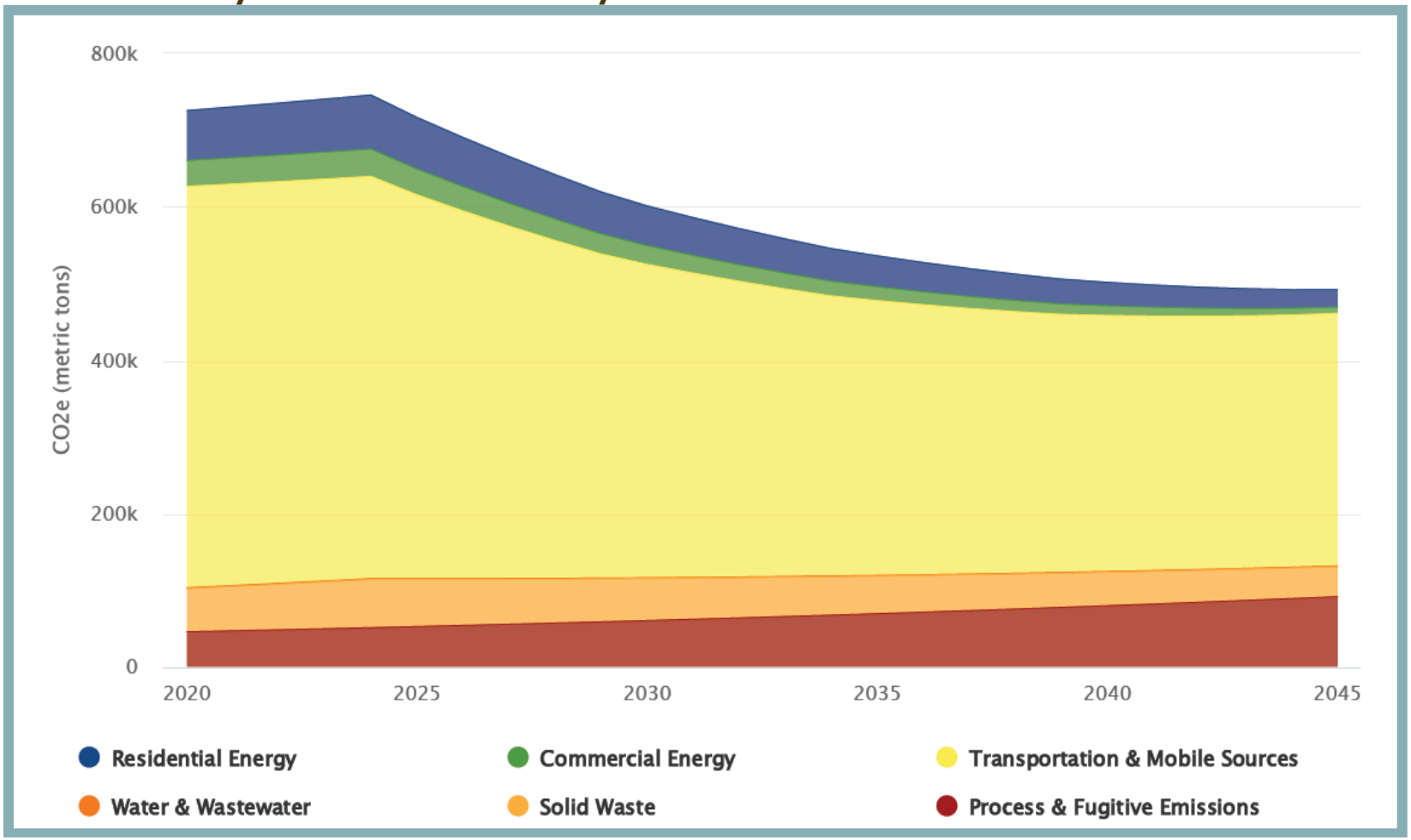
2045 Reduction Target

The 2045 reduction target has made substantial progress although carbon neutrality could be unachievable in current forecasts due to costs, realistic implementation schedules, and current technology. While the State Programs forecast 4.78 MTCO2e/yr/capita, the implementation of the CAP Update measures forecast reduces emissions to 3.01 MTCO2e/yr/capita, which remains above carbon neutrality.

Consequently, the City of Manteca must adopt emission reduction measures to further reduce estimated future emissions. Reductions will be achieved through the implementation of programs and policies that target sectors on a local level. Manteca must implement these local actions to reach the 2030 target and make substantial progress towards the 2045 goal. The measures should remain feasible, cost effective, clear, measurable, and equitable as implemented. Chapter 6 of this CAP Update will introduce reduction measures necessary to ensure the City achieves an adequate emissions reduction.

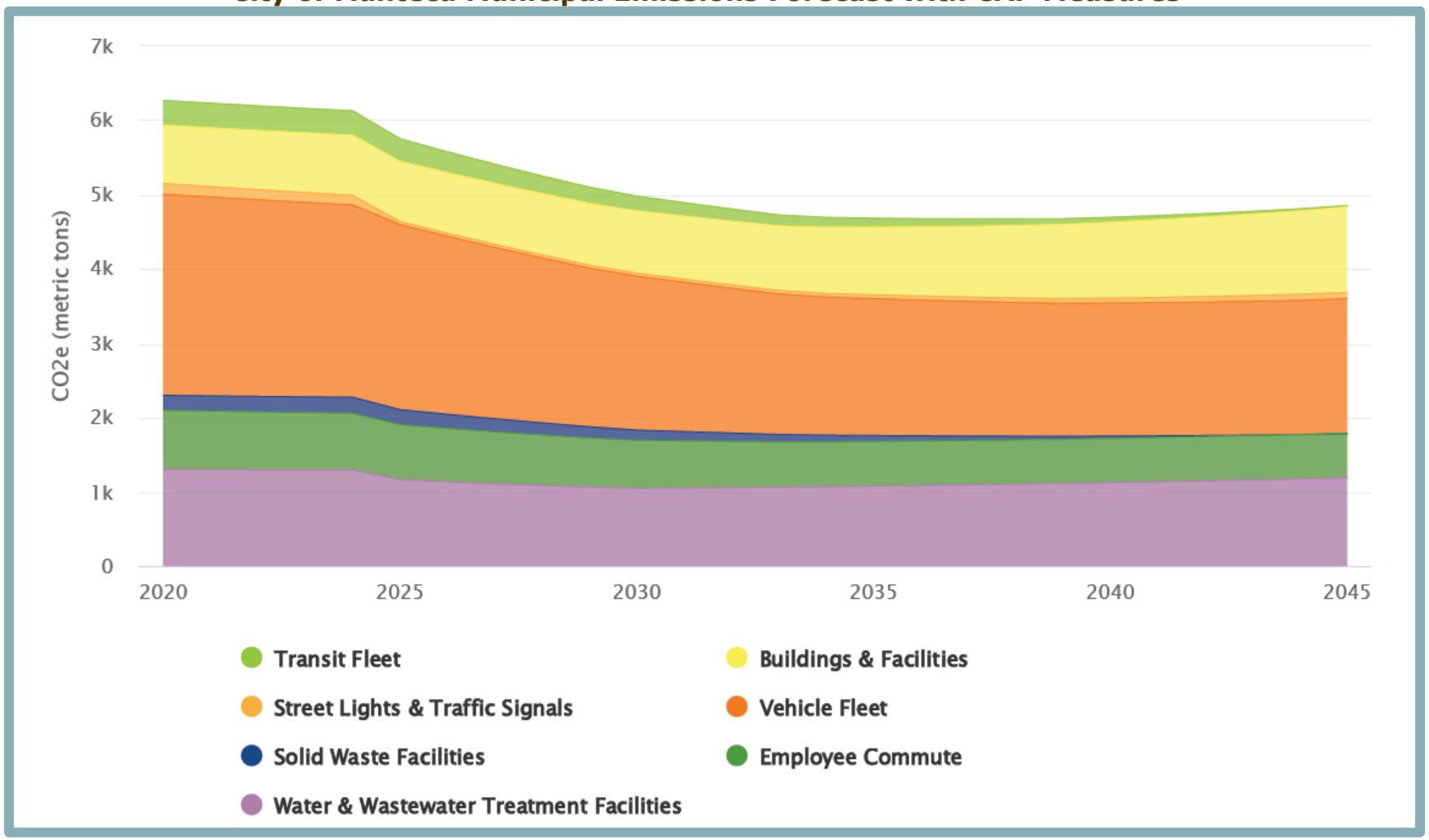
The emissions forecasts are presented in Figure 16 through Figure 18 below.

Figure 16
City of Manteca Community Emissions Forecast with CAP Measures



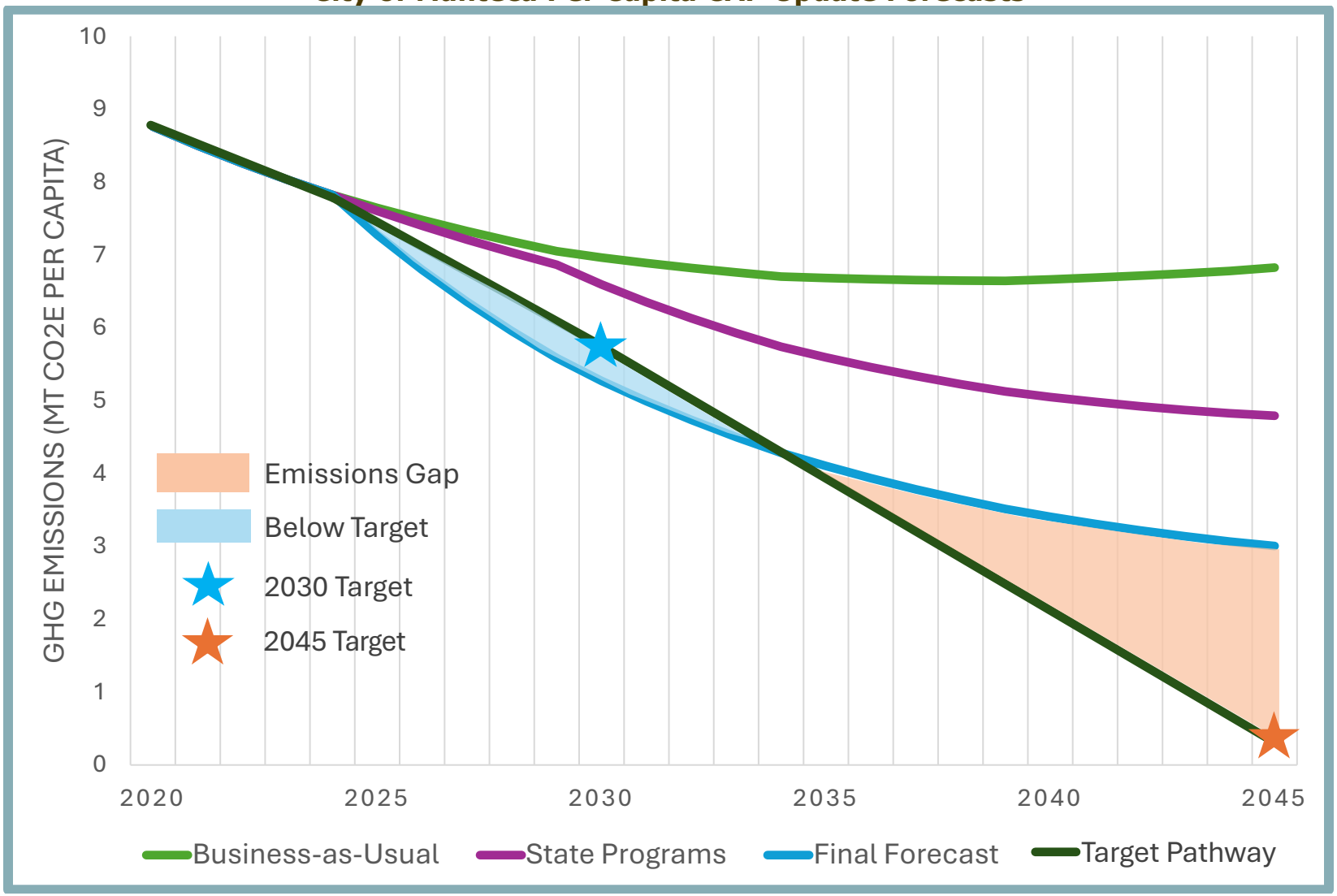
Source: Clearpath, 2024.

Figure 17
City of Manteca Municipal Emissions Forecast with CAP Measures



Source: Clearpath, 2024.

Figure 18
City of Manteca Per Capita CAP Update Forecasts



Source: Clearpath, 2024.

6. Emissions Reduction Measures

6. EMISSIONS REDUCTION MEASURES

The following chapter outlines an introduction to emission reduction strategies and presents the proposed GHG emissions reductions measures. All emissions quantifications are presented in Appendix B to this CAP Update.

6.1 EMISSIONS REDUCTION BASICS

As discussed in Chapter 5 of this CAP Update, in addition to implementation of Statewide policies and regulations, local-action emission reduction measures are required for the City of Manteca to achieve the emission targets set by the Manteca Climate Action Plan Advisory Committee (CAPAC). The following reduction measures have been separated into several focus areas, each of which address the major sources of emissions associated with the City. The focus area categories correspond to the emissions estimations presented in Chapter 5.

For each emission reduction strategy, specific implementation actions are identified. Additionally, the party responsible for implementation of such actions is identified and labeled consistent with the key shown in Table 10. Implementing parties are broken into three categories: Existing, representing actions that would reduce existing emissions within the City of Manteca or be implemented within existing developments; Municipal, representing actions that would be implemented by the City of Manteca and would reduce emissions related to operations of the municipal government or the larger community; and Future Development, which represents actions that would be implemented by new development or redevelopment projects within the City. Additionally, the approximate overall cost is shown symbolically through the use of the key presented in Table 11. Co-benefits, such as public health and ecosystem health, are presented within Table 12 and are provided within each measure. Table 13 provides a summary of all measures included in this CAP Update.

Reduction Measure Quantification

In addition to identifying the responsible parties, the quantified efficacy of each reduction measure is also specified. To the extent feasible, the efficacy of each reduction measure is quantified independently using the ClearPath software. However, in some cases the parameters of ClearPath do not allow for the individual quantification of reduction measures. As such, some reduction measures may have been grouped and quantified together.

It should be noted that all reduction measures take into account Statewide programs that would work to reduce emissions simultaneous to the City of Manteca's efforts. For instance, the State's Renewable Portfolio Standard (RPS) for publicly owned utilities was included in the ClearPath emissions modeling for all reduction measures as were various programs related to vehicle emissions reductions such as the State's Low Carbon Fuel Standard and Pavley fuel efficiency requirements. As discussed in Chapter 5 of this CAP Update, such Statewide programs have been considered during emissions forecasting. Therefore, the emissions reductions from such programs have already been accounted for and are not recounted in the following section. Additionally, the measures are quantified using the corresponding sector $MTCO_2e$ to produce percentage reductions as compared to each forecast's total emissions.

Table 10 - Party Responsible Key

Existing	*Existing*: Represents actions that would reduce existing emissions within the City or be implemented within existing developments.
Municipal	*Municipal*: Represents actions that would be implemented by the City and would reduce emission related to operations of the municipal government or the larger community.
Future Development	*Future Development*: Represents actions that would be implemented by new development or redevelopment projects within the City.

Table 11 – CAP Measures Generalized Cost Key

Symbol	Approximate Cost
$	Low
$$	Moderate
$$$	High

Table 12 – CAP Co-Benefits Key

Symbol	Co-Benefit
	Public Health
	Ecosystem Health
	Infrastructure Improvement
	Resource Preservation
	Climate Change Resilience
	Social Equity

Table 13. CAP Goals and Measures	
GOALS	**MEASURES**
Transportation (TR)	
Promote Alternative Transportation	TR.3: Increase Use of Alternative Transportation TR.4: Promote Alternative Transportation Through Updated Parking Standards
Implement Electric Vehicle Infrastructure	TR.5: Optimize City Fleet TR.6: Support Electric Vehicle Adoption, Charging Infrastructure, and Alternative Fuels.
Work to Increase Active Mobility	TR.1: Bicycle and Pedestrian Infrastructure Improvement TR.9: Safe Routes to School
Reduce Single Occupant Vehicle Use and Emissions	TR.2: Congestion Management TR.7: Establish a Transportation Management Association TR.8: Mobile and Area Source Emissions Reductions
Land Use (LU)	
Encourage Sustainable Growth	LU.1: Encourage Adaptive Reuse LU.2: Comply with State Affordable Housing Requirements LU.3: Sustainable Growth of New Development LU.4: Urban Tree Management Plan
Energy and Building Design (EG)	
Expand Renewable Energy	EG.1: Renewable Energy Production Plan EG.3: Renewable Energy Requirement for Private Development EG.4: Participate in Energy Programs
Increase Lighting Efficiency	EG.8: Improve Lighting Efficiency
Improve Building Design	EG.2: Resource Efficiency Improvements for City Buildings EG.5: Enforce CALGreen EG.6: Energy Efficient Design EG.7: Efficient Design of City Structures
Water Conservation (WC)	
Increase Water Efficiency	WC.1: Community Wide Water Use Efficiency WC.2: Water Efficient Landscape WC.3: Sustainable Water Service
Solid Waste Management (SW)	
Increased Waste Diversion	SW.1: Expand Municipal Recycling Program SW.2: Expand Yard Waste and Other Organics Composting SW.3: Improve Waste Management Practices.

6.2 TRANSPORTATION RELATED MEASURES

The following section discusses the measures and actions relating to transportation within the City of Manteca. As mentioned in Table 13, the measures in this section all work towards four common goals, which include promoting alternative transportation, implementing electric vehicle infrastructure, increasing active mobility, and reducing single-occupant vehicle use and emissions.

Measure TR.1: Bicycle and Pedestrian Infrastructure Improvement

Description

Improve bicycle and pedestrian infrastructure within the community to increase non-motorized travel. Creating a more comfortable environment for cyclists, walkers, or users of the public transportation systems would encourage higher rates of usage among the population, encouraging active transportation and reducing single occupancy automotive trips.

This measure includes initiatives to encourage active transportation with infrastructure improvements. Implementation of roadway and bikeway infrastructure improvements in existing right-of-way, such as "road diets," narrower pedestrian crossing distances, green stormwater infrastructure, etc., to meet Green Streets standards and increase safety for pedestrians and bicycles. Subsidizing, or investing in public transit would be another encouraging factor, this effort would promote expansion of public transit routes and increased operation frequency within Manteca to support day-to-day travel needs. This measure also includes improvements to the safety and atmosphere of public transportation, encouraging more residents to see public transport as a viable and safe mode of travel.

This measure would also benefit from the expansion of the cities treescape and shade, especially during summer months. Increasing the shade cover of the City would also encourage these forms of transportation during the summers.

Co-Benefits

Action ID and Description

Action TR.1.1

The City shall seek to obtain grant funding to support the following action items listed below.

Action TR.1.2

Fulfill the Implementation Measures included in the City of Manteca Active Transportation Plan.

Action TR.1.3
Focus on developing destinations and linking existing infrastructure to connect to these destinations.

Action TR.1.4
Consider Green Streets standards in review of future development project applications, as appropriate.

Action TR.1.5
Consider Green Streets standards in City Capital Improvement Plan projects throughout the City with appropriate design and consideration for location and use.

Action TR.1.6
The City shall seek to obtain continued funding to support operations and maintenance (O&M) through funding mechanisms such as O&M Agreements, Homeowners Associations, etc.

2030 Reduction	2045 Reduction	Approximate Cost
0.009 percent	0.03 percent	$$

Measure TR.2: Congestion Management

Description:

Reduce congestion and calm traffic within downtown Manteca. The focus of proposed strategies would be to reduce vehicle speeds through the City such as the installation of raised median islands, raised crosswalks, chicanes, and rumble strips, as well as construction of roundabouts to ease congestion at intersections and provide gateways to the City. Reductions in congestion would reduce vehicle related emissions of GHGs, and traffic calming throughout downtown would promote the use of alternative means of transportation. The reduction in speed improves safety for alternative forms of transportation such as walking or bicycling, which are GHG emission free. Inclusion of similar congestion reduction and traffic calming strategies in future development would promote alternative modes of transportation and reduce congestion, that may otherwise be caused by new development, while creating a cohesive circulation network throughout the City.

Anti-Idling Strategies for roadways reduce vehicle idling by implementing strategies that reduce or remove impediments to the free flow of motor vehicles. Strategies include removal of four-way stop signs, diverging diamond intersections, permissive-protective left-turns, and traffic signal synchronization to provide efficient flow of traffic.

Action ID and Description

Action TR.2.1

Synchronize traffic lights installed in future developments to ease traffic flow, which minimizes vehicle stopping and idling.

Co-Benefits

Action TR.2.2

Require new developments to include traffic calming and congestion management measures, where deemed appropriate, with a target of 50 percent, of all proposed streets and intersections. Furthermore, the City shall seek to implement such strategies within existing areas of the City.

Action TR.2.3

Establish a Downtown Specific Plan with policies and strategies specifically reflecting the principles of this measure.

Action TR.2.4

The City shall seek to identify areas within the City Limits where safety or congestion has become a concern and work to develop Anti-Idling/Congestion Management Strategies suitable for addressing such concerns.

ATTACHMENT 4

2030 Reduction	2045 Reduction	Approximate Cost
8.5 percent	29.1 percent	$$

Measure TR.3: Increase Use of Alternative Transportation

Description

Through the Engineering and the Public Works Department, the City shall seek to upgrade existing infrastructure for alternative transportation and require new development to include infrastructure for alternative transportation. Such upgrades may include extension of sidewalks, establishment of safe-routes to schools, re-striping of roads to include bike lanes, and posting of "Share the Road" street signs. Additionally, the City shall comply with the California Complete Streets Act, which requires planning for "complete streets" as a component of future General Plan updates. In order to ensure proper implementation of such future policies, the City shall consider future adoption of a Complete Streets Ordinance, in line with the City's General Plan. Such upgrades may coincide and support the improvements discussed in Measure TR.1 and TR.9 or include site specific design features such as designated bus lanes or turnouts, solar supported bus stops, Park-N-Ride areas, sidewalk extensions, and bicycle infrastructure. Furthermore, new developments should be required to construct alternative transportation infrastructure on-site and connecting off-site, such as bicycle parking, and sidewalk connections.

Action ID and Description

Action TR.3.1

Seek to comply with the requirements of the California Complete Streets Act.

Action TR.3.2

Adoption of a Complete Streets Ordinance.

Co-Benefits

Action TR.3.3

Establish/enforce minimum standards for bicycle parking.

Action TR.3.4

As determined, require new developments to connect to bicycle and pedestrian path connections while remaining consistent with the City's Active Transportation Plan.

Action TR.3.5

Periodically consider the feasibility of allowing bike share programs within Manteca based on changes in technologies and the City's population.

Action TR.3.6

Promote destination facilities such as lockers and showers at new non-residential developments through voluntary development design guidelines.

Action TR.3.7

Continue to implement Safe Routes to School program, tailor new bicycle and pedestrian infrastructure to promote active transportation to school for Manteca students.

Action TR.3.8

Manteca Transit shall seek to increase the frequency of existing bus services within the City.

Action TR.3.9

Manteca Transit shall establish a timeline for the potential future expansion of bus service within the City based on development within the City and population growth.

Action TR.3.10

Address stigma regarding alternative transportation by increasing safety, and marketing to promote alternate transportation.

2030 Reduction	2045 Reduction	Approximate Cost
0.23 percent	0.27 percent	$

Measure TR.4: Promote Alternative Transportation Through Updated Parking Standards

Description

Updated parking standards can be used to discourage the use of single-passenger traditionally fueled vehicles. Such preference may be established through requirements for reserved parking for motorcycles, car share, carpool, and low emissions vehicles; adjustments to the minimum and maximum parking requirements to limit overall parking supply required for new development, thus encouraging carpooling and alternative modes of transportation; allow for shared parking areas between land uses; and require bicycle parking in proportion to vehicle parking. These measures can be focused on high trafficked areas of which parking lots make up approximately 20 percent of the land coverage. Decreasing both amount of parking, and ease of parking in this district and other high trafficked areas would encourage alternative transportation uses; therefore, encouraging the use of alternative fueled vehicles, ride sharing, and alternative modes of transportation which would reduce the vehicle miles travelled associated with City residents.

Develop financing/incentives for purchasing, using, and maintaining electric micromobility vehicles for personal use (such as bicycles, scooters, trailers). Include specific provisions for low-income and vulnerable populations. Conduct a parking pricing study and implement pilot projects to test their effectiveness. Reduce or eliminate minimum parking standards in new developments.

Co-Benefits

Action ID and Description

Action TR.4.1

Implement development parking standards to discourage single-occupancy vehicle use in the City's Design Standards.

Action TR.4.2

Seek to obtain grant funding for implementation of an EV/NEV shuttle program in the CBD.

Action TR.4.3

Include multi-level parking, where applicable, in high trafficked zones to promote density.

Action TR.4.4

Add Charging and electric infrastructure, where determined feasible, to underserved areas of town as discussed in Measure TR.6.

Action TR.4.5

Consider providing incentives for the use and maintenance of micromobility vehicles (e-bikes, e-scooters, segways, etc.).

2030 Reduction	2045 Reduction	Approximate Cost
4.3 percent	14.6 percent	$

Measure TR.5: Optimize City Fleet

Description

The City shall use the inventory of all City owned vehicles, which includes the fuel consumed per year and the fuel economy for each vehicle. The City shall establish a target average miles per gallon (mpg) goal, for improving fuel economy across the City's entire vehicle fleet. The target mpg shall be designed to reduce fuel consumption by City-owned vehicles. The City shall prioritize the purchase of alternatively fueled vehicles. As part of fleet optimization and fleetwide fuel economy improvements, the City shall ensure the proper maintenance of vehicles (such as proper tire inflation and oil changes) to ensure City vehicles operate at the maximum fuel efficiency possible and inform City employees of the benefits of reducing vehicle idling times.

To the extent feasible, the City shall consider focusing the purchase of new fleet vehicles to hybrid vehicles, electric vehicles, or alternative fuel vehicles. Such fleet improvements would likely occur over a long period of time as the City grows and expands the fleets used by the Public Works Department, Police Department, fire Department, and other forms of Municipal Transit.

Develop a plan to transition the municipal vehicle fleet to alternative fuels (e.g., electric, battery electric vehicle, hydrogen).

Address "first mile/last mile" and short-trip transportation needs by continuing to prioritize, fund, and implement on-going programs/partnerships and develop new programs/partnerships to provide alternative transportation options within Manteca. Include specific provisions for low-income or vulnerable populations. Include specific action recommendations, pilot programs, or other ways to implement actions.

Coordinate with regional transit agencies and cities to promote cohesive transit interconnections, including express buses to neighboring areas.

Co-Benefits

Action ID and Description

Action TR.5.1

Consult with San Joaquin Valley Air Pollution Control District (APCD) to seek grant funding opportunities.

Action TR.5.2

Set goal increase in miles per gallon for entire fleet.

Action TR.5.3

Implement policies for use of alternative fuel vehicles.

Action TR.5.4

By 2030 require that 60 percent of new vehicles purchased for the City fleet be zero emissions vehicles, and all vehicles by 2040 purchased for the City fleet shall be zero emissions vehicles.

Action TR.5.5

Create or recommend policies for a reduction in idling time for City vehicles through education of City field crews.

Action TR.5.6

Recommend policies for the Manteca Unified School District to replace diesel-powered school buses with CNG buses, hybrid buses, or other emissions-reducing alternatives.

Action TR.5.7

Create or recommend policies for the City to use low or zero emissions vehicles wherever possible and practicable.

2030 Reduction	2045 Reduction	Approximate Cost
18.2 percent	76.0 percent	$$

Measure TR.6: Support Electric Vehicle Adoption, Charging Infrastructure, and Alternative Fuels

Description

Recommend or create polices requiring the installation of electric vehicle (EV) charging stations at existing and future commercial developments within the City, particularly near State Route 99 and State Route 120. Establish minimum EV charging requirements for new residential developments and require electrification of new or proposed loading docks in commercial and industrial developments within the City. Install EV charging stations in existing public parking areas, such as those related to government offices or recreation areas. Locating a charging station within the community will encourage intra-community electric vehicle use as well as EV use along State Route 99 and State Route 120.

Update and implement the public and private charging infrastructure needs, time frame, and implementation approach to enable all vehicles to transition to electric. Identify and implement the first five-year plan including specific locations and feasibility, costs, potential grant funding and partners, electric vehicle adoption needs and opportunities, and support alternative/hydrogen fuel. Include provisions for low-income and vulnerable community members. Aim to increase community-wide passenger EV vehicle adoption to 20 percent by 2030 and 55 percent by 2045.

Action ID and Description

Action TR.6.1

Seek funding to support electric vehicle charging/hydrogen or other new vehicle technology and seek to incentivize future gas stations to provide alternative fuel options.

Co-Benefits

Action TR.6.2

Update Municipal Code to require charging stations as part of new development and identify potential sites for an Electric Vehicle charging station within City Limits.

Action TR.6.3

Establish targets for the number of EV charging stations installed at public parking areas by the year 2026.

Action TR.6.4

Pending available funding require installation of Electric Vehicle charging stations at all new municipal facilities that include vehicle parking.

Action TR.6.5

The City shall identify existing municipal facilities where Electric Vehicle charging stations could be installed. Once feasible sites are identified, the City shall pursue

grant funding for installation of public Electric Vehicle charging infrastructure. Identification of suitable locations for EV charging stations at existing facilities shall be completed by the year 2026.

Action TR.6.6

All existing and future City-run areas with paid parking, shall consider allowing for EV's to be exempt from payment of parking fees to encourage use of EVs within the City.

Action TR.6.7

Target the installation of EV charging stations capable of charging Electric Trucks along highway corridors and existing EV charging station locations.

Action TR.6.8

Support Electric vehicles and zero-emission vehicles car share companies in coming into the City. Look into opportunities with agencies to purchase rebate programs to provide a higher trade-in value for combustion vehicle to aid low-income and vulnerable community members.

2030 Reduction	2045 Reduction	Approximate Cost
12.8 percent	43.7 percent	$$$

Measure TR.7: Establishment of a Transportation Management Association

Description

The City shall seek to establish a Transportation Management Association (TMA). The TMA may be operated by the City, transit provider, a Business Association, or another entity as appropriate, and operations of the TMA may be conducted independently from or in concert with other nearby jurisdictions and TMAs. In general, TMAs provide ongoing training and special assistance to TMA members for the implementation of commute alternative programs at work sites, including monthly networking meetings and assistance with work site program design. TMA activities include outreach to area employees and residents in an effort to provide varied commute choices, including bicycle and vanpool subsidies, vanpool formation assistance, and transit information.

Co-Benefits

Action ID and Description

Action TR.7.1

In concert with SJCOG, San Joaquin Valley APCD, and other local jurisdictions, the City shall seek to establish, participate in, or form a TMA by the year 2030.

Action TR.7.2

New developments shall be required to demonstrate membership within future TMAs servicing the City of Manteca.

2030 Reduction	2045 Reduction	Approximate Cost
0.14 percent	0.16 percent	$

Measure TR.8: Mobile and Area Source Emissions Reductions

Description

The City shall seek to reduce emissions from mobile sources other than on-road vehicles. While on-road vehicles, such as passenger cars and heavy-duty trucks, represent the majority of emissions from mobile sources within the City of Manteca, emissions from other mobile sources contribute significant amounts of emissions. For instance, operations of fossil-fuel powered landscape maintenance equipment, construction equipment, recreational vehicles, and industrial equipment all result in GHG emissions from combustion of gasoline, diesel, or natural gas. The City shall seek to implement various means of controlling emissions from such sources through encouragement of electric-powered landscaping equipment, requirements for construction equipment used within the City Limits, and other actions.

Co-Benefits

Action ID and Description

Action TR.8.1

By the year 2045, require all construction fleets operating within the City of Manteca to meet U.S. EPA Tier 4 engine standards. The suggested timeline for implementation of this measures is for 10 percent of the pieces of equipment in construction fleets operating within the City in the year 2026 to meet the U.S. EPA's Tier 4 standard, with the proportion of vehicles in the fleet meeting such standards increasing to 30 percent in 2030, 60 percent in 2035 and 100 percent in 2045. The percentage shall be calculated by dividing the number of Tier 4 pieces of equipment by the sum of all pieces of construction equipment used in the fleet, multiplied by 100. Compliance with this measure may be achieved through use of Tier 4 engines or implementation of similar methods or technologies to achieve equivalent reductions in construction fleet emissions. The City will continually comply with Federal and State requirements throughout implementation.

Action TR.8.2

To the extent feasible, projects subject to Site Plan and Design Review shall be required to include outdoor electrical outlets that allow for the use of electrically powered landscaping equipment.

Action TR.8.3

Projects subject to Site Plan and Design Review that would include truck loading docks shall be required to include electrical outlets for each loading dock to reduce the amount of truck idling and truck refrigeration unit generator use.

Action TR.8.4

Municipal facilities shall seek to switch from gas powered landscaping equipment to electrical landscaping equipment. Additionally, new municipal facilities shall consider designing buildings with outdoor outlets to support electrically powered landscaping equipment.

Action TR.8.5

The City shall promote any future San Joaquin Valley APCD or PG&E programs that support replacement of fossil fuel powered landscaping equipment with electrically powered landscaping equipment.

Action TR.8.6

The City shall require all construction sites to connect to existing grid power to support construction activities, where feasible.

2030 Reduction	2045 Reduction	Approximate Cost
2.0 percent	6.5 percent	$$

Measure TR.9: Safe Routes to School

Description

Collaborate with the local school district to improve pedestrian crossings, promote active transportation to school, and develop educational programs focusing on bicycle safety. In conjunction with SJCOG and the local school district, efforts will be made to enhance pedestrian crossings, encourage active transportation, add shelters to bus stops, and implement safe routes to school linkages between community schools and new developments. It should be noted that citywide pedestrian and bicycle infrastructure improvements mandated by Measure TR.1 may facilitate the implementation of this measure.

Co-Benefits

Action ID and Description

Action TR.9.1

Fulfill the Implementation Measures included in the City of Manteca's Active Transportation Plan.

Action TR.9.2

Ensure future expansion of school campuses include designations of safe routes to school for each new school site.

Action TR.9.3

Require new development proposals within areas designated as Safe Routes to School to show pedestrian and bicycle improvements within development plans sufficient to provide students with a safe means of walking or bicycling to school.

Action TR.9.4

Work with the local school district to promote walking or biking groups wherein organized groups of students walk or bicycle to school under the supervision of designated chaperones.

Action TR.9.5

Improve existing pedestrian routes to school: The City shall survey existing pedestrian routes to school and identify priority areas for targeting with this program. Additionally, the City shall pursue grant opportunities to fund improvements.

2030 Reduction	2045 Reduction	Approximate Cost
0.005 percent	0.02 percent	$

6.3 LAND USE RELATED MEASURES

The following section discusses the measures and actions relating to land use within the City of Manteca. As mentioned in Table 13, the following measures fall under the goal of sustainable growth.

Measure LU.1: Encourage Adaptive Reuse

Description

The City shall promote and or create policies for the adaptive reuse of existing buildings, vacant lots, and underutilized areas of Downtown Manteca. Such reuse should be focused on increasing the density of development within the City, while providing community amenities and opportunities for innovative site developments.

Co-Benefits

Action ID and Description

Action LU.1.1

Consider reducing impact fees for development that includes reuse of existing structures or infill development.

Action LU.1.2

Provide streamlined project review of projects that include reuse of existing structures or infill development.

2030 Reduction	2045 Reduction	Approximate Cost
0.01 percent	0.33 percent	$

Measure LU.2: Comply with State Affordable Housing Requirements

Description

The City shall comply with existing State law related to the provision of affordable housing.

Action ID and Description

Action TR.10.1

Consider future updates to the City's Municipal Code to allow for additional increased density through density bonuses based on inclusion of affordable housing units in proposed developments.

Action TR.10.2

Comply with the State Affordable Housing Requirements

Co-Benefits

2030 Reduction	2045 Reduction	Approximate Cost
Supportive	*Supportive*	$

Measure LU.3: Sustainable Growth of New Development

Description

The City shall create policies to promote new development within the City that use sustainable growth principles, such as encouraging mixed uses and infill development, locating higher-density developments near existing services and amenities, and encouraging alternative modes of transportation.

Co-Benefits

Action ID and Description

Action LU.3.1

Continue to integrate SJCOG's Smart Growth Principles into the City's Development Guidelines and seek to streamline the permitting process for developments demonstrating consistency.

Action LU.3.2

Establish standards for "walkable neighborhoods", where new residential development (particularly multi-family developments) shall be located within one half mile of a combination of at least two of the following amenities: a park, a school, a grocery store, or a commercial development.

2030 Reduction	2045 Reduction	Approximate Cost
0.29 percent	1.0 percent	$$

Measure LU.4: Urban Tree Management Plan

Description

The City shall seek funding for the update of the Urban Tree Management Plan. The plan shall include provisions for the maintenance of existing trees, the planting of new trees, tree planting requirements for new developments, methods of improving the existing urban forest, and tree protection guidelines. An Urban Tree Management Plan shall formalize the City's goal of encouraging the expansion of the City's urban forest canopy, comprising shade trees along City streets and trees located on private property and in open spaces. The City's Urban Tree Management Plan shall be designed in compliance with California's Urban Forestry Act of 1978, making the Plan eligible to seek grant funding through the State's Urban & Community Forestry Program.

Co-Benefits

Action ID and Description

Action LU.4.1

Pursue grant funding from CAL FIRE, USFS, California's Urban & Community Forestry Program, or other agencies to fund urban forestry planning within the City.

Action LU.4.2

Update and implement Urban Tree Management Plan.

Action LU.4.3

Update landscaping regulations to require shade over at minimum 35 percent over City parks and include maintenance requirements of new trees.

Action LU.4.4

Seek opportunities for partnerships with agencies promoting urban forestry such as ReLeaf California, and the California Urban Forests Council.

2030 Reduction	2045 Reduction	Approximate Cost
4.4 percent	11.6 percent	$$$

6.4 ENERGY AND BUILDING DESIGN RELATED MEASURES

The following section discusses the measures and actions relating to energy and building design within the City of Manteca. As mentioned in Table 13, the measures in this section all work towards three common goals, which include expanding renewable energy, increasing lighting efficiency, and improving building design.

Measure EG.1: Renewable Energy Production Plan

Description

The City shall aim to identify existing renewable energy sources and assess new City facilities for solar panel installation feasibility, while establishing a renewable energy production goal for 2030. Additionally, the City will explore "Community Solar" projects and Power Purchase Agreements, while also encouraging private solar panel installation. Consideration will be given to central renewable energy installations to meet building standards. To achieve these goals, the City will increase building and transportation electrification capacity, invest in community solar energy and solar battery storage, and encourage residents to opt for high-efficiency energy options. Furthermore, the City will develop financing and incentive programs for energy improvements.

Co-Benefits

Action ID and Description

Action EG.1.1

Encourage future commercial development, as well as existing consumers of large amounts of electricity, to install solar panel infrastructure beyond CalGreen code requirements.

Action EG.1.2

Work with local utility providers and other concerned parties to acquire funding sources for solar energy projects.

Action EG.1.3

Promote participation in Energy Upgrade California, as well as other State, federal, and utility incentive programs for improving home and business energy efficiency.

Action EG.1.4

Consider investment in Power Purchase Agreements and solar battery storage.

Action EG.1.5

Inventory City facilities and properties that could be developed with solar power

installations and establish a 2045 production goal based on available installation sites.

Action EG.1.6

Produce a Renewable Energy Production Plan summarizing the City's efforts and establishing the 2045 production goal.

2030 Reduction	2045 Reduction	Approximate Cost
1.6 percent	8.4 percent	$$$

Measure EG.2: Resource Efficiency Improvements for City Buildings

Description

City buildings and facilities operations account for approximately 29 percent of municipal emissions; thus, reducing emissions from this sector would greatly reduce overall municipal emissions. The City should conduct energy audits for existing facilities, and the City should implement all recommendations for energy efficiency improvements for municipal buildings. In addition, the City shall conduct resource efficiency audits for all City buildings and facilities focused on improving water efficiency, improving interior building climate controls, upgrading building and facility appliances, prioritizing equipment and appliance replacement to improve energy efficiency, educating employees on reducing energy demand, increasing renewable energy production in municipal facilities.

Co-Benefits

Action ID and Description

Action EG.2.1

Assess energy use for all existing municipal facilities and establish a goal for increasing energy efficiency throughout all existing municipal facilities by 30 percent by 2030 and 100 percent by 2045.

Action EG.2.2

Conduct systematic energy audits of municipal facilities, prioritize largest energy consuming facilities and investigate means of reducing energy demand from municipal facilities.

Action EG.2.3

Promote participation in Energy Upgrade California, as well as other State, federal, and utility incentive programs for improving home and business energy efficiency.

Action EG.2.4

Produce an Energy Efficiency Plan that shall include targeted measures to reduce energy demand within existing City facilities. The Energy Efficiency Plan shall include results of energy audits, recommendations for increasing energy efficiency following the facility audits, and updates for the City's progress in achieving the recommendations of the energy audits.

Action EG.2.5

Apply energy efficiency recommendations from municipal facility audits and Energy Efficiency Plan.

2030 Reduction	2045 Reduction	Approximate Cost
0.9 percent	2.1 percent	$$$

Measure EG.3: Renewable Energy Requirement for Private Development

Description

The City shall implement the requirements of the 2022 California Building Standards Code related to PV systems for new residential development. Specifically, all low-rise residential buildings (including single-family units, duplex units, and multi-family units that are three stories or fewer) shall have a minimum solar zone dependent on the specific areas of the roofing. In addition, the City shall implement development requirements for commercial facilities larger than 3,000 square feet that at least 15 percent of the estimated energy demand of the project must be satisfied through renewable sources. Renewable energy may either be included on-site, as part of the project, or may be attained through off-site options such as community solar projects or other methods.

Co-Benefits

Action ID and Description

Action EG.3.1

Update the City's Municipal Code to incorporate the most recent California Building Standards Code.

Action EG.3.2

Adopt minimum renewable energy standards for new commercial developments.

Action EG.3.3

Implement applicable Design Review standards that include renewable energy standards.

ATTACHMENT 4

2030 Reduction	2045 Reduction	Approximate Cost
11.7 percent	40.5 percent	$$

Measure EG.4: Participate in Energy Programs

Description

California Cities are allowed to designate areas within Cities where property owners may enter voluntary agreements to help finance the installation of renewable energy and increases in energy efficiency through low-interest loans. Repayment of the loans is included in the property owner's property tax bill.

Pacific Gas & Electric Company (PG&E) maintains energy-savings programs. PG&E programs include rebates for home upgrades, design support, low-income weatherization programs, and programs to reduce peak energy demand.

Action ID and Description

Action EG.4.1

The City shall encourage local homeowners to participate in programs as a means to finance solar panel installations, roofing and installation upgrades, and other energy-saving home improvements.

Co-Benefits

Action

EG.4.2

Advertise energy saving programs on the City's website and at community facilities.

2030 Reduction	2045 Reduction	Approximate Cost
0.6 percent	1.8 percent	$

Measure EG.5: Enforce CALGreen

Description

The City shall ensure that all building plan checks include a check for consistency with the State's most up-to-date California Green Building Standards Code (CALGreen). The CALGreen Code promotes environmentally responsible, cost-effective building methods that are intended to save energy and water, while increasing the environmental safety of new developments. Additionally, the City shall consider the feasibility of adopting Tier 1 voluntary standards for new construction.

Continue to update the City's residential and non-residential codes to encourage all-electric new construction and increase electric vehicle charging infrastructure requirements; adopt a requirement that all new municipal building construction must be all-electric.

Co-Benefits

Action ID and Description

Action EG.5.1

All building plan checks shall include consistency checks to ensure new development is constructed in compliance with the CALGreen Code effective at the time of the plan check.

Action EG.5.2

The City Council shall consider the viability of adopting CALGreen Tier 1 standards for new development. If the CALGreen Tier 1 standards are found to be viable, the City shall adopt the CALGreen Tier 1 standards, and the CALGreen Tier 1 standards shall be updated along with the triennial update of the CALGreen Standards.

2030 Reduction	2045 Reduction	Approximate Cost
3.4 percent	11.7 percent	$$

Measure EG.6: Energy Efficient Design

Description

The City shall update design guidelines and design review standards to encourage the use of energy efficient building design techniques. Such building design measures may include features not explicitly discussed in the CALGreen Code, such as the use of passive solar, solar water heaters for structures and swimming pools, efficient water heating requirements, green roofs, and other innovative techniques to reduce building energy demands.

Additionally, the City shall incentivize the creation of community microgrids and the networking of local energy sources. Continually create and/or support resiliency hubs that remain in operation during a power grid outage.

Co-Benefits

Action ID and Description

Action EG.6.1

Include energy efficient design recommendations within the City's Community Design Standards to reduce building energy demands.

Action EG.6.2

Update design review standards to remain consistent with the current CALGreen Code.

Action EG.6.3

Incentivize the creation of community microgrids and networking local energy sources to support energy resiliency.

Action EG.6.4

Encourage the use of green roofs and solar water heaters for new structures and during building renovations.

2030 Reduction	2045 Reduction	Approximate Cost
18.6 percent	64.2 percent	$$

Measure EG.7: Efficient Design of City Structures

Description

During design of new municipal structures, the feasibility and cost-effectiveness of designing new municipal structures to the Tier 1 standards of the CALGreen Code shall be formally evaluated. Should the evaluation show that implementation of the Tier 1 CALGreen standards for the new municipal building be feasible and cost-effective, the City shall construct the new building to such standards. The City shall aim to switch from fossil gas to electricity in all existing City facilities with the thresholds of 30 percent by 2030 and 100 percent by 2045.

Action ID and Description

Action EG.7.1

During preliminary City evaluation of design considerations for new municipal structures, the City shall incorporate a feasibility and cost-effectiveness evaluation for designing new structures in compliance with the Tier 1 CALGreen standards.

Co-Benefits

Action EG.7.2

The City shall invest in switching existing City facilities from fossil fuels to electricity in the effort to phase out fossil fuel use.

2030 Reduction	2045 Reduction	Approximate Cost
11.5 percent	39.9 percent	$$$

Measure EG.8: Improve Lighting Efficiency

Description

As part of its LED Streetlight Replacement Program, PG&E recently replaced conventional high-pressure sodium-vapor (HSVP) and metal halide lamps in City streetlights with LED lamps. LED lamps are more efficient than traditional lighting technologies and have a much longer lifespan, among other benefits. Future municipal and private development shall be constructed with the use of LED fixtures in all outdoor lighting to save energy and reduce operating costs. In addition, the City shall consider off-grid lighting options for future developments.

Co-Benefits

Action ID and Description

Action EG.8.1

Require use of LED streetlights and other outdoor light fixtures for future development projects within the City.

Action EG.8.2

Where feasible, implement off grid lighting for future developments.

2030 Reduction	2045 Reduction	Approximate Cost
8.8 percent	13.0 percent	$$

6.5 WATER CONSERVATION RELATED MEASURES

The following section discusses the measures and actions relating to water conservation within the City of Manteca. As mentioned in Table 13, the three related measures seek to achieve the goal of increasing water efficiency within the City.

Measure WC.1: Communitywide Water Use Efficiency

Description

The City's Public Works Department provides potable water for the City. As a water purveyor, the City is uniquely situated to encourage water use efficiency throughout the community. To measure progress towards increasing community water use efficiency, the City shall set a per capita water consumption goal, based on the existing water consumption in City. To achieve the water use efficiency goal, the City should consider methods of reducing community-wide water use such as offering free water audits to community members, facilitating community use of statewide programs, such as the Save Our Water Rebates, and recommending conservation measures for implementation throughout the City.

Co-Benefits

Action ID and Description

Action WC.1.1

Seek funding sources relating to the promotion of water use efficiency.

Action WC.1.2

Identify current per capita water consumption within the City and establish per capita water use reduction goal.

Action WC.1.3

Implement strategies, including the conservation measures within the most recent Urban Water Management Plan, to achieve the required water use reduction.

Action WC.1.4

Every CAP inventory update, assess progress towards per capita water consumption goals and adjust goals as needed.

2030 Reduction	2045 Reduction	Approximate Cost
16.2 percent	29.4 percent	$$

Measure WC.2: Water Efficient Landscaping

Description

All new private development, new municipal facilities, and public areas shall be landscaped using water efficient designs. Additionally, consistent with the City's water efficient landscaping ordinance, the City shall encourage the use of low maintenance landscaping. Water efficient landscaping and low maintenance landscaping reduce water demand from landscaping by up to 20 percent, save money in maintenance costs, and reduce the GHG emissions related to landscape maintenance.

The City shall seek to develop financing/incentive options with specific provisions for low-income and vulnerable populations that promote climate-ready private landscapes, such as installing drought tolerant, native, climate ready plants and/or xeriscaping; programs that support turf removal; installing rainwater capture and harvesting equipment; and the use of green stormwater measures to enhance natural water infiltration.

Co-Benefits

Action ID and Description

Action WC.2.1

The water efficient landscaping ordinance shall be reviewed and updated with every CAP inventory update to reflect a balanced approach to water conservation.

Action WC.2.2

Incentivize retrofitting and provide financing options for conversions of existing landscapes.

Action WC.2.3

Update Municipal Code to allow for grey water capture and reuse within private developments while focusing on closed water systems.

2030 Reduction	2045 Reduction	Approximate Cost
Supportive	*Supportive*	$

Measure WC.3: Sustainable Wastewater Service

Description

In the event that the City elects to construct a new wastewater treatment plant, the new plant shall be designed to incorporate methane gas recovery and energy co-generation systems or other technologies that could reduce GHG emissions related to wastewater treatment, similar to the existing wastewater treatment plant. Should the City continue to operate the existing wastewater treatment plant, the City shall investigate the feasibility of incorporating renewable energy systems to provide a GHG free source of electricity to the treatment plant.

Action ID and Description

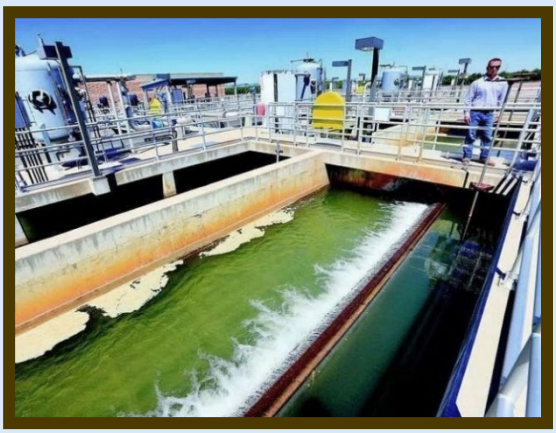
Action WC.3.1

Prioritize GHG emissions reductions during design and operation of City Wastewater Treatment Plant(s).

Action WC.3.2

Consider the feasibility of future use of recycled water to meet landscaping irrigation needs and target reuse of 10 percent of total wastewater.

Co-Benefits



Action WC.3.3

The City should investigate the feasibility of incorporating a renewable energy system at the City's Wastewater Treatment Plant to provide a source of renewable energy that can meet the electrical needs of the Plant.

2030 Reduction	2045 Reduction	Approximate Cost
16.8 percent	30.5 percent	$$$

6.6 SOLID WASTE RELATED MEASURES

The following section discusses the measures and actions relating to solid waste within the City of Manteca. As mentioned in Table 13, the three related measures seek to achieve the goal of increased waste diversion.

Measure SW.1: Expand Municipal Recycling Program

Description

The City shall expand the use of recycling bins at municipal facilities such as public parks, community centers, school facilities, and in the downtown area of the City.

Action ID and Description

Action SW.1.1

Identify and map areas in the City where municipal trash and recycling collection receptacles are located.

Action SW.1.2

Establish a plan for expanding municipal recycling services through collocating recycling receptacles with trash receptacles.

Action SW.1.3

The City shall investigate the feasibility of expanding the type of items within the recycling stream and target single use plastics.

Co-Benefits

2030 Reduction	2045 Reduction	Approximate Cost
0.04 percent	0.1 percent	$$

Measure SW.2: Expand Yard Waste and Other Organics Composting

Description

The City should investigate expanding the yard waste service to include composting services for organic wastes such as residential and commercial food waste. Expanding organics composting would reduce the amount of waste produced within the City and reduce the amount of GHG emissions from waste disposal. If expansion of the City's organics program is found not to be feasible, the City shall promote and support residents to begin home composting.

Co-Benefits

Action ID and Description

Action SW.2.1

The City shall establish waste reduction goals consistent with Statewide waste reduction requirements (SB 1383, AB 1572, AB 939).

Action SW.2.2

The City should promote yard waste programs and expand organics collections.

Action SW.2.3

The City should consider innovative new technologies for facilitating composting, such as the use of biodigesters or City-operated composting facilities.

Action SW.2.4

If the City finds expansion of organics collections programs infeasible, the City shall seek grant funding to promote and support home composting programs by providing small-scale home composting equipment or encourages use of biodigesters or City-operated composting facilities.

Action SW.2.5

The Solid Waste Division shall discuss potential expansion of composting services.

2030 Reduction	2045 Reduction	Approximate Cost
13.1 percent	30.8 percent	$$$

Measure SW.3: Improve Waste Management Process

Description

The City should investigate improving the waste management facilities to expand capacity for organic and recycled waste and to decrease the number of fugitive emissions produced from the breakdown of organic matter. This measure would support these improvements through incentives to develop new waste facilities, and to capture gas at existing facilities.

Action ID and Description

Action SW.3.1

Conduct a feasibility study and in coordination with the applicable landfill to improve and implement landfill gas system pilot project at privately managed landfills by 2030 to exceed State requirements by 10 percent by 2045.

Action SW.3.2

Incentivize and continue the development of new composting/anaerobic digestion facilities and on-farm digesters to divert compostable waste from landfills and sell the byproduct(s).

Co-Benefits

Action SW.3.3

Study options to expand and/or identify new opportunities to manage hard to recycle materials in the unincorporated area through additional hauler services, drop-off locations and/or Center for hard to recycle materials.

2030 Reduction	2045 Reduction	Approximate Cost
12.1 percent	23.7 percent	$$

6.7 REDUCTION MEASURE SUMMARY

It should be noted that while the emissions reductions presented in Chapter 5 are for the years 2030 and 2045, the majority of mitigation measures presented above would result in GHG emissions reductions beginning in the year of adoption and extending past target years. For instance, the recent Waste to Fuel Program implemented on City garbage trucks as part of the City of Manteca's effort to divert organic waste and use it as fuel which results in GHG emissions reductions for the lifespan of such programs. Consequently, the emissions reductions measures would serve to reduce anticipated emissions in the year 2030 to below the per capita emissions target for 2030.

As shown in Section 5.3 in Chapter 5, the emissions reduction through Statewide programs would reduce anticipated emissions in the year 2045 by 336,024 $MTCO_2e$, which equates to an approximately 30 percent reduction from the BAU forecasted emissions level for 2045. Considering the anticipated level of emissions reductions that would be achieved by implementation of this CAP Update, emission reductions in the year 2045 would be anticipated to equal approximately 631,544 $MTCO_2e$/yr. With an estimated population of 165,302 residents in the year 2045, the estimated remaining 496,694 $MTCO_2e$/yr emissions rate in 2045 would result in a per capita emissions rate of 3.01 $MTCO_2e$/yr. Despite the overall reduction in GHG emissions from present levels, as currently calculated, such reductions would not be sufficient to achieve the City's reduction goal of reaching carbon neutrality.

As shown throughout this CAP Update, emissions within the City of Manteca during the year 2030 would result in per capita emissions below the City's per capita emissions goal for the year 2030. Although the emissions reduction measures included in this CAP Update would not be sufficient to meet the City's goal for the year 2045, the emissions reductions achieved by implementation of the foregoing emissions reduction measures would be significant and would place the City of Manteca on a path to achieving their per capita emissions goal for 2045. Further progress towards obtaining the City's per capita emissions goal for 2045 would be made during the subsequent CAP update processes. Because the City of Manteca has been demonstrated to remain consistent with the State's GHG emissions targets and the State's 2022 Scoping Plan for the year 2030, this CAP will provide sufficient direction to guide the City's emissions reductions through 2030. However, in order to ensure that the City's emissions trajectory continues to decline in accordance with the City's emissions goal for the year 2045, after the year 2030, the City shall update the CAP more regularly, in intervals not to exceed five years. Updating the CAP in the future will ensure that the reduction calculations and emissions forecasting remain up to date. Furthermore, subsequent future updates to the CAP will allow for the incorporation of new emissions reduction technologies and methodologies that are not currently known. Although new technologies are speculative at this time, the proliferation of zero emissions passenger and freight vehicles as well as autonomous vehicles is one example of an impending technological change with effects that are difficult to predict at this early stage of development.

Nevertheless, by achieving the City's per capita emissions goal for the year 2030 and ensuring that communitywide emissions would continue to decline through the year 2045, this CAP ensures that the City of Manteca will achieve continued progress towards achieving the legislative requirements of SB 32. Although emissions reductions sufficient to meet the legislative emissions reduction requirements of Executive Order (EO) B-55-18 cannot be demonstrated at this time,

the implementation of the emissions reductions strategies included in this CAP Update will result in on-going GHG emissions reductions and allow the City to incorporate further emissions reductions strategies in the future, sufficient to reach the emissions reduction requirement of AB 32, SB 32, and EO B-55-18.

7. IMPLEMENTATION

7. IMPLEMENTATION

The following chapter describes how the City will generally proceed to implement the emissions reduction measures presented in Chapter 6 of this CAP Update. In addition, this chapter identifies potential funding sources and resources related to project funding that the City may pursue to support implementation and achieve the emissions goals presented.

7.1 IMPLEMENTATION

The emissions reduction measures presented in Chapter 6 include specific actions that delineate the timeline for measure implementation and the party or parties responsible for strategy implementation. As discussed in Chapters 5 and 6 the emission levels within the City of Manteca in 2030 would comply with the emission targets established by the City and the 2022 Scoping Plan. Consequently, the City of Manteca would comply with the Statewide emissions reduction targets established by SB 32. Although the emissions reduction measures included in this CAP Update would result in a 61.1 percent reduction in emissions from the Business as Usual (BAU) levels forecasted for the year 2045, such emissions reductions would not be sufficient to meet the goal of carbon neutrality established by the Climate Action Plan Advisory Committee (CAPAC), the 2022 Scoping Plan, and Executive Order (EO) B-55-18. Nevertheless, the emissions reductions resulting from implementation of the emissions reduction measures in this CAP would be substantial and would place the City of Manteca's total emissions level on a downward trajectory.

Emission forecasts used throughout this CAP Update are based on population growth estimates and the GHG Emissions Inventory. The data used within the CAP Update represents the most up-to-date sources of information for growth projections in the City of Manteca; however, it is uncertain the exact amount of growth that will be realized in future years, with the level of uncertainty increasing the farther into the future projections are focused.

As discussed above and in Chapter 5 of this CAP Update, based on projections for development within the City of Manteca, the City of Manteca is anticipated to comply with State emissions reductions goals by the year 2030. However, looking past the year 2030, growth trends within the City of Manteca increase in uncertainty, due to deviations from modeling and the City of Manteca potentially adopting updates to the existing General Plan, which could restrict or increase growth within the City limits. Therefore, this CAP Update provides a useful outlook into future emissions within the City of Manteca, but there is a significant need for continual updates to this CAP Update to ensure that the growth projections and emissions forecasts remain reliable and accurate. Nevertheless, the fact that the City of Manteca will achieve the 2030 emissions reductions goals, as long as the CAP Update measures are implemented as outlined, provides a strong indication that the City of Manteca will reduce GHG emissions in compliance with the State's requirements.

Considering the uncertainty surrounding the rate of future growth within the City of Manteca and the potential for future regulations to place further requirements on development within the City of Manteca, future updates to this CAP Update will be necessary in order to ensure that the emissions goals and emissions reduction measures keep pace with growth within the City of

Manteca and the evolving regulatory environment. Additionally, new technologies may become available in the future, the incorporation of which could provide new methodologies and routes to reducing GHG emissions within the City. Therefore, the City of Manteca shall seek to update the CAP at least once within each five-year period beginning in the year 2030. The City may also choose to amend the CAP more frequently than every five years, as new information becomes available, or where changes are necessary to respond to major legislative or regulatory requirements. Updating the City of Manteca's CAP on the foregoing schedule would ensure that the City of Manteca is able to adapt the CAP to any changes in the regulatory environment and incorporate updated methodologies or approaches to emissions control technologies. Furthermore, future updates to the CAP shall include updated emissions inventories. Updated emissions inventories will act to continually monitor Citywide emissions and inform decision makers with regard to the efficacy of reduction measures contained within this CAP Update or the need for new reduction measures. Specific areas of focus for future GHG inventories could include greater specificity regarding the amount of high global warming potential (GWP) gases emitted in the City, finer scale attribution of energy consumption between different economic sectors (e.g. industrial, residential, commercial), refined emissions estimates related to water and wastewater utilities, and more precise attribution of vehicle use and miles travelled between different economic sectors.

Prior to updating any portions of the CAP, the City of Manteca shall pursue implementation of the emissions reduction measures and development thresholds laid out within this CAP Update. Section 7.2 provides further discussion related to the implementation of the CAP emissions reduction measures.

Sustainability Webpage

To aid in the implementation of the emissions reduction measures, the City of Manteca shall create a specific page on the City's website that describes the City's sustainability efforts, identifies partnerships, and provides educational resources and opportunities for community members. The site will also serve as a clearinghouse for information on the City of Manteca's CAP progress and future updates.

7.2 Implementation of Reduction measures

Chapter 6, Emissions Reduction Measures, of this CAP Update presents various information related to specific measures designed to aid the City of Manteca in reducing present and future GHG emissions. Each emissions reduction measure presented in Chapter 6 includes specific actions to be taken, as well as an identification of the party or parties responsible for the measure's implementation.

As noted in Chapter 6, some of the emissions reduction measures would be implemented through municipal actions, while other strategies would be implemented by private developers within the City of Manteca, under the guidance and direction of City staff. For instance, Transportation Measure TR.6 requires that any new government facilities include EV charging stations, while also requiring that the City of Manteca's Municipal Code be updated to include requirements for new developments within the City to include installation of EV charging stations and infrastructure. To assist developers in determining which reduction measures must be implemented within private developments in the City of Manteca, a Draft Sustainability Checklist has been prepared to be used during the review of future project proposals. The Draft Sustainability Checklist includes a succinct list of measures required to be implemented by future development, which

ensures that future development complies with the emissions reduction measures included in this CAP Update. The Draft Sustainability Checklist is included as Appendix B to this CAP Update.

The finalized sustainability checklist would be implemented during the City's development review process for all new development proposals within the City of Manteca. Development requirements within the draft sustainability checklist adapt the emissions reduction measures presented in Chapter 6 for all types of new development within the City of Manteca, including reuse of existing developments, infill development, and new development in currently undeveloped portions of the City of Manteca. Completion of the finalized sustainability checklist will be a requirement of the City of Manteca's development approval process for all proposed developments within the City of Manteca in the future.

In addition to the use of the finalized sustainability checklist during the development review process, City Staff Reports will also include a CAP Consistency section, which will relate a project's consistency to the City's CAP to decision makers and the public. The inclusion of a CAP Consistency section in all Staff Reports would ensure that all City actions, including those not required to complete a sustainability checklist, would be assessed for compliance with the City's CAP Update.

7.3 FUNDING

Using this CAP Update as a starting block, the City will be able to pursue funding through various federal, State, and regional programs that fund GHG emission reducing activities and measures. The City will continually identify and adjust the constituents in which to fund and finance CAP Updates. Examples include the following:

- Federal Institutions;
- Regional Institutions;
- State Institutions;
- Building developers;
- Property and Business Owners;
- Private Institutions;
- Public Institutions;
- Utility Providers; and
- Taxpayers.

For instance, the State's Cap-and-Trade program for GHG emissions creates annual auction proceeds that are directed into various programs aimed at reducing GHG emissions on a local and Statewide basis. Such programs include the California Strategic Growth Council's Sustainable Agricultural Lands Conservation Program discussed in Land Use Measure LU.4. The Sustainable Agricultural Lands Conservation Program provides grant funding for planning projects and conservation easements that protect economically viable at-risk agricultural lands. In addition, programs such as the California Air Resources Board's Low Carbon Transportation Investments and Air Quality Improvement Plan exist to support the deployment of advanced technology and clean transportation in the light- and heavy-duty vehicle sectors. Moreover, the City may choose to pursue individual programs such as the Community Solar Pilot Program, funding for urban forestry through the California Department of Forestry and Fire Protection, or other programs.

The California Environmental Protection Agency (CalEPA) maintains a database of available funding opportunities through the CoolCalifornia.org program. Through the CoolCalifornia.org program, the CalEPA promulgates best practices for emissions reductions, examples of such emissions reduction's practices, and funding sources. Through the continued distribution of Cap-and-Trade program funds and legislative action at the State level, diverse funding sources are anticipated to remain available into the foreseeable future.

The CAP Update may also provide a basis for the City to pursue funding for climate change resiliency programs. Based on the anticipated regional effects of climate change, such programs may include increasing the availability of cooling centers during summer months, supporting urban forestry, increasing flood protection, and/or protecting regional groundwater supplies.

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7. REFERENCES

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All photos used throughout this CAP were either: (1) sourced and designed from Freepix; or (2) sourced from The Manteca Bulletin.

APPENDIX B

Appendix B - GHG Quantification

Table 1
Manteca Existing and Projected Population

Year	2020	2030	2045
Population	83,498	114,934	165,302

Sources: Population Forecast for Manteca. November 2024; Clearpath, 2025.

Table 2
CAP Goals and Measures Summary

GOALS	MEASURES	2030 Reductions	2045 Reductions
Transportation (TR)			
Promote Alternative Transportation	TR.3: Increase Use of Alternative Transportation TR.4: Promote Alternative Transportation Through Updated Parking Standards	TR.3: 1,216 $MTCO2_e$ TR.4: 22,287 $MTCO2_e$	TR.3: 1,330 $MTCO2_e$ TR.4: 71,011 $MTCO2_e$
Implement Electric Vehicle Infrastructure	TR.5: Optimize City Fleet TR.6: Support Electric Vehicle Adoption, Charging Infrastructure, and Alternative Fuels.	TR.5: 567 $MTCO2_e$ TR.6: 66,863 $MTCO2_e$	TR.5: 1,815 $MTCO2_e$ TR.6: 213,034 $MTCO2_e$
Work to Increase Active Mobility	TR.1: Bicycle and Pedestrian Infrastructure Improvement TR.9: Safe Routes to School	TR.1: 46 $MTCO2_e$ TR.9: 28 $MTCO2_e$	TR.1: 148 $MTCO2_e$ TR.9: 89 $MTCO2_e$
Reduce Single Occupant Vehicle Use and Emissions	TR.2: Congestion Management TR.7: Establish a Transportation Management Association TR.8: Mobile and Area Source Emissions Reductions	TR.2: 44,575 $MTCO2_e$ TR.7: 730 $MTCO2_e$ TR.8: 10,472 $MTCO2_e$	TR.2: 142,022 $MTCO2_e$ TR.7: 798 $MTCO2_e$ TR.8: 31,417 $MTCO2_e$
Land Use (LU)			
Encourage Sustainable Growth	LU.1: Encourage Adaptive Reuse LU.2: Comply with State Affordable Housing Requirements LU.3: Sustainable Growth of New Development LU.4: Urban Tree Management Plan	LU.1: 504 $MTCO2_e$ LU.2: Supportive LU.3: 1,512 $MTCO2_e$ LU.4: Supportive	LU.1: 1,605 $MTCO2_e$ LU.2: Supportive LU.3: 4,816 $MTCO2_e$ LU.4: Supportive
Energy and Building Design (EG)			
Expand Renewable Energy	EG.1: Renewable Energy Production Plan EG.3: Renewable Energy Requirement for Private Development EG.4: Participate in Energy Programs	EG.1: 1,498 $MTCO2_e$ EG.3: 11,070 $MTCO2_e$ EG.4: 528 $MTCO2_e$	EG.1: 8,025 $MTCO2_e$ EG.3: 38,747 $MTCO2_e$ EG.4: 1,711 $MTCO2_e$

Increase Lighting Efficiency	EG.8: Improve Lighting Efficiency	EG.8: 84 $MTCO2_e$	EG.8: 169 $MTCO2_e$
Improve Building Design	EG.2: Resource Efficiency Improvements for City Buildings EG.5: Enforce CALGreen EG.6: Energy Efficient Design EG.7: Efficient Design of City Structures	EG.2: 9 $MTCO2_e$ EG.5: 3,194 $MTCO2_e$ EG.6: 17,613 $MTCO2_e$ EG.7: 10,902 $MTCO2_e$	EG.2: 27 $MTCO2_e$ EG.5: 11,180 $MTCO2_e$ EG.6: 61,390 $MTCO2_e$ EG.7: 38,149 $MTCO2_e$
Water Conservation (WC)			
Increase Water Efficiency	WC.1: Community Wide Water Use Efficiency WC.2: Water Efficient Landscape WC.3: Sustainable Water Service	WC.1: 212 $MTCO2_e$ WC.2: 91 $MTCO2_e$ WC.3: 220 $MTCO2_e$	WC.1: 585 $MTCO2_e$ WC.2: 91 $MTCO2_e$ WC.3: 606 $MTCO2_e$
Solid Waste Management (SW)			
Increased Waste Diversion	SW.1: Expand Municipal Recycling Program SW.2: Expand Yard Waste and Other Organics Composting SW.3: Improve Waste Management Practices.	SW.1: 33 $MTCO2_e$ SW.2: 9,754 $MTCO2_e$ SW.3: 8,978 $MTCO2_e$	SW.1: 115 $MTCO2_e$ SW.2: 34,758 $MTCO2_e$ SW.3: 26,752 $MTCO2_e$

2020 Community Baseline Inventory	MTCO2e
Residential Energy	65271.61159
Commercial Energy	33714.76773
Transportation & Mobile Sources	523214.8178
Solid Waste	56157.33209
Process & Fugitive Emissions	45578
Water & Wastewater	1295.606086

2030 Community Forecast	MTCO2e
Residential Energy	69395.05667
Commercial Energy	25278.99309
Transportation & Mobile Sources	522007.8305
Solid Waste	74179.49529
Process & Fugitive Emissions	60205.01527
Water & Wastewater	1283.548451

2045 Community Forecast	MTCO2e
Residential Energy	84350.02155
Commercial Energy	11218.03809
Transportation & Mobile Sources	484097.6572
Solid Waste	112615.9706
Process & Fugitive Emissions	91400.54411
Water & Wastewater	1948.623662

2020 Government Baseline Inventory	MTCO2e
Buildings & Facilities	786.09283
Street Lights & Traffic Signals	144
Vehicle Fleet	2704.6946
Transit Fleet	332
Employee Commute	792
Solid Waste Facilities	202.33984
Water & Wastewater Treatment Facilities	1304.0007

2030 Government Forecast	MTCO2e
Buildings & Facilities	841.56698
Street Lights & Traffic Signals	108.83101
Vehicle Fleet	2069.4322
Transit Fleet	321.64818
Employee Commute	728.1016
Solid Waste Facilities	181.07419
Water & Wastewater Treatment Facilities	1309.893

2045 Government Forecast	MTCO2e
Buildings & Facilities	1153.0645
Street Lights & Traffic Signals	153.28275
Vehicle Fleet	1820.0482
Transit Fleet	414.28602
Employee Commute	912.59446
Solid Waste Facilities	140.99685
Water & Wastewater Treatment Facilities	1988.6188

CNG Fuel Production Reduction = (negative 1090.7) negative 106824 Gallons Diesel

2020 Total Emissions Inventory	MTCO2e
Transportation	523,215
Residential Energy	65,272
Commerical Energy	33,715
Solid Waste	56,157
Process & Fugitive Emissions	45,578
Total	730,202

Calculation Sector Numbers	MTCO2e
Transportation	527043.5123
Land Use	527043.5123
Energy and Building Design	99916.47215
Water Conservation	1304.000744
Solid Waste Management	56359.67193
	1211667.169

Total 2030 Calculation Sector Numbers	MTCO2e
Transportation	525127.0125
Land Use	525127.0125
Energy and Building Design	94674.046
Water Conservation	1309.892967
Solid Waste Management	74360.56948

Total 2045 Calculation Sector Numbers	MTCO2e
Transportation	487244.5859
Land Use	487244.5859
Energy and Building Design	95568.059
Water Conservation	1988.618785
Solid Waste Management	112756.9675

Calculations

Transportation	Energy	Water Conservation	Solid Waste
523214.8178	65271.61159		202.3398383
2704.694567	33714.76773		56157.33209
332	786.0928317		**56359.67193**
792	144		
527043.5123	**99916.47215**		
522007.8305	53648.03877		181.0741907
2069.432248	25278.99309		74179.49529
321.6481822	841.5669782		**74360.56948**
728.1016006	108.8310068		
525127.0125	**79877.42985**		
484097.6572	29235.45425		112615.9706
1820.048234	11218.04		140.9968499
414.2860178	1153.064511		**112756.9675**
912.5944603	153.2827471		
487244.5859	**41759.84151**		

ClearPath Measures	Sector	2030 Sector MTCO2e	2030 Measure MTCO2e	Split Amounts
TR.1: Bicycle and Pedestrian Infrastructure Improvement & TR.9: Safe Routes to School	Transportation	525127.0125	74.23860332	TR.1=46.399 TR.9=27.839 (5/8 & 3/8)
(Diesel) TR.6: Support Electric Vehicle Charging Infrastructure & TR.4: Promote Alternative Transportation Through Updated Parking Standards & TR.2: Congestion Management	Transportation	525127.0125	22999.41677	TR.2=7,666.472 TR.4=3,833.236 TR.6=11,499.708 (2/6 & 1/6 & 3/6)
(GAS) TR.6: Support Electric Vehicle Charging Infrastructure & TR.4: Promote Alternative Transportation Through Updated Parking Standards & TR.2: Congestion Management	Transportation	525127.0125	110728.2027	TR.2=36,909.4 TR.4=18,454.7 TR.6= 55,364.1 (2/6 & 1/6 & 3/6)
TR.8: Mobile Source Emissions Reductions (Engine Tiers Construction and AG)	Transportation	525127.0125	3,161.16	TR.8= 3,161.16
TR.8: Mobile Source Emissions Reductions (Electric landscaping)	Transportation	525127.0125	7,311.33	TR.8= 7,311.33
TR.3: Increase Use of Alternative Transportation & TR.7: Establish a Transportation Management Association	Transportation	525127.0125	1945.539076	TR.3=1,215.9619 TR.7=729.577 (1/2 &1/2)
TR.5: Optimize City Fleet 1/2	Transportation	525127.0125	437.9391975	TR.5= 437.939
TR.5: Optimize City Fleet 2/2	Transportation	525127.0125	129.093038	TR.5= 129.093
LU.1: Encourage Adaptive Reuse & LU.3: Sustainable Growth of New Development	Land Use	525127.0125	2015.628648	LU.1=503.907 LU.3= 1,511.721 (1/4 & 3/4)
EG.2: Resource Efficiency Improvements for City Buildings	Energy (Commerical)	94,674.05	0.207487031	EG.2= 0.207487031487594
EG.5: Enforce CALGreen	Energy (Commerical)	94,674.05	3194.324405	EG.5= 3194.32440519925
EG.3: Renewable Energy Requirement for Private Development	Energy (Commerical)	94,674.05	11070.768	EG.3= 11070.76819925
EG.7: Efficient Design of City Structures	Energy (Commerical)	94,674.05	10902.18452	EG.7= 10902.1845219925
EG.6: Energy Efficient Design	Energy (Commerical)	94,674.05	16634.05591	EG.6= 16634.0559119925
EG.1: Renewable Energy Production Plan & EG.6: Energy Efficient Design	Energy (Commerical)	94,674.05	1957.213865	EG.1=978.6069 EG.6= 978.6069 (1/2 &1/2)
EG.1: Renewable Energy Production Plan & EG.4: Participate in Energy Programs	Energy (Commerical)	94,674.05	1039.966167	EG.1=519.983 EG.4=519.983 (1/2 &1/2)
EG.2: Resource Efficiency Improvements for City Buildings & EG.4: Participate in Energy Programs	Energy (Commerical)	94,674.05	17.20589692	EG.2= 8.602945 EG.4= 8.602945 (1/2 &1/2)
EG.8: Improve Lighting Efficiency	Energy (Commerical)	94,674.05	83.64743181	EG.8= 83.6474318119925
WC.1: Community Wide Water Use Efficiency	Wastewater	1309.892967	212.3591434	WC.1= 212.359143440611
WC.3: Sustainable Water Service	Wastewater	1309.892967	220.2112565	WC.3= 220.211256483737
WC.2: Water Efficient Landscape	Wastewater	1309.892967	91.41197132	WC.2= 91.4119713176678
SW.3: Improve Waste Management Practices	Solid Waste	74360.56948	8978.482258	SW.3= 8978.48225772343
SW.2: Expand Yard Waste and Other Organics Composting	Solid Waste	74360.56948	9743.038336	SW.2= 9743.03833645894
SW.1:Expand Municipal Recycling Program & SW.2: Expand Yard Waste and Other Organics Composting	Solid Waste	74360.56948	43.61816874	SW.1= 32.7135 SW.2= 10.90

CAP Measures	Measure MTCO2e	Final MTCO2e Reductions	Sector MTCO2e	Percentage of Sector Reduction
TR.1: Bicycle and Pedestrian Infrastructure Improvement	46.399	46.399	522007.8305	0.008888564
TR.2: Congestion Management	7666.472+36,909.4	44,575.87	522007.8305	8.539310599
TR.3: Increase Use of Alternative Transportation	1,215.96	1,215.96	522007.8305	0.232939398
TR.4: Promote Alternative Transportation Through Updated Parking Standards	18,454.7+3833.236	22,287.94	522007.8305	4.269656258
TR.5: Optimize City Fleet	129.093+437.939	567.03	3119.182031	18.17880439
TR.6: Support Electric Vehicle Charging Infrastructure	55,364.1+11499.708	66,863.71	522007.8305	12.8089477
TR.7: Establish a Transportation Management Association	729.577	729.577	522007.8305	0.139763612
TR.8: Mobile Source Emissions Reductions	3,161.16 + 7,311.33	10,472.49	522007.8305	2.006194618
TR.9: Safe Routes to School	27.839	27.839	522007.8305	0.005333062
LU.1: Encourage Adaptive Reuse	503.907	503.91	522007.8305	0.096533035
LU.2: Comply with State Affordable Housing Requirements	Supportive	0	522007.8305	0
LU.3: Sustainable Growth of New Development	1,511.72	1511.72	522007.8305	0.289597188
LU.4: Urban Tree Management Plan	Supportive	0	522007.8305	0
EG.1: Renewable Energy Production Plan	519.983+978.6069	1,498.59	94,674.05	1.582894218
EG.2: Resource Efficiency Improvements for City Buildings	8.602945+0.207487	8.81	950.397985	0.92698008
EG.3: Renewable Energy Requirement for Private Development	11070.7682	11070.77	94,674.05	11.69356383
EG.4: Participate in Energy Programs	8.602945+519.983	528.58	94,674.05	0.558315634
EG.5: Enforce CALGreen	3194.324405	3194.32	94,674.05	3.374018683
EG.6: Energy Efficient Design	978.6069+16634.0559	17,612.67	94,674.05	18.60348294
EG.7: Efficient Design of City Structures	10902.18452	10902.18	94,674.05	11.51548968
EG.8: Improve Lighting Efficiency	83.64743181	83.65	950.397985	8.801575899
WC.1: Community Wide Water Use Efficiency	212.3591434	212.36	1309.892967	16.21201162
WC.2: Water Efficient Landscape	91.41197132	91.41	1309.892967	6.978432767
WC.3: Sustainable Water Service	220.2112565	220.21	1309.892967	16.81129723
SW.1: Expand Municipal Recycling Program	32.7135	32.71	74360.56948	0.043988367
SW.2: Expand Yard Waste and Other Organics Composting	9743.0383+10.90	9,753.93	74360.56948	13.11707276
SW.3: Improve Waste Management Practices.	8978.4822	8978.48	74360.56948	12.07424857

ClearPath Measures	Sector	2030 Sector MTCO	2030 Measure MTCO2e	Split Ratios
TR.1: Bicycle and Pedestrian Infrastructure Improvement & TR.9: Safe Routes to School	Transportation	487244.5859	236.5311103	TR.1=148.125 TR.9=88.875 (5/8 & 3/8)
(Diesel) TR.6: Support Electric Vehicle Charging Infrastructure & TR.4: Promote Alternative Transportation Through Updated Parking Standards & TR.2: Congestion Management	Transportation	487244.5859	73278.28569	TR.2=24,426.09 TR.4=12,213.04 TR.6=36,639.14 (2/6 & 1/6 & 3/6)
(GAS) TR.6: Support Electric Vehicle Charging Infrastructure & TR.4: Promote Alternative Transportation Through Updated Parking Standards & TR.2: Congestion Management	Transportation	487244.5859	352790.3751	TR.2=117,596.79 TR.4=58,798.39 TR.6= 176,395.18 (2/6 & 1/6 & 3/6)
TR.8: Mobile Source Emissions Reductions (Engine Tiers Construction and AG)	Transportation	487244.5859	9483.5	TR.8= 9483.5
TR.8: Mobile Source Emissions Reductions (Electric landscaping)	Transportation	487244.5859	21934	TR.8= 21934
TR.3: Increase Use of Alternative Transportation & TR.7: Establish a Transportation Management Association	Transportation	487244.5859	2128.484374	TR.3=1,330.3125 TR.7=798.1875 (5/8 & 3/8)
TR.5: Optimize City Fleet 1/2	Transportation	487244.5859	1395.315105	TR.5= 1395.3151
TR.5: Optimize City Fleet 2/2	Transportation	487244.5859	419.7327714	TR.5= 419.73277
LU.1: Encourage Adaptive Reuse & LU.3: Sustainable Growth of New Development	Land Use	487244.5859	6421.980757	LU.1=1,605.49 LU.3= 4,816.48 (1/4 & 3/4)
EG.2: Resource Efficiency Improvements for City Buildings	Energy (Commerical)	95,568.06	0.207487031	EG.2= 0.207487031487594
EG.5: Enforce CALGreen	Energy (Commerical)	95,568.06	11180.13542	EG.5= 11180.1354181973
EG.3: Renewable Energy Requirement for Private Development	Energy (Commerical)	95,568.06	38747.6908	EG.3= 38747.6907960349
EG.7: Efficient Design of City Structures	Energy (Commerical)	95,568.06	38149.00303	EG.7= 38149.003026237
EG.6: Energy Efficient Design	Energy (Commerical)	95,568.06	58219.19567	EG.6= 58219.1956
EG.1: Renewable Energy Production Plan & EG.6: Energy Efficient Design	Energy (Commerical)	95,568.06	6340.767801	EG.1=3,170.38 EG.6= 3,170.38 (1/2 &1/2)
EG.1: Renewable Energy Production Plan & EG.4: Participate in Energy Programs	Energy (Commerical)	95,568.06	3369.168851	EG.1=1,684.58 EG.4=1,684.58 (1/2 &1/2)
EG.2: Resource Efficiency Improvements for City Buildings & EG.4: Participate in Energy Programs	Energy (Commerical)	95,568.06	53.17272888	EG.2=26.58 EG.4= 26.58 (1/2 &1/2)
EG.8: Improve Lighting Efficiency	Energy (Commerical)	41759.84151	169.23	EG.8= 83.6474318119925
WC.1: Community Wide Water Use Efficiency	Wastewater	1988.618785	584.6533407	WC.1= 584.6533407
WC.3: Sustainable Water Service	Wastewater	1988.618785	606.2712661	WC.3= 606.271266
WC.2: Water Efficient Landscape	Wastewater	1988.618785	91.41197132	WC.2= 91.4119713176
SW.3: Improve Waste Management Practices	Solid Waste	112756.9675	26751.66698	SW.3= 26751.66698
SW.2: Expand Yard Waste and Other Organics Composting	Solid Waste	112756.9675	34757.55685	SW.2= 34757.556852330
SW.1:Expand Municipal Recycling Program & SW.2: Expand Yard Waste and Other Organics Composting	Solid Waste	112756.9675	152.6635906	SW.1=114.49 SW.2= 38.16589

CAP Measures	Measure MTCO2e	Final MTCO2e Red	Sector MTCO2e	Percentage of Sector Reduction
TR.1: Bicycle and Pedestrian Infrastructure Improvement	148.125	148.13	487244.5859	0.030401569
TR.2: Congestion Management	24,426.09+117,596.79	142,022.88	487244.5859	29.14816996
TR.3: Increase Use of Alternative Transportation	1,330.31	1,330.31	487244.5859	0.273027662
TR.4: Promote Alternative Transportation Through Updated Parking Standards	12,213.04 +58,798.39	71,011.43	487244.5859	14.57408293
TR.5: Optimize City Fleet	1395.3151+419.73277	1,815.04	2387.616999	76.01889251
TR.6: Support Electric Vehicle Charging Infrastructure	36,639.14+176,395.18	213,034.32	487244.5859	43.72225494
TR.7: Establish a Transportation Management Association	798.19	798.19	487244.5859	0.163816597
TR.8: Mobile Source Emissions Reductions	9483.5 + 21934	31,417.50	487244.5859	6.447993659
TR.9: Safe Routes to School	88.875	88.88	487244.5859	0.018241352
LU.1: Encourage Adaptive Reuse	1,605.49	1,605.49	487244.5859	0.329503918
LU.2: Comply with State Affordable Housing Requirements	Supportive	0	487244.5859	0
LU.3: Sustainable Growth of New Development	4,816.48	4,816.48	487244.5859	0.988513806
LU.4: Urban Tree Management Plan	Supportive	0	487244.5859	0
EG.1: Renewable Energy Production Plan	6340.767+1,684.58	8,025.34	95,568.06	8.397512813
EG.2: Resource Efficiency Improvements for City Buildings	26.58 +0.207487	26.78	1,306.35	2.049990907
EG.3: Renewable Energy Requirement for Private Development	38747.6908	38747.6908	95,568.06	40.54460371
EG.4: Participate in Energy Programs	1,684.58+26.58	1,711.16	95,568.06	1.790514548
EG.5: Enforce CALGreen	11180.13541	11180.13541	95,568.06	11.69861094
EG.6: Energy Efficient Design	3,170.38+58219.1956	61,389.57	95,568.06	64.23649349
EG.7: Efficient Design of City Structures	38149.00303	38149.00303	95,568.06	39.91815197
EG.8: Improve Lighting Efficiency	169.23	169.23	1,306.35	12.95444216
WC.1: Community Wide Water Use Efficiency	584.6533407	584.6533407	1988.618785	29.39997073
WC.2: Water Efficient Landscape	91.41197132	91.41197132	1988.618785	4.596756905
WC.3: Sustainable Water Service	606.2712661	606.2712661	1988.618785	30.48705316
SW.1: Expand Municipal Recycling Program	114.49	114.49	112756.9675	0.101536963
SW.2: Expand Yard Waste and Other Organics Composting	34757.55685	34757.55685	112756.9675	30.82519656
SW.3: Improve Waste Management Practices.	26751.66698	26751.66698	112756.9675	23.7250678

Sector	Sub_sector
Stationary Energy	Residential
Stationary Energy	Residential
Stationary Energy	Commercial
Stationary Energy	Commercial
Stationary Energy	Commercial
Stationary Energy	Commercial
Stationary Energy	Commercial
Transportation	On-Road
Transportation	On-Road
Transportation	On-Road
Transportation	Off-road
Transportation	Off-road
Waste	Solid waste disposal
Waste	Wastewater
Waste	Wastewater
Waste	Wastewater
Waste	Wastewater

ATTACHMENT 4

Inventory_record
2020 Baseline Residential Energy Inventory Electricity Usage
2020 Baseline Residential Energy Inventory Natural Gas Usage
2020 Baseline DA Electrical Use
2020 Baseline Commercial Natural Gas Usage
2020 Baseline Commercial Electricity Usage
2020 Baseline Commercial Electricity (County and Special Districts)
2020 Baseline Commercial Natural Gas Usage (County and Special Districts and possibly industrial)
2020 Baseline Community Transportation & Mobile Sources (2019 VMT from GPU) Natural Gas
2020 Baseline Community Transportation & Mobile Sources (2019 VMT from GPU) Diesel
2020 Baseline Community Transportation & Mobile Sources (2019 VMT from GPU) Gasoline
2020 Baseline Community Transportation & Mobile Source Off-road equipment use (Ag)
2020 Baseline Community Transportation & Mobile Source Off-road equipment (construction)
2020 Baseline Community Solid Waste Generation
2020 Baseline WWTP Digester Gas Combustion
2020 Baseline Government Operations Process N2O
2020 Baseline WWTP Process N2O from Effluent Discharge
2020 Baseline Government Operations WWTP Flaring

ATTACHMENT 4

category.calculator	Fuel Type
Emissions from Grid Electricity (USCP Required)	
Emissions from Stationary Fuel Combustion (USCP Required)	Natural Gas
Emissions from Grid Electricity (USCP Required)	
Emissions from Stationary Fuel Combustion (USCP Required)	Natural Gas
Emissions from Grid Electricity (USCP Required)	
Emissions from Grid Electricity (USCP Required)	
Emissions from Stationary Fuel Combustion (USCP Required)	Natural Gas
On Road Transportation (USCP Required)	CNG
On Road Transportation (USCP Required)	Diesel
On Road Transportation (USCP Required)	Gasoline
Emissions from Off Road Vehicles (USCP Recommended)	Diesel
Emissions from Off Road Vehicles (USCP Recommended)	Diesel
Landfilled Waste (Obsolete)	
Emissions from the Combustion of Digester Gas (USCP Recommended, where applicable)	
Process N2O Emissions from Wastewater Treatment (USCP Recommended)	
Process N2O from Effluent Discharge to River, Ocean, or Deep Well Injection	
Emissions from Flaring of Digester Gas (USCP Recommended, where applicable)	

ATTACHMENT 4

Activity Name	Activity Data	CO2 (MT)	CH4 (MT)	N2O (MT)	CO2e (MT)
Electricity Energy Equivalent (MMBtu)	629357.6997	13382.92419	2.17472426	0.25093	13510.313
Energy Equivalent (MMBtu)	973203.7	51599.26017	4.8660185	0.09732	51761.299
Electricity Energy Equivalent (MMBtu)	114376.1229	2432.141503	0.39522283	0.045603	2455.2925
Energy Equivalent (MMBtu)	223891.7	11870.73793	1.1194585	0.022389	11908.016
Electricity Energy Equivalent (MMBtu)	426897.041	9077.716439	1.4751283	0.170207	9164.125
Electricity Energy Equivalent (MMBtu)	19878.26962	422.6998026	0.06868869	0.007926	426.72338
Energy Equivalent (MMBtu)	183516.7	9730.055434	0.9175835	0.018352	9760.611
On Road VMT	716641	0	1.40891621	0.125412	72.68388
On Road VMT	70751968	110229.503	0.39116358	16.22694	114540.59
On Road VMT	569729247	374851.4387	4.43308834	5.630839	376467.74
		20033.05121	2.82542544	0.510146	20247.352
		11788.14949	0.66965002	0.300188	11886.449
Waste Generated (wet tons)	92698.25		2005.619		56157.332
Energy Equivalent (MMBtu)	34844.2656		0.11150165	0.021952	8.9392963
Process N2O Population Served	91527			0.800861	212.22823
Daily N Load at Facility with Release to Environment (kg N/day)	90.64			0.259884	68.869297
Annual Digester Gas Flared (scf / year)	22639290.75		2.75689737		77.193126

ATTACHMENT 4

CO2 Emissions Factor	CO2 Emissions F	CH4 Emissi	CH4 Emissions Factor Units	N2O Emissions Factor	N2O Emissions Factor Units	GPC
0.021264416	MT/MMBtu	3.46E-06	MT/MMBtu	3.99E-07	MT/MMBtu	I.1.2
53.02	kg/MMBtu	0.005	kg/MMBtu	0.0001	kg/MMBtu	I.1.1
0.021264416	MT/MMBtu	3.46E-06	MT/MMBtu	3.99E-07	MT/MMBtu	I.2.2
	kg/MMBtu		kg/MMBtu		kg/MMBtu	I.2.1
0.021264416	MT/MMBtu	3.46E-06	MT/MMBtu	3.99E-07	MT/MMBtu	I.2.2
0.021264416	MT/MMBtu	3.46E-06	MT/MMBtu	3.99E-07	MT/MMBtu	I.2.2
	kg/MMBtu		kg/MMBtu		kg/MMBtu	I.2.1
0.052529183	MT/MMBtu	1.97E-06	MT/mile	1.75E-07	MT/mile	II.1.1
0.073934483	MT/MMBtu	5.53E-09	MT/mile	2.29E-07	MT/mile	II.1.1
0.07024	MT/MMBtu	7.78E-09	MT/mile	9.88E-09	MT/mile	II.1.1
0.073964068	MT/MMBtu	1.04E-05	MT/MMBtu	1.88E-06	MT/MMBtu	II.5.1
0.073964068	MT/MMBtu	4.20E-06	MT/MMBtu	1.88E-06	MT/MMBtu	II.5.1
						III.1.2
					g/person	
					kg N2O/kg N in effluent	
		1.22E-07		4		

notes

PGE provided community data. Emission factors from PGE and eGRID 2020. Usage data was average 2018-2020 to account for pandemic swing.
PGE data. 2018-2020 average natural gas usage.

Includes ag in average. Only included industrial in 2018 of the 3 year average (2018-2020).
This is additional kWh usage from the PGE community report for county and special districts operating in Manteca.
This is additional natural gas therms from the PGE community report for county and special districts operating in Manteca and industrial therms based on diffe

Offroad database fuel consumption 2020, % of Manteca population vs. SJ County population
Calculated from Offroad database. % of Manteca population to SJ County population.

rence in PGE community report and aggregate data provided.

Residential

Year	Usage	CO2e	Output Name
2020	629358	13510	Electricity Energy Equivalent (MMBtu)
2021	647121	13308	Electricity Energy Equivalent (MMBtu)
2022	665385	13109	Electricity Energy Equivalent (MMBtu)
2023	684165	12913	Electricity Energy Equivalent (MMBtu)
2024	703475	12720	Electricity Energy Equivalent (MMBtu)
2025	723330	12529	Electricity Energy Equivalent (MMBtu)
2026	743745	12342	Electricity Energy Equivalent (MMBtu)
2027	764736	12157	Electricity Energy Equivalent (MMBtu)
2028	786320	11975	Electricity Energy Equivalent (MMBtu)
2029	808513	11796	Electricity Energy Equivalent (MMBtu)
2030	831333	11620	Electricity Energy Equivalent (MMBtu)
2031	854796	11948	Electricity Energy Equivalent (MMBtu)
2032	878922	12285	Electricity Energy Equivalent (MMBtu)
2033	903729	12632	Electricity Energy Equivalent (MMBtu)
2034	929236	12988	Electricity Energy Equivalent (MMBtu)
2035	955463	13355	Electricity Energy Equivalent (MMBtu)
2036	982430	13732	Electricity Energy Equivalent (MMBtu)
2037	1010158	14119	Electricity Energy Equivalent (MMBtu)
2038	1038668	14518	Electricity Energy Equivalent (MMBtu)
2039	1067984	14928	Electricity Energy Equivalent (MMBtu)
2040	1098126	15349	Electricity Energy Equivalent (MMBtu)
2041	1129120	15782	Electricity Energy Equivalent (MMBtu)
2042	1160988	16227	Electricity Energy Equivalent (MMBtu)
2043	1193756	16685	Electricity Energy Equivalent (MMBtu)
2044	1227449	17156	Electricity Energy Equivalent (MMBtu)
2045	1262092	17641	Electricity Energy Equivalent (MMBtu)
2020	973204	51761	Natural Gas - Energy Equivalent (MMBtu)
2021	1000671	53222	Natural Gas - Energy Equivalent (MMBtu)
2022	1028914	54724	Natural Gas - Energy Equivalent (MMBtu)
2023	1057954	56269	Natural Gas - Energy Equivalent (MMBtu)
2024	1087814	57857	Natural Gas - Energy Equivalent (MMBtu)
2025	1118517	59490	Natural Gas - Energy Equivalent (MMBtu)
2026	1150086	61169	Natural Gas - Energy Equivalent (MMBtu)
2027	1182546	62895	Natural Gas - Energy Equivalent (MMBtu)
2028	1215922	64671	Natural Gas - Energy Equivalent (MMBtu)
2029	1250240	66496	Natural Gas - Energy Equivalent (MMBtu)
2030	1285527	68373	Natural Gas - Energy Equivalent (MMBtu)
2031	1321810	70302	Natural Gas - Energy Equivalent (MMBtu)
2032	1359116	72287	Natural Gas - Energy Equivalent (MMBtu)
2033	1397476	74327	Natural Gas - Energy Equivalent (MMBtu)
2034	1436918	76425	Natural Gas - Energy Equivalent (MMBtu)
2035	1477474	78582	Natural Gas - Energy Equivalent (MMBtu)
2036	1519174	80800	Natural Gas - Energy Equivalent (MMBtu)
2037	1562051	83080	Natural Gas - Energy Equivalent (MMBtu)
2038	1606139	85425	Natural Gas - Energy Equivalent (MMBtu)
2039	1651471	87836	Natural Gas - Energy Equivalent (MMBtu)
2040	1698082	90315	Natural Gas - Energy Equivalent (MMBtu)
2041	1746008	92864	Natural Gas - Energy Equivalent (MMBtu)
2042	1795288	95485	Natural Gas - Energy Equivalent (MMBtu)
2043	1845958	98180	Natural Gas - Energy Equivalent (MMBtu)
2044	1898058	100951	Natural Gas - Energy Equivalent (MMBtu)
2045	1951629	103800	Natural Gas - Energy Equivalent (MMBtu)

Commerical

Year	Usage	CO2e	Output Name
2020	561151	12046	Electricity Energy Equivalent (MMBtu)
2021	576989	11866	Electricity Energy Equivalent (MMBtu)
2022	593274	11688	Electricity Energy Equivalent (MMBtu)
2023	610019	11514	Electricity Energy Equivalent (MMBtu)
2024	627236	11341	Electricity Energy Equivalent (MMBtu)
2025	644939	11172	Electricity Energy Equivalent (MMBtu)
2026	663142	11004	Electricity Energy Equivalent (MMBtu)
2027	681859	10840	Electricity Energy Equivalent (MMBtu)
2028	701103	10678	Electricity Energy Equivalent (MMBtu)
2029	720891	10518	Electricity Energy Equivalent (MMBtu)
2030	741238	10360	Electricity Energy Equivalent (MMBtu)
2031	762158	10653	Electricity Energy Equivalent (MMBtu)
2032	783670	10954	Electricity Energy Equivalent (MMBtu)
2033	805788	11263	Electricity Energy Equivalent (MMBtu)
2034	828530	11581	Electricity Energy Equivalent (MMBtu)
2035	851915	11907	Electricity Energy Equivalent (MMBtu)
2036	875959	12244	Electricity Energy Equivalent (MMBtu)
2037	900682	12589	Electricity Energy Equivalent (MMBtu)
2038	926103	12944	Electricity Energy Equivalent (MMBtu)
2039	952242	13310	Electricity Energy Equivalent (MMBtu)
2040	979118	13685	Electricity Energy Equivalent (MMBtu)
2041	1006752	14072	Electricity Energy Equivalent (MMBtu)
2042	1035167	14469	Electricity Energy Equivalent (MMBtu)
2043	1064383	14877	Electricity Energy Equivalent (MMBtu)
2044	1094425	15297	Electricity Energy Equivalent (MMBtu)
2045	1125314	15729	Electricity Energy Equivalent (MMBtu)
2020	407408	21669	Natural Gas - Energy Equivalent (MMBtu)
2021	418907	22280	Natural Gas - Energy Equivalent (MMBtu)
2022	430730	22909	Natural Gas - Energy Equivalent (MMBtu)
2023	442887	23556	Natural Gas - Energy Equivalent (MMBtu)
2024	455387	24220	Natural Gas - Energy Equivalent (MMBtu)
2025	468240	24904	Natural Gas - Energy Equivalent (MMBtu)
2026	481456	25607	Natural Gas - Energy Equivalent (MMBtu)
2027	495044	26330	Natural Gas - Energy Equivalent (MMBtu)
2028	509017	27073	Natural Gas - Energy Equivalent (MMBtu)
2029	523383	27837	Natural Gas - Energy Equivalent (MMBtu)
2030	538155	28622	Natural Gas - Energy Equivalent (MMBtu)
2031	553344	29430	Natural Gas - Energy Equivalent (MMBtu)
2032	568961	30261	Natural Gas - Energy Equivalent (MMBtu)
2033	585020	31115	Natural Gas - Energy Equivalent (MMBtu)
2034	601531	31993	Natural Gas - Energy Equivalent (MMBtu)
2035	618509	32896	Natural Gas - Energy Equivalent (MMBtu)
2036	635966	33825	Natural Gas - Energy Equivalent (MMBtu)
2037	653915	34779	Natural Gas - Energy Equivalent (MMBtu)
2038	672372	35761	Natural Gas - Energy Equivalent (MMBtu)
2039	691349	36770	Natural Gas - Energy Equivalent (MMBtu)
2040	710861	37808	Natural Gas - Energy Equivalent (MMBtu)
2041	730925	38875	Natural Gas - Energy Equivalent (MMBtu)
2042	751554	39973	Natural Gas - Energy Equivalent (MMBtu)
2043	772766	41101	Natural Gas - Energy Equivalent (MMBtu)
2044	794577	42261	Natural Gas - Energy Equivalent (MMBtu)
2045	817003	43454	Natural Gas - Energy Equivalent (MMBtu)

Transportation

Year	Usage	CO2e	Output Name
2020	569729247	376468	Gasoline - On Road VMT
2021	585809291	377029	Gasoline - On Road VMT
2022	602343178	377591	Gasoline - On Road VMT
2023	619343717	378153	Gasoline - On Road VMT
2024	636824081	378717	Gasoline - On Road VMT
2025	654797810	380449	Gasoline - On Road VMT
2026	673278829	382190	Gasoline - On Road VMT
2027	692281457	383938	Gasoline - On Road VMT
2028	711820416	385695	Gasoline - On Road VMT
2029	731910842	387459	Gasoline - On Road VMT
2030	752568301	392419	Gasoline - On Road VMT
2031	773808796	397442	Gasoline - On Road VMT
2032	795648783	402530	Gasoline - On Road VMT
2033	818105182	407682	Gasoline - On Road VMT
2034	841195390	412901	Gasoline - On Road VMT
2035	864937297	421158	Gasoline - On Road VMT
2036	889349296	429581	Gasoline - On Road VMT
2037	914450299	438172	Gasoline - On Road VMT
2038	940259753	446934	Gasoline - On Road VMT
2039	966797653	455872	Gasoline - On Road VMT
2040	994084559	467332	Gasoline - On Road VMT
2041	1022141611	479081	Gasoline - On Road VMT
2042	1050990546	491125	Gasoline - On Road VMT
2043	1080653713	503471	Gasoline - On Road VMT
2044	1111154094	516128	Gasoline - On Road VMT
2045	1142515318	530165	Gasoline - On Road VMT
2020	70751968	114541	Diesel - On Road VMT
2021	72748872	114711	Diesel - On Road VMT
2022	74802137	114882	Diesel - On Road VMT
2023	76913353	115053	Diesel - On Road VMT
2024	79084157	115225	Diesel - On Road VMT
2025	81316229	115752	Diesel - On Road VMT
2026	83611299	116282	Diesel - On Road VMT
2027	85971145	116814	Diesel - On Road VMT
2028	88397595	117348	Diesel - On Road VMT
2029	90892530	117885	Diesel - On Road VMT
2030	93457881	119394	Diesel - On Road VMT
2031	96095637	120922	Diesel - On Road VMT
2032	98807842	122470	Diesel - On Road VMT
2033	101596595	124038	Diesel - On Road VMT
2034	104464058	125625	Diesel - On Road VMT
2035	107412453	128138	Diesel - On Road VMT
2036	110444063	130700	Diesel - On Road VMT
2037	113561237	133314	Diesel - On Road VMT
2038	116766391	135980	Diesel - On Road VMT
2039	120062007	138699	Diesel - On Road VMT
2040	123450638	142186	Diesel - On Road VMT
2041	126934910	145761	Diesel - On Road VMT
2042	130517522	149425	Diesel - On Road VMT
2043	134201250	153181	Diesel - On Road VMT
2044	137988947	157032	Diesel - On Road VMT
2045	141883548	161303	Diesel - On Road VMT
2020	716641	73	CNG - On Road VMT
2021	736867	73	CNG - On Road VMT
2022	757665	73	CNG - On Road VMT
2023	779049	73	CNG - On Road VMT
2024	801037	73	CNG - On Road VMT
2025	823646	73	CNG - On Road VMT
2026	846892	74	CNG - On Road VMT
2027	870795	74	CNG - On Road VMT
2028	895372	74	CNG - On Road VMT
2029	920643	75	CNG - On Road VMT
2030	946627	76	CNG - On Road VMT
2031	973345	77	CNG - On Road VMT
2032	1000817	78	CNG - On Road VMT
2033	1029064	79	CNG - On Road VMT
2034	1058108	80	CNG - On Road VMT
2035	1087972	81	CNG - On Road VMT
2036	1118679	83	CNG - On Road VMT
2037	1150253	85	CNG - On Road VMT
2038	1182717	86	CNG - On Road VMT
2039	1216098	88	CNG - On Road VMT
2040	1250422	90	CNG - On Road VMT
2041	1285714	92	CNG - On Road VMT
2042	1322001	95	CNG - On Road VMT
2043	1359314	97	CNG - On Road VMT
2044	1397679	100	CNG - On Road VMT
2045	1437127	102	CNG - On Road VMT
2020	270848	20247	Agricultural - Energy Equivalent (MMBtu)
2021	278493	19944	Agricultural - Energy Equivalent (MMBtu)
2022	286353	19646	Agricultural - Energy Equivalent (MMBtu)
2023	294435	19352	Agricultural - Energy Equivalent (MMBtu)
2024	302745	19063	Agricultural - Energy Equivalent (MMBtu)
2025	311290	18777	Agricultural - Energy Equivalent (MMBtu)
2026	320076	18496	Agricultural - Energy Equivalent (MMBtu)
2027	329110	18220	Agricultural - Energy Equivalent (MMBtu)
2028	338398	17947	Agricultural - Energy Equivalent (MMBtu)
2029	347949	17679	Agricultural - Energy Equivalent (MMBtu)
2030	357770	17414	Agricultural - Energy Equivalent (MMBtu)
2031	367868	17906	Agricultural - Energy Equivalent (MMBtu)
2032	378250	18411	Agricultural - Energy Equivalent (MMBtu)
2033	388926	18931	Agricultural - Energy Equivalent (MMBtu)
2034	399903	19465	Agricultural - Energy Equivalent (MMBtu)
2035	411190	20014	Agricultural - Energy Equivalent (MMBtu)
2036	422795	20579	Agricultural - Energy Equivalent (MMBtu)
2037	434728	21160	Agricultural - Energy Equivalent (MMBtu)
2038	446998	21757	Agricultural - Energy Equivalent (MMBtu)
2039	459614	22371	Agricultural - Energy Equivalent (MMBtu)
2040	472586	23003	Agricultural - Energy Equivalent (MMBtu)
2041	485925	23652	Agricultural - Energy Equivalent (MMBtu)
2042	499639	24319	Agricultural - Energy Equivalent (MMBtu)
2043	513741	25006	Agricultural - Energy Equivalent (MMBtu)
2044	528241	25712	Agricultural - Energy Equivalent (MMBtu)
2045	543150	26437	Agricultural - Energy Equivalent (MMBtu)
2020	159377	11886	Construction - Energy Equivalent (MMBtu)
2021	163875	11709	Construction - Energy Equivalent (MMBtu)
2022	168500	11533	Construction - Energy Equivalent (MMBtu)
2023	173256	11361	Construction - Energy Equivalent (MMBtu)
2024	178146	11191	Construction - Energy Equivalent (MMBtu)
2025	183174	11023	Construction - Energy Equivalent (MMBtu)
2026	188344	10859	Construction - Energy Equivalent (MMBtu)
2027	193660	10696	Construction - Energy Equivalent (MMBtu)
2028	199125	10536	Construction - Energy Equivalent (MMBtu)
2029	204746	10378	Construction - Energy Equivalent (MMBtu)
2030	210524	10223	Construction - Energy Equivalent (MMBtu)
2031	216466	10512	Construction - Energy Equivalent (MMBtu)
2032	222576	10808	Construction - Energy Equivalent (MMBtu)
2033	228858	11113	Construction - Energy Equivalent (MMBtu)
2034	235317	11427	Construction - Energy Equivalent (MMBtu)
2035	241959	11750	Construction - Energy Equivalent (MMBtu)
2036	248788	12081	Construction - Energy Equivalent (MMBtu)
2037	255809	12422	Construction - Energy Equivalent (MMBtu)
2038	263029	12773	Construction - Energy Equivalent (MMBtu)
2039	270453	13133	Construction - Energy Equivalent (MMBtu)
2040	278086	13504	Construction - Energy Equivalent (MMBtu)
2041	285935	13885	Construction - Energy Equivalent (MMBtu)
2042	294005	14277	Construction - Energy Equivalent (MMBtu)
2043	302303	14680	Construction - Energy Equivalent (MMBtu)
2044	310836	15094	Construction - Energy Equivalent (MMBtu)
2045	319609	15520	Construction - Energy Equivalent (MMBtu)

Wastewater

Year	Usage	CO2e	Output Name
2020	22639291	77	Annual Digester Gas Flared (scf / year)
2021	23278262	79	Annual Digester Gas Flared (scf / year)
2022	23935268	82	Annual Digester Gas Flared (scf / year)
2023	24610817	84	Annual Digester Gas Flared (scf / year)
2024	25305433	86	Annual Digester Gas Flared (scf / year)
2025	26019654	89	Annual Digester Gas Flared (scf / year)
2026	26754033	91	Annual Digester Gas Flared (scf / year)
2027	27509139	94	Annual Digester Gas Flared (scf / year)
2028	28285557	96	Annual Digester Gas Flared (scf / year)
2029	29083889	99	Annual Digester Gas Flared (scf / year)
2030	29904753	102	Annual Digester Gas Flared (scf / year)
2031	30748785	105	Annual Digester Gas Flared (scf / year)
2032	31616639	108	Annual Digester Gas Flared (scf / year)
2033	32508988	111	Annual Digester Gas Flared (scf / year)
2034	33426522	114	Annual Digester Gas Flared (scf / year)
2035	34369952	117	Annual Digester Gas Flared (scf / year)
2036	35340010	120	Annual Digester Gas Flared (scf / year)
2037	36337447	124	Annual Digester Gas Flared (scf / year)
2038	37363035	127	Annual Digester Gas Flared (scf / year)
2039	38417570	131	Annual Digester Gas Flared (scf / year)
2040	39501868	135	Annual Digester Gas Flared (scf / year)
2041	40616769	138	Annual Digester Gas Flared (scf / year)
2042	41763137	142	Annual Digester Gas Flared (scf / year)
2043	42941860	146	Annual Digester Gas Flared (scf / year)
2044	44153852	151	Annual Digester Gas Flared (scf / year)
2045	45400050	155	Annual Digester Gas Flared (scf / year)
2020	52961250	9	Annual Gas Production (scf / Year)
2021	54456029	9	Annual Gas Production (scf / Year)
2022	55992996	9	Annual Gas Production (scf / Year)
2023	57573343	10	Annual Gas Production (scf / Year)
2024	59198294	10	Annual Gas Production (scf / Year)
2025	60869107	10	Annual Gas Production (scf / Year)
2026	62587077	11	Annual Gas Production (scf / Year)
2027	64353536	11	Annual Gas Production (scf / Year)
2028	66169850	11	Annual Gas Production (scf / Year)
2029	68037429	11	Annual Gas Production (scf / Year)
2030	69957718	12	Annual Gas Production (scf / Year)
2031	71932205	12	Annual Gas Production (scf / Year)
2032	73962420	12	Annual Gas Production (scf / Year)
2033	76049936	13	Annual Gas Production (scf / Year)
2034	78196371	13	Annual Gas Production (scf / Year)
2035	80403386	14	Annual Gas Production (scf / Year)
2036	82676292	14	Annual Gas Production (scf / Year)
2037	85006047	14	Annual Gas Production (scf / Year)
2038	87405258	15	Annual Gas Production (scf / Year)
2039	89872185	15	Annual Gas Production (scf / Year)
2040	92408738	16	Annual Gas Production (scf / Year)
2041	95016883	16	Annual Gas Production (scf / Year)
2042	97698641	16	Annual Gas Production (scf / Year)
2043	1E+08	17	Annual Gas Production (scf / Year)
2044	1.03E+08	17	Annual Gas Production (scf / Year)
2045	1.06E+08	18	Annual Gas Production (scf / Year)
2020	91527	212	Process N2O Population Served
2021	94110	218	Process N2O Population Served
2022	96766	224	Process N2O Population Served
2023	99498	231	Process N2O Population Served
2024	102306	237	Process N2O Population Served
2025	105193	244	Process N2O Population Served
2026	108162	251	Process N2O Population Served
2027	111215	258	Process N2O Population Served
2028	114354	265	Process N2O Population Served
2029	117581	273	Process N2O Population Served
2030	120900	280	Process N2O Population Served
2031	124312	288	Process N2O Population Served
2032	127821	296	Process N2O Population Served
2033	131429	305	Process N2O Population Served
2034	135138	313	Process N2O Population Served
2035	138952	322	Process N2O Population Served
2036	142874	331	Process N2O Population Served
2037	146906	341	Process N2O Population Served
2038	151053	350	Process N2O Population Served
2039	155316	360	Process N2O Population Served
2040	159700	370	Process N2O Population Served
2041	164207	381	Process N2O Population Served
2042	168842	392	Process N2O Population Served
2043	173607	403	Process N2O Population Served
2044	178507	414	Process N2O Population Served
2045	183545	426	Process N2O Population Served
2020	42484	928	Water Supply Energy Equivalent (MMBtu)
2021	40700	914	Water Supply Energy Equivalent (MMBtu)
2022	38991	901	Water Supply Energy Equivalent (MMBtu)
2023	37353	887	Water Supply Energy Equivalent (MMBtu)
2024	35784	874	Water Supply Energy Equivalent (MMBtu)
2025	34281	861	Water Supply Energy Equivalent (MMBtu)
2026	32841	848	Water Supply Energy Equivalent (MMBtu)
2027	31462	835	Water Supply Energy Equivalent (MMBtu)
2028	30141	823	Water Supply Energy Equivalent (MMBtu)
2029	28875	811	Water Supply Energy Equivalent (MMBtu)
2030	27662	798	Water Supply Energy Equivalent (MMBtu)
2031	27662	821	Water Supply Energy Equivalent (MMBtu)
2032	27662	844	Water Supply Energy Equivalent (MMBtu)
2033	27662	868	Water Supply Energy Equivalent (MMBtu)
2034	27662	892	Water Supply Energy Equivalent (MMBtu)
2035	27662	918	Water Supply Energy Equivalent (MMBtu)
2036	27662	944	Water Supply Energy Equivalent (MMBtu)
2037	27662	970	Water Supply Energy Equivalent (MMBtu)
2038	27662	998	Water Supply Energy Equivalent (MMBtu)
2039	27662	1026	Water Supply Energy Equivalent (MMBtu)
2040	27662	1055	Water Supply Energy Equivalent (MMBtu)
2041	27662	1084	Water Supply Energy Equivalent (MMBtu)
2042	27662	1115	Water Supply Energy Equivalent (MMBtu)
2043	27662	1147	Water Supply Energy Equivalent (MMBtu)
2044	27662	1179	Water Supply Energy Equivalent (MMBtu)
2045	27662	1212	Water Supply Energy Equivalent (MMBtu)
2020	91	69	Daily N Load at Facility with Release to Environment (kg N/day)
2021	93	71	Daily N Load at Facility with Release to Environment (kg N/day)
2022	96	73	Daily N Load at Facility with Release to Environment (kg N/day)
2023	99	75	Daily N Load at Facility with Release to Environment (kg N/day)
2024	101	77	Daily N Load at Facility with Release to Environment (kg N/day)
2025	104	79	Daily N Load at Facility with Release to Environment (kg N/day)
2026	107	81	Daily N Load at Facility with Release to Environment (kg N/day)
2027	110	84	Daily N Load at Facility with Release to Environment (kg N/day)
2028	113	86	Daily N Load at Facility with Release to Environment (kg N/day)
2029	116	88	Daily N Load at Facility with Release to Environment (kg N/day)
2030	120	91	Daily N Load at Facility with Release to Environment (kg N/day)
2031	123	94	Daily N Load at Facility with Release to Environment (kg N/day)
2032	127	96	Daily N Load at Facility with Release to Environment (kg N/day)
2033	130	99	Daily N Load at Facility with Release to Environment (kg N/day)
2034	134	102	Daily N Load at Facility with Release to Environment (kg N/day)
2035	138	105	Daily N Load at Facility with Release to Environment (kg N/day)
2036	141	108	Daily N Load at Facility with Release to Environment (kg N/day)
2037	145	111	Daily N Load at Facility with Release to Environment (kg N/day)
2038	150	114	Daily N Load at Facility with Release to Environment (kg N/day)
2039	154	117	Daily N Load at Facility with Release to Environment (kg N/day)
2040	158	120	Daily N Load at Facility with Release to Environment (kg N/day)
2041	163	124	Daily N Load at Facility with Release to Environment (kg N/day)
2042	167	127	Daily N Load at Facility with Release to Environment (kg N/day)
2043	172	131	Daily N Load at Facility with Release to Environment (kg N/day)
2044	177	134	Daily N Load at Facility with Release to Environment (kg N/day)
2045	182	138	Daily N Load at Facility with Release to Environment (kg N/day)

Solid Waste

Year	Usage	CO2e	Output Name
2020	92698	56157	All - Waste Generated (wet tons)
2021	95315	57742	All - Waste Generated (wet tons)
2022	98005	59372	All - Waste Generated (wet tons)
2023	100771	61048	All - Waste Generated (wet tons)
2024	103615	62771	All - Waste Generated (wet tons)
2025	106539	64542	All - Waste Generated (wet tons)
2026	109546	66364	All - Waste Generated (wet tons)
2027	112638	68237	All - Waste Generated (wet tons)
2028	115817	70163	All - Waste Generated (wet tons)
2029	119086	72143	All - Waste Generated (wet tons)
2030	122447	74179	All - Waste Generated (wet tons)
2031	125903	76273	All - Waste Generated (wet tons)
2032	129457	78426	All - Waste Generated (wet tons)
2033	133110	80639	All - Waste Generated (wet tons)
2034	136867	82915	All - Waste Generated (wet tons)
2035	140730	85256	All - Waste Generated (wet tons)
2036	144702	87662	All - Waste Generated (wet tons)
2037	148786	90136	All - Waste Generated (wet tons)
2038	152986	92680	All - Waste Generated (wet tons)
2039	157304	95296	All - Waste Generated (wet tons)
2040	161743	97985	All - Waste Generated (wet tons)
2041	166308	100751	All - Waste Generated (wet tons)
2042	171002	103595	All - Waste Generated (wet tons)
2043	175829	106518	All - Waste Generated (wet tons)
2044	180791	109525	All - Waste Generated (wet tons)
2045	185894	112616	All - Waste Generated (wet tons)

Process & Fugitive Emissions

Year	Usage	CO2e	Output Name
2020	45578	45578	HFC-134a - CO2e (MT)
2021	46864	46864	HFC-134a - CO2e (MT)
2022	48187	48187	HFC-134a - CO2e (MT)
2023	49547	49547	HFC-134a - CO2e (MT)
2024	50946	50946	HFC-134a - CO2e (MT)
2025	52383	52383	HFC-134a - CO2e (MT)
2026	53862	53862	HFC-134a - CO2e (MT)
2027	55382	55382	HFC-134a - CO2e (MT)
2028	56945	56945	HFC-134a - CO2e (MT)
2029	58552	58552	HFC-134a - CO2e (MT)
2030	60205	60205	HFC-134a - CO2e (MT)
2031	61904	61904	HFC-134a - CO2e (MT)
2032	63651	63651	HFC-134a - CO2e (MT)
2033	65448	65448	HFC-134a - CO2e (MT)
2034	67295	67295	HFC-134a - CO2e (MT)
2035	69194	69194	HFC-134a - CO2e (MT)
2036	71147	71147	HFC-134a - CO2e (MT)
2037	73155	73155	HFC-134a - CO2e (MT)
2038	75220	75220	HFC-134a - CO2e (MT)
2039	77343	77343	HFC-134a - CO2e (MT)
2040	79526	79526	HFC-134a - CO2e (MT)
2041	81771	81771	HFC-134a - CO2e (MT)
2042	84079	84079	HFC-134a - CO2e (MT)
2043	86452	86452	HFC-134a - CO2e (MT)
2044	88892	88892	HFC-134a - CO2e (MT)
2045	91401	91401	HFC-134a - CO2e (MT)

GOVERNMENT EMISSIONS

Transit

Year	Usage	CO2e	Output Name
2020	200604		332 Diesel - Transit VMT
2021	203680		330 Diesel - Transit VMT
2022	206803		329 Diesel - Transit VMT
2023	209974		327 Diesel - Transit VMT
2024	213194		325 Diesel - Transit VMT
2025	216463		324 Diesel - Transit VMT
2026	219782		323 Diesel - Transit VMT
2027	223152		323 Diesel - Transit VMT
2028	226574		322 Diesel - Transit VMT
2029	230048		321 Diesel - Transit VMT
2030	233576		322 Diesel - Transit VMT
2031	237157		323 Diesel - Transit VMT
2032	240794		324 Diesel - Transit VMT
2033	244486		325 Diesel - Transit VMT
2034	250609		329 Diesel - Transit VMT
2035	256886		335 Diesel - Transit VMT
2036	263319		341 Diesel - Transit VMT
2037	269914		348 Diesel - Transit VMT
2038	276674		354 Diesel - Transit VMT
2039	283604		361 Diesel - Transit VMT
2040	290706		369 Diesel - Transit VMT
2041	297987		378 Diesel - Transit VMT
2042	305450		387 Diesel - Transit VMT
2043	313100		395 Diesel - Transit VMT
2044	320942		405 Diesel - Transit VMT
2045	328980		414 Diesel - Transit VMT

Buildings and Facilities

Year	Usage	CO2e	Output Name
2020	50535		144 Electricity Energy Equivalent (MMBtu)
2021	51310		140 Electricity Energy Equivalent (MMBtu)
2022	52097		136 Electricity Energy Equivalent (MMBtu)
2023	52895		132 Electricity Energy Equivalent (MMBtu)
2024	53707		129 Electricity Energy Equivalent (MMBtu)
2025	54530		125 Electricity Energy Equivalent (MMBtu)
2026	55366		122 Electricity Energy Equivalent (MMBtu)
2027	56215		118 Electricity Energy Equivalent (MMBtu)
2028	57077		115 Electricity Energy Equivalent (MMBtu)
2029	57952		112 Electricity Energy Equivalent (MMBtu)
2030	58841		109 Electricity Energy Equivalent (MMBtu)
2031	59743		110 Electricity Energy Equivalent (MMBtu)
2032	60659		112 Electricity Energy Equivalent (MMBtu)
2033	61590		114 Electricity Energy Equivalent (MMBtu)
2034	63132		117 Electricity Energy Equivalent (MMBtu)
2035	64713		120 Electricity Energy Equivalent (MMBtu)
2036	66334		123 Electricity Energy Equivalent (MMBtu)
2037	67995		126 Electricity Energy Equivalent (MMBtu)
2038	69698		129 Electricity Energy Equivalent (MMBtu)
2039	71444		132 Electricity Energy Equivalent (MMBtu)
2040	73233		135 Electricity Energy Equivalent (MMBtu)
2041	75067		139 Electricity Energy Equivalent (MMBtu)
2042	76947		142 Electricity Energy Equivalent (MMBtu)
2043	78874		146 Electricity Energy Equivalent (MMBtu)
2044	80850		150 Electricity Energy Equivalent (MMBtu)
2045	82875		153 Electricity Energy Equivalent (MMBtu)
2020	12081		643 Natural Gas - Energy Equivalent (MMBtu)
2021	12266		652 Natural Gas - Energy Equivalent (MMBtu)
2022	12454		662 Natural Gas - Energy Equivalent (MMBtu)
2023	12645		673 Natural Gas - Energy Equivalent (MMBtu)
2024	12839		683 Natural Gas - Energy Equivalent (MMBtu)
2025	13036		693 Natural Gas - Energy Equivalent (MMBtu)
2026	13236		704 Natural Gas - Energy Equivalent (MMBtu)
2027	13439		715 Natural Gas - Energy Equivalent (MMBtu)
2028	13645		726 Natural Gas - Energy Equivalent (MMBtu)
2029	13854		737 Natural Gas - Energy Equivalent (MMBtu)
2030	14067		748 Natural Gas - Energy Equivalent (MMBtu)
2031	14282		760 Natural Gas - Energy Equivalent (MMBtu)
2032	14501		771 Natural Gas - Energy Equivalent (MMBtu)
2033	14724		783 Natural Gas - Energy Equivalent (MMBtu)
2034	15092		803 Natural Gas - Energy Equivalent (MMBtu)
2035	15470		823 Natural Gas - Energy Equivalent (MMBtu)
2036	15858		843 Natural Gas - Energy Equivalent (MMBtu)
2037	16255		865 Natural Gas - Energy Equivalent (MMBtu)
2038	16662		886 Natural Gas - Energy Equivalent (MMBtu)
2039	17079		908 Natural Gas - Energy Equivalent (MMBtu)
2040	17507		931 Natural Gas - Energy Equivalent (MMBtu)
2041	17946		954 Natural Gas - Energy Equivalent (MMBtu)
2042	18395		978 Natural Gas - Energy Equivalent (MMBtu)
2043	18856		1003 Natural Gas - Energy Equivalent (MMBtu)
2044	19328		1028 Natural Gas - Energy Equivalent (MMBtu)
2045	19812		1054 Natural Gas - Energy Equivalent (MMBtu)

Streetlights

Year	Usage	CO2e	Output Name
2020	6687		144 Electricity Energy Equivalent (MMBTU)
2021	6790		140 Electricity Energy Equivalent (MMBTU)
2022	6894		136 Electricity Energy Equivalent (MMBTU)
2023	7000		132 Electricity Energy Equivalent (MMBTU)
2024	7107		129 Electricity Energy Equivalent (MMBTU)
2025	7216		125 Electricity Energy Equivalent (MMBTU)
2026	7326		122 Electricity Energy Equivalent (MMBTU)
2027	7439		118 Electricity Energy Equivalent (MMBTU)
2028	7553		115 Electricity Energy Equivalent (MMBTU)
2029	7669		112 Electricity Energy Equivalent (MMBTU)
2030	7786		109 Electricity Energy Equivalent (MMBTU)
2031	7906		110 Electricity Energy Equivalent (MMBTU)
2032	8027		112 Electricity Energy Equivalent (MMBTU)
2033	8150		114 Electricity Energy Equivalent (MMBTU)
2034	8354		117 Electricity Energy Equivalent (MMBTU)
2035	8563		120 Electricity Energy Equivalent (MMBTU)
2036	8778		123 Electricity Energy Equivalent (MMBTU)
2037	8998		126 Electricity Energy Equivalent (MMBTU)
2038	9223		129 Electricity Energy Equivalent (MMBTU)
2039	9454		132 Electricity Energy Equivalent (MMBTU)
2040	9691		135 Electricity Energy Equivalent (MMBTU)
2041	9933		139 Electricity Energy Equivalent (MMBTU)
2042	10182		142 Electricity Energy Equivalent (MMBTU)
2043	10437		146 Electricity Energy Equivalent (MMBTU)
2044	10698		150 Electricity Energy Equivalent (MMBTU)
2045	10967		153 Electricity Energy Equivalent (MMBTU)

Vehicle Fleet

Year	Usage	CO2e	Output Name
2020	170101		1493 Gasoline - Fleet Vehicle VMT
2021	172709		1477 Gasoline - Fleet Vehicle VMT
2022	175357		1461 Gasoline - Fleet Vehicle VMT
2023	178046		1444 Gasoline - Fleet Vehicle VMT
2024	180776		1428 Gasoline - Fleet Vehicle VMT
2025	183548		1417 Gasoline - Fleet Vehicle VMT
2026	186363		1406 Gasoline - Fleet Vehicle VMT
2027	189220		1394 Gasoline - Fleet Vehicle VMT
2028	192122		1383 Gasoline - Fleet Vehicle VMT
2029	195068		1372 Gasoline - Fleet Vehicle VMT
2030	198059		1372 Gasoline - Fleet Vehicle VMT
2031	201096		1372 Gasoline - Fleet Vehicle VMT
2032	204180		1372 Gasoline - Fleet Vehicle VMT
2033	207310		1373 Gasoline - Fleet Vehicle VMT
2034	212502		1386 Gasoline - Fleet Vehicle VMT
2035	217825		1409 Gasoline - Fleet Vehicle VMT
2036	223280		1433 Gasoline - Fleet Vehicle VMT
2037	228872		1457 Gasoline - Fleet Vehicle VMT
2038	234604		1482 Gasoline - Fleet Vehicle VMT
2039	240480		1507 Gasoline - Fleet Vehicle VMT
2040	246502		1540 Gasoline - Fleet Vehicle VMT
2041	252676		1574 Gasoline - Fleet Vehicle VMT
2042	259004		1608 Gasoline - Fleet Vehicle VMT
2043	265491		1644 Gasoline - Fleet Vehicle VMT
2044	272140		1680 Gasoline - Fleet Vehicle VMT
2045	278956		1720 Gasoline - Fleet Vehicle VMT
2020	11580		1231 Diesel - Fleet Vehicle VMT
2021	11987		1198 Diesel - Fleet Vehicle VMT
2022	12171		1165 Diesel - Fleet Vehicle VMT
2023	12357		1171 Diesel - Fleet Vehicle VMT
2024	12547		1158 Diesel - Fleet Vehicle VMT
2025	12739		1149 Diesel - Fleet Vehicle VMT
2026	12934		1140 Diesel - Fleet Vehicle VMT
2027	13133		1131 Diesel - Fleet Vehicle VMT
2028	13334		1122 Diesel - Fleet Vehicle VMT
2029	13539		1113 Diesel - Fleet Vehicle VMT
2030	13746		1113 Diesel - Fleet Vehicle VMT
2031	13957		1113 Diesel - Fleet Vehicle VMT
2032	14171		1113 Diesel - Fleet Vehicle VMT
2033	14388		1113 Diesel - Fleet Vehicle VMT
2034	14749		1124 Diesel - Fleet Vehicle VMT
2035	15118		1143 Diesel - Fleet Vehicle VMT
2036	15497		1162 Diesel - Fleet Vehicle VMT
2037	15885		1182 Diesel - Fleet Vehicle VMT
2038	16283		1202 Diesel - Fleet Vehicle VMT
2039	16690		1222 Diesel - Fleet Vehicle VMT
2040	17108		1249 Diesel - Fleet Vehicle VMT
2041	17537		1276 Diesel - Fleet Vehicle VMT
2042	17976		1304 Diesel - Fleet Vehicle VMT
2043	18426		1333 Diesel - Fleet Vehicle VMT
2044	18888		1362 Diesel - Fleet Vehicle VMT
2045	19361		1395 Diesel - Fleet Vehicle VMT

Solid Waste

Year	Usage	CO2e	Output Name
2020	334		202 All - Waste Generated (wet tons)
2021	339		205 All - Waste Generated (wet tons)
2022	344		209 All - Waste Generated (wet tons)
2023	350		212 All - Waste Generated (wet tons)
2024	355		215 All - Waste Generated (wet tons)
2025	360		218 All - Waste Generated (wet tons)
2026	366		222 All - Waste Generated (wet tons)
2027	372		225 All - Waste Generated (wet tons)
2028	377		229 All - Waste Generated (wet tons)
2029	383		232 All - Waste Generated (wet tons)
2030	389		236 All - Waste Generated (wet tons)
2031	395		239 All - Waste Generated (wet tons)
2032	401		243 All - Waste Generated (wet tons)
2033	407		247 All - Waste Generated (wet tons)
2034	417		253 All - Waste Generated (wet tons)
2035	428		259 All - Waste Generated (wet tons)
2036	438		266 All - Waste Generated (wet tons)
2037	449		272 All - Waste Generated (wet tons)
2038	461		279 All - Waste Generated (wet tons)
2039	472		286 All - Waste Generated (wet tons)
2040	484		293 All - Waste Generated (wet tons)
2041	496		301 All - Waste Generated (wet tons)
2042	509		308 All - Waste Generated (wet tons)
2043	521		316 All - Waste Generated (wet tons)
2044	534		324 All - Waste Generated (wet tons)
2045	548		332 All - Waste Generated (wet tons)

Employee Commute

Year	Usage	CO2e	Output Name
2020	2010155		790 Gasoline - Employee Commute VMT
2021	2040976		781 Gasoline - Employee Commute VMT
2022	2072274		772 Gasoline - Employee Commute VMT
2023	2104050		764 Gasoline - Employee Commute VMT
2024	2136313		755 Gasoline - Employee Commute VMT
2025	2169070		749 Gasoline - Employee Commute VMT
2026	2202330		743 Gasoline - Employee Commute VMT
2027	2236100		737 Gasoline - Employee Commute VMT
2028	2270388		731 Gasoline - Employee Commute VMT
2029	2305202		725 Gasoline - Employee Commute VMT
2030	2340549		726 Gasoline - Employee Commute VMT
2031	2376438		726 Gasoline - Employee Commute VMT
2032	2412878		726 Gasoline - Employee Commute VMT
2033	2449876		726 Gasoline - Employee Commute VMT
2034	2511233		733 Gasoline - Employee Commute VMT
2035	2574127		745 Gasoline - Employee Commute VMT
2036	2638596		758 Gasoline - Employee Commute VMT
2037	2704679		770 Gasoline - Employee Commute VMT
2038	2772418		783 Gasoline - Employee Commute VMT
2039	2841853		797 Gasoline - Employee Commute VMT
2040	2913027		814 Gasoline - Employee Commute VMT
2041	2985883		832 Gasoline - Employee Commute VMT
2042	3060767		850 Gasoline - Employee Commute VMT
2043	3137424		869 Gasoline - Employee Commute VMT
2044	3216000		888 Gasoline - Employee Commute VMT
2045	3296545		909 Gasoline - Employee Commute VMT
2020	5152		2 Diesel - Employee Commute VMT
2021	5231		2 Diesel - Employee Commute VMT
2022	5311		2 Diesel - Employee Commute VMT
2023	5393		2 Diesel - Employee Commute VMT
2024	5475		2 Diesel - Employee Commute VMT
2025	5559		2 Diesel - Employee Commute VMT
2026	5645		2 Diesel - Employee Commute VMT
2027	5731		2 Diesel - Employee Commute VMT
2028	5819		2 Diesel - Employee Commute VMT
2029	5908		2 Diesel - Employee Commute VMT
2030	5999		2 Diesel - Employee Commute VMT
2031	6091		2 Diesel - Employee Commute VMT
2032	6184		2 Diesel - Employee Commute VMT
2033	6279		2 Diesel - Employee Commute VMT
2034	6438		2 Diesel - Employee Commute VMT
2035	6597		2 Diesel - Employee Commute VMT
2036	6763		2 Diesel - Employee Commute VMT
2037	6932		2 Diesel - Employee Commute VMT
2038	7106		2 Diesel - Employee Commute VMT
2039	7284		2 Diesel - Employee Commute VMT
2040	7466		3 Diesel - Employee Commute VMT
2041	7653		3 Diesel - Employee Commute VMT
2042	7845		3 Diesel - Employee Commute VMT
2043	8041		3 Diesel - Employee Commute VMT
2044	8243		3 Diesel - Employee Commute VMT
2045	8449		3 Diesel - Employee Commute VMT
2020	17269		0 Electric - Employee Commute VMT
2021	17534		0 Electric - Employee Commute VMT
2022	17803		0 Electric - Employee Commute VMT
2023	18076		0 Electric - Employee Commute VMT
2024	18353		0 Electric - Employee Commute VMT
2025	18634		0 Electric - Employee Commute VMT
2026	18920		0 Electric - Employee Commute VMT
2027	19210		0 Electric - Employee Commute VMT
2028	19505		0 Electric - Employee Commute VMT
2029	19804		0 Electric - Employee Commute VMT
2030	20107		0 Electric - Employee Commute VMT
2031	20416		0 Electric - Employee Commute VMT
2032	20729		0 Electric - Employee Commute VMT
2033	21047		0 Electric - Employee Commute VMT
2034	21374		0 Electric - Employee Commute VMT
2035	22114		0 Electric - Employee Commute VMT
2036	22868		0 Electric - Employee Commute VMT
2037	23236		0 Electric - Employee Commute VMT
2038	23818		0 Electric - Employee Commute VMT
2039	24414		0 Electric - Employee Commute VMT
2040	25025		0 Electric - Employee Commute VMT
2041	25652		0 Electric - Employee Commute VMT
2042	26295		0 Electric - Employee Commute VMT
2043	26953		0 Electric - Employee Commute VMT
2044	27628		0 Electric - Employee Commute VMT
2045	28320		0 Electric - Employee Commute VMT

Wastewater

Year	Usage	CO2e	Output Name
2020	22639291		77 Annual Digester Gas Flared (scf / year)
2021	23278262		79 Annual Digester Gas Flared (scf / year)
2022	23935268		82 Annual Digester Gas Flared (scf / year)
2023	24610817		84 Annual Digester Gas Flared (scf / year)
2024	25305433		86 Annual Digester Gas Flared (scf / year)
2025	26019654		89 Annual Digester Gas Flared (scf / year)
2026	26754033		91 Annual Digester Gas Flared (scf / year)
2027	27509139		94 Annual Digester Gas Flared (scf / year)
2028	28285557		96 Annual Digester Gas Flared (scf / year)
2029	29083889		99 Annual Digester Gas Flared (scf / year)
2030	29904753		102 Annual Digester Gas Flared (scf / year)
2031	30748785		105 Annual Digester Gas Flared (scf / year)
2032	31616639		108 Annual Digester Gas Flared (scf / year)
2033	32508868		111 Annual Digester Gas Flared (scf / year)
2034	33426522		114 Annual Digester Gas Flared (scf / year)
2035	34369952		117 Annual Digester Gas Flared (scf / year)
2036	35340010		120 Annual Digester Gas Flared (scf / year)
2037	36337447		124 Annual Digester Gas Flared (scf / year)
2038	37363035		127 Annual Digester Gas Flared (scf / year)
2039	38417570		131 Annual Digester Gas Flared (scf / year)
2040	39501868		135 Annual Digester Gas Flared (scf / year)
2041	40618769		138 Annual Digester Gas Flared (scf / year)
2042	41763137		142 Annual Digester Gas Flared (scf / year)
2043	42941860		146 Annual Digester Gas Flared (scf / year)
2044	44153852		151 Annual Digester Gas Flared (scf / year)
2045	45400050		155 Annual Digester Gas Flared (scf / year)
2020	52961250		9 Digester Annual Gas Production (scf / Year)
2021	54456029		9 Digester Annual Gas Production (scf / Year)
2022	55992996		9 Digester Annual Gas Production (scf / Year)
2023	57573343		10 Digester Annual Gas Production (scf / Year)
2024	59198294		10 Digester Annual Gas Production (scf / Year)
2025	60869107		10 Digester Annual Gas Production (scf / Year)
2026	62587077		11 Digester Annual Gas Production (scf / Year)
2027	64353536		11 Digester Annual Gas Production (scf / Year)
2028	66169850		11 Digester Annual Gas Production (scf / Year)
2029	68037429		11 Digester Annual Gas Production (scf / Year)
2030	69957718		12 Digester Annual Gas Production (scf / Year)
2031	71932205		12 Digester Annual Gas Production (scf / Year)
2032	73962420		12 Digester Annual Gas Production (scf / Year)
2033	76049936		13 Digester Annual Gas Production (scf / Year)
2034	78196371		13 Digester Annual Gas Production (scf / Year)
2035	80403386		14 Digester Annual Gas Production (scf / Year)
2036	82672692		14 Digester Annual Gas Production (scf / Year)
2037	85006047		14 Digester Annual Gas Production (scf / Year)
2038	87405258		15 Digester Annual Gas Production (scf / Year)
2039	89872185		15 Digester Annual Gas Production (scf / Year)
2040	92408738		16 Digester Annual Gas Production (scf / Year)
2041	95016883		16 Digester Annual Gas Production (scf / Year)
2042	97698641		16 Digester Annual Gas Production (scf / Year)
2043	1E+08		17 Digester Annual Gas Production (scf / Year)
2044	1.03E+08		17 Digester Annual Gas Production (scf / Year)
2045	1.06E+08		18 Digester Annual Gas Production (scf / Year)
2020	41705		895 Electricity Energy Equivalent (MMBtu)
2021	42882		882 Electricity Energy Equivalent (MMBtu)
2022	44092		869 Electricity Energy Equivalent (MMBtu)
2023	45337		856 Electricity Energy Equivalent (MMBtu)
2024	46616		843 Electricity Energy Equivalent (MMBtu)
2025	47932		830 Electricity Energy Equivalent (MMBtu)
2026	49285		818 Electricity Energy Equivalent (MMBtu)
2027	50676		806 Electricity Energy Equivalent (MMBtu)
2028	52106		794 Electricity Energy Equivalent (MMBtu)
2029	53577		782 Electricity Energy Equivalent (MMBtu)
2030	55089		770 Electricity Energy Equivalent (MMBtu)
2031	56644		792 Electricity Energy Equivalent (MMBtu)
2032	58243		814 Electricity Energy Equivalent (MMBtu)
2033	59886		837 Electricity Energy Equivalent (MMBtu)
2034	61577		861 Electricity Energy Equivalent (MMBtu)
2035	63315		885 Electricity Energy Equivalent (MMBtu)
2036	65102		910 Electricity Energy Equivalent (MMBtu)
2037	66939		936 Electricity Energy Equivalent (MMBtu)
2038	68828		962 Electricity Energy Equivalent (MMBtu)
2039	70771		989 Electricity Energy Equivalent (MMBtu)
2040	72768		1017 Electricity Energy Equivalent (MMBtu)
2041	74822		1046 Electricity Energy Equivalent (MMBtu)
2042	76934		1075 Electricity Energy Equivalent (MMBtu)
2043	79105		1106 Electricity Energy Equivalent (MMBtu)
2044	81338		1137 Electricity Energy Equivalent (MMBtu)
2045	83634		1169 Electricity Energy Equivalent (MMBtu)
2020	622		33 Natural Gas - Energy Equivalent (MMBtu)
2021	640		34 Natural Gas - Energy Equivalent (MMBtu)
2022	658		35 Natural Gas - Energy Equivalent (MMBtu)
2023	677		36 Natural Gas - Energy Equivalent (MMBtu)
2024	696		37 Natural Gas - Energy Equivalent (MMBtu)
2025	715		38 Natural Gas - Energy Equivalent (MMBtu)
2026	736		39 Natural Gas - Energy Equivalent (MMBtu)
2027	756		40 Natural Gas - Energy Equivalent (MMBtu)
2028	778		41 Natural Gas - Energy Equivalent (MMBtu)
2029	800		43 Natural Gas - Energy Equivalent (MMBtu)
2030	822		44 Natural Gas - Energy Equivalent (MMBtu)
2031	845		45 Natural Gas - Energy Equivalent (MMBtu)
2032	869		46 Natural Gas - Energy Equivalent (MMBtu)
2033	894		48 Natural Gas - Energy Equivalent (MMBtu)
2034	919		49 Natural Gas - Energy Equivalent (MMBtu)
2035	945		50 Natural Gas - Energy Equivalent (MMBtu)
2036	972		52 Natural Gas - Energy Equivalent (MMBtu)
2037	999		53 Natural Gas - Energy Equivalent (MMBtu)
2038	1027		55 Natural Gas - Energy Equivalent (MMBtu)
2039	1056		56 Natural Gas - Energy Equivalent (MMBtu)
2040	1086		58 Natural Gas - Energy Equivalent (MMBtu)
2041	1117		59 Natural Gas - Energy Equivalent (MMBtu)
2042	1148		61 Natural Gas - Energy Equivalent (MMBtu)
2043	1181		63 Natural Gas - Energy Equivalent (MMBtu)
2044	1214		65 Natural Gas - Energy Equivalent (MMBtu)
2045	1248		66 Natural Gas - Energy Equivalent (MMBtu)
2020	113		8 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2021	116		9 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2022	119		9 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2023	123		9 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2024	126		9 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2025	130		10 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2026	133		10 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2027	137		10 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2028	141		10 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2029	145		11 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2030	149		11 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2031	153		11 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2032	157		12 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2033	162		12 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2034	166		12 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2035	171		13 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2036	176		13 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2037	181		13 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2038	186		14 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2039	191		14 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2040	197		15 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2041	202		15 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2042	208		15 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2043	214		16 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2044	220		16 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2045	226		17 Distillate Fuel Oil No. 2 - Energy Equivalent (MMBtu)
2020	91527		212 Process N2O Population Served
2021	94110		218 Process N2O Population Served
2022	96766		224 Process N2O Population Served
2023	99498		231 Process N2O Population Served
2024	102306		237 Process N2O Population Served
2025	105193		244 Process N2O Population Served
2026	108162		251 Process N2O Population Served
2027	111215		258 Process N2O Population Served
2028	114354		265 Process N2O Population Served
2029	117581		273 Process N2O Population Served
2030	120900		280 Process N2O Population Served
2031	124312		288 Process N2O Population Served
2032	127821		296 Process N2O Population Served
2033	131429		305 Process N2O Population Served
2034	135138		313 Process N2O Population Served
2035	138952		322 Process N2O Population Served
2036	142874		331 Process N2O Population Served
2037	146906		341 Process N2O Population Served
2038	151053		350 Process N2O Population Served
2039	155316		360 Process N2O Population Served
2040	159700		370 Process N2O Population Served
2041	164207		381 Process N2O Population Served
2042	168842		392 Process N2O Population Served
2043	173607		403 Process N2O Population Served
2044	178507		414 Process N2O Population Served
2045	183545		426 Process N2O Population Served
2020	91		69 Daily N Load at Facility with Release to Environment (kg N/day)
2021	93		71 Daily N Load at Facility with Release to Environment (kg N/day)
2022	96		73 Daily N Load at Facility with Release to Environment (kg N/day)
2023	99		75 Daily N Load at Facility with Release to Environment (kg N/day)
2024	101		77 Daily N Load at Facility with Release to Environment (kg N/day)
2025	104		79 Daily N Load at Facility with Release to Environment (kg N/day)
2026	107		81 Daily N Load at Facility with Release to Environment (kg N/day)
2027	110		84 Daily N Load at Facility with Release to Environment (kg N/day)
2028	113		86 Daily N Load at Facility with Release to Environment (kg N/day)
2029	116		88 Daily N Load at Facility with Release to Environment (kg N/day)
2030	120		91 Daily N Load at Facility with Release to Environment (kg N/day)
2031	123		94 Daily N Load at Facility with Release to Environment (kg N/day)
2032	127		96 Daily N Load at Facility with Release to Environment (kg N/day)
2033	130		99 Daily N Load at Facility with Release to Environment (kg N/day)
2034	134		102 Daily N Load at Facility with Release to Environment (kg N/day)
2035	138		105 Daily N Load at Facility with Release to Environment (kg N/day)
2036	141		108 Daily N Load at Facility with Release to Environment (kg N/day)
2037	145		111 Daily N Load at Facility with Release to Environment (kg N/day)
2038	150		114 Daily N Load at Facility with Release to Environment (kg N/day)
2039	154		117 Daily N Load at Facility with Release to Environment (kg N/day)
2040	158		120 Daily N Load at Facility with Release to Environment (kg N/day)
2041	163		124 Daily N Load at Facility with Release to Environment (kg N/day)
2042	167		127 Daily N Load at Facility with Release to Environment (kg N/day)
2043	172		131 Daily N Load at Facility with Release to Environment (kg N/day)
2044	177		134 Daily N Load at Facility with Release to Environment (kg N/day)
2045	182		138 Daily N Load at Facility with Release to Environment (kg N/day)

APPENDIX C

Local Climate Change Snapshot

Manteca

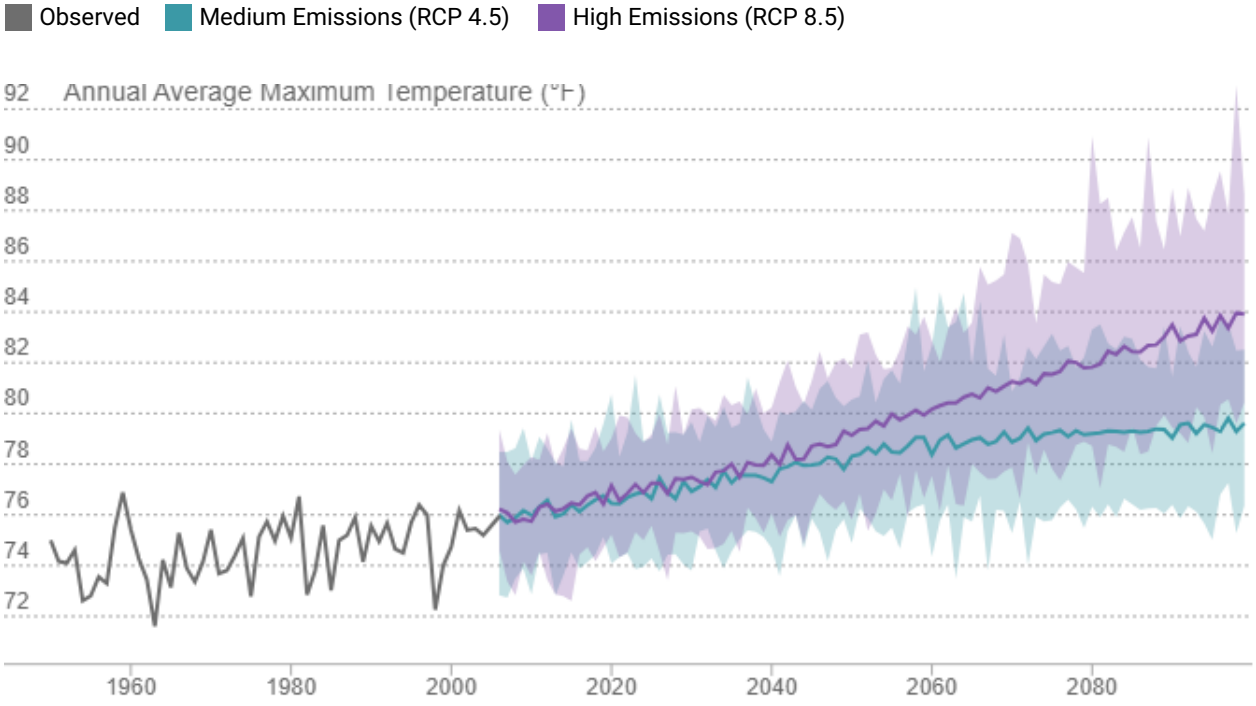
California

Temperature

Overall temperatures are projected to rise in California during the 21st century. While the entire state will experience temperature increases, the local impacts will vary greatly with many communities and ecosystems already experiencing the effects of rising temperatures.

Annual Average Maximum Temperature

Average of all the hottest daily temperatures in a year.



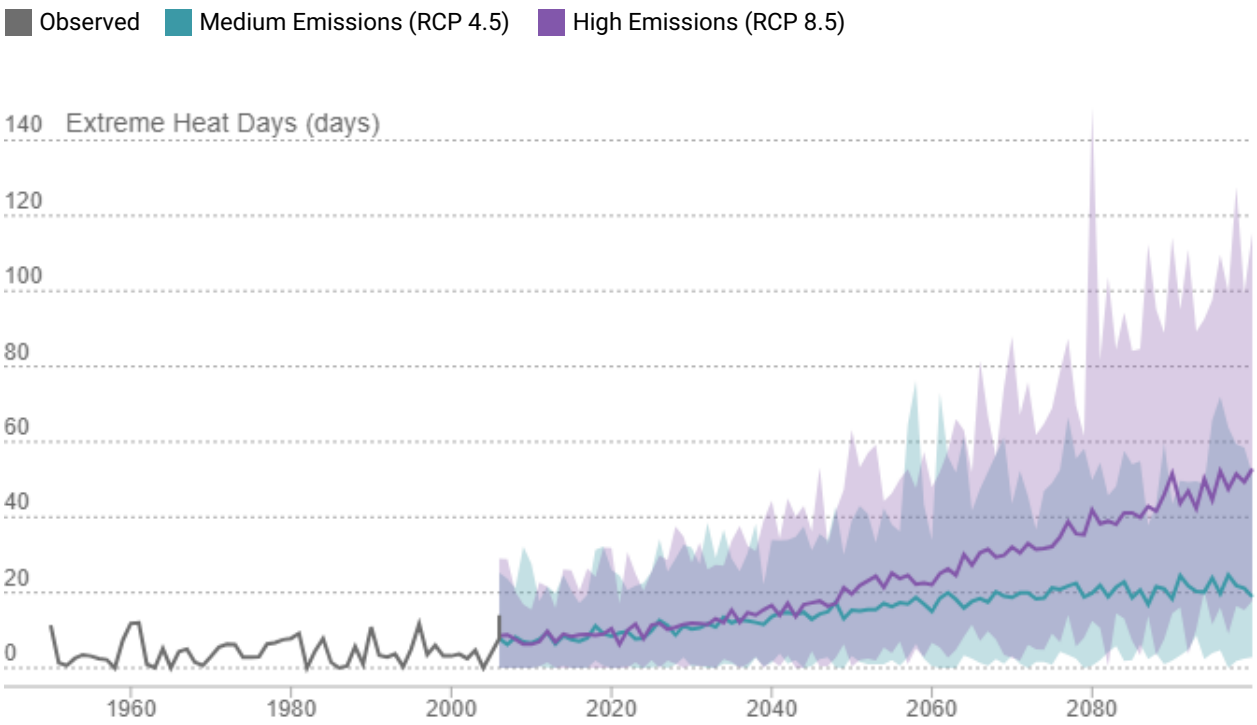
Observed (1961-1990) 30yr Average: 74.4 °F

	Change from baseline ⓘ	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	74.4 °F	74.2 - 74.7 °F
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+3.8 °F	78.2 °F	76.8 - 79.5 °F
HIGH EMISSIONS (RCP 8.5)	+4.7 °F	79.1 °F	77.1 - 81.1 °F
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+4.9 °F	79.3 °F	77.2 - 81.6 °F
HIGH EMISSIONS (RCP 8.5)	+8.1 °F	82.5 °F	79.6 - 86.7 °F

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Manteca boundary.

Extreme Heat Days

Number of days in a year when daily maximum temperature is above a threshold temperature



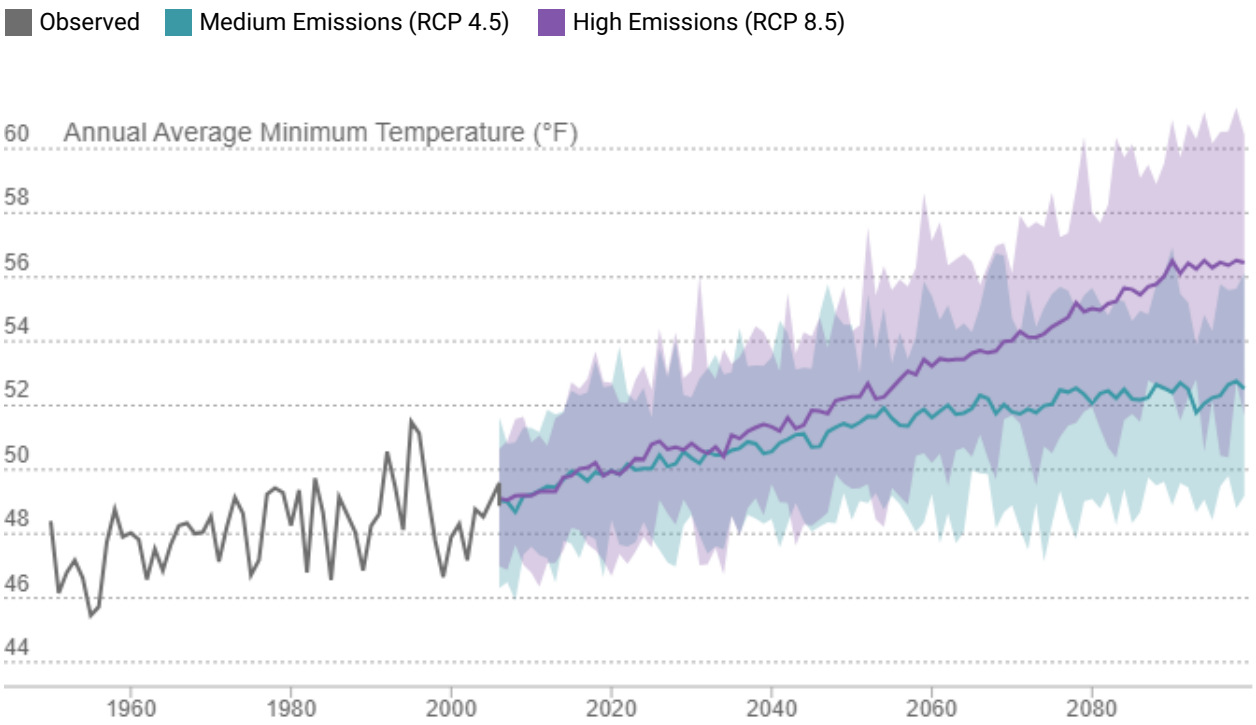
Observed (1961-1990) 30yr Average: 4 days

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	4 days	3 - 5 days
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+11 days	15 days	7 - 27 days
HIGH EMISSIONS (RCP 8.5)	+16 days	20 days	9 - 39 days
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+17 days	21 days	8 - 43 days
HIGH EMISSIONS (RCP 8.5)	+37 days	41 days	22 - 81 days

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Manteca boundary.
4. Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at that location.

Annual Average Minimum Temperature

Average of all coldest daily temperatures in a year.



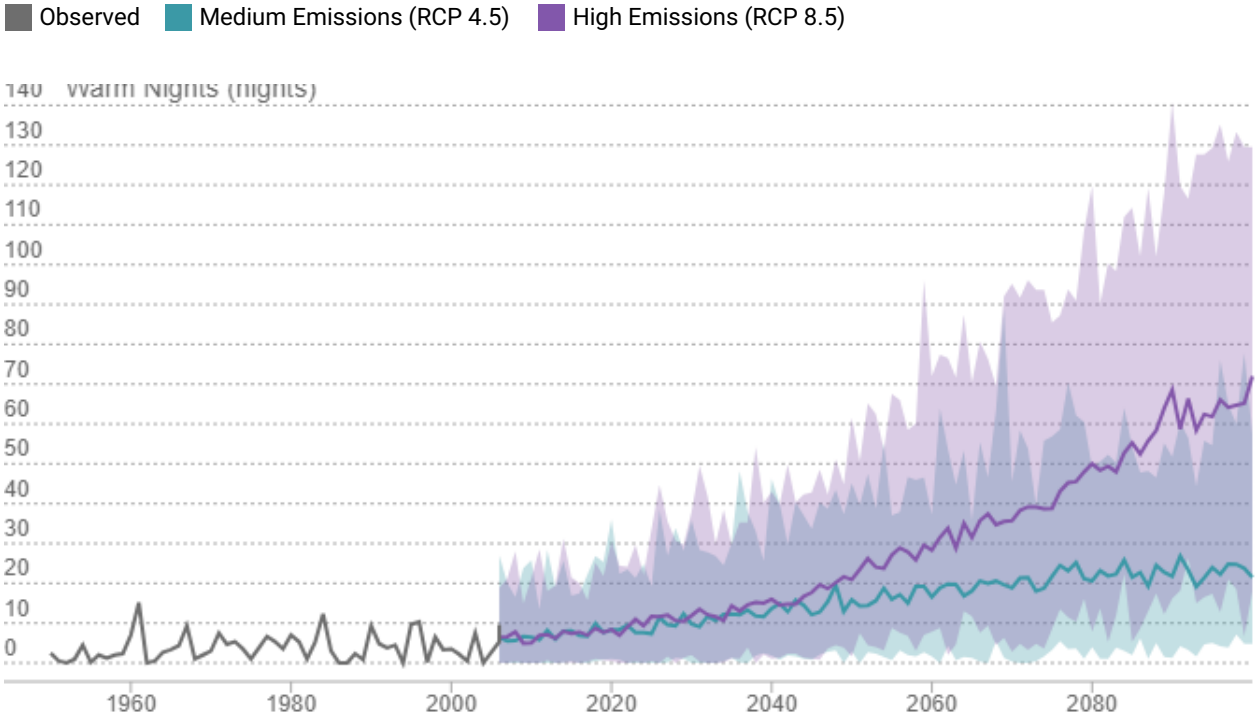
Observed (1961-1990) 30yr Average: 48.1 °F

	Change from baseline ⓘ	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	48.0 °F	47.6 - 48.4 °F
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+3.3 °F	51.3 °F	49.6 - 52.6 °F
HIGH EMISSIONS (RCP 8.5)	+4.2 °F	52.2 °F	50.3 - 53.9 °F
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+4.3 °F	52.3 °F	49.7 - 54.3 °F
HIGH EMISSIONS (RCP 8.5)	+7.4 °F	55.4 °F	52.1 - 58.2 °F

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Manteca boundary.

Warm Nights

Number of days in a year when daily minimum temperature is above a threshold temperature



Observed (1961-1990) 30yr Average: 4 nights

	Change from baseline ⓘ	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	3 nights	1 - 7 nights
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+12 nights	15 nights	8 - 28 nights
HIGH EMISSIONS (RCP 8.5)	+19 nights	22 nights	12 - 43 nights
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+19 nights	22 nights	8 - 48 nights
HIGH EMISSIONS (RCP 8.5)	+50 nights	53 nights	17 - 101 nights

1. Data derived from 32 LOCA downscaled climate projections generated to support California's Fourth Climate Change Assessment. Details are described in Pierce et al., 2018.
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Manteca boundary.

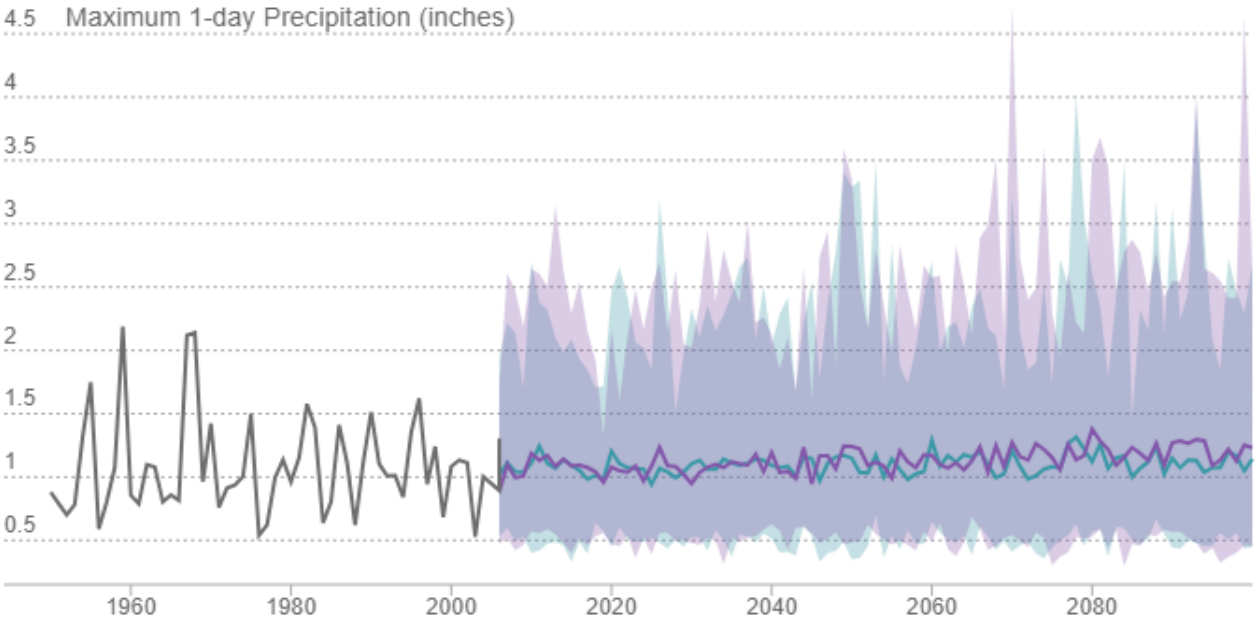
Precipitation

California's climate varies between wet and dry years. Research suggests that for much of the state, wet years will become wetter and the dry years will become drier. Dry years are also likely to be followed by dry years, increasing the risk of drought. While California does not see the average annual precipitation changing significantly in the next 50-75 years, precipitation will likely be delivered in more intense storms and within a shorter wet season. We are already seeing some of the impacts from a shift towards larger year to year fluctuations.

Maximum 1-day Precipitation

The maximum daily precipitation amount for each year. In other words, the greatest amount of daily rain or snow (over a 24 hour period) for each year.

Observed Medium Emissions (RCP 4.5) High Emissions (RCP 8.5)



Observed (1961-1990) 30yr Average: 1.093 inches

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	1.052 inches	0.943 - 1.172 inches
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+0.050 inches	1.102 inches	0.925 - 1.470 inches
HIGH EMISSIONS (RCP 8.5)	+0.064 inches	1.116 inches	0.960 - 1.323 inches
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+0.069 inches	1.121 inches	0.857 - 1.470 inches
HIGH EMISSIONS (RCP 8.5)	+0.151 inches	1.203 inches	0.895 - 1.704 inches

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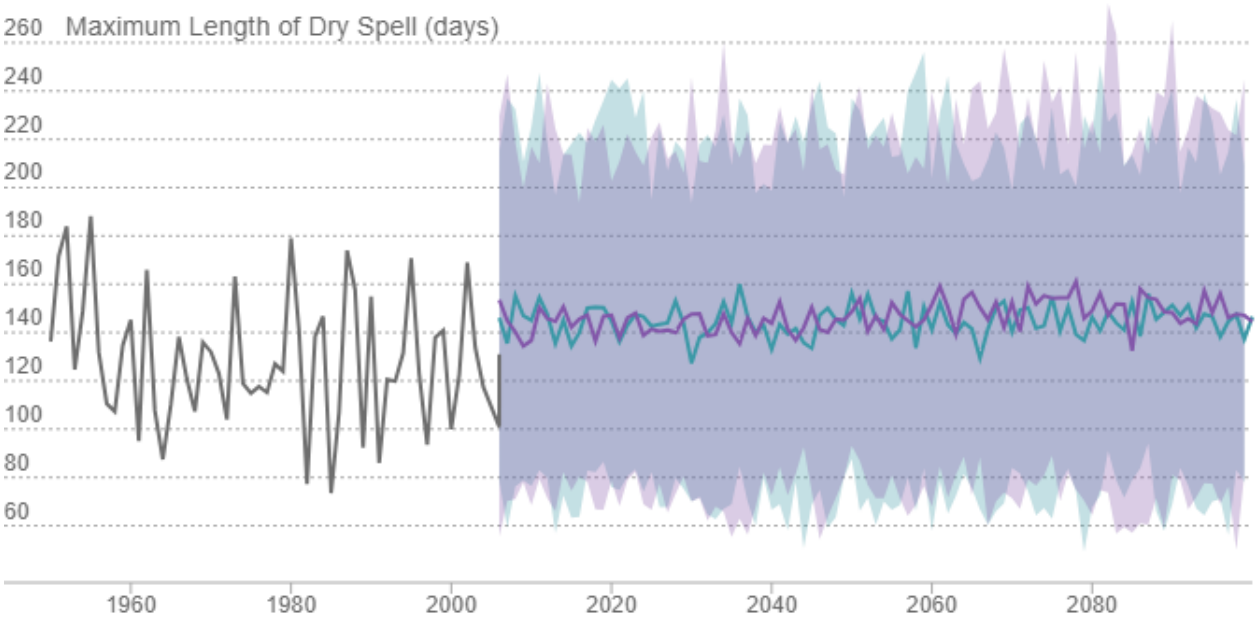
2. Observed historical data derived from Gridded Observed Meteorological Data. Details are described in Livneh et al., 2015.
3. Data presented are aggregated over all LOCA grid cells that intersect Manteca boundary.
4. Threshold temperature for a location is defined as the 98th percentile value of historical daily maximum/minimum temperatures (from 1961–1990, between April and October) observed at that location.

Maximum Length of Dry Spell

The maximum length of dry spell for each year. In other words, the maximum number of consecutive days with precipitation < 1mm for each year.

Observed Medium Emissions (RCP 4.5) High Emissions (RCP 8.5)



Observed (1961-1990) 30yr Average: 125 days

	Change from baseline	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	138 days	125 - 150 days
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	+6 days	144 days	126 - 160 days
HIGH EMISSIONS (RCP 8.5)	+7 days	145 days	124 - 166 days
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+7 days	145 days	119 - 163 days
HIGH EMISSIONS (RCP 8.5)	+13 days	151 days	116 - 180 days

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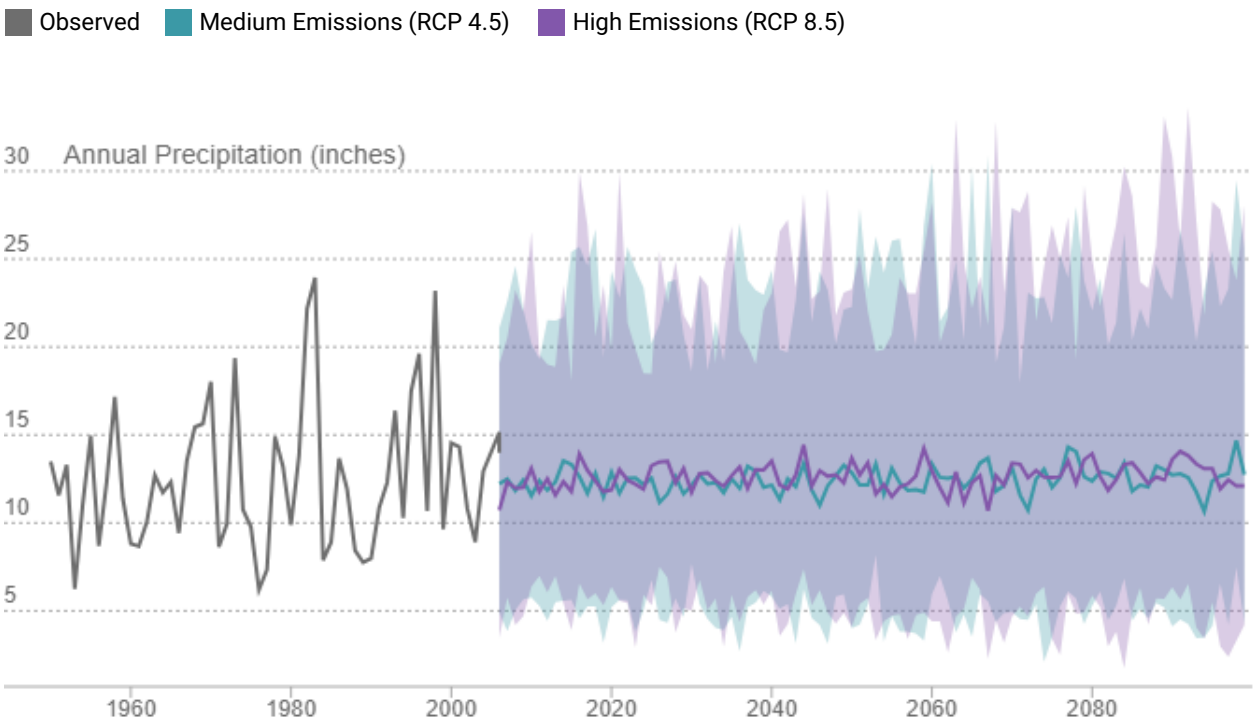
Annual Precipitation

Total precipitation projected for a year



Observed (1961-1990) 30yr Average: 12.1 inches

	Change from baseline ⓘ	30yr Average	30yr Range
Baseline (1961-1990)			
MODELED HISTORICAL	-	12.6 inches	11.5 - 13.6 inches
Mid-Century (2035-2064)			
MEDIUM EMISSIONS (RCP 4.5)	-0.2 inches	12.4 inches	10.7 - 17.2 inches
HIGH EMISSIONS (RCP 8.5)	0.0 inches	12.6 inches	10.0 - 15.9 inches
End-Century (2070-2099)			
MEDIUM EMISSIONS (RCP 4.5)	+0.0 inches	12.6 inches	10.1 - 16.1 inches
HIGH EMISSIONS (RCP 8.5)	+0.3 inches	12.9 inches	8.2 - 17.8 inches

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