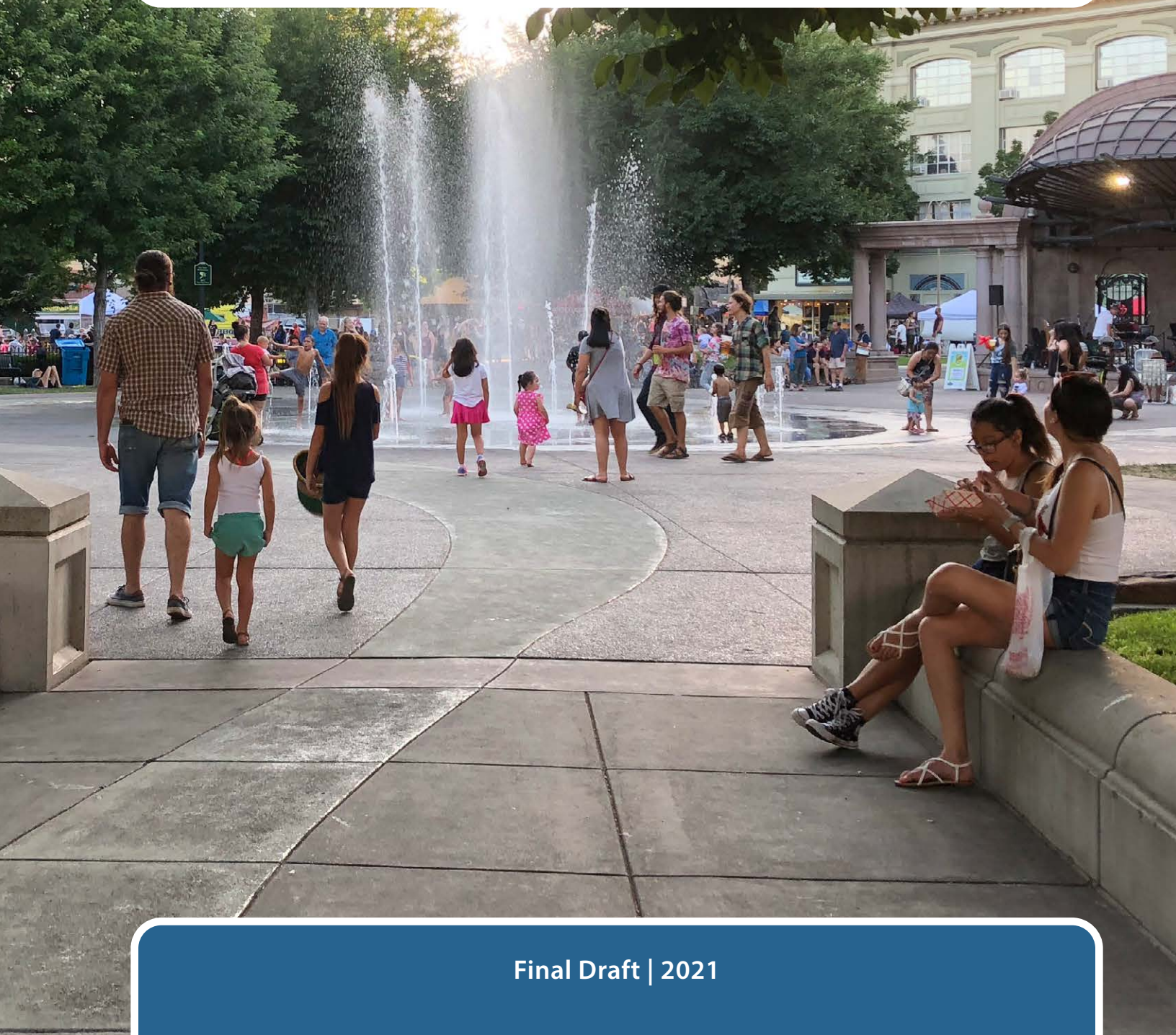
City of Chico, California

CLIMATE ACTION PLAN UPDATE



Final Draft | 2021

Prepared for:

City of Chico, California

411 Main Street | Chico, CA 95928
530-896-7200
chico.ca.us

CITY OF CHICO
INC. 1872

Prepared by:

Rincon Consultants, Inc.

4825 J Street, Suite 200 | Sacramento, CA 95819
916-706-1374
rinconconsultants.com

rincon
RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

TABLE OF CONTENTS

1. INTRODUCTION

VISION FOR CLIMATE ACTION IN CHICO

The City of Chico appreciates the need to mitigate climate change impacts through the next decade. Heavy rainfall and flooding in 2017 caused the Oroville Dam's spillways to overflow, prompting the evacuation of more than 180,000 people living downstream. Strong winds and drought conditions in 2018 created the deadliest wildfire in California's history, which destroyed the town of Paradise and drove a massive influx of climate migrants into Chico. Fire again threatened the region in 2020, when a lightning strike caused the Northern Complex fire in Plumas and Butte Counties. These disasters have put Chico on the front lines of a changing climate.

In response to the need for ambitious climate action, this Climate Action Plan (CAP) includes specific actions to reduce greenhouse gas (GHG) emissions (including carbon dioxide, methane, and nitrous oxide emissions) and achieve the City's target of carbon neutrality[1] by 2045. Achieving carbon neutrality in Chico will demonstrate a fair share contribution to limiting global temperature rise to below 2 degrees Celsius in this century, which is consistent with the International Panel on Climate Change (IPCC) analysis on what is necessary to reduce the likelihood of catastrophic global climate change. Addressing climate change also presents the community with an opportunity to operate more efficiently and effectively, avoid inequities, and improve health and well-being.

A NOTE ABOUT COVID-19

The outbreak of the COVID-19 pandemic drastically affected daily life and has highlighted the interdependence of public health, economic and racial equity, and environmental sustainability on a national level. As the nation and local economy begin to recover from the impacts of COVID-19, it has become imperative to plan for a future that aligns economic growth and new development with equity and sustainability. This CAP was developed to balance strategies for a sustainable Chico with the need for economic growth and new development in an equitable and realistic way, serving the overall recovery effort in Chico.

1 *Carbon neutrality refers to achieving net-zero carbon dioxide equivalent emissions, such that any greenhouse gas emissions created are offset by greenhouse gas emissions sequestering activities. Carbon dioxide equivalent emissions include the most common human-caused greenhouse gas emissions, such as carbon dioxide, methane, and nitrous oxide.*

LEADING PRINCIPLES

With drought, fires, and flooding projected to worsen across California over the coming decades due to climate change,[2] Chico has developed this CAP to create a plan for a **safer and more resilient future**. The CAP also strategically positions the community's residents and business-owners to take early advantage of emerging **cost savings** and **economic opportunities** that arise with modernization and new technologies. Additionally, the CAP supports **affordable housing** development, prioritizes **social equity**, improves the **quality of life** for residents, and **engages** the citizens of Chico in ongoing climate action work. These leading principles are described in more detail below.

- **SAFER FUTURE:** Reducing GHG emissions in Chico helps to avoid property damage and loss of life from flooding, fires, heat waves, and drought made worse by climate change.
- **COST SAVINGS:** New technologies and innovative approaches to procuring energy for communities are lowering costs for the average resident and business owner. Taking advantages of these opportunities and implementing them now saves the community money in both the short- and long-term.
- **ECONOMIC OPPORTUNITY:** The CAP presents opportunities for investment and job creation around local energy generation projects such as privately owned solar or battery farms, alternative transportation projects such as shared e-bikes, and all-electric technology installation such as electric heat pumps and water heaters.
- **AFFORDABLE HOUSING:** California's housing crisis weighs heavily on the state, including within Chico. Adoption and implementation of the CAP makes building affordable housing in Chico easier and faster for developers (see the section on CEQA streamlining below).
- **SOCIAL EQUITY:** Chico's CAP is successful only with proper consideration of social equity. The strategies contained in the CAP were developed alongside a comprehensive outreach effort to develop a plan that works equitably for all members of the community.
- **QUALITY OF LIFE:** The CAP includes significant co-benefits for Chico by providing for cleaner air, resilient water sources, and more active and livable neighborhoods.
- **ENGAGED CITIZENS:** Chico cannot act alone. The success of this CAP is dependent on input from and collaboration with the community. Climate action is an iterative process, which will be adjusted with the introduction of new technologies, information, and feedback from the community through ongoing partnerships and community engagement.

The CAP's strategies take a new approach to climate change policy that is actionable, measurable, cost-effective, fiscally responsible, and highly implementable over the course of the next decade.

2 *https://www.nrdc.org/sites/default/files/climate-change-health-impacts-california-ib.pdf*

CAP FUNDING AND FINANCING

To help ensure the CAP is both cost-effective and fiscally responsible, the CAP includes a Climate Action Finance Map (Appendix D). The Climate Action Finance Map is a detailed tool that includes funding and financing pathway options to support the measures and actions included in the CAP. Specifically, the map identifies multiple grants, partner sponsorships, state or utility incentive programs, loans, bonds, fees, and tax pathways to be utilized for implementing the CAP. The City and community costs associated with each CAP action are explained in detail in Chapter 4. By implementing this CAP in concert with the Climate Action Finance Map, the costs of implementation will be minimized.

CEQA STREAMLINING

This CAP will guide the City of Chico towards reducing GHG emissions consistent with the state goal to reduce GHG emissions 40% below 1990 levels by 2030, established by Senate Bill (SB) 32, and will make substantial progress towards the state's long term goal of carbon neutrality by 2045, established by Executive Order (EO) B-55-18. In addition, this CAP will fulfill the requirements of the California Environmental Quality Act (CEQA) Guidelines § 15183.5(b) to be a qualified GHG reduction plan. Under CEQA, local agencies must evaluate the environmental impacts of new development projects, including impacts from GHG emissions associated with their construction and operation. This process can be cumbersome for local agencies and developers alike and can result in project delays. The CEQA Guidelines provide an option for new projects to streamline the CEQA analysis of GHG emissions by tiering off of a "qualified" GHG reduction plan. Per CEQA Guidelines § 15183.5(b), a qualified GHG reduction plan must:

1. Quantify existing and projected GHG emissions within the plan area.
2. Establish a reduction target based on SB 32.
3. Identify and analyze sector specific GHG emissions from Plan activities.
4. Specify policies and actions (measures) that local jurisdictions will enact and implement over time to achieve a specified reduction target.
5. Establish a tool to monitor progress and amend if necessary.
6. Adopt in a public process following environmental review.

This CAP meets these requirements and provides Chico and its developers with a critical tool to help facilitate development over the next decade. Chico considers this especially important, given the current need for new affordable housing and future development plans.

HISTORY OF SUSTAINABILITY IN CHICO

Chico has been working to reduce GHG emissions since 2005 and has achieved measurable success, primarily as a result of state-level action. In fact, community-wide emissions have decreased 27% since 2005, exceeding the City's original goal of 25% in the 2020 CAP (Figure 1-1). After accounting for population increases since 2005, this equates to a 42% decrease in GHG emissions per person, demonstrating that the City is already on its way to achieving the ambitious reductions included in this plan.

Figure 1-1 GHG Emissions Trends in Chico

Since 2005, emissions in Chico have decreased 27% overall and 42% per person, despite a large population increase.

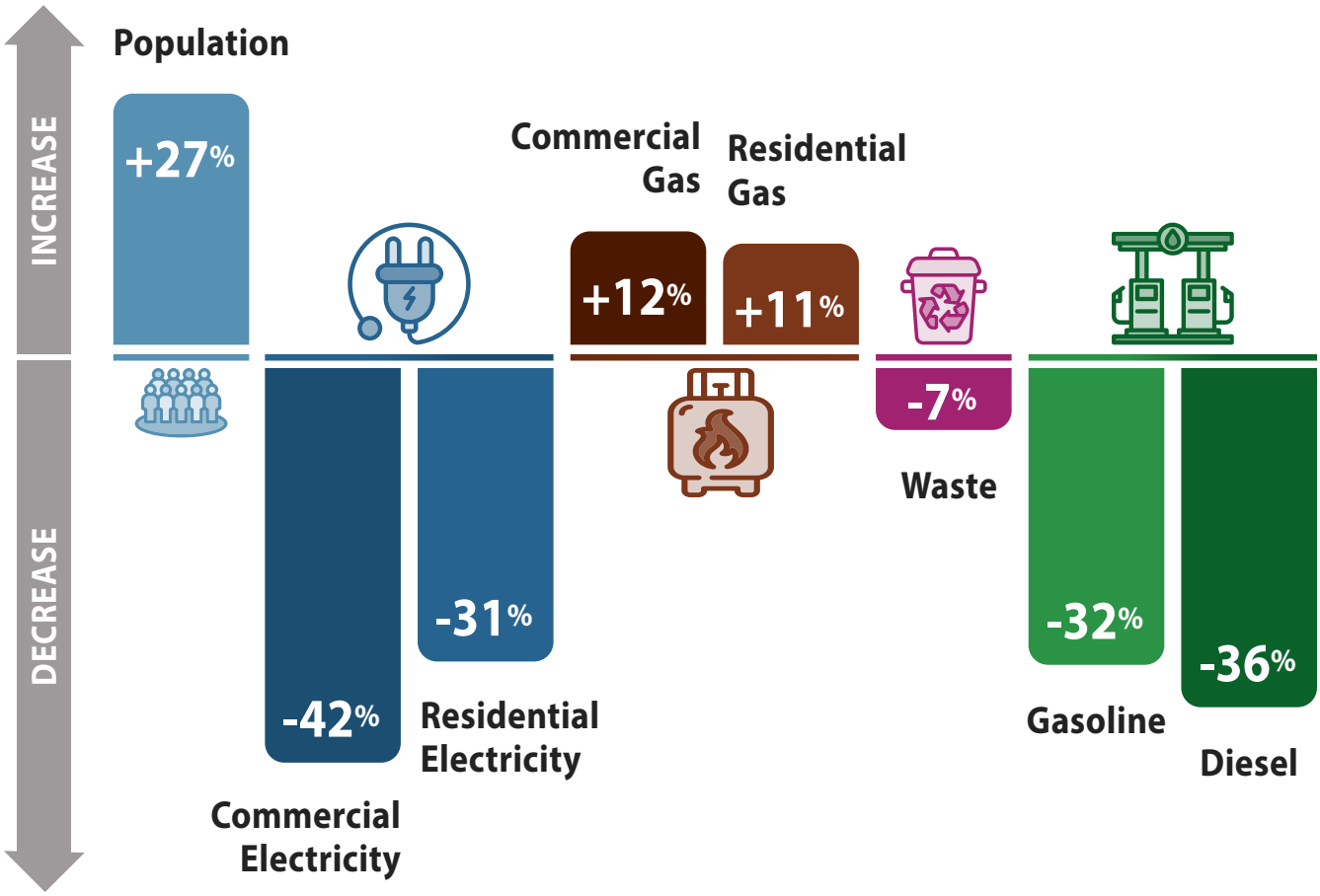
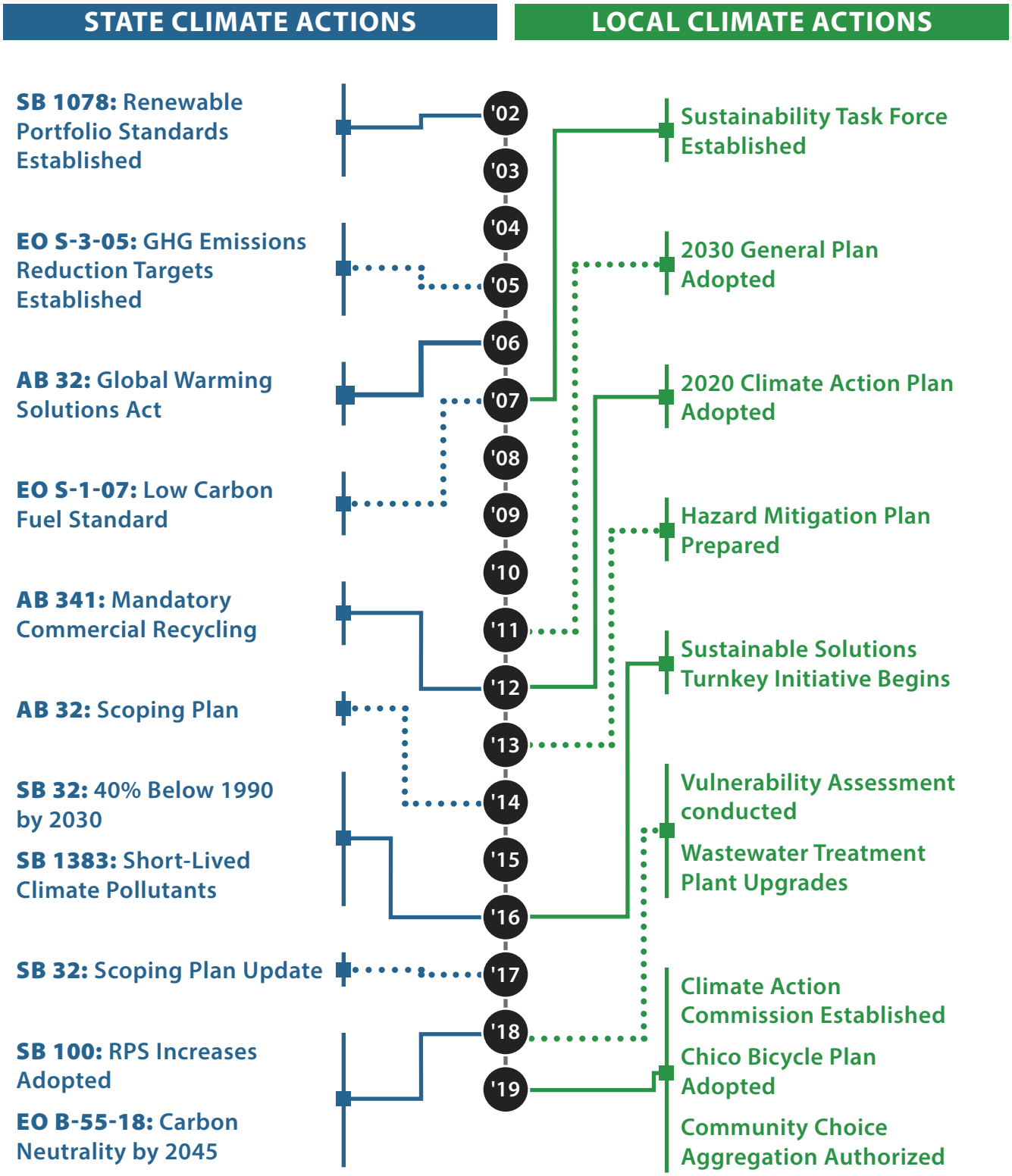


Figure 1-2 State and Local Climate Action



CLIMATE ACTION COMMISSION SPOTLIGHT

The City of Chico's Climate Action Commission (CAC) was established in 2019 to serve as an advisory body to the City Council on matters related to climate action, adaptation, and resilience. The CAC was an evolution of Chico's Sustainability Task Force, which was created in 2007 after Chico's Mayor signed the Mayor's Climate Protection Agreement. The Sustainability Task Force assisted the City in meeting the objectives of the Mayor's Agreement, tracked GHG emissions in an annual GHG emissions inventory, and developed the City's first CAP.

The CAC has advised the development of this CAP from its inception and continues to advise City Council on climate action and resiliency throughout Chico.

COMMUNITY ENGAGEMENT

In addition to feedback and guidance from the Climate Action Commission, Chico's CAP was developed alongside an involved public engagement process. This process consisted of building awareness about the CAP effort, informing the community about Chico's GHG emissions and reduction progress so far, soliciting and obtaining feedback from the community on the plan's context and priorities, engaging the community on Chico-specific climate action issues and policies, and meeting with targeted stakeholders to build policy development consensus. These efforts included:

- **WINTER 2019:** Initial listening sessions led by the Climate Action Commission at the Rotary Club of Chico Sunrise, Butte Environmental Council, CSU Chico, and Chico High School, and Pleasant Valley High School, prior to CAP development kick-off.
- **ONGOING:** Presentations on CAP progress and technical findings at the City's monthly Climate Action Commission meetings for the duration of the CAP development process.
- **MAY/JUNE 2020:** Phase 1 outreach, conducted virtually to mitigate community spread of COVID-19, led by the City and consultant team. A comprehensive list of 350 stakeholders was built and notifications on the virtual outreach event were disseminated in English and Spanish through the City website and social media channels, multiple emails and calls directly to stakeholders, and a news story on Telemundo. Community members participated in a "Check your Chico Knowledge" quiz, watched an animated informational video, and provided feedback in a short online questionnaire in both English and Spanish. **This effort resulted in active engagement from 200 community members.**
- **OCTOBER 2020:** CAP Stakeholder meeting on electrification. The City held a focused electrification stakeholder's working group via Zoom, which solicited discussion and feedback from participants on the CAP's electrification strategy. Participants included representatives from local businesses and business groups that would be affected by the new building electrification ordinance, including Enloe, AOL, Valley Contractor's Exchange, CSU Chico, Chico Builders Association, and North Valley Property Owners.
- **NOVEMBER/DECEMBER 2020:** Phase 2 outreach, conducted virtually to mitigate community spread of COVID-19, led by the City and consultant team. Notifications on the virtual outreach event were disseminated in English and Spanish through the City website and social media channels, notifications to all stakeholders and over 200 community members, and personal calls and emails to 50 high-priority stakeholders. Community members participated in a virtual community workshop in both English and Spanish, consisting of a short informational video and nine-page interactive document which solicited open-ended feedback on key proposed GHG reduction strategies. **The effort reached 4,490 community members and resulted in active engagement from 57 households.**

- **MARCH 2021:** Community Building Electrification Workshop. This workshop was conducted virtually and discussed the pros and cons of electrification, the City's proposed timeline for an electrification ordinance, and featured insights from a local developer on the cost savings associated with constructing all-electric single-family and multi-family homes.

Further details on the outreach conducted including the information shared, stakeholders contacted, activities conducted during the outreach phases, and the results and feedback from the community are included in Appendix A of the CAP. Community input was carefully reviewed during the planning process and incorporated into the CAP. Top community concerns included the need for clear implementation timelines, impacts of electrification to housing affordability, decreased grid reliability, and affordability of electric appliance adoption. Additional information is provided in the CAP around these concerns, including the implementation timeframe for all actions in Chapter 6, discussion of costs associated with all-electric housing (Chapter 5 and Chapter 7), inclusion of additional actions to increase local grid reliability in the GHG reduction strategy and a discussion of impacts to the grid from electrification (see Measure E-4 in Chapter 6 and grid reliability discussion in Chapter 5), and detailed discussion of the costs associated with electric appliances (Chapter 7).

EQUITY CONTEXT

The City of Chico understands the importance of incorporating the needs and perspectives of diverse members of the community, particularly those of underserved populations, into the CAP's strategies. Environmental and public health conditions within disadvantaged communities are often impacted by GHG emissions more than other communities, and areas with high concentration of low-income families are more likely to be exposed to pollution and environmental hazards. Chico is home to a census tract that is among the 25% most disadvantaged in the state.[3] While these community members would benefit from the outcomes of the CAP such as improved air quality, they may also face disproportionate barriers to implementing proposed CAP strategies, such as transitioning to all-electric appliances. To this end, the City developed CAP actions with a strong consideration for costs to the community, explored in detail in Chapter 5 and Chapter 7, with higher community costs addressed by the Climate Action Finance Map (Appendix D).

3 *CalEnviroScreen 3.0*

THE SCIENCE OF CLIMATE CHANGE

WHAT IS CLIMATE CHANGE?

Climate change is caused by increasing levels of GHGs in the atmosphere. GHGs trap energy from the sun in earth's atmosphere, a process called the greenhouse effect (Figure 1-3). This effect makes the earth warm enough to sustain life; however, land use changes and combustion of fossil fuels are increasing GHGs in the atmosphere, amplifying the greenhouse effect, and changing global climate patterns. This pattern is widely accepted by the scientific community, with over 97% of climate scientists agreeing that climate change is occurring and that human activities are the root cause.[4]

At the community level, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the most common GHGs, making up 97% of the GHG emissions generated in the United States.[5] GHGs are largely released to the atmosphere via emissions from the combustion of fossil fuels. This occurs, for example, when gasoline is combusted in a car or natural gas is combusted in a heater or coal is burned to create electricity.

Climate change is projected to cause increasingly hazardous conditions for life on earth, including increased heat waves, wildfires, drought, extreme storms, flooding, and sea level rise. Secondary impacts of climate change include adverse changes to biological resources and public health.[6]

The International Panel on Climate Change (IPCC) projections show that a reduction in GHG emission to carbon neutrality by mid-century is required to limit warming trends to 2.7 degrees Fahrenheit and avoid the worst impacts of climate change.[7]

4 https://climate.nasa.gov/scientific-consensus/
5 https://www.wri.org/blog/2020/02/greenhouse-gas-emissions-by-country-sector
6 https://www.nrdc.org/sites/default/files/climate-change-health-impacts-california-ib.pdf
7 https://www.ipcc.ch/sr15/chapter/spm/

Figure 1-3 Greenhouse Gas Effect and Associated Climate Impacts

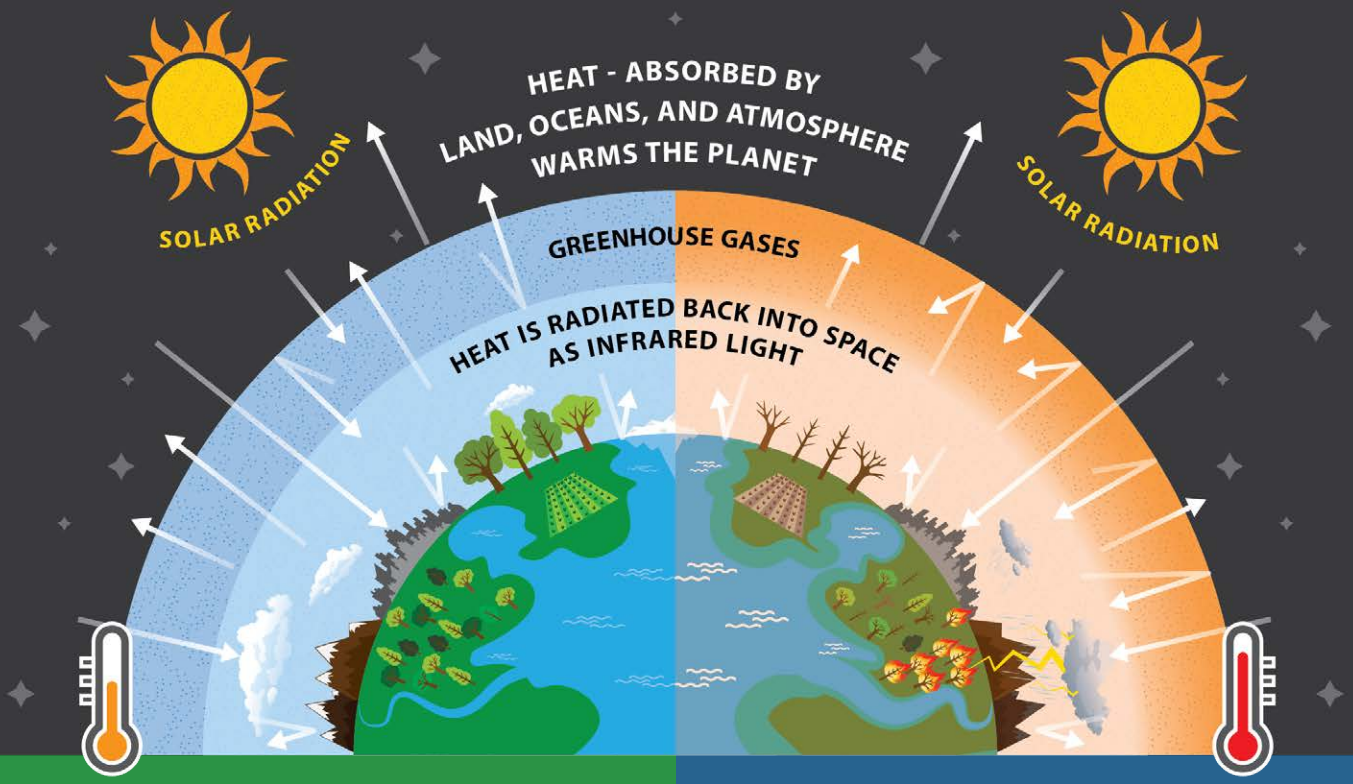
GREENHOUSE GAS EFFECT

Since the advent of the industrial revolution human activities such as burning fossil fuels and deforestation have caused a substantial increase in the concentration of greenhouse gases in the atmosphere.

THE RESULT: Extra trapped heat and higher global temperatures.

WITH NORMAL
GREENHOUSE GASES

WITH INCREASED
GREENHOUSE GASES



Some heat continues into space while the rest, trapped by greenhouse gases, help maintain the planet's relatively comfortable temperatures.

LESS GAS =
LESS HEAT TRAPPED IN THE ATMOSPHERE

Retain more reliable:

- Weather
- Temperature
- Rainfall
- Sea Level

Increased greenhouse gases means less heat escapes to space. Between preindustrial times and now, the earth's average temperature has risen by 1.8°F (1.0°C).

MORE GAS =
MORE HEAT TRAPPED IN THE ATMOSPHERE

Results in more intense:

- Storms
- Heat
- Drought
- Sea Level Rise

How do Cities Contribute to Climate Change?

The main sources of GHG emissions in cities are buildings, transportation, waste, and water. Building emissions are associated with electricity and natural gas used by commercial, residential, and municipal buildings. Transportation emissions are generated by fuels used to power cars, trucks, and off-road vehicles. Waste generates methane emissions from trash (especially organics) decomposing in the landfill. Water emissions are generated by the electricity used to transport water for residential, commercial, and agricultural use, and emissions from wastewater treatment processes.

How Can Cities Mitigate Climate Change?

Local governments play an important role in reducing local GHG emissions. Local government policies can influence high-emissions behaviors, mitigate climate change effects, and prepare the community for a more resilient future. Cities can exercise their influence through local land use planning, building standards, and public and private partnerships to develop behavior-changing policies. Electricity and even some fuels can be generated through renewable and carbon neutral processes. Through their influence, cities can improve building codes, incentivize alternative transportation options, expand options for waste stream diversion and renewable energy sources, and educate community members about their choices as citizens and customers. This CAP is Chico's next step in a long history of improving sustainability, decreasing GHG emissions, and improving the quality of life for Chico's communities.

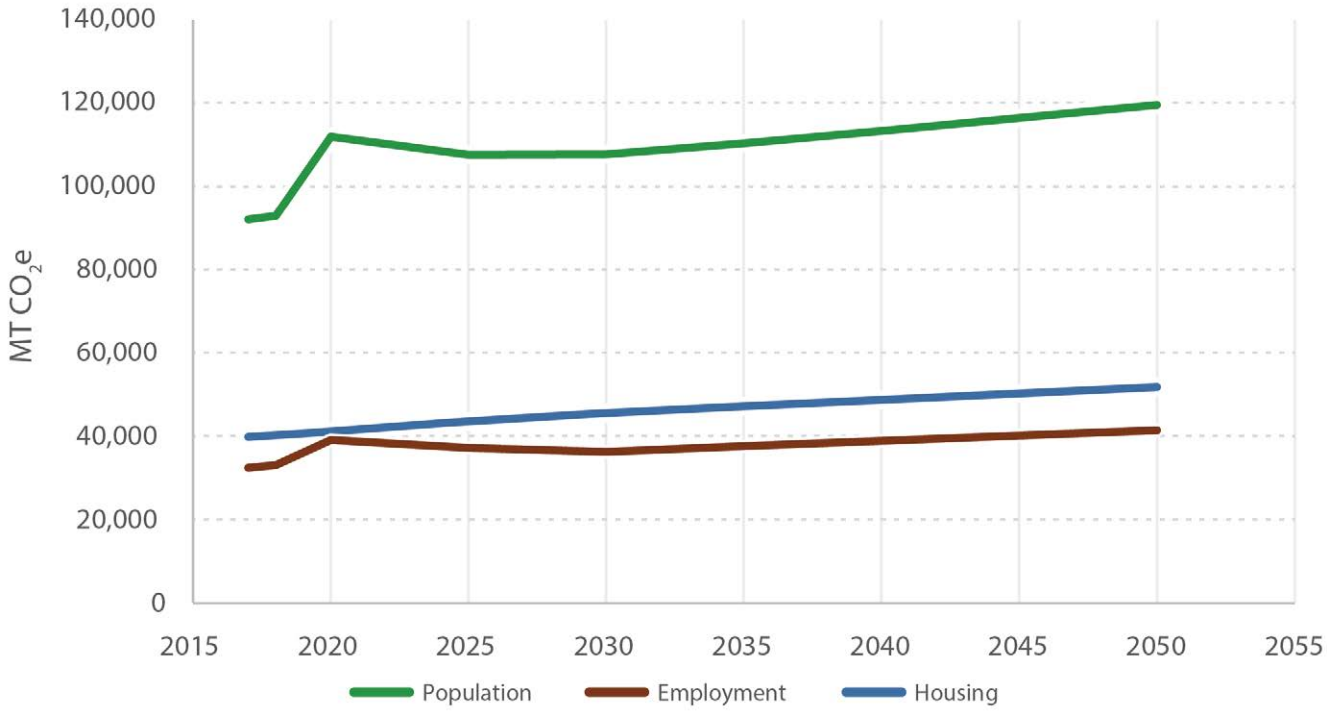
CLIMATE CHANGE IMPACTS IN CHICO

CHICO CONTEXT

Located at the northeastern edge of the agriculturally rich Sacramento Valley, Chico is the most populous city in Butte County. The City supports a diverse range of industries, including agriculture, recreation, tourism, healthcare, manufacturing, and education. The City is home to California State University, Chico, the second oldest institution in the California State University system, Enloe Medical Center, which serves as the regional medical hospital and level II Trauma Center, and Bidwell Park, which covers 17% of the City's geographical extent.

Chico was the fastest growing city in California in 2019.[8] The 2018 Camp Fire destroyed the nearby town of Paradise and created 50,000 climate migrants in the region, many of whom moved in with friends and family in Chico, growing the City's population by 20.7% almost overnight. The Butte County Association of Governments (BCAG) estimates large growth in housing units in Chico through 2030, accompanied by a decrease in population through 2030, as many people temporarily displaced by the Camp Fire move away from Chico (Figure 1-4).

Figure 1-4 Projected Growth in Chico



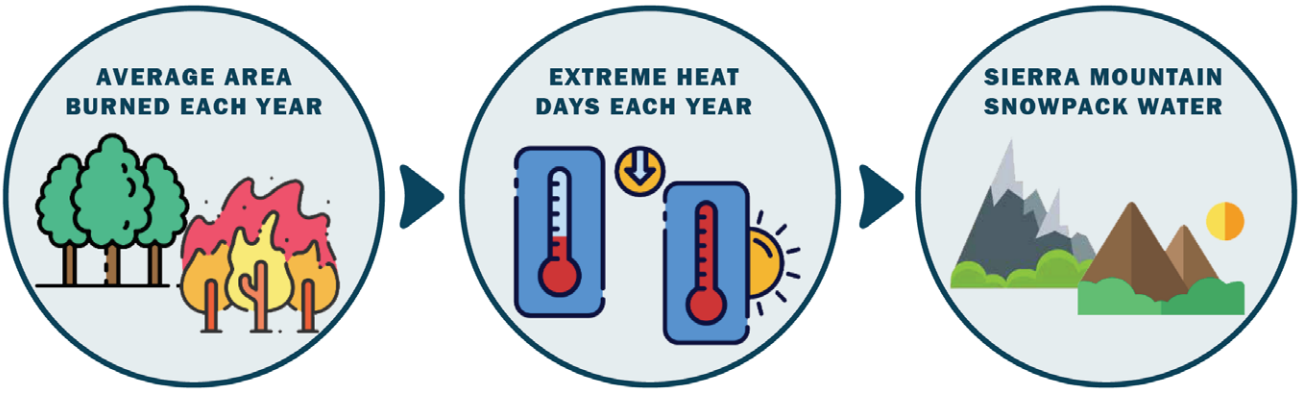
8 *Department of Finance, 2019*

Chico's geographic location, industries, demographics, and future growth together dictate the City's vulnerabilities to climate change. The City of Chico completed a Vulnerability Assessment in 2018 to outline the potential climate impacts Chico is expected to see in the future. The Vulnerability Assessment includes a summary of the City's efforts to adapt to these impacts. While this CAP primarily focuses on reducing GHG emissions in Chico to mitigate the most significant impacts of climate change, many of the strategies identified will also help prepare the City for future extreme climate events.

VULNERABILITY ASSESSMENT

The number of extreme temperature days, heat waves, and wildfires vary greatly depending on the amount of GHG emissions that humans emit over time. Increased GHG emissions can reduce snowpack, negatively affecting sensitive habitats like Bidwell Park, and potentially require human migrations like Chico experienced from the Camp Fire. Climate change impacts in Chico were analyzed in the City's 2018 Vulnerability Assessment and are expected to affect public health and safety, and the health of the local economy.

Figure 1-5 Chico Climate Projections at a Glance



Public Health and Safety

Adverse impacts from climate change are expected to disproportionately affect vulnerable populations, including people in low-income areas, communities of color, young children and the elderly, people experiencing homelessness, outdoor workers, and socially or linguistically isolated people. Currently 25.2% of Chico's residents are living in poverty[9] and 1,096 people are considered to be homeless.[10]

WILDFIRE

Increased temperatures are leading to increased frequency and extent of wildfires across California. The City of Chico has already experienced the devastating effects of increasing wildfires, after the Camp Fire in 2018 and the Northern Complex Fire in 2020.

CLIMATE CHANGE IMPACTS IN ACTION – 2018 CAMP FIRE

The massive influx of people from the 2018 Camp Fire exacerbated crime and traffic congestion and put undue pressure on the sewage and waste systems in the City. Lack of housing to accommodate these new people was the single biggest post-fire issue, creating more pressure for affordable housing in a city that already faces a homelessness crisis, like most other cities in California.

The lasting effects of the Camp Fire serve to highlight the importance of maintaining strong development trends in Chico through the future. To align with State GHG reduction goals and build new housing to meet demand, the City of Chico must adopt a new strategy for development. This CAP contains the first steps of this new strategy, making Chico more resilient to future events like the Camp Fire.

Aftermath of the Paradise Fire (Chico Enterprise-Record)

9 *United State Census Bureau, 2017*

10 *2017 Homeless Point in Time Census and Survey Report, 2017*

DROUGHT

Periods of drought are increasing in Chico, leading to decreasing surface water and groundwater availability. This will particularly affect agricultural output, potentially resulting in decreased food supply and resiliency.[11]

RESPIRATORY ILLNESS

Local GHG emissions directly affect local air quality. Natural gas usage in residential and commercial buildings contributes six times more outdoor NO_2 emissions than power plants do in California.[12] and are disproportionately linked with respiratory illnesses, including asthma and COVID-19 mortality.[13] Increased wildfire risk is leading to more frequent periods of low-quality air in Chico, which poses a health hazard to vulnerable populations.

HEAT-RELATED ILLNESS

The duration and magnitude of heat waves are already increasing in Chico. Cases of heat-related illnesses such as nausea, dizziness, stroke, dehydration, and heat exhaustion are expected to rise and exacerbate pre-existing medical conditions. Evidence shows that heat related illness affects vulnerable populations disproportionately due to factors such as lack of access to air conditioning, higher likelihood of exposure, and higher rates of underlying medical conditions.[14]

ECOLOGICAL DEGRADATION AND DISEASE

The changing climate is affecting biological resources and ecological function in Chico, especially in spaces like Bidwell Park that span multiple habitat types. Decreasing ecological function can lead to faster-spreading diseases, to which humans and crops may be vulnerable.

11 *https://www.csuchico.edu/sustainability/doc-library/chico-climate-change-vulnerability-assessment.pdf*
12 *EPA National Emissions Inventory, 2017*
13 *American Lung Association*
14 *https://www.epa.gov/heatislands/heat-islands-and-equity#equity-connection*

Health of the Local Economy

Climate change is expected to disproportionately affect small and medium businesses in Chico as they have less capital and fewer resources to deal with business impacts from increased power failures and prolonged heat waves.

POWER OUTAGES

High temperatures and winds decrease the efficiency of power lines and can lead to power outages and blackouts, limiting and disrupting operations of businesses.

IMPACTS TO INFRASTRUCTURE

Climate change can impact Chico's infrastructure. High temperatures cause excessive roadway degradation and increased pressure on the structural joints in bridges. Increased flood events and wildfires cause considerable property damage. These changes will lead to increased infrastructure costs for taxpayers, residents, and businesses owners.

COST OF NATURAL GAS

Residential natural gas usage is projected to decline 25% by 2050 due to increased energy efficiency.[15] This will lead to dramatically increased natural gas prices to maintain the high costs of natural gas infrastructure. This is expected to disproportionately affect residents and businesses who rely on natural gas for cooking and heating.

15 *https://gridworks.org/initiatives/cagas-system-transition/*


CITY OF CHICO
INC. 1872

2. GREENHOUSE GAS EMISSIONS IN CHICO

CONDUCTING A GHG EMISSIONS INVENTORY

Conducting a GHG emissions inventory for a community consists of identifying the major GHG-generating activities from residents and businesses operating in the community, collecting summary data on those activities for a calendar year, then converting the collected data to GHG emissions using science-based GHG emissions factors. Inventories measure GHG emissions in units of metric tons of carbon dioxide equivalent, or MT CO_2e. One MT is equivalent to 2,205 pounds, roughly the weight of 220 house cats. The average car produces one MT of CO_2e by driving from Chico to Atlanta. Charging 127,000 smartphones also produces roughly one MT of CO_2e. Alternatively, growing 16.5 tree seedlings in Bidwell Park for 10 years removes 1 MT of CO_2e from the atmosphere.[15]

Various protocols currently exist to guide the development of GHG emissions inventories. Chico's inventory methods rely on the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Version 1.2) and are consistent with the methodologies employed by other cities throughout the State of California.

The U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions (Version 1.2) separates a city's GHG-generating activities into categories known as emissions sectors. These emissions sectors broadly describe where GHG emissions are coming from within a city and are under some level of the city's jurisdictional control. For example, large emissions sectors for cities include the transportation sector (which captures combustion emissions from cars and other vehicles operating within the city), the building sector (which captures emissions from electricity, natural gas, and other energy source usage within the city), and the waste sector (which captures emissions from sending solid waste to the landfill).

Not all GHG-generating activities within a city are included in a GHG emissions inventory for a CAP. Excluded activities are generally those that cannot be controlled or influenced by city policies, and are therefore of little relevance to a city planning document such as a CAP. For example, the emissions associated with the production of goods coming into the community are often excluded from inventories because the choice of which goods to buy is entirely up to the individual consumer, and is typically not influenced by a local government. Combustion emissions from cars traveling through a city, whose origins and destinations are outside of city limits, are also typically excluded because a local government cannot reasonably influence this pass-through travel activity.

15 *https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator*

CHICO'S GHG EMISSIONS INVENTORY

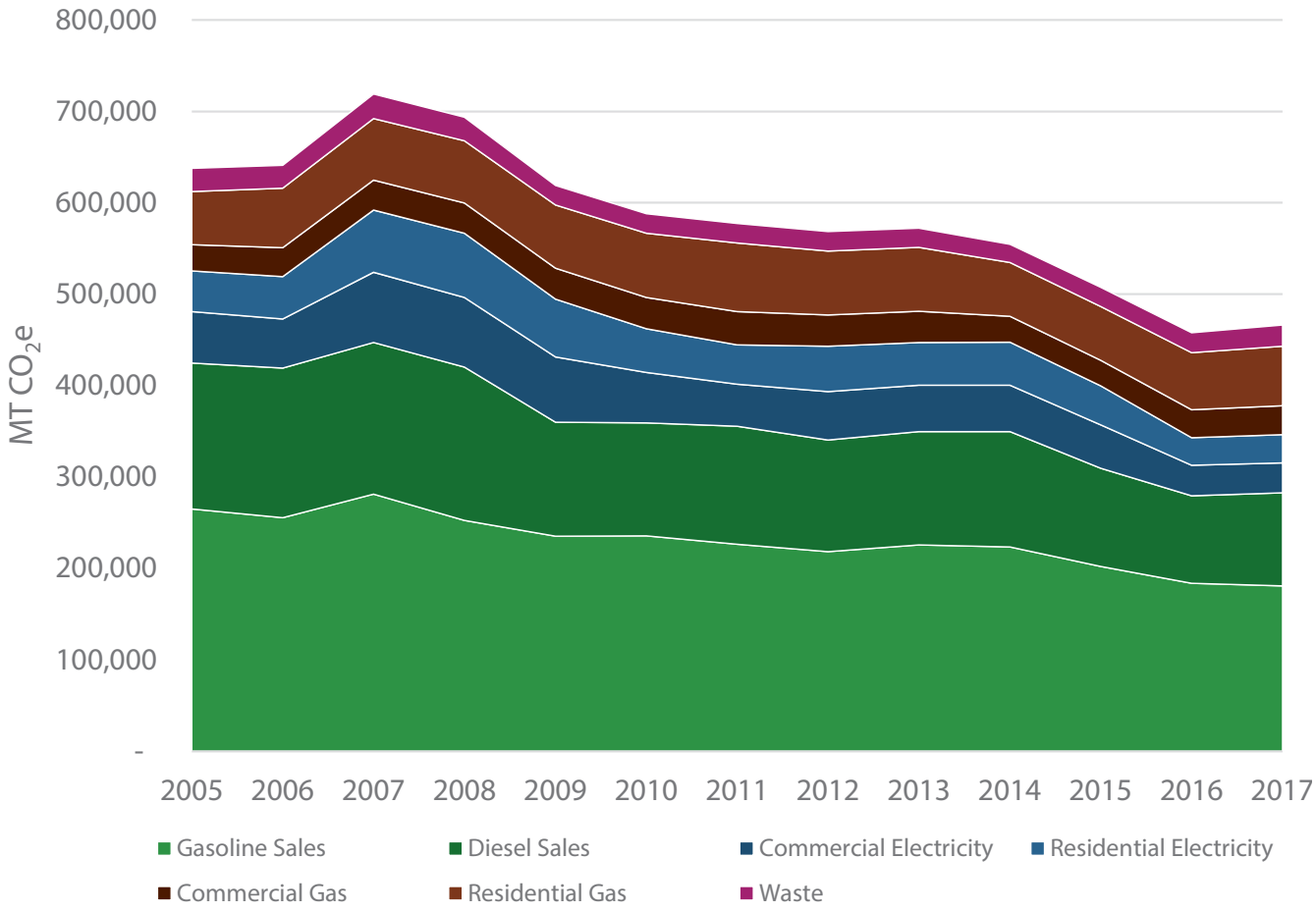
The City of Chico has conducted a GHG emissions inventory of community-wide GHG emissions for each year between 2005 and 2017. The 2017 inventory was used for this CAP as the most up-to-date picture of GHG emissions in Chico.

Chico's annual inventories include emissions from gasoline and diesel sales, electricity and natural gas usage in homes, offices, and other residential and commercial buildings, and waste sent to the landfill from all residential and commercial properties. Typically, water and wastewater are included in community inventories, but these sources of GHG emissions were captured by the electricity sector. See Appendix B for more information about the data used and how GHG emissions were calculated for Chico's 2017 inventory.

GHG EMISSIONS OVER TIME

The results of the GHG emissions inventories completed for 2005 through 2017 show a strong decreasing trend in Chico's emissions over time, as shown in Figure 2-1, primarily as a result of state-level action. In fact, Chico's GHG emissions have decreased 27% overall since 2005, despite a population increase of approximately 27%. With this GHG emissions reduction, Chico has exceeded its goal to reduce its GHG emissions in 2020 by 25%, the equivalent of taking 9,326 passenger vehicles off the road for one year, or preserving 292 acres of U.S. forest from conversion to cropland.

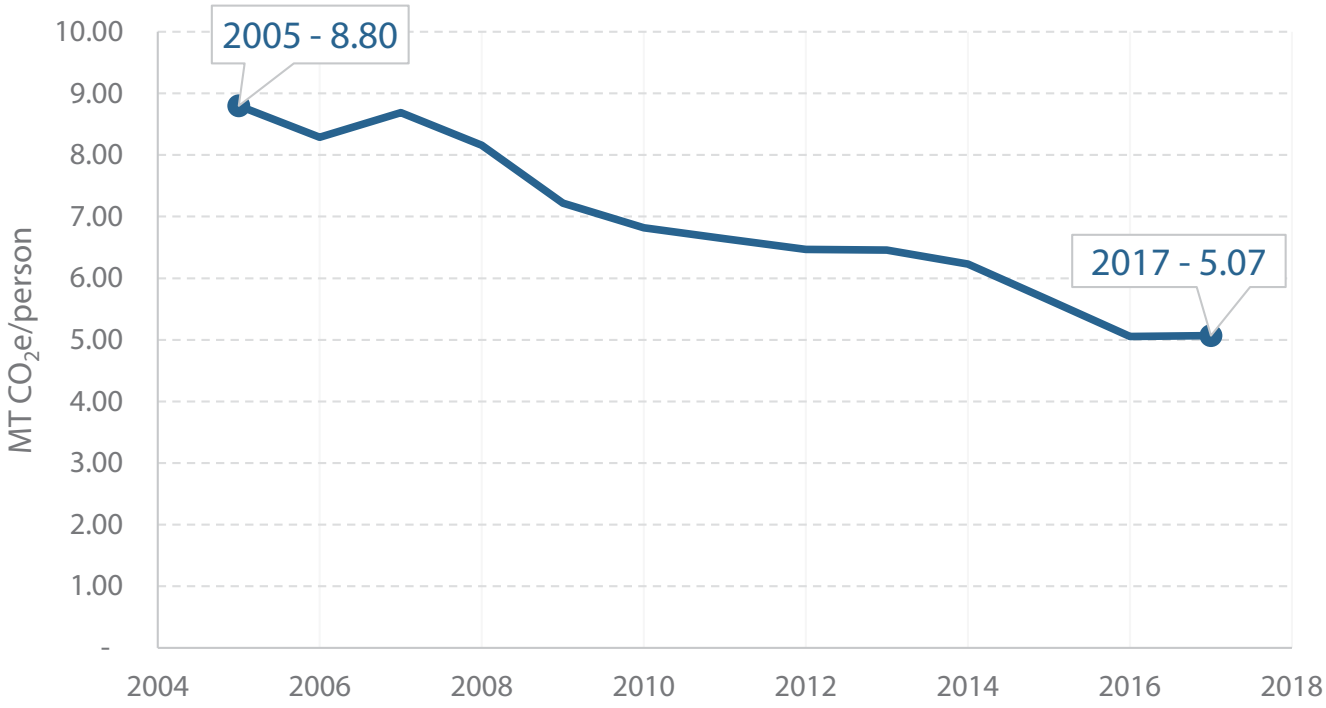
Figure 2-1 History of GHG Emissions in Chico



Looking at total or absolute emissions shows that Chico's emissions have decreased over time. In some cases, a more telling metric can be emissions per person, or per capita emissions.

Per capita emissions divide a city's total annual emissions by a city's population in that year. Over time, as emissions decreased and population increased in Chico, this resulted in an even greater decrease in per capita emissions. In fact, per capita emissions have decreased 42% between 2005 and 2017 – an even larger percent decrease than absolute emissions (Figure 2-2). This larger per capita decrease was driven primarily by decreases in gasoline and diesel sales, and reductions in the carbon intensity of electricity (driven by the state).

Figure 2-2 Chico's Per Capita GHG Emissions

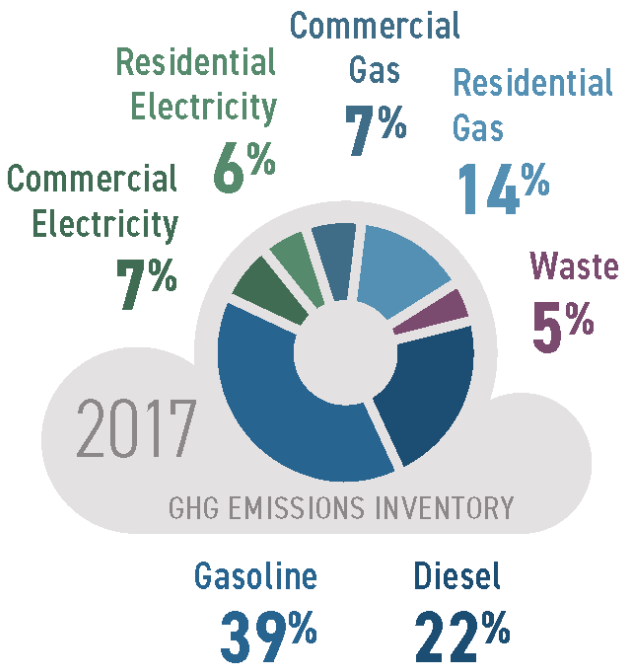


Since 2005, emissions in Chico have decreased 27% overall and 42% per person, despite a large population increase.

CURRENT GHG EMISSIONS IN CHICO – 2017 INVENTORY RESULTS

While Chico has done a good job reducing its GHG emissions overall, gasoline and diesel sales for passenger and commercial vehicles were still the largest contributors to Chico's GHG emissions in 2017, followed by natural gas usage by commercial and residential buildings, electricity by commercial and residential buildings, and waste sent to the landfill (Figure 2-3).

Figure 2-3 Chico's 2017 GHG Emissions



Total emissions in Chico in 2017 were 466,366 MT CO_2e, equivalent to 5.07 MT CO_2e per person (Table 2-1). The 2017 inventory is the most up-to-date reference point for Chico's GHG emissions, and is considered the baseline for the GHG emissions analysis in this CAP. See Appendix B for a full accounting of the data and methods used for Chico's inventory.

Table 2-1 Chico's 2017 GHG Emissions

Emissions Sector	2017 GHG Emissions (MT CO_2e)
Residential Electricity	30,757
Commercial Electricity	32,658
Residential Natural Gas	64,769
Commercial Natural Gas	31,926
Gasoline	181,031
Diesel	101,854
Landfilled Waste	23,372
Total Emissions	466,366
Emissions per person	5.07

GHG EMISSIONS FORECAST – FUTURE EMISSIONS IN CHICO

Using the 2017 inventory, the City developed a GHG emissions forecast. The forecast provides an estimate for how Chico's GHG emissions will look in the future, based primarily on projected population and job growth in the City.[16] This allows the City to see where it is headed, and how much it needs to reduce emissions in order to meet the GHG emissions reduction targets for 2030 and 2045 (Figure 2-5).

In order to clearly demonstrate how Chico's emissions look in the future, two forecasts were developed – a business-as-usual (BAU) and adjusted forecast. The BAU forecast shows what Chico's emissions would look like if population and job growth were the only drivers for GHG-generating activities, essentially assuming that per capita emissions remain constant. The adjusted forecast adjusts the BAU forecast to account for state-level legislation and policies that are expected to reduce emissions for all jurisdictions in California.

The state legislation and policies included in the adjusted forecast are the Advanced Clean Cars Program, Title 24 Building Energy Efficiency Standards, and California Renewable Portfolio Standard (RPS).[17] The Advanced Clean Cars Program is a comprehensive car emissions control program which regulates smog, soot causing pollutants, and GHG emissions into a single coordinated package of requirements for passenger cars and light trucks model years 2017 through 2025 to reduce California's GHG emissions by 34 percent in 2025.[18] Title 24 Building Energy Efficiency Standards regulate new residential and commercial development in California by requiring increased efficiency related to space heating and cooling, lighting, and water heating. The California RPS program requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from renewable energy resources. For example, electricity service providers must procure electricity from 50% renewable resources by 2026, 60% by 2030, and 100% by 2045, leading to significant statewide decreases in electricity emissions. See Appendix B for more information on these programs and policies.

16 *Job and population growth were provided by Butte County Association of Governments (BCAG)*

17 *California's Short Lived Climate Pollutant Reduction Strategy (SB 1383), which requires jurisdictions to reduce organic waste sent to the landfill 75% below 2014 levels by 2025 was not included in the adjusted forecast because this strategy will be implemented at the jurisdictional level. However, programs 1383 was the driver for Chico's strategy for reducing waste emissions in this CAP, and was therefore included as an expected reduction in Chico's emissions resulting from the CAP (see Chapter 5).*

18 *https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/about*

The adjusted forecast is considered a more realistic picture of Chico's future emissions. The BAU and adjusted forecasts can be compared to show the extent to which state-level policies and programs will help to reduce GHG emissions in Chico (Figure 2-4 and Table 2-2).

Figure 2-4 Chico's BAU and Adjusted GHG Emissions Forecast

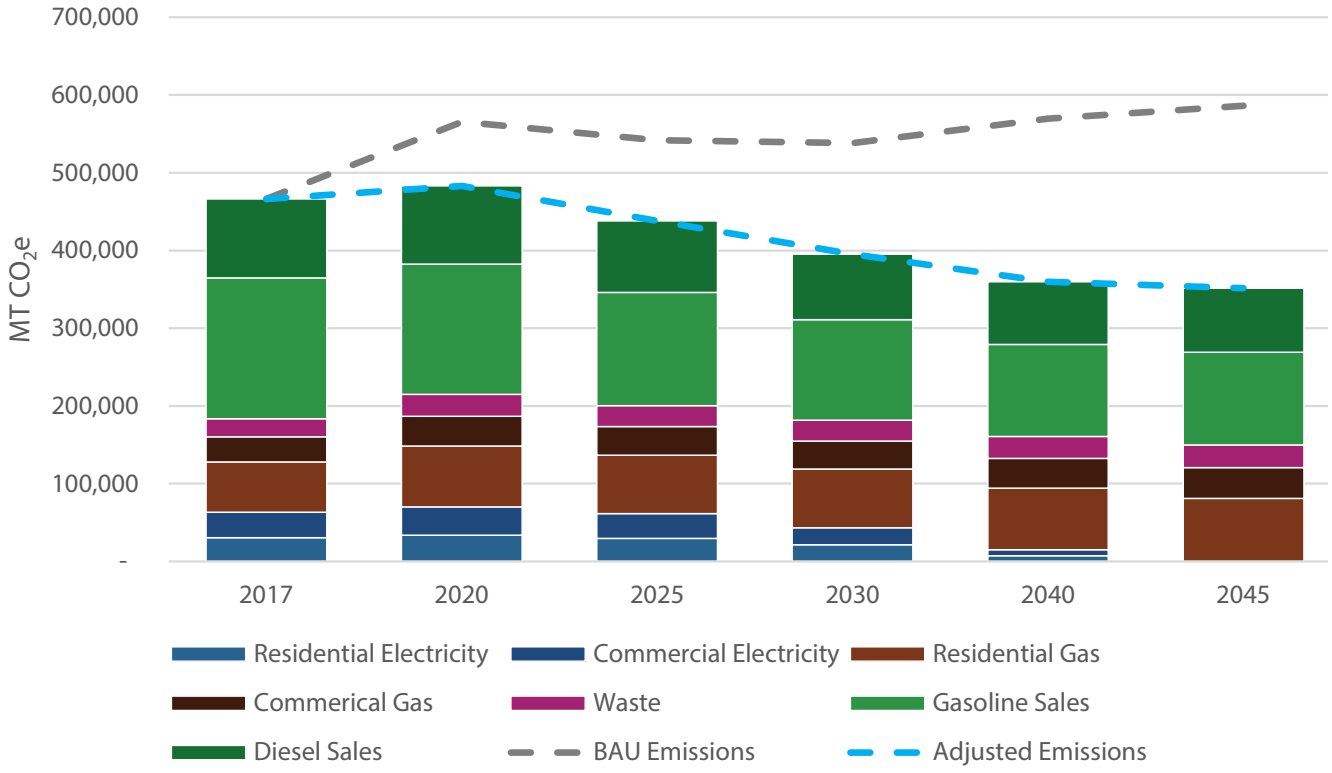


Table 2-2 Chico's BAU and Adjusted Emissions Forecast

	2017	2025	2030	2045
Population	92,022	107,593	107,712	116,420
Jobs	32,429	37,124	36,251	40,162
BAU Emissions (MT CO_2e)	466,366	541,754	538,282	586,167
Advanced Clean Cars Program Savings (MT CO_2e)	0	-91,496	-113,662	-154,322
Title 24 Savings (MT CO_2e)	0	-1,579	-1,282	-4,705
California RPS Savings (MT CO_2e)	0	-10,717	-28,021	-75,628
Adjusted Emissions (MT CO_2e)	466,366	437,961	395,317	351,512
Adjusted Per Capita Emissions (MT CO_2e/person)	5.07	4.07	3.67	3.02

POPULATION GROWTH IN THE WAKE OF THE CAMP FIRE

The Butte County Association of Governments (BCAG) estimates that Chico's population grew 20.7% as a result of the climate migration spurred by the 2018 Camp Fire. This is reflected in Chico's GHG emissions forecast, as the large bump from 2017 to 2020. As displaced people gradually move away from Chico, the population is expected to decline through 2030, then grow normally from 2040 through 2045. These trends are also visible in the forecast. **Lessons from the Camp Fire highlight the need for energy and transportation infrastructure, waste services, and development patterns that are resilient to future climate change impacts.**


CITY OF CHICO
INC. 1872

3. GHG EMISSIONS TARGETS

CLIMATE ACTION AT THE STATE LEVEL

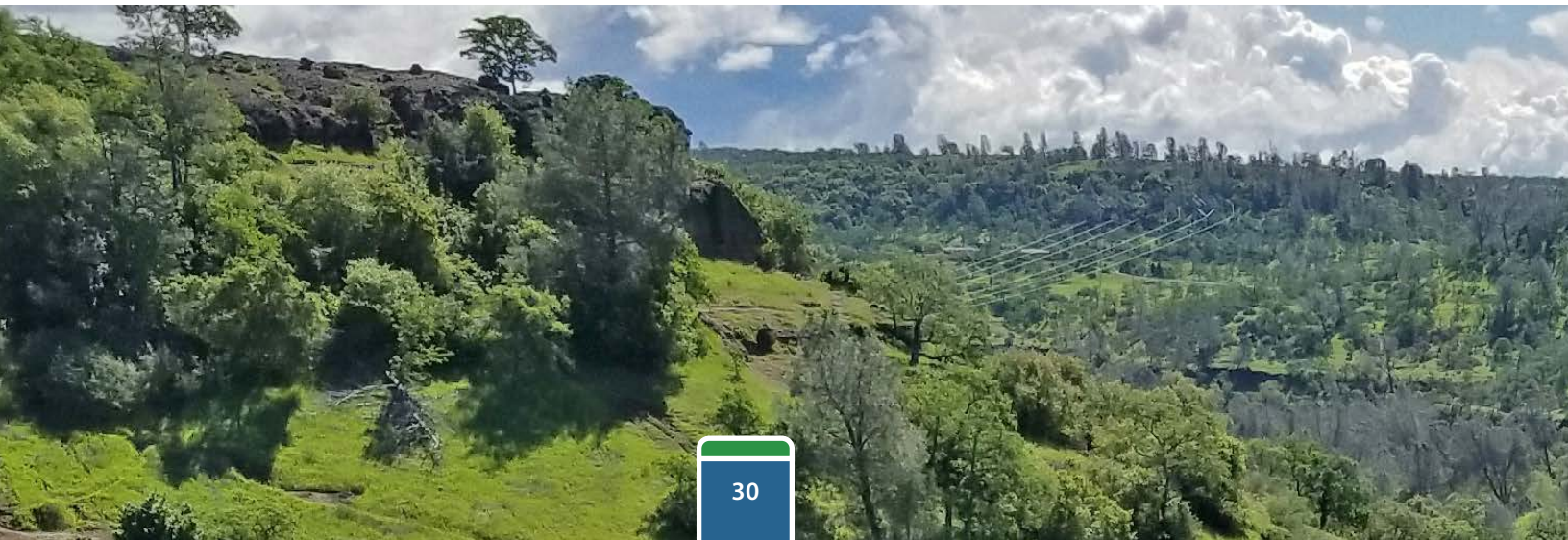
California is a global leader in climate change action, having established extensive legislation, policies, and programs to reduce GHG emissions within the state over the last ten years. The primary drivers of climate action at the state level are Assembly Bill (AB) 32, Senate Bill (SB) 32, and Executive Order (EO) B-55-18. These regulations chart a path towards a carbon neutral California by 2045, as explained below.

Assembly Bill 32 – Codified the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires the California Air Resources Board (CARB) to prepare a Scoping Plan that outlines the main strategies the state will employ to meet the 2020 target. The AB 32 Scoping Plan was adopted in 2014 and California met this target in 2016.

Senate Bill 32 – The successor to AB 32 which requires California to achieve a statewide reduction in GHG emissions of 40% below 1990 levels by 2030. The SB 32 Scoping Plan was adopted in 2017.

Executive Order B-55-18 – Established a new statewide goal of achieving and maintaining carbon neutrality as soon as possible, and no later than 2045. Executive orders have not been codified by the state but are binding for state agencies and must therefore be addressed by qualified GHG reduction plans.

Programs and policies that support the goals established in the above bills include Title 24 Energy Efficiency Standards, which increase energy efficiency in new development, the Advanced Clean Cars Program, which improves fuel efficiency in new vehicles, and the California Renewable Portfolio Standard (RPS), which, through SB 100, requires electricity providers to procure 100% renewable electricity by 2045. A full list of relevant state-level legislation is included in Appendix C.



CHICO'S GHG EMISSIONS TARGETS

This CAP adopts a GHG emissions target for 2030 – a required part of a CEQA "qualified" CAP – and a long-term GHG emissions goal for 2045. Chico's targets are to reduce mass emissions 45% below 1990 levels by 2030 and to achieve carbon neutrality by 2045. The adopted 2030 target therefore exceeds SB 32 (40% reduction in GHG emissions from 1990 levels by 2030) by 5% while the adopted 2045 goal aligns with EO B-55-18, the state's current long-term GHG reduction goal.

Chico has converted these targets into per capita emissions which take population growth into account and help provide flexibility for the City to grow (or shrink) over time without impacting the City's ability to meet its GHG emissions targets. This methodology aligns with the California Air Resources Board's (CARB) recommendations in the 2017 Climate Change Scoping Plan Update[19] and is especially important for Chico given the recent and potential future population fluxes due to fire and other disasters.

A 2030 GHG reduction target that exceeds SB 32 was chosen to provide additional flexibility to the City and to provide some protection against the uncertainty surrounding GHG reductions. This goal also better prepares Chico to begin the process of achieving carbon neutrality in the long-term by reducing the work required after 2030 and allowing the City to capitalize on cost-effective opportunities available today. The targets adopted by Chico were developed in order to provide consistency with the state's 2030 targets and to provide the City with substantial progress towards meeting the 2045 goal of carbon neutrality (see Table 3-1). The target emissions trajectory in per capita emissions is shown in Figure 3-1, relative to the BAU forecast, adjusted forecast, and 2017 baseline inventory.

19 *https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/scoping_plan_2017.pdf*

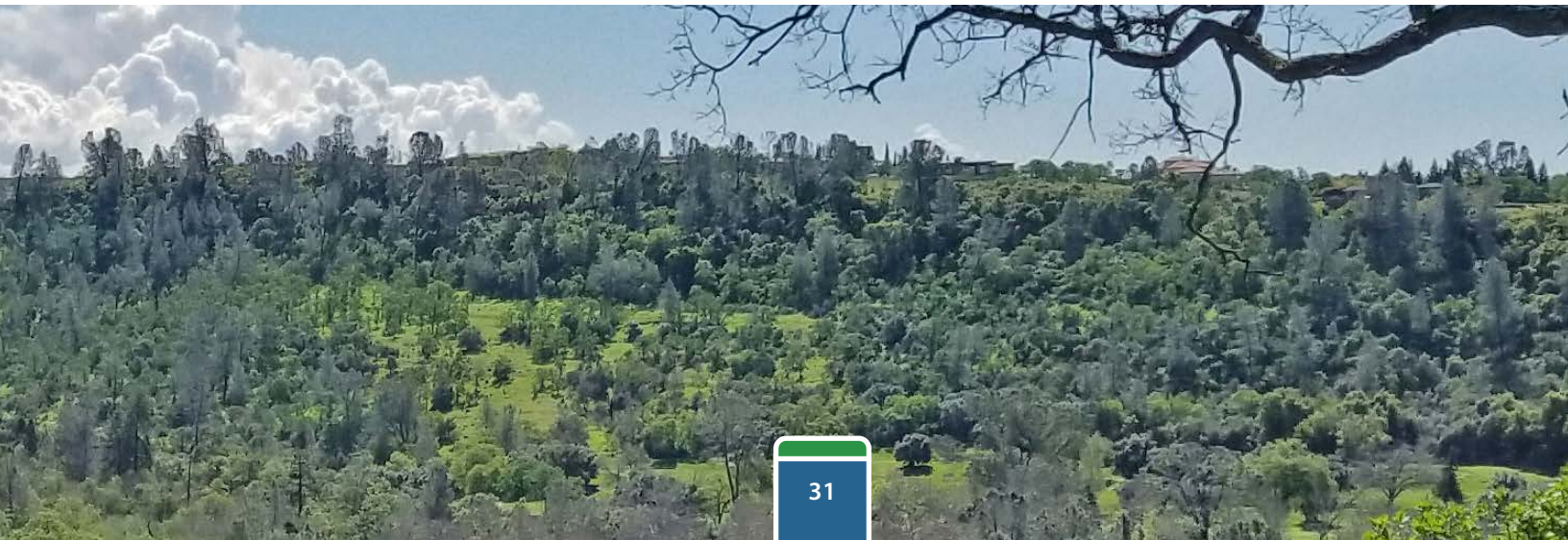
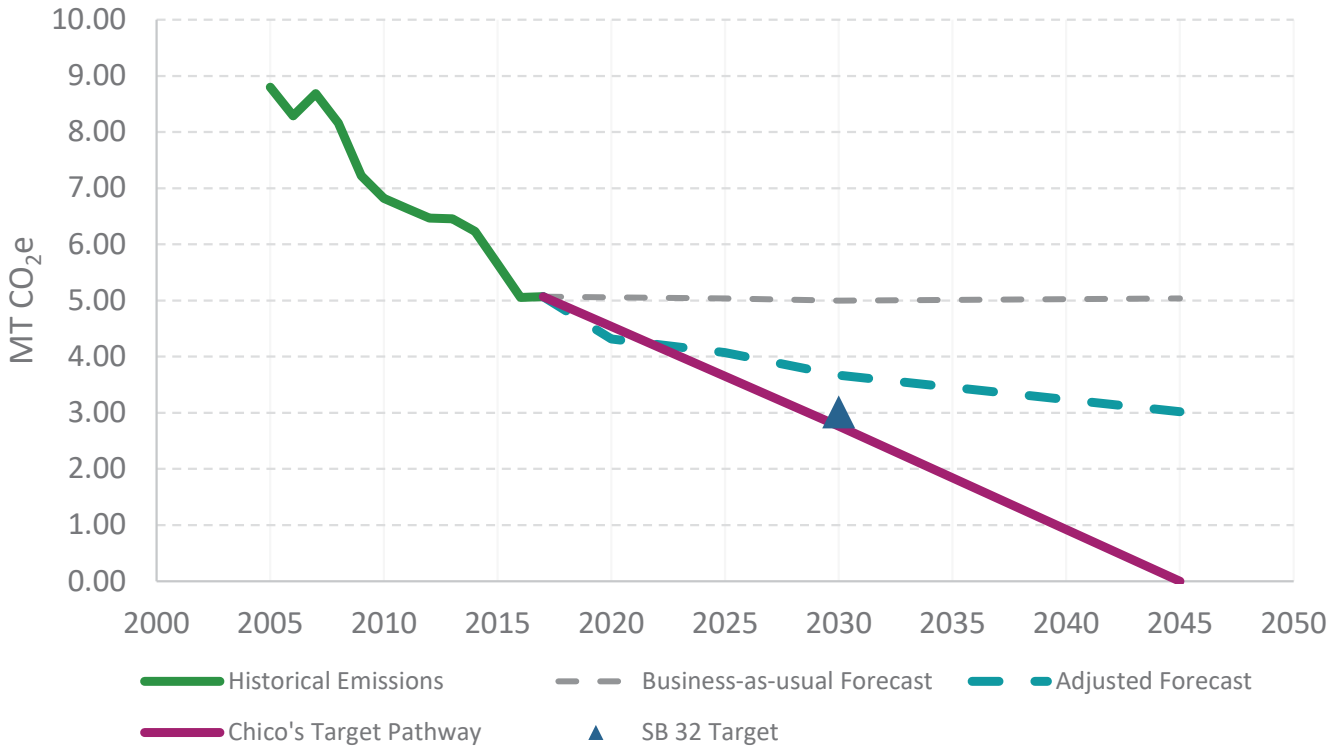


Table 3-1 Chico's GHG Emissions Targets

Target Description		2030	2045
Minimum State Targets	% Reduction from 1990	40%	100%
	Translated to Per Capita Emissions for Chico (MT CO_2e/person)	3.00	0.00
	Translated to Absolute Emissions for Chico (MT CO_2e)	325,135	0
Chico Targets	% Reduction from 1990 (absolute emission)	45%	100%
	Translated to Per Capita Emissions for Chico (MT CO_2e/person)	2.76	0.00
	Translated to Absolute Emissions for Chico (MT CO_2e)	297,386	0

Note: Chico has adopted per capita targets. For reference, the per capita targets have been translated to absolute emissions in units of MT CO_2e, but these values do not represent Chico's official targets. The final absolute emission targets for future years will be calculated once the population numbers are known.

Figure 3-1 GHG Emissions Forecast and Targets



GHG EMISSIONS GAP

As shown in Figure 3-1, a gap remains between the adjusted forecast emissions (blue dashed line) and Chico's target emissions (purple line), even after accounting for reductions that will result from state regulations. This gap represents the emissions to be reduced through adoption of local policies and programs contained in this CAP. **This gap is equal to 0.91 MT CO_2e per person in 2030 and 3.02 MT CO_2e per person in 2045.** In absolute emissions, this is equal to 97,931 MT CO_2e in 2030 and 351,512 MT CO_2e in 2045. The gap will be closed through implementation of the GHG reduction strategies contained in this CAP.

The strategies consist of local actions the City will implement to achieve emissions reductions in a **cost-effective, equitable, and transparent** way. The strategies were developed based on planned efforts and best practices of other similar and neighboring jurisdictions, which were then vetted by City staff, community organizations, local businesses, and individual community members. Chico's GHG reduction strategies and the specific measures and actions that will reduce Chico's emissions are detailed in the following chapters.


CITY OF CHICO
INC. 1872

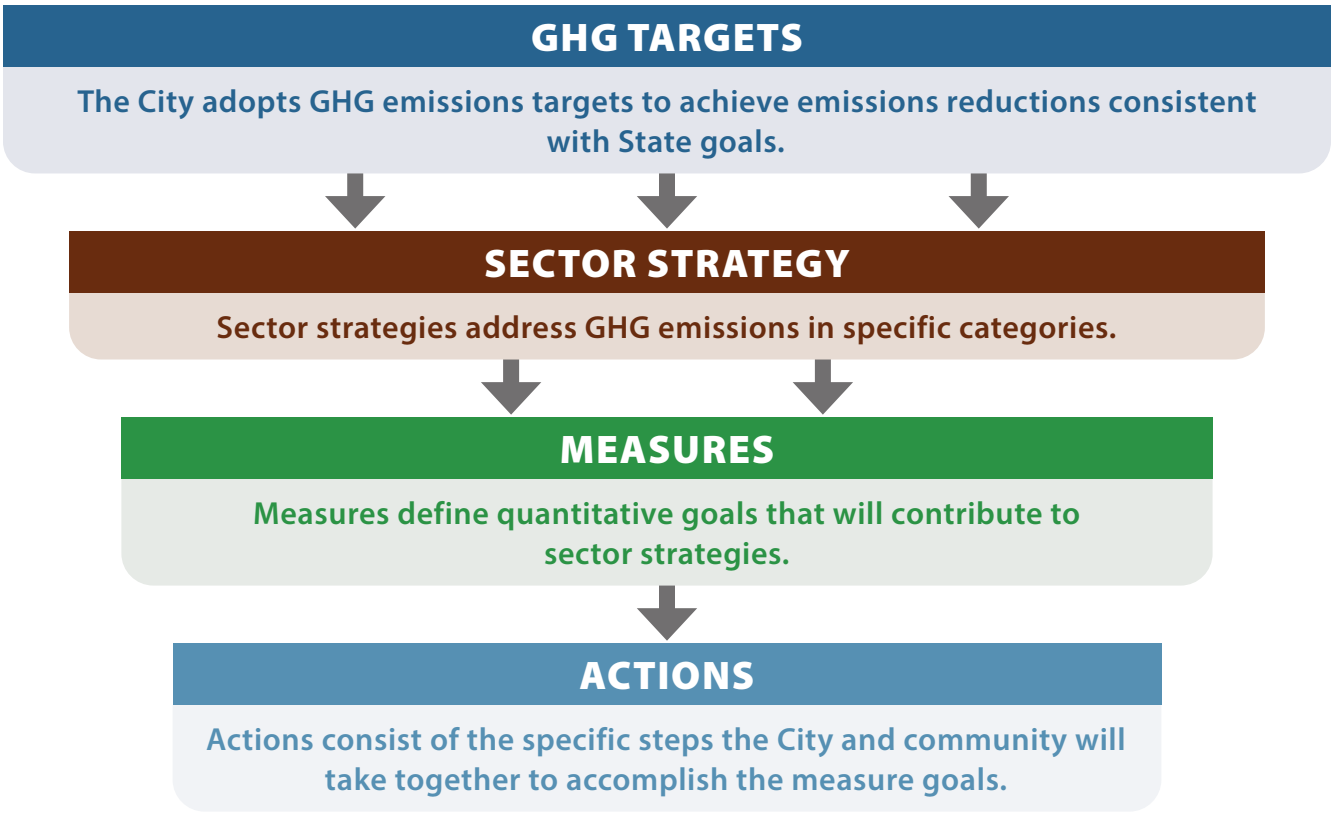
4. GHG REDUCTION FRAMEWORK

HOW THE GHG REDUCTION STRATEGIES ARE ORGANIZED

The City of Chico has worked with community partners, local businesses, and individual community members to identify strategies for reducing GHG emissions in Chico as part of this CAP's development. The strategies are organized in a support structure with three levels, as follows:

1. **Sector Strategies:** The CAP's GHG emissions targets drive focused and cohesive strategies for reductions in each sector. The sectors include Energy, Transportation, Waste, Sequestration, and Outreach and Education.
2. **Measures:** Measures define quantitative goals within each sector that will contribute to the overall sector strategy and result in substantial reductions in GHG emissions.
3. **Actions:** Actions consist of the specific steps the City will take in support of specific measures, which together accomplish the measure goal. Each action concretely identifies the responsible parties and mechanisms required for implementation.

Figure 4-1 GHG Reduction Strategy



KEY PILLARS FOR GHG REDUCTION

The CAP's strategies for reducing GHG emissions are comprehensive and closely tied to the CAP's leading principles, with each sector strategy built to incorporate six key pillars:

1. **Collaboration** with local partners
2. **Socially equitable** approaches
3. **Cost-effective** for the City and community
4. **Accountability** for progress
5. **Education and leadership** within the community
6. **GHG reduction** potential for the City

The measures and actions together ensure that the sector strategies they support meet the criteria of the six key pillars, discussed in more detail below.

1. COLLABORATION – PARTNERING FOR SUPPORT

The City recognizes that effective climate action does not occur in a vacuum and that groups outside of the municipal government may be better positioned to implement specific actions and measures. To successfully implement the CAP, it will take collaboration across City departments, with local non-profits, utility providers, community groups, business associations, local institutions, and the community to achieve the goals of this CAP. The sector strategies incorporate many actions focused on collaborating with the City's extensive list of partners. Collaboration with these groups began before the inception of the CAP, but were expanded through targeted outreach, and will continue to grow as the CAP is implemented. A full list of stakeholders engaged during the CAP update is included in Appendix A but some of the key local partners who will have a role in implementing the Chico CAP include:

- Build.com
- Butte Choice Energy (BCE)
- Butte County
- Butte County Association of Governments (BCAG)
- Butte Environmental Council
- California State University, Chico (CSU Chico)
- Chico Unified School District (CUSD)
- Chamber of Commerce
- Chico Builders Association
- Chico Velo
- Enloe Medical Center
- Fifth Sun
- North State Rendering
- Pacific Gas & Electric (PG&E)
- Recology
- Sierra Nevada Brewing Co.
- Valley Contractors Exchange
- Waste Management

2. SOCIAL EQUITY – PRIORITIZING UNDERSERVED COMMUNITIES

Chico cannot meaningfully implement a CAP without considering the effects of each sector strategy on underserved communities. Successful climate action in Chico requires an equitable distribution of the benefits and impacts associated with each measure to avoid exacerbating existing inequities and placing a cost burden on low-income community members. For this reason, each sector strategy was developed to include equity actions that specifically address how the sector strategies and supporting measures will be implemented to ensure Chico's underserved communities and vulnerable populations equally benefit from this CAP. As the CAP is implemented it will be critical for the City to continue the conversations around equity impacts and adjust based on feedback from the community.

3. COST EFFECTIVENESS – REDUCING THE BURDEN ON INDIVIDUALS AND THE CITY

Implementation of Chico's CAP and its sector strategies will carry costs for the community and costs for the City – although implementation is expected to result in long-term cost savings for the City and community. The City understands that the sector strategies cannot rely on local residents and business owners making changes they can't afford. This understanding was deeply ingrained in the development of the sector strategies. Actions that involve or require community participation were built to be cost-effective, have funding opportunities, and/or have a high return on investment. Local residents and business owners are not expected to face an unavoidable cost burden as a result of implementing the sector strategies.

In order to cover the up-front costs associated with CAP implementation, the CAP includes a comprehensive Climate Action Finance Map (Appendix D) to better facilitate social equity and improve cost effectiveness of the sector strategies. The City recognizes that the limiting factor in climate action is often the high capital cost of implementing changes to infrastructure and has developed the Climate Action Finance Map to highlight funding opportunities and ensure the cost burden is not placed on Chico's taxpayers.

4. ACCOUNTABILITY – HOLDING CHICO ACCOUNTABLE TO ITS GOALS

The City developed the CAP's sector strategies to hold the City accountable to its goals and targets. To help keep the City on track for implementation, actions are included to help keep Chico accountable to its GHG reduction targets. This CAP also includes an Implementation and Monitoring Plan (Chapter 8), which directs the implementation and monitoring of the CAP's measures and actions relative to the GHG reduction targets.

5. EDUCATION AND LEADERSHIP – PAVING THE WAY FOR IMPACTS

The City understands that implementation of the CAP will lead to change and many of these changes will require the adoption of new technologies and behaviors. This change is unlikely to occur without conversations between the City, key stakeholders, and the community through establishing partnerships and conducting community education and outreach. While the community stands to benefit from these changes, the City will need to learn how to better implement them and remove hurdles to adoption. Throughout the CAP's implementation, the City will provide the leadership and resources necessary for individuals and business owners in the community to be a part of this effort.

6. GHG REDUCTION POTENTIAL – REDUCING GHG'S IN CHICO

To contribute Chico's fair share towards the State's GHG reduction goals and meet the requirements of a qualified GHG reduction plan, the CAP must demonstrate that its implementation will lead to quantitative GHG reductions. The sector strategies were developed based on substantial evidence that the measures and actions would result in quantified GHG reductions through 2030 and 2045. The GHG reductions expected from each measure and action are shown in the next section, and an in-depth analysis of the substantial evidence for these reductions is provided in Appendix E.

CO-BENEFITS OF THE GHG REDUCTION STRATEGIES

In addition to GHG emissions reductions, the sector strategies will produce many co-benefits. Co-benefits refer to the positive effects that a climate action policy will have on other community objectives. For example, incentives for all-electric equipment can lower energy costs for residents and improve local air quality, in addition to reducing GHG emissions in the community. The co-benefits associated with the CAP's actions include:

IMPROVED PUBLIC HEALTH: The sector strategies will help ensure cleaner air and more active and livable neighborhoods. In particular, the energy and transportation sector strategies include long-term plans for significantly reducing fossil fuel usage in the community, especially natural gas. Natural gas is responsible for increased levels of nitrogen oxide emissions in homes and other buildings – several times higher than outdoor air quality standards – and is disproportionately linked with respiratory illness, including asthma.[20] Natural gas is also getting more expensive. Without a transition plan, the bill for running a gas furnace could increase 500% by 2050, due to increasing natural gas infrastructure costs coupled with a naturally declining demand for gas as appliances become more energy efficient.[21]

RESILIENCE: Actions that address climate change can bolster the ability of local residents and businesses to recover quickly from or reduce the impact of other hazards such as extreme heat days or localized flooding. For example, planting trees for carbon sequestration and increasing tree canopy cover can help keep streets and neighborhoods cooler – covering 40% of a city street can counteract the warming effects from asphalt.[22] Climate actions can also enhance community cohesion—the networks of formal and informal relationships among neighbors that foster a mutually supporting human environment.[23,24]

HEALTHIER ECOSYSTEMS: Actions to mitigate and adapt to climate change supports more healthy and functional ecosystems. Healthier ecosystems provide a variety of public benefits including reducing pollutants in local creeks, providing species habitat, improving air and water quality, reducing flood risk, and providing areas for human recreation and respite.

---

20 *https://www.nationalasthma.org.au/living-with-asthma/resources/patients-carers/factsheets/gas-stoves-and-asthma-in-children#:~:text=How%20does%20gas%20combustion%20lead,and%20may%20worsen%20asthma%20symptoms*

21 *https://gridworks.org/initiatives/cagas-system-transition/*

22 *https://www.popsci.com/shade-city-streets-trees-cooling/*

23 *https://depts.washington.edu/hhwb/Thm_Community.html*

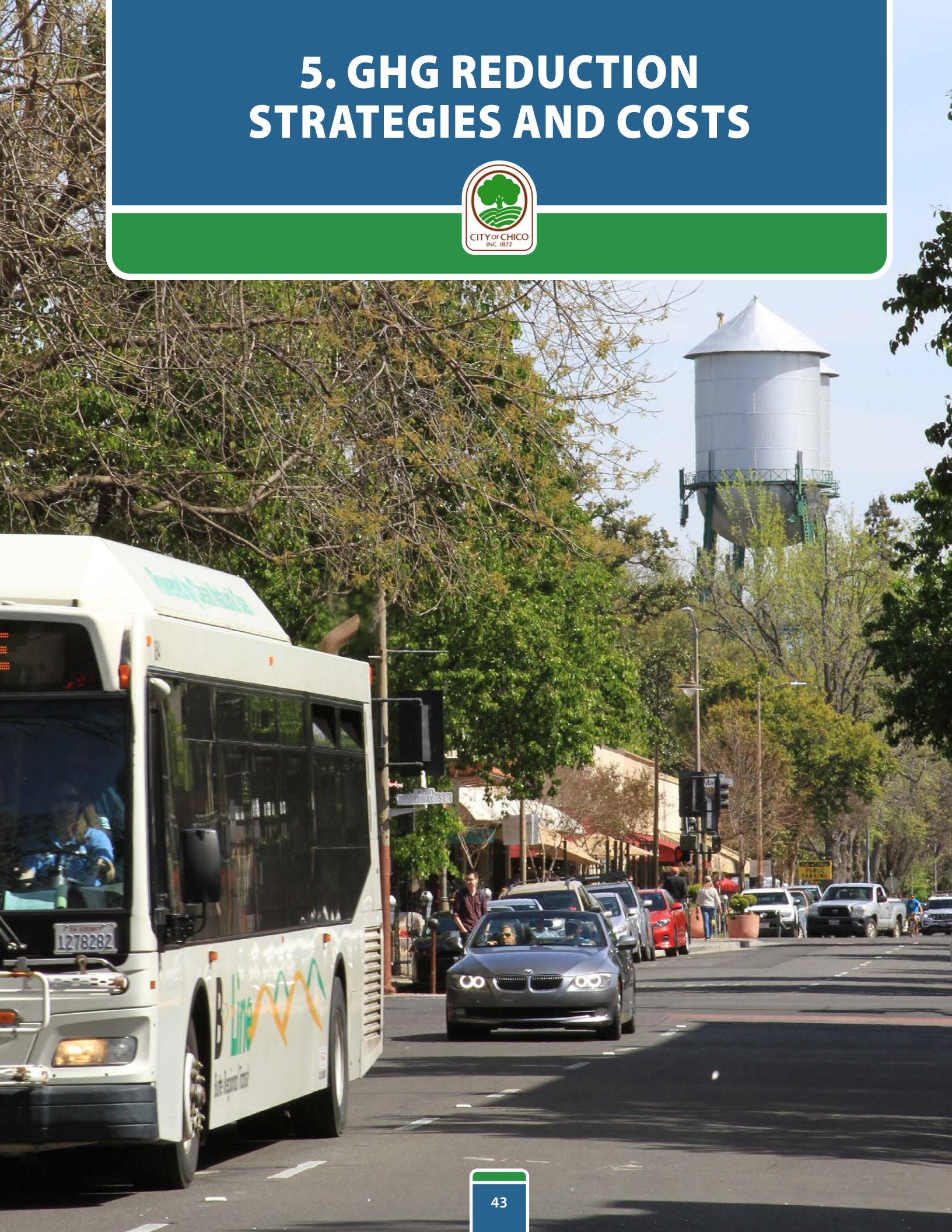
24 *https://www.researchgate.net/publication/328539965_Climate_Action_Co-benefits_and_Integrated_Community_Planning_Uncovering_the_Synergies_and_Trade-Offs*

REDUCED TRAFFIC CONGESTION AND IMPROVED ROAD SAFETY: With full implementation of the transportation measures included in this plan, there will be an added benefit of reduced traffic congestion. Measures designed to increase biking, walking, bicycle and scooter sharing, and use of public transportation have the goal of taking single-occupancy vehicles off the road and providing Chico residents and visitors expanded options besides using personal vehicles.

STRONGER LOCAL DEVELOPMENT: Another co-benefit of the CAP as a whole is its facilitation of local development. A key concern throughout the CAP development process has been the promotion of thoughtful development in Chico that will support the local economy, provide for infrastructure upgrades, and ensure affordable housing needs are met in alignment with City and State goals. At its core, the CAP provides a clear pathway for new development to align with State climate action requirements and supports local development and investment. The sector strategies are a key component of a CEQA-qualified GHG reduction plan, which will allow new development projects to "tier off" of the CAP, significantly reducing the required CEQA review that new development faces. Many jurisdictions within California recognize the importance of maintaining a CAP for this purpose.


CITY OF CHICO
INC. 1872

5. GHG REDUCTION STRATEGIES AND COSTS



GHG reduction strategies have been developed in five sectors: Energy, Transportation, Waste, Sequestration, and Outreach and Education. An overview of each sector strategy is included below. This section also includes an overview of the community and City costs associated with each measure. Community costs are defined as costs that groups or members of the community would bear if each measure and its supporting actions are fully implemented. City costs are defined as costs that the City will have responsibility for. The CAP's Climate Action Finance Map (Appendix D) provides funding and financing opportunities and case studies to help offset the community costs and mitigate the larger City costs that are identified below. With full implementation of the CAP and the funding and financing pathways from the Climate Action Finance Map, both community costs and City costs will be minimized.

ENERGY

The focusing strategy for the energy sector is electrification coupled with carbon-free electricity. All-electric buildings are powered 100% by electricity and when coupled with carbon-free electricity, their operating energy footprint become carbon-free.

MEASURE E-1: Procure carbon-free electricity for the community through a CCA by 2024 and maintain opt-out rates of 5% for residential and 15% for commercial through 2030 and 2045

The California Renewable Portfolio Standard requires all retail electricity providers in California to provide carbon neutral electricity by 2045. Procuring community-wide carbon-free electricity through a Community Choice Aggregation (CCA) will expedite that timeline and offer significant GHG reductions in the short term with minimal increases to community electricity bills.[25]

- **COMMUNITY COSTS:** This measure will automatically enroll all community accounts into the CCA's 100% renewable/carbon free electricity option starting in 2024, which will be offered by Butte Choice Energy[26] at a slight price premium. Community members will individually have the opportunity to opt-out or opt-down from the 100% renewable/carbon free option in the event these cost increases are not feasible.
- **CITY COSTS:** The City will incur administrative costs for coordination with BCE and outreach.

25 *While Butte Choice Energy has not yet established rates, many CCA's provide a carbon free energy option that is comparable to PG&E rates and a 100% renewable option that costs approximately 1 cent per kWh more. This results in a 4-5 dollar per month cost increase. https://www.pge.com/pge_global/common/pdfs/customer-service/other-services/alternative-energy-providers/community-choice-aggregation/ebce_rateclasscomparison.pdf*

26 *https://www.buttechoiceenergy.org/*

MEASURE E-2: Eliminate natural gas in all new building construction starting in 2025 to reduce natural gas 6% by 2030 and 16% by 2045 compared to the adjusted forecast

New construction built without natural gas is less expensive[27] for most building types and will result in carbon free buildings by 2045 at the latest[28]. Retrofitting existing buildings that rely on natural gas to be all-electric is a substantial task. To ensure new buildings won't need to be retrofitted later, Measure E-2 will require new buildings and major retrofits to be all-electric through an electrification ordinance starting in 2025 (unless the 2025 California Building Code Update includes all-electric requirements for new buildings). An electrification ordinance will not be implemented until 2025, if necessary, in order to give the community time to better understand and prepare for the new development requirements.

- **COMMUNITY COSTS:** This measure will affect costs for local developers for new construction. Building all-electric has been shown to be cost-effective for developers and building owners for all building types in the City of Chico, when combined with additional solar photovoltaics.[29] This measure will not affect existing buildings and is not expected to increase costs to residents. The ordinance is expected to reduce utility bill costs for residents in new all-electric buildings as well as community wide due to decreased natural gas infrastructure deployment.
- **CITY COSTS:** City costs associated with this measure will generally include administrative staff and consultant time for development of an ordinance and outreach to the community.

27 *https://explorer.localenergycodes.com/chico-city/forecast/11-PGE/studies/1,2,3*

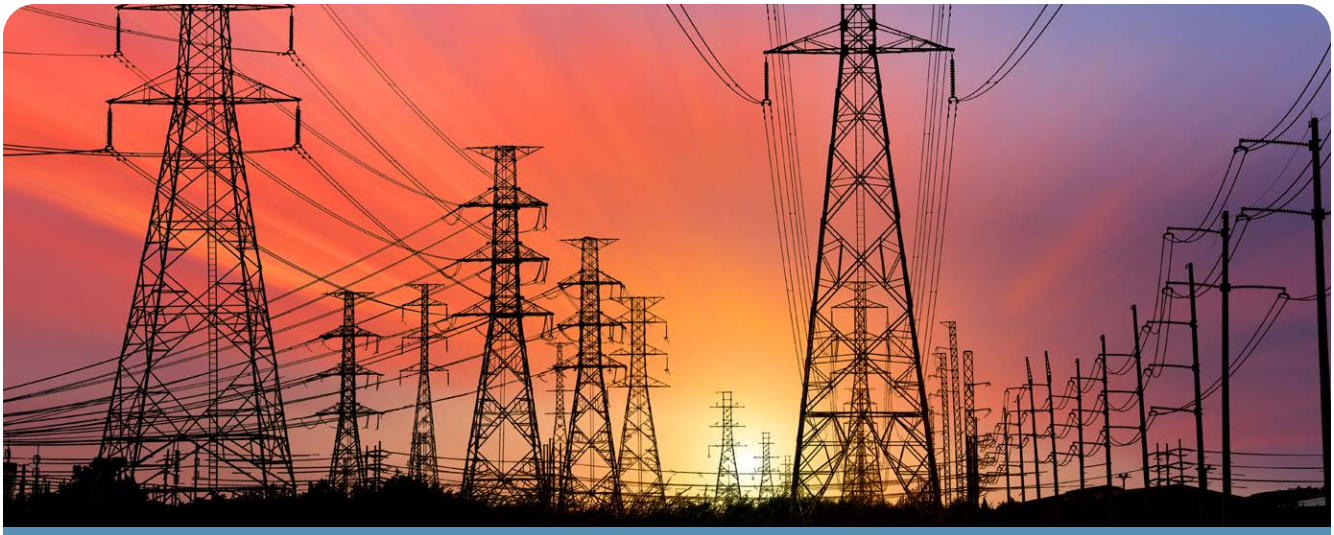
28 *SB100 will provide 100% carbon free electricity by 2045. The City of Chico will also join a CCA which will be able to provide carbon free electricity as early as 2025.*

29 *https://explorer.localenergycodes.com/chico-city/forecast/11-PGE/studies/1,2,3*

MEASURE E-3: Electrify existing residential buildings starting in 2027 to reduce overall residential natural gas consumption to 100 therms/person by 2030 and 30 therms/person by 2045

Retrofitting existing buildings to be all-electric requires up-front investments that many community members may not be able to afford. While existing building electrification is likely to have long-term payback, additional resources are needed before any mandatory electrification measures for existing buildings is put in place. Measure E-3 will provide a framework of updated policies, incentives, consumer financing options, and outreach to drive the electrification of existing buildings in a cost-effective and equitable way.

- **COMMUNITY COSTS:** Starting in 2027, the Chico community will be expected to replace broken or non-working HVAC and hot water heaters with all-electric models. In general, all-electric models are more expensive than natural-gas fueled counterparts upfront but provide long-term on-bill savings. A detailed discussion of these costs can be found in Chapter 7. The Climate Action Finance Map identifies multiple pathways to offset these costs through local utility partnerships, on-bill financing, and other methods and would be expanded by an existing building electrification study prior to implementation of any new requirements. A significant outreach and education effort will also accompany this measure to adequately prepare and educate the community for these changes.
- **CITY COSTS:** This measure will require the City to invest in all-electric infrastructure for existing municipal buildings. In instances where this is not cost-effective, the costs could potentially be offset through grant-based or finance-based pathways identified in the Climate Action Finance Map so that these costs do not ultimately fall on the Chico taxpayer. This measure is also associated with administrative costs for updating the local building code, tracking electrification progress, and working with partners to conduct outreach and develop incentives.



ELECTRIFICATION AND GRID RELIABILITY

Outreach efforts for the CAP (described in Chapter 1 and detailed in Appendix A) resulted in concern from the community about the potential for electrification measures in the CAP to increase demands on the electrical grid, especially given the potential for service disruptions from public safety power shutoffs (PSPS) multiple times a year. Peak grid demand, and therefore PSPS, usually occurs in the summer on the hottest days when most buildings are running their A/Cs. Building electrification in Chico will focus on electrifying residential and commercial hot water heaters and heat pumps that run on natural gas (stoves and clothes dryers use comparatively insignificant amounts of electricity). Hot water heaters, while used throughout the year, can use electricity during off-peak times by heating water and storing it for use at a later time, avoiding significant contribution to peak demand in the summer. Since heat pumps are primarily used in the winter for space heating, converting to an electric heat pump would similarly avoid contributing to peak demand in the summer. Electrifying a heat pump or other space heating appliance has the added benefit of being highly efficient, and widespread electrification of temperature control appliances would likely reduce electricity demand throughout the year. The electrical grid is therefore well-suited to absorbing increased electrical demands from electrification, which even under full electrification scenarios would not exceed current peak summer electricity demands.[30] PG&E is also fully supportive of building electrification. As explained in a recent letter to the California Energy Commission, PG&E continuously forecasts load in its service territory and implements upgrades to the electrical grid to meet the demand. PG&E fully expects to meet the needs that all-electric buildings will require.[31]

30 https://www.nrdc.org/experts/merrian-borgeson/californias-grid-ready-all-electric-buildings
31 https://efiling.energy.ca.gov/GetDocument.aspx?tn=233630&DocumentContentId=66211

MEASURE E-4: Increase generation and storage of local renewable energy

To increase Chico's energy resilience overall, Measure E-4 will support local energy generation and storage projects that prioritize low-income communities.

- **COMMUNITY COSTS:** Community members may choose to invest in solar PV and/or battery storage. Many financing options are available for these systems, many of which result in a positive cash flow.[32]
- **CITY COSTS:** Under this measure, the City will work with PG&E through the Sustainable Solutions Turnkey Program to support and develop local energy generation and storage projects, which are generally associated with high construction and maintenance costs. However, several large-scale projects are already funded and underway through the Sustainable Solutions Turnkey Program and the Climate Action Finance Map identifies other potential pathways for financially supporting future projects that will not result in a financial burden for the City or its taxpayers. Costs likely to be incurred by the City and its taxpayers will be administrative costs for coordinating with partners, supporting financing avenues, and implementing the measure.

TRANSPORTATION

Transportation is the largest GHG emissions sector in Chico and has historically been the most challenging to address across California. Reducing transportation emissions and becoming a carbon neutral city means reducing the number of miles driven by fossil fuel-powered vehicles. This requires a major shift in the community's relationship to transportation and is greatly dependent on community buy-in to transportation alternatives. The City's transportation strategy consists of a two-pronged approach: providing new infrastructure to shift car travel to active transportation (i.e., biking, walking) and public/shared transit; then increasing electric vehicle supply equipment infrastructure to electrify the remaining car trips to the greatest extent possible. The City cannot achieve higher bike and pedestrian use, transit mode share, or electric vehicle (EV) adoption alone, but it is committed to pursuing the funding, partnerships and infrastructure updates to make these choices more attractive and feasible for the community. While the 2030 targets are achievable without substantial changes to how Chico approaches mobility, achieving the long term goal of carbon neutrality will require substantial changes to how the community moves through the City. Chico has set a **target of 35% reduction in transportation fuels (diesel and gasoline) by 2030** and will accomplish this through the following measures:

32 Positive cash flow means the energy savings are greater than the monthly loan payments.

MEASURE T-1: Improve active transportation infrastructure to achieve greater than 6% bicycle mode share by 2030 and 12% bicycle mode share by 2045

The City will work to provide safe, low stress and convenient biking and pedestrian infrastructure and prioritize active transportation. Infrastructure needs include bikeways, sidewalk improvements, and expansions of both kinds of infrastructure to all areas of the City. The primary action the City will take under this measure is to implement the Chico Bicycle Master Plan,[33] which identifies a suite of road improvement projects and bike safety innovations, which include safe bike parking infrastructure to reduce bike theft. While the bicycle mode share goals associated with the Bicycle Master Plan are modest - 6% mode share by 2030 and 12% mode share by 2045 - Chico plans to surpass these goals with additional infrastructure development beyond the Bicycle Master Plan. The City is currently working with the bicycle-pedestrian advisory committee to identify additional projects. While these efforts could not be quantified as part of this CAP due to still being in the planning stages and resulting changes to bicycle mode share unknown, the City is committed to achieving higher levels of bicycle mode share on par with the leading bicycle cities in California. The City has therefore established an unquantified goal of achieving 15% bicycle mode share by 2030.

- **COMMUNITY COSTS:** Community costs are anticipated to be low or no cost, and potential cost savings for residents would come from a decreased dependence on driving and better health. Some infrastructure costs could be shared by the community through fees/taxes depending on the funding and financing strategies employed by the City.
- **CITY COSTS:** Construction costs associated with new biking and pedestrian infrastructure is generally high, and can vary widely. Designated bike routes and bike boulevards cost about $10,000/mile. On-street bike lanes, buffered or not, cost about $100,000/mile. Separated, mixed-use paths cost about $1M/mile. Separated bikeways cost about $1.5-3M/mile.[34] As a point of comparison, roads for motor vehicles are many times more expensive to build and maintain. Installing biking infrastructure can save cities considerable amounts of money in road maintenance costs as use of motor vehicle roads drops. In addition to the City's current collection of bicycle infrastructure impact fees for new development and ongoing pursuit of grant opportunities, the Climate Action Finance Map identifies alternative potential pathways for securing the necessary capital to implement these projects.

33 https://www.csuchico.edu/sustainability/_assets/documents/2019-city-of-chico-bike-plan.pdf

34 https://cal.streetsblog.org/2019/08/30/breaking-down-caltrans-cost-estimate-of-the-complete-streets-bill/#:~:text=On%2Dstreet%20bike%20lanes%2C%20buffered,use%20paths%3A%20%241M%2Fmile

MEASURE T-2: Improve EV infrastructure to achieve greater than 23% EV share of car registrations by 2030, and 90% by 2045

While Chico cannot require its residents to buy EVs, Measure T-2 will ensure the supporting EV infrastructure is present in the City to begin to remove present barriers to EV adoption. Chico has set a **goal to add 942 new chargers to Chico by 2030.**

- **COMMUNITY COSTS:** Costs for local developers to include EV infrastructure (including conduit and panel capacity) in new construction are expected to be less than $400-$600 per space, compared to over $2,000 per space when completing a retrofit.[35] Incorporation of EV infrastructure in new development is quickly becoming a requirement under the California Building Code. Costs for installing ready to use EV chargers in existing parking lots can vary widely depending on infrastructure and technology used from between $500 to $7,000 for Level 2 chargers, though a Level 1 charger may be even less expensive.[36] Costs for residents who choose to buy EVs due to increased charging infrastructure in the City are highly dependent on vehicle choice. Many EVs are comparable in cost to gasoline-powered vehicles with lifecycle savings.[37]
- **CITY COSTS:** City costs associated with this measure will include staff and consultant time for development of an ordinance and outreach to the community, if not already required by the California Building Code. City-funded EV chargers are expected to be between $2,000 and $7,000 per charger, assuming Level II chargers are purchased. DC fast chargers can charge significantly more vehicles in less time but can cost up to $55,000. The City could leverage partnerships to install these chargers at low to no cost to the City as shown in the Climate Action Finance Map.

35 *https://fremont.gov/DocumentCenter/View/31450/PEV-Infrastructure-Cost-Effectiveness-Report_Energy-Solutions_July-2016*
36 *http://www.bcag.org/documents/PEV%20Readiness%20Plan/Draft%20Butte%20PEV%20Readiness%20Plan%203-9-18.pdf*
37 *https://www.carboncounter.com/#!/explore*

MEASURE T-3: Improve shared mobility and transit programs and infrastructure

Improving shared mobility and transit programs and infrastructure will help to shift mode share to shared rideables and public transit by making it more convenient and effective. The City will work to identify partnerships with shared rideables companies (e.g., e-bike share) to bring these services to Chico. The City does not have jurisdiction over public transit and must instead work in collaboration with its partners, including BCAG, to expand service lines, increase route speeds, and reduce wait times. While GHG emissions reductions from this measure cannot be quantified at this time, higher public transit adoption rates in the community are paramount to Chico's success in reaching its targets, and the City will continue to investigate opportunities for improvement in this area as the CAP is implemented and monitored, particularly over the next five years.[38]

- **COMMUNITY COSTS:** Community members who elect to shift from personal vehicles to shared transit options are expected to save money.
- **CITY COSTS:** City costs associated with this measure will include staff and consultant time for exploration of partnership opportunities with BCAG, and implementation of associated studies, surveys, and programs.

MEASURE T-4: Implement parking and curb management procedures that support the mode shift goals of the overall transportation strategy

Measure T-4 will help create incentives for biking, walking, or other active transportation modes through improved curbside management procedures including dynamic parking pricing, better defined loading zones, improved use of parking space, and overall sup- port for active transportation and EVs, in line with the City's Downtown Access Plan.[39]

- **COMMUNITY COSTS:** Parking costs in Downtown areas will likely increase during times of high usage and special events, but use of alternative modes of transport provided by improved transportation demand management would be free or low cost.
- **CITY COSTS:** The City will likely incur administrative costs for staff and consultant time to update the municipal and zoning code.

38 *The ongoing impacts of COVID 19 have also made the current and future use of transit less certain. However, the City of Chico remains dedicated to working with its regional partners to improve transit within the City and regionally.*

39 *https://chico.ca.us/sites/main/files/file-attachments/downtown_access_action_plan.pdf?1575399725*

MEASURE T-5: Support implementation of the City's General Plan that promotes sustainable infill development and mixed-use development in new growth areas to reduce vehicle miles traveled (VMT)

Measure T-5 will provide the long-term planning and development framework that will continue to make Chico highly accessible for active transportation and public transit options.

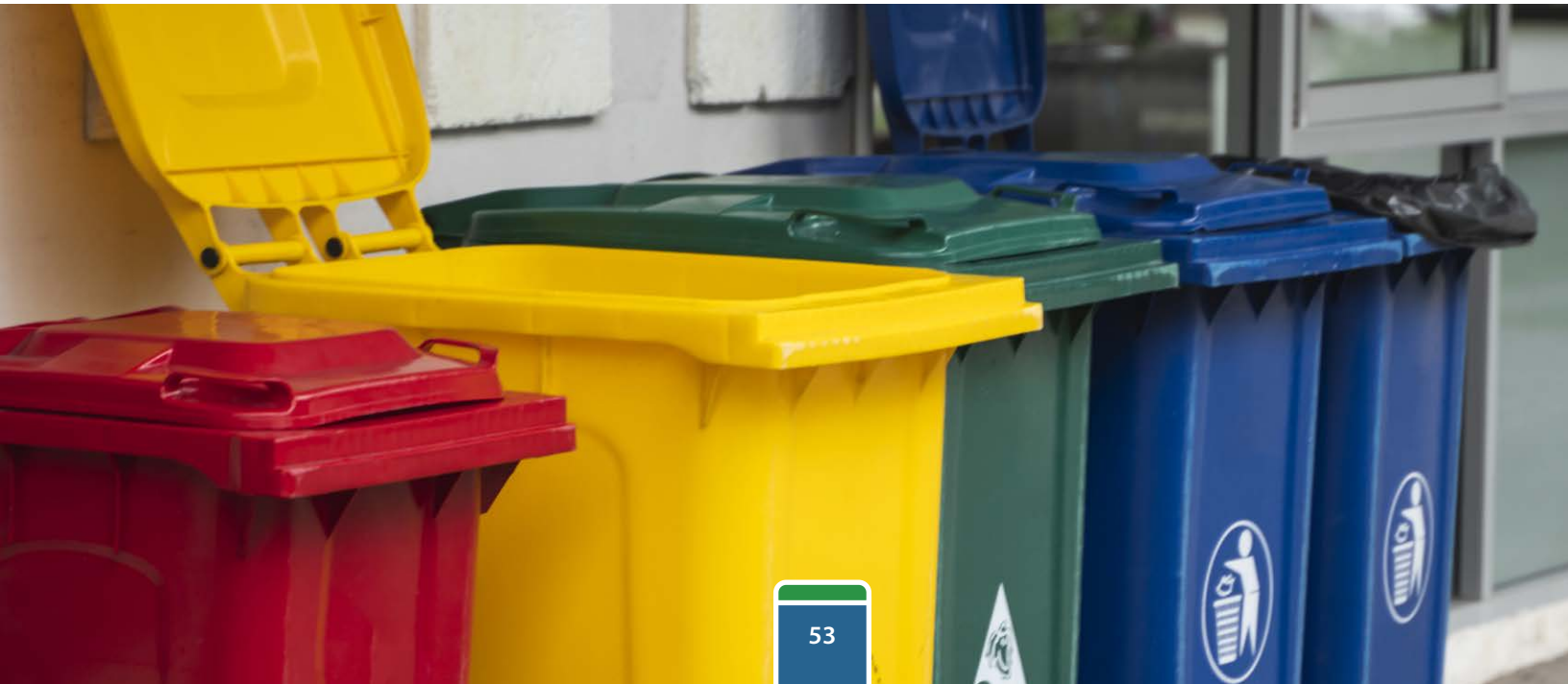
- **COMMUNITY COSTS:** No costs to the community are anticipated.
- **CITY COSTS:** City costs associated with this measure will include staff time for supporting measure integration with community development.

WASTE

Emission reductions in the waste sector are driven by compliance with SB 1383, which requires all jurisdictions in California to reduce organic waste disposal 75% and increase edible food recovery 20% relative to 2014 levels by 2025. The main mechanism through which Chico will comply with SB 1383 is by updating waste hauler franchise agreements and identifying and partnering with appropriate stakeholders to ensure requirements for organic waste reduction and edible food recovery are met.

MEASURE W-1: Update waste hauler franchise agreements to implement requirements of SB 1383 and achieve 75% reduction below 2014 levels in organic waste to 0.4 tons of waste/person by 2025 and maintain through 2045

- **COMMUNITY COSTS:** The community may experience increased waste pickup rates. Calrecycle estimates $17 annual costs per household and $662 annual costs for small businesses in order to meet these State requirements.[40]
- **CITY COSTS:** The City will incur costs associated with staff time to coordinate measure implementation and work with local waste haulers and other partners. Finance options for expanding use of the biodigester at North State Rendering are included in the Climate Action Finance Map.



SEQUESTRATION

A carbon neutral future includes carbon sequestration mechanisms which take carbon out of the atmosphere. The best technology cities have for achieving higher rates of carbon sequestration is through increasing the urban tree canopy by planting more trees and greenscaping. The primary actions under this sector strategy are implementing Chico's Urban Forest Revitalization Program[41], which establishes tree planting goals for the future, and developing and implementing an Urban Forest Master Plan.[42]

MEASURE S-1: Increase carbon sequestration by increasing urban canopy cover at least 10% by 2030 through new greenscaping programs

- **COMMUNITY COSTS:** No costs to the community are anticipated.
- **CITY COSTS:** City costs will include staff time for tree planting ($2 million) and maintenance ($3 million) costs associated with the Urban Forest Revitalization Plan. Capital needs for implementing this measure can be addressed through existing programs and initiatives, as well as pathways identified in the Climate Action Finance Map.

MEASURE S-2: Develop and implement the Urban Forest Master Plan

- **COMMUNITY COSTS:** No costs to the community are anticipated.
- **CITY COSTS:** City costs will include staff time for development of the Urban Forest Master Plan ($140 thousand), tree planting ($2 million) and maintenance ($3 million) costs, currently being paid for with a grant. Capital needs for implementing this measure in the future can be addressed through existing programs and initiatives, as well as pathways identified in the Climate Action Finance Map.

41 *https://www.becnet.org/urbanforest#:~:text=Butte%20Environmental%20Council%20has%20partnered,track%20to%20exceed%20that%20goal*
42 *https://chico.ca.us/post/chico-urban-forest-summit*

OUTREACH AND EDUCATION

A coordinated outreach and education effort is an important part of any CAP to provide the information and context to the community that is necessary for successful CAP implementation. The many partners identified during the CAP development process will be crucial in the over-arching outreach and education efforts included here.

MEASURE O-1: Conduct a holistic community outreach and education program to optimize CAP implementation.

- **COMMUNITY COSTS:** No costs to the community are anticipated.
- **CITY COSTS:** City costs will include staff time and materials associated with measure outreach.

GHG REDUCTION MEASURES SUMMARY

Together, Chico's CAP measures have the potential to reduce GHG emissions to Chico's adopted 2030 target and to make substantial progress towards Chico's 2045 carbon neutrality goal, as shown in Table 5-1. Remaining emissions in 2045 include some natural gas end-uses like stoves and dryers, transportation emissions from remaining fossil fuel-powered cars, and emissions from undiverted waste. GHG emissions reductions from the measures are also demonstrated visually in Figure 5-1, which shows Chico's per capita GHG emissions forecast with the measures incorporated (dark blue line), aligned with or below Chico's target pathway (purple line) through 2030, then diverging above the target pathway after 2030. For more information about how these reductions were calculated, please see Appendix E.

Table 5-1 Chico CAP Measure GHG Reductions Summary

Measure Number	Measure	Estimated Minimum 2030 Reduction * (MT CO2e)	Estimated Minimum 2045 Reduction* (MT CO2e)
Energy			
E-1	Procure carbon-free electricity for the community through a CCA by 2024 and maintain opt-out rates of 5% for residential and 15% for commercial through 2030 and 2045	39,169	0
E-2	Eliminate natural gas in all new building construction starting in 2025 to reduce natural gas 6% by 2030 and 16% by 2045 compared to the adjusted forecast	6,729	19,565
E-3	Electrify existing residential buildings starting in 2027 to reduce overall natural gas consumption to 100 therms/person by 2030 and 30 therms/person by 2045	13,931	51,512
E-4	Increase generation and storage of local renewable energy	Supportive	Supportive
Transportation			
T-1	Improve active transportation infrastructure to achieve greater than 6% bicycle mode share by 2030 and 12% bicycle mode share by 2045	1,531	1,504
T-2	Improve EV infrastructure to achieve greater than 23% EV share of car registrations by 2030, and 90% by 2045	28,616	105,496
T-3	Improve shared mobility and transit programs and infrastructure	Supportive	Supportive

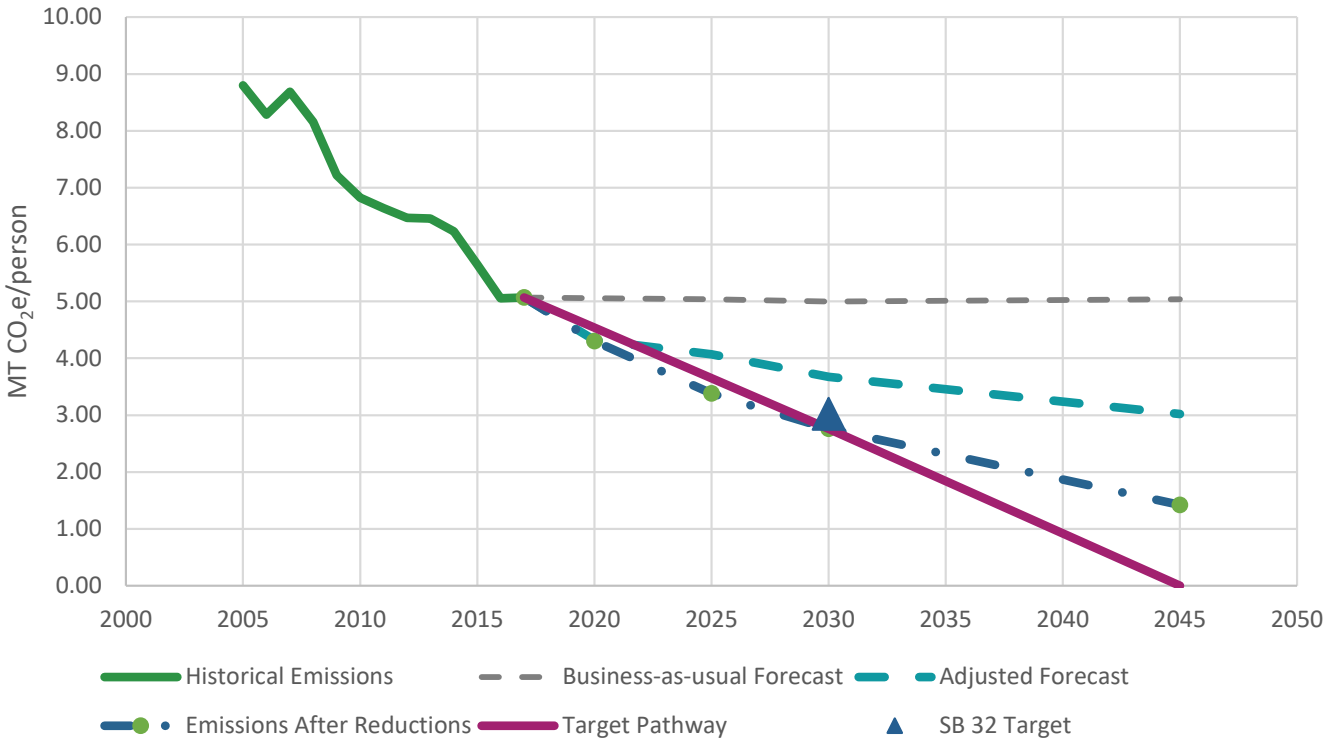
***** *- Relative to the Adjusted Forecast*

Measure Number	Measure	Estimated Minimum 2030 Reduction * (MT CO2e)	Estimated Minimum 2045 Reduction* (MT CO2e)
T-4	Implement parking and curb management procedures that support the mode shift goals of the overall transportation strategy	Supportive	Supportive
T-5	Support implementation of the City's General Plan that promotes sustainable infill development and mixed-use development in new growth areas to reduce vehicle miles traveled (VMT)	Supportive	Supportive
Waste			
W-1	Update waste hauler franchise agreements to implement requirements of SB 1383 and achieve 75% reduction below 2014 levels in organic waste to 0.4 tons of waste/person by 2025 and maintain through 2045	7,693	7,693
Sequestration			
S-1	Increase carbon sequestration by increasing urban canopy cover at least 10% by 2030 through new greenscaping programs	261	261
S-2	Develop and Implement the Urban Forest Master Plan	Supportive	Supportive
Outreach and Education			
O-1	Conduct a holistic community outreach and education program to optimize CAP implementation	Supportive	Supportive
OVERALL REDUCTIONS			
Total Reduction Needed to Meet Target/Goal		97,931	351,512
Estimated Reductions Achieved by Full Implementation of Measures		97,931	186,031
Absolute Emission Reductions from 1990 (%) [1]		-45%	-69%
Per Capita Emission Reductions from 1990 (%)		-80%	-90%
Gap to Target/Goal		0	165,482

1. Absolute emissions reduction values are estimated based on current population projections and are for reference. Actual progress toward the 2030 target will be determined by comparison to the per capita GHG emissions target of 2.7 MT of CO_2e per person pursuant to the 2017 Scoping Plan Guidelines.

***** *- Relative to the Adjusted Forecast*

Figure 5-1 Chico's Per Capita GHG Emissions After Reductions



6. GHG REDUCTION MEASURES AND ACTIONS

MEASURES AND ACTIONS

This chapter provides a detailed actions table including all the actions that support each measure, with detail on the key pillars supported, co-benefits, and GHG reductions expected from each action. The Climate Action Finance Plan shows funding and financing pathways for measures and actions associated with higher capital costs. Please see Chapters 5 and 7 for a detailed discussion of City and community costs, as well as Appendix D for the Climate Action Finance Plan.

ENERGY

MEASURE E-1

Procure Carbon-Free Electricity for the Community Through a CCA by 2024 and Maintain Opt-Out Rates of 5% for Residential and 15% for Commercial Through 2030 and 2045

Action E-1-1 Provide carbon neutral electricity to the community

Procure carbon neutral electricity for the community through Butte Choice Energy Community Choice Aggregation (CCA),[37] in accordance with the ordinance authorizing the implementation of a CCA Program through a Joint Powers Agreement with Butte County, amending Title 15 of the Municipal Code. Automatically enroll community and municipal accounts in the 100% renewable energy option by 2024 (or as market conditions prove favorable) with an opt-out option.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ Cost-effective	2030: 39,170 2045: 0	2024 (Preparation in progress)	■ Planning Division ■ Butte Choice Energy ■ Public Works O&M

37 *https://www.buttechoiceenergy.org/*

Action E-1-2 Partner with Butte Choice Energy to conduct community outreach and track opt-out rates

Work with Butte Choice Energy to conduct targeted community outreach with the aim of maintaining low opt-out rates (5% or less for residential accounts and 15% or less for commercial accounts). Track opt-out rates through Butte Choice Energy and share results publicly on an annual basis.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Accountability ■ Education and leadership	Supportive	2024	■ Planning Division ■ Butte Choice Energy ■ Public Works O&M

MEASURE E-2
Eliminate Natural Gas in All New Building Construction Starting in 2025 to Reduce Natural Gas 6% by 2030 and 16% by 2045 Compared to the Adjusted Forecast

Action E-2-1 Require new construction to be all-electric

Adopt a new ordinance which bans the installation of natural gas in new residential and commercial construction by 2025 if not already required by the State's 2025 cycle update to the Building Energy Efficiency Standards (California Code of Regulations Title 24, Parts 6 and 11). The ordinance will only apply for building types where electrification is shown to be cost-effective. Implementation will consist of the following:

1. Engage and educate the community and stakeholders
2. Conduct a Cost-effectiveness Study
3. Develop and draft the new building ordinance for public process and revisions
4. Formally adopt the new building ordinance
5. Apply to the California Energy Commission for final ordinance approval

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Cost-effective ■ Education and leadership ■ GHG reduction potential	2030: 6,730 2045: 19,560	2025	■ Planning Division ■ Building Division

MEASURE E-3
Electrify Existing Residential Buildings Starting in 2027 to Reduce Overall Residential Natural Gas Consumption to 100 Therms/Person by 2030 and 30 Therms/Person by 2045

Action E-3-1 Electrify existing residential buildings

If not already required by the State's Building Energy Efficiency Standards (California Code of Regulations Title 24, Parts 6 and 11), adopt an electrification ordinance for existing residential buildings to transition natural gas to electric in two phases, to be implemented through the building permit process.

PHASE I: Limit expansion of natural gas lines in existing buildings by 2025.
PHASE II: Require HVAC system replacements and hot water heaters replacements to be all-electric by 2027.

Implementation will consist of the following:

1. Engage and educate the community and stakeholders
2. Conduct a Cost-effective study
3. Develop and draft the new building ordinance for public process and revisions
4. Formally adopt the new building ordinance
5. Apply to the California Energy Commission for final ordinance approval

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ GHG reduction potential	2030: 13,470 2045: 50,360	2025	■ Planning Division ■ Building Division

Action E-3-2: Update RECO to support electrification

Expand the City's Residential Energy Conservation Ordinance (RECO), Title 16 of the Municipal Code, to cover substantial remodels (over 50%). Amend RECO to require electrification and/or energy conservation improvements for substantial remodels (over 50%) in the same way that RECO currently requires these types of upgrades upon transfer/sale of homes and apartments. The amendment will include electrification options such as installation of a 200 amp panel and/or installation of electric heat pump appliances for HVAC and hot water heaters as well as the option to go beyond the base requirements for energy conservation set forth in the State's Building Energy Efficiency Standards (California Code of Regulations Title 24, Part 6).

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability ■ GHG reduction potential	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Building Division

Action E-3-3 Decarbonize municipal buildings

Adopt a plan to decarbonize all municipal buildings by 2045. Work on this plan will begin in 2022. This plan would include a new building electrification policy as well as an existing building natural gas phase-out policy. Decarbonization of municipal buildings will be driven by the PG&E Sustainable Solutions Turnkey Program, which aims to achieve net neutrality in electricity usage by 2030, and work towards full decarbonization by 2045.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Education and Leadership ■ GHG reduction potential	2030: 460 2045: 1,150	In progress	■ Public Works O&M ■ PG&E

Action E-3-4 Perform an electrification feasibility study

Conduct a feasibility study/existing building analysis to understand the costs associated with electrifying existing residential and commercial buildings in the City of Chico.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ Cost-effective	Supportive	2023	■ Planning Division

Action E-3-5 Track electrification progress

Develop a permit tracking program for existing building electrification to track annual progress in achieving the City's electrification goals.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2025	■ Planning Division ■ Building Division

Action E-3-6 Identify and partner with stakeholders to conduct electrification outreach, promotion, and education

Leverage partnerships with stakeholders to conduct outreach, promotion, and education around new and existing building electrification, including:

- Induction/electric stove cooking competition to demonstrate the competitiveness of electric stoves for replacing gas stoves
- Information sessions/events that educate the public on safety concerns around gas stoves and health/cost benefits of replacing water heaters and space heaters with electric heat pumps
- Develop financial and technical resources, including hosting workforce development trainings for installers and building owners/operators to discuss benefits and technical requirements of electrification and move towards all-electric requirements
- Conduct internal trainings with planners and building officials on state decarbonization goals and incentives available for electric homes
- Establish a comprehensive, coordinated electrification education campaign for property owners and occupants, including an updated list of rebates and incentives available for residents wanting to electrify their homes

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Education and Leadership ■ Socially equitable	Supportive	2021 (In progress)	■ Planning Division

Action E-3-7 Partner with stakeholders to develop resident-level funding pathways for implementing electrification ordinance

Leverage partnerships with stakeholders and establish funding pathways to ease community members' costs when complying with an electrification ordinance or meeting State standards, including:

1. Investigation of a transfer tax rebate for electric panels and/or other upgrades
2. Partner with PG&E, Butte Choice Energy, and/or other stakeholders to create or expand electrification/retrofit programs and incentives, especially for low-income residents. These could include the PACE program, PG&E's low-income weatherization program, tariffed on-bill financing, metered energy efficiency, or others.

Key Pillars Supported	GHG Reduction ($MT CO_2e$)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ Cost-effective ■ Accountability	Supportive	2023	■ Planning Division ■ Building Division ■ PG&E ■ Butte Choice Energy

MEASURE E-4
Increase Generation and Storage of Local Renewable Energy

Action E-4-1 Coordinate with stakeholders to provide local energy generation support and incentives for the community

Partner with PG&E and/or other stakeholders to support and incentivize local on-site energy generation and storage resources within the community with a focus on underserved communities. This could include a co-located community solar and storage project.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ Accountability	Supportive	2023	■ Public Works O&M ■ PG&E

Action E-4-2 Streamline battery storage building permit requirements

Coordinate City departments to establish and streamline battery storage building permit requirements to allow for easier implementation of these technologies within the community.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Cost-effective ■ Accountability	Supportive	2023	■ Planning Division ■ Building Division

Action E-4-3 Conduct an energy generation feasibility study

Conduct a feasibility study through the PG&E Sustainable Solutions Turnkey (SST) program to assess cost and applicable locations for installation of battery back-up systems, generators, or a micro-grid throughout the City. Engage with the community to determine how local energy generation systems can support community infrastructure as well as critical public infrastructure.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Accountability	Supportive	In progress	■ Public Works O&M ■ PG&E

Action E-4-4 Install renewable energy technology at municipal facilities

Implement the comprehensive PG&E Sustainable Solutions Turnkey Program to install renewable energy technology at municipal facilities. Key energy conservation measures include:

- Increasing backup generation capacity and adding battery storage at City facilities
- Upgrading aeration systems at the Wastewater Treatment Plan to reduce energy consumption by 11%
- Upgrading and automating all City HVAC systems
- Installing solar PV at the Municipal Services Parking Lot to create 290 kW energy savings
- Replacing aging 1MW solar PV system at the Wastewater Treatment Plant, and adding an additional 738 kW of solar PV within the existing footprint to create a total of 1.75 MW energy savings
- Updating City-operated irrigation control system design and development City-wide.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration	Supportive	In progress	■ Public Works O&M ■ PG&E

TRANSPORTATION

MEASURE T-1

Improve Active Transportation Infrastructure to Achieve Greater Than 6% Bicycle Mode Share by 2030 and 12% Bicycle Mode Share by 2045[38]

Action T-1-1 Implement Chico Bicycle Master Plan

Implement the Chico Bicycle Plan 2019 Update[39] in accordance with the Plan's goals, objectives, and policies. Implementation of the Plan may include:

- Adding additional miles to the bikeway network
- Implementing new end-of-trip facilities and enforcement protocols to reduce bicycle theft
- Conducting road repairs and road maintenance
- Improving/expanding wayfinding, safety, and comfort
- Integrating with transit and other transport modes
- Conducting promotion and education around biking in Chico
- Identifying and competing for funding sources

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ GHG reduction potential	2030: 1,530 2045: 1,500	In progress	■ Planning Division ■ Public Works Engineering

Action T-1-2 Require shaded and convenient bike parking

Require shaded Park-a-Bike style rack or equivalent when installing bike parking in new development.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division

38 *As explained in Chapter 5, the City of Chico has established the more aggressive goal to achieve 15% bicycle mode share by 2030, however, this is not quantified as part of the CAP because the additional efforts to improve bicycle infrastructure beyond what is proposed in the Bicycle Master Plan are still in the early stages of planning.*

39 *https://www.csuchico.edu/sustainability/_assets/documents/2019-city-of-chico-bike-plan.pdf*

Action T-1-3 Require major road upgrades to include bicycle infrastructure

Require major road upgrades to include bicycle infrastructure and its maintenance unless a significant cost/feasibility issue is shown. Update Title 18 Standard Details on each roadway section type to include the applicable bikeway modifications such as Type II lanes and buffered bikeway.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Cost effectiveness ■ Accountability	Supportive	In progress	■ Planning Division ■ Public Works Engineering

Action T-1-4 Perform a street/intersection study

Conduct a street/intersection study to identify streets and intersections that can be improved for pedestrians and bicyclists through traffic calming measures and/or where multi-use pathway opportunities exist to increase active transportation.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division ■ Public Works Engineering

Action T-1-5 Complete an Active Transportation Plan

Develop and implement an Active Transportation Plan (consistent with the General Plan) that identifies funding strategies and policies for development of pedestrian, bicycle, and other modes of alternative transportation projects. Work with the City's bike/ped working group to identify high priority areas. Example improvements include:

- Pave shoulders of streets that have high traffic counts
- Separate bike lanes from motor traffic with concrete bumper blocks or better
- Establish a safe east-west connection over highway 99

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ Accountability	Supportive	2023	■ Planning Division ■ Public Works Engineering

Action T-1-6 Identify and partner with stakeholders to conduct outreach, promotion, and education

Leverage partnerships with stakeholders to conduct ongoing outreach, promotion, and education around active transportation in Chico. This could include:

- Establishing City-wide events or programs that promote active transportation in the community
- Regularly updating the City's Bicycle and Pedestrian Network Map and sharing through City and stakeholder partnership platforms
- Supporting Chico Velo in hosting workshops and classes on bike riding, safety, and maintenance by certified instructors
- Instituting car-free days downtown, potentially coupled with Farmer's Market or other large and regular events
- Consolidating a list of local employer-provided bicycle parking, lockers, showers, and incentives as a demonstration tool for other interested employers

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Education and Leadership	Supportive	In progress	■ Planning Division ■ Public Works Engineering

Action T-1-7 Create a Bike/Ped/Parking Coordinator Position

Create a Bike/Ped/Parking Coordinator position for the City to ensure implementation of active and shared mobility measures.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2023	■ Planning Division ■ Public Works Engineering

MEASURE T-2
Improve EV Infrastructure to Achieve Greater Than 23% EV Share of Car Registrations by 2030, and 90% by 2045

Action T-2-1 Increase privately owned EV charging infrastructure

If not already required by the State's Building Energy Efficiency Standards, consistent with the Final Butte PEV Readiness Plan,[40] amend the City's Building Code by 2023 to require the following::

- EV capable private garages for new single-family and duplex residential development
- 20% EV charging capable spaces and panel capacity for new multi-family residential development
- 20% EV charging capable spaces for new commercial development
- At least 1% working EV charging spaces for all new development and major retrofits

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability ■ GHG reduction potential	2030: 28,616 2045: 105,496	2023	■ Planning Division ■ Public Works Engineering

Action T-2-2 Increase publicly accessible EV charging infrastructure

Work with public and private partners to ensure there are at least 942 publicly accessible DCFC and Level 2 EV chargers with the City's Sphere of Influence, with a focus on providing access to low-income households and affordable housing by 2030. Prioritize locations based on analysis in the Final Butte PEV Readiness Plan.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ GHG reduction potential	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

40 *http://www.bcag.org/documents/PEV%20Readiness%20Plan/Final%20Butte%20PEV%20Readiness%20Plan%205-24-2018.pdf*

Action T-2-3 Increase City-owned EV charging infrastructure

Install new publicly accessible EV chargers at City-owned facilities. Develop and implement a fee for use of City-owned chargers to encourage efficient use and turnover, especially for those without home charging capability. Allocate parking fee revenue towards projects that support EV infrastructure, alternative fuel projects, and active transportation projects.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ Accountability ■ GHG reduction potential	Supportive	2021 (In progress)	■ Planning Division ■ Public Works Engineering ■ Public Works O&M

Action T-2-4 Identify and partner with stakeholders to develop ZEV-related rebates

Investigate partnerships with public and private stakeholders to develop rebates on at-home electric circuits, panel upgrades, and Level 2 chargers.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ Cost effectiveness	Supportive	2022 (Preparation in progress)	■ Planning Division

Action T-2-5 Encourage EV adoption and infrastructure improvements

Conduct outreach, promotion, and education to encourage EV adoption and infrastructure improvements. This could include the following:

- Providing education and outreach to the community on the benefits of ZEVs, availability of public charging, and relevant rebates and incentives available for businesses and residents
- Working with major employers (e.g., CSUC, Fifth Sun, Build.com, Enloe) to provide EV charging for employees and encourage EV adoption among employees

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Accountability ■ Education and leadership	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

Action T-2-6 Establish universal EV signage

Establish universal signage and marking requirements for EV parking spaces.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

Action T-2-7 Streamline the permitting and inspection processes for installing electric vehicle supply equipment (EVSE)[41]

Streamline both the EVSE permitting and inspection processes, which may include:

- Prioritizing EVSE permitting for faster turnaround times
- Establishing flat fees for standard installations
- Enabling homeowners and licensed contractors to submit EVSE permit applications online
- Allowing EVSE across different zoning classifications
- Considering simple EVSE installations as exempt from CEQA on a case-by-case basis
- Allowing installation of EVSE as a mitigation measure for large projects
- Condensing inspections for more complex installations that do not include panel upgrades or underground conduit
- Establishing a 24-hour flexible inspection request program online
- Providing shorter inspection windows
- Removing requirement for electrician to be present during inspection to decrease consumer costs

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Cost effectiveness ■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division

41 EVSE is in reference to electric vehicle chargers and charging infrastructure.

MEASURE T-3
Improve Shared Mobility and Transit Programs and Infrastructure

Action T-3-1 Partner with BCAG to improve and expand transit within the City

This could include:

- Expanded transit service, especially along transit priority corridors, and more frequent and reliable transit service. More frequent transit can begin to act as a shuttle, especially since downtown employees and CSUC students and faculty are eligible for free transit passes
- Improved and/or more efficient transit technology
- Improved service/communication through interactive service maps, app payments, and real time arrival info
- Increased active transportation access to transit stops
- Enhanced, comfortable stops and stations
- Education and outreach to the community on new and existing shared transit options
- Subsidized transit passes
- New electric hop-on hop-off trolley service through major points of interest (e.g., downtown, Bidwell Park, Bidwell Mansion, Sierra Nevada, fair grounds, Chico State)

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable ■ Education and leadership	Supportive	In progress	■ Planning Division ■ BCAG

Action T-3-2 Prepare for shared bike programs

Conduct an active transportation share (e.g., bike-share, scooter-share) feasibility study. Update municipal ordinances to prepare the City for shared mobility programs in accordance with the Bicycle Master Plan[42] and the Downtown Access Plan.[43] Consider starting a bike share pilot program in Downtown, ideally with docked e-bikes.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability ■ GHG reduction potential	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

Action T-3-3 New employer trip reduction programs

Implement General Plan Action CIRC 9.1.2 to reduce single occupancy vehicle trips associated with work commutes. As a condition of project approval, require new non-residential projects that will employ more than 100 people to submit a Travel Demand Management Plan that identifies strategies to reduce single-occupancy vehicle trips, including encouraging employers to provide transit subsidies, bicycle facilities, alternative work schedules, telecommuting and preferential parking for carpool/vanpools.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division

Action T-3-4 Conduct a transportation equity study

Partner with CSUC to conduct a transportation equity study to investigate current barriers for minority, low-income, and senior populations in disadvantaged communities to take transit, walk, bike, use rideshare, or carshare.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable	Supportive	2023	■ Planning Division

42 https://www.csuchico.edu/sustainability/_assets/documents/2019-city-of-chico-bike-plan.pdf

43 https://chico.ca.us/sites/main/files/file-attachments/downtown_access_action_plan.pdf?1575399725

Action T-3-5 Conduct a local transportation survey

Support BCAG in conducting local transportation surveys every five years to better understand the community's needs and motivation for traveling by car versus other alternatives such as by bike or bus. Use survey results to inform transit expansion and improvement projects.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ BCAG

Action T-3-6 Encourage and facilitate carsharing services

Perform ongoing outreach to carsharing companies about the potential to implement a carsharing program in Chico, preferably electric.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ Education and leadership ■ Cost-effective	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

Action T-3-7 Encourage use of local transit

Promote use of B-Line for Downtown transit especially. This could include bus open houses and promotion of DoubleMap app.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Cost-effective	Supportive	In progress	■ Planning Division ■ BCAG

Action T-3-8 Invest in TDM strategies

In accordance with the Downtown Access Plan,[44] designate and use a portion of paid parking revenue to invest in TDM strategies including Actions T-3-1 to T-3-7 that will ensure cost-effective Downtown access by improving transit, bicycle facilities, and create incentives for people to avoid driving.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	Preparation in progress	■ Planning Division ■ Public Works Engineering

MEASURE T-4
Implement Parking and Curb Management Procedures that Support the Mode Shift Goals of the Overall Transportation Strategy

Action T-4-1 Utilize dynamic parking pricing Downtown

In accordance with the Downtown Access Plan,[45] utilize dynamic pricing for Downtown area parking, increasing costs of parking during times of high usage and special events.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division ■ Public Works Engineering

Action T-4-2 Improve curbside management

Improve curbside management in accordance with the Downtown Access Plan. This may include updating the Municipal Code to require active loading only, prohibit double parking, define locations for additional loading zones, and design loading zone signage.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works Engineering

44 https://chico.ca.us/sites/main/files/file-attachments/downtown_access_action_plan.pdf?1575399725
45 https://chico.ca.us/sites/main/files/file-attachments/downtown_access_action_plan.pdf?1575399725

Action T-4-3 Encourage parklets Downtown

Identify opportunities for development of parklets throughout the City's Downtown, to replace parking spaces with bike parking or outdoor restaurant seating.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division ■ Public Works Engineering

Action T-4-4 Establish carpool/vanpool/shuttle parking minimums

Update the Municipal Code to establish minimums for carpool/vanpool/shuttle parking requirements in new non-residential development.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2023	■ Planning Division

MEASURE T-5
Support Implementation of the City's General Plan that Promotes Sustainable Infill Development and Mixed-Use Development in New Growth Areas to Reduce Vehicle Miles Traveled (VMT)

Action T-5-1 Support infill growth

Continue to support infill growth and thoughtful mixed-use development in new growth areas consistent with the Chico 2030 General Plan and the regional Sustainable Communities Strategy.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division

WASTE

MEASURE W-1

Update Waste Hauler Franchise Agreements to Implement Requirements of SB 1383 and Achieve 75% Reduction Below 2014 Levels in Organic Waste to 0.4 Tons of Waste/Person by 2025 and Maintain Through 2045

Action W-1-1 Require residential and commercial organic waste collection through updated waste hauler contracts

Update waste hauler contracts to include expanded organic waste collection. Pass an ordinance by 2022 requiring residential and commercial organics generators to subscribe to organics collection programs or alternatively report organics self-hauling and/or backhauling. Allow limited waivers and exemptions to generators for de minimis volumes and physical space constraints and maintain records for waivers/exemptions.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Accountability ■ GHG reduction potential	2030: 7,690 2045: 7,690	2022	■ Planning Division ■ Public Works O&M ■ Waste Management ■ Recology

Action W-1-2 Require edible food recovery

Adopt an edible food recovery ordinance or similarly enforceable mechanism to ensure edible food generators, food recovery services, and food recovery organizations comply with State requirements to increase recovery rates.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Socially equitable	Supportive	2022	■ Planning Division ■ Public Works O&M

Action W-1-3 Partner with North State Rendering to expand use of the digester

Work with North State Rendering to expand use of organics in the digester. Conduct a pilot to demonstrate effectiveness and identify funding sources for a larger expansion.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ GHG reduction potential	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M ■ North State Rendering

Action W-1-4 Conduct capacity planning for organic waste collection

Engage in organic waste collection capacity planning by executing the following:

- Estimate Chico's disposal of organic waste in tons
- Identify and verify amount of available organics waste recycling infrastructure
- Estimate the amount of new or expanded capacity needed to process organic waste
- Work with the City of Chico's Recycling and Solid Waste Division and waste haulers to coordinate organic waste delivery to Recology's Oroville Transfer Station and Ostrom Road organics facility
- Develop and submit an implementation schedule highlighting planning effort to provide enough new or expanded organics capacity, including timelines and relevant milestones by the end of the report period
- Identify proposed new or expanded facilities that could be used for additional capacity

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M ■ Waste Management ■ Recycling and Solid Waste Division ■ Recology

Action W-1-5 Conduct capacity planning for edible food recovery

Engage in edible food recovery capacity planning by executing the following actions:

- Estimate the amount of edible food that will be disposed by organics generators in Chico
- Work with commercial food generators to reduce excess edible food generation
- Work regionally to establish a full list of food recovery organizations that can receive edible food from Chico businesses
- Identify proposed new or expanded food recovery capacity
- Identify the minimum capacity required to recover 20% of edible food that is estimated to be disposed
- If existing and planned capacity is insufficient based on the above process, the City of Chico must develop and submit an implementation schedule highlighting the planning effort to provide enough new or expanded capacity for increasing edible food donations and identify proposed new or expanded facilities to be used to for additional capacity

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M

Action W-1-6 Develop and implement a partnered education and outreach program

Update waste hauler contracts and partner with stakeholders (e.g., Recology, CSUC, Chico State, BEC) to develop and implement an education and outreach program around SB 1383:

- Coordinate with Recology's education and outreach personnel to expand on existing community outreach
- Conduct outreach and education at schools on composting, recycling, and waste reduction
- Provide education to the community on home composting techniques
- Inform organics generators/edible food generators on requirements to properly separate materials, organic waste prevention and on-site recycling, methane reduction benefits of composting, and information related to edible food donation
- Hold a compost give-away event for Chico residents
- Identify percentage of organics generators who are "limited English-Speaking households" or "linguistically isolated." If more than five percent (5%) of Chico's organics generators are defined as "limited English-speaking households" or linguistically isolated," provide education and outreach in a language or languages that will assure the information is understood by that community

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Education and leadership	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M ■ Waste Management ■ Recology

Action W-1-7 Develop and implement an inspection and compliance program

Update waste hauler contracts to implement an inspection and compliance program for the edible food recovery program and organics procurement program with defined enforcement mechanisms and penalties, to begin prior to 2024. Maintain records of compliance in accordance with SB 1383.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M

SEQUESTRATION

MEASURE S-1
Increase Carbon Sequestration by Increasing Urban Canopy Cover at Least 10% by 2030 Through New Greenscaping Programs

Action S-1-1 Implement Chico's Urban Forest Revitalization Program

Implement the Urban Forest Revitalization Program[46] to plant 700 trees by March 2022 (adopted) and 4,500 trees by 2030 (new goal). Focus on areas of the City with low tree canopy cover based on canopy map and optimize carbon sequestration through management of the existing urban forest.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ GHG reduction potential	2030: 260 2045: 260	2022 (Preparation in progress)	■ Public Works O&M

Action S-1-2 Increase greenspace in Chico

Identify and participate in partnership opportunities necessary to convert public and private spaces into water efficient greenspace and increase the City's carbon sequestering greenspace by 2030.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M

46 *https://www.becnet.org/urbanforest#:~:text=Butte%20Environmental%20Council%20has%20partnered,track%20to%20exceed%20that%20goal*

Action S-1-3 Improve greenspace management to maximize carbon sequestration

Improve management of public open space and park lands, including use of compost, to maximize carbon sequestration. Through permit review, evaluate and ensure that landscaping plans utilize native species identified in the Urban Forest Management Plan where feasible.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022 (Preparation in progress)	■ Planning Division ■ Public Works O&M

Action S-1-4 Require shade trees in new major developments

Require new development to include shade trees for enhanced energy savings, provided it would not interfere with solar installation. Tree species and location would be determined in coordination with the City's Urban Forester. Street tree planting shall also be required for all new single-family subdivisions.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	In progress	■ Planning Division

MEASURE S-2
Develop and Implement the Urban Forest Master Plan

Action S-2-1 Develop, adopt and implement the Urban Forest Master Plan[47]

Create an actionable strategic plan for the City's urban forest that will guide it to its vision of a healthy, robust and resilient urban forest over the next 40 years. The plan shall include sections on work programs, policies, ordinances, sustainable urban forest management, design, planting, staffing, stewardship, carbon offset, storm water management, creek, open space and natural resource management, public tree inventory, and community participation and education.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Socially equitable ■ GHG Reduction Potential	Supportive	2022/2023 (Preparation in progress)	■ Planning Division ■ Public Works O&M

Action S-2-2 Conduct a canopy cover analysis

Conduct a tree canopy coverage analysis that includes all trees within the city limits, including public and private property trees, open space, natural resources area, creek and riparian areas, and golf courses. The resulting study should provide information on the number of trees and tree density on all identified areas and provide analysis if trees are equitably distributed throughout the city and present a clear picture on where city should strategically invest resources.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2022	■ Planning Division ■ Public Works O&M

47 *https://chico.ca.us/post/chico-urban-forest-summit*

Action S-2-3 Conduct citywide tree planting analysis

Conduct a tree planting analysis to gain a better understanding of the urban forest's overall condition. The resulting information should be used to develop management recommendations associated with tree removal, tree planting, trimming cycle adjustments and related maintenance activities. Additionally, the results of this analysis should be used to develop a list of recommended tree species that will be suitable for the city's current environmental conditions as well as anticipated conditions caused by climate change.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Accountability	Supportive	2023	■ Planning Division ■ Public Works O&M

OUTREACH AND EDUCATION

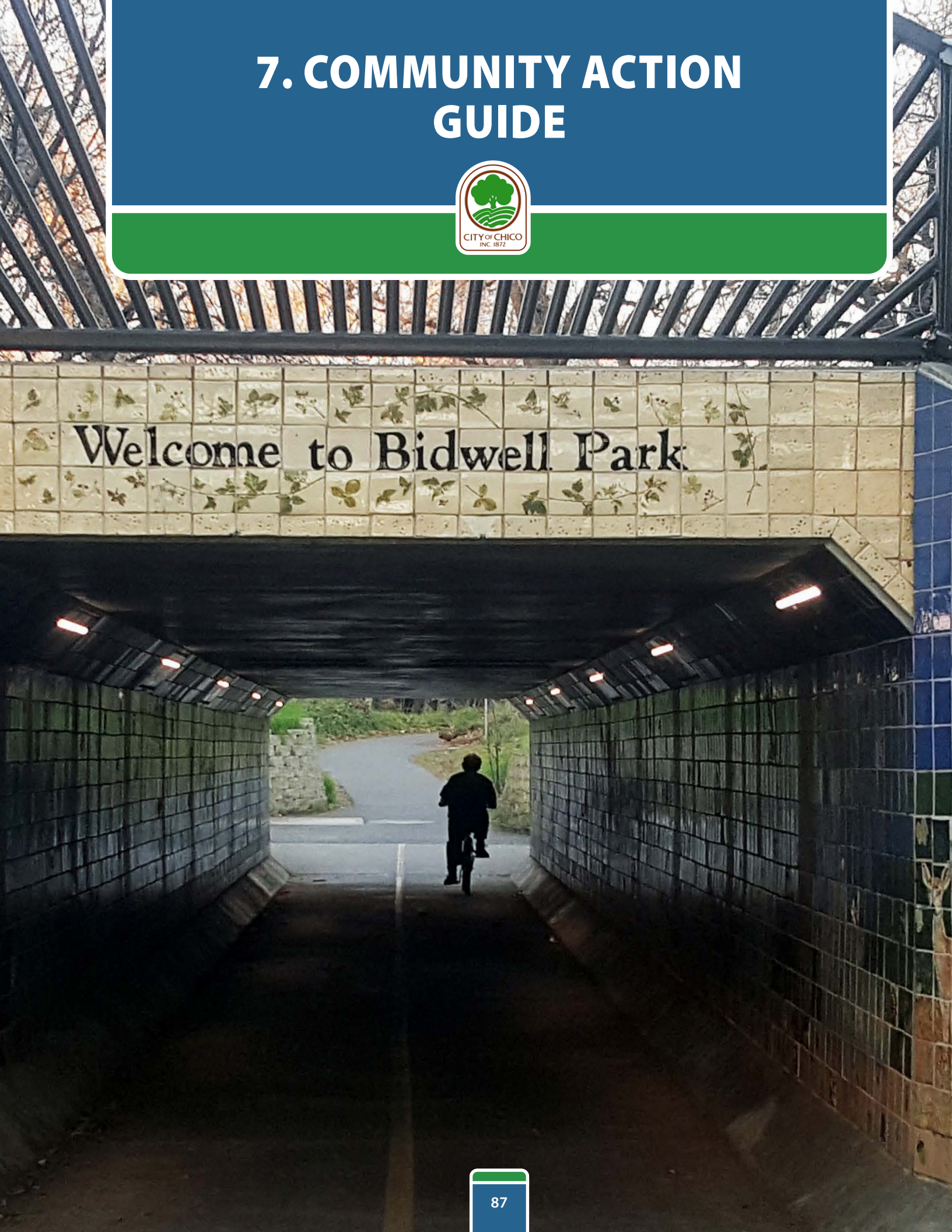
MEASURE O-1
Conduct a Holistic Community Outreach and Education Program to Optimize CAP Implementation

Action O-1-1 Conduct partnered community outreach and education

Develop a plan for ongoing community outreach strategies to maintain education and promotion of the CAP. This includes regular maintenance of the City's CAP webpage and ongoing PR, working with CUSD to create K-12 lesson plans, and partnering with CSUC and non-profits.

Key Pillars Supported	GHG Reduction (MT CO2e)	Implementation Start	Monitoring and Implementation Responsibility
■ Collaboration ■ Education and leadership	Supportive	2022/2023 (Preparation in progress)	■ Planning Division

7. COMMUNITY ACTION GUIDE



This community action guide includes actions that can be taken at the community level by residents, homeowners and property owners, businesses and employers, and developers to support Chico's GHG emissions reduction goals, improve sustainability, and help mitigate the impacts of climate change. This section also includes resources specific to Chico that make taking these actions possible. In general, these actions support Chico's efforts to decarbonize electricity, electrify its buildings, reduce fossil-fuel based transportation, divert organic waste from the landfill, and conserve water.

RESIDENTS

Residents play a big role in helping Chico to achieve its GHG targets. If you are a resident of Chico, this section includes information and resources related to actions you can take that will make the biggest impacts.

BIKE, WALK, SKATEBOARD, SCOOTER, TAKE THE BUS, OR CARPOOL WHEN POSSIBLE

IMPACT: Moderate to high. Finding alternative transportation options to single-occupancy vehicles is key to reducing your transportation footprint. Biking, walking, skateboarding, scootering, taking the bus, and carpooling are all good alternative transportation options, and support Chico's efforts to increase active and shared transportation (Measures T-1 and T-3).

COST: Walking and biking/skateboarding/scootering are great low/no cost alternatives to driving and can help improve resident's health and wellness. Taking the bus or carpooling can also help save on your transportation costs. Taking the B-Line in Chico costs $1.75 for a local trip and $2.40 for a regional trip. Butte Regional Transit also offers cost-saving multi-day passes.

RESOURCES:

- *Explore Chico's bike path map (186 rideable bike paths)*
- *Explore Chico Velo's guide to bike routes in Chico*
- *Review Chico's guide to bike safety*
- *Find all B-Line routes and schedules*
- *Free B Line Transit for downtown workers and students*

BUY AN ELECTRIC VEHICLE WHEN IT'S TIME FOR A NEW CAR

IMPACT: High. Gasoline and diesel usage are the largest contributor to Chico's GHG emissions. Chico's transportation strategy includes electrifying car trips to the greatest extent possible (Measure T-2). Buying an electric vehicle will directly support this strategy and may provide life cycle cost savings in the long run.

COST: Costs for residents who choose to buy EVs are highly dependent on vehicle choice. Many EV's are comparable in cost to gasoline-powered vehicles and can be comparatively less expensive over the full life of the car.[37] Costs can also be associated with installing an EV charger in your home. Level 1 chargers can cost between $300 to $600 to install.

RESOURCES:

- *Evaluate the GHG footprint of different cars*
- *Explore a list of affordable electric cars on the market*
- *Review a summary of EV and charging costs in Chapter 10 of BCAG's EV Readiness Plan*

COMPOST YOUR YARD AND FOOD WASTE

IMPACT: Low to moderate. Chico has adopted a strategy to divert organic waste from the landfill through enhanced composting programs in the City (Measure W-1). You can support this work by doing your own composting and recycling now. It's low cost and has the added benefit of reducing strain on local landfills.

COST: Low to none.

RESOURCES:

- *Recycle your yard waste with Chico's Curbside yard waste recycling program*
- *Compost at home*
- *Drop off your compost at CSU Chico's Compost drop off*
- Buy compost from *Waste Management*, *Earthworm Soil Factory*, or *The Worm Farm*
- *Learn about all the ways to recycle in Butte County*

37 https://www.carboncounter.com/#!/explore

HOMEOWNERS AND PROPERTY OWNERS

Homeowners and property owners have power over how their property uses resources like energy for heating and cooling, and water for washing and landscaping. If you are a homeowner or property owner in Chico, this section includes a list of suggested actions for reducing the energy and water usage of your property while maintaining comfort in a cost-effective way.

INSTALL SOLAR PANELS AND/OR BATTERY STORAGE

IMPACT: High. Installing solar panels on your property reduces your electricity emissions directly to zero and increases Chico's electrical grid resiliency. These are key aspects of Chico's energy strategy (see Measures E-1 and E-4). Battery storage takes this one step further by allowing you to store solar energy for use at night, decreasing your emissions footprint even further at the time when the grid is supplying the most carbon intensive electricity. Battery storage can also increase your property's resiliency by providing electricity during power outages or disasters.

COST: Up-front cost for installing solar panels and batteries on your home can be high (currently anywhere from $5,000 to $17,000 after tax breaks for solar and $11,000 to $18,000 for batteries), but on-bill cost savings start right away and can pay off the installation in 7 to 20 years for solar and 6 to 12 years for battery storage. Average savings for solar after 20 years is $20,000 on average. PG&E and other programs provide financing options for installing solar.

RESOURCES:

- *Learn about PG&E's steps to install and connect renewable energy*
- *Use PG&E's solar calculator tool to estimate your solar savings potential*
- *Apply for a residential solar permit from the City online*
- *Explore opportunities to get free solar installed on your home through Grid Alternatives Energy for All Program for families with limited or fixed incomes*

INSTALL AN ELECTRIC WATER HEATER, HEAT PUMP HVAC, AND/OR STOVE TOP

IMPACT: High. All-electric appliances will be GHG-free with Chico's switch to carbon-free electricity through Butte Choice Energy (Measure E-1), and support the effort to electrify existing buildings (Measure E-3). Investigate the electrification process now so that you are prepared to replace your gas unit with an electric alternative once it breaks down. Focusing on time of replacement will help keep costs lower for homeowners and property owners.

COST: In general, all-electric models are more expensive than natural-gas fueled counterparts upfront but provide long term on-bill savings. Current marginal costs (the cost increase compared to replacement with a natural gas appliance) after rebates for a heat pump HVAC (which also provides cooling) is about $3,600 to $8,200 before incentives. However, if a household expects to replace both an air conditioner and a furnace, a single heat pump unit provides the same heating and cooling at a lower upfront cost. Heat pump hot water heaters represent a marginal cost between $1,700 and $2,600 before incentives and offers significant cost savings over time.[38] These marginal costs can vary depending on the age of the building and the electrical infrastructure present. PG&E currently offers rebates on all-electric equipment.

RESOURCES:

- *Explore Services from Royal Heating and Air*
- *Explore Rebated from Climate and Energy Solutions*
- *Learn more about installing electric appliances from The Switch is On*
- *Find rebates and contractors for installing electric appliances from The Switch is On*

38 *E3 Residential Building Electrification in CA 2019*

REDUCE YOUR WATER USAGE

IMPACT: Low. While water usage is only a small contributor to GHG emissions in Chico, smart water usage is imperative to maintaining the agricultural industry in California and reducing the impacts of drought.

COST: Low to none.

RESOURCES:

- *Replace your lawn and turf with water wise landscaping*
- *Tune up your irrigation system for free through CalWater*
- *Explore CalWater rebates for water conservation appliances*

BUSINESSES AND EMPLOYERS

Businesses and employers will play a key role in reducing GHG emissions in Chico and supporting this CAP. This section provides a list of actions that businesses and employers can take to support GHG emissions reductions in Chico.

INSTALL BIKE-FRIENDLY FACILITIES FOR YOUR EMPLOYEES AND ENCOURAGE PUBLIC TRANSIT

IMPACT: High. You can help your employees decarbonize their commute and bike, walk, or take the bus to work. Consider installing bike racks or bike lockers for employees to safely store their bikes during the workday, providing showering facilities, and/or offering financial incentives for employees to bike, walk, carpool, or take the bus to work. Also consider partnering with Chico Velo, the local bicycle advocacy group, to further support Chico's bike culture.

RESOURCES:

- *Explore more ways to encourage your employees to bike to work*
- *Advertise free B Line transit for downtown workers to your employees*
- *Contact Chico Velo to discuss partnership options*

INSTALL EV CHARGERS IN THE EMPLOYEE PARKING LOT AND CONVERT FLEET TO ELECTRIC WHEN POSSIBLE

IMPACT: High. Gasoline and diesel usage are the largest contributor to Chico's GHG emissions. Chico's transportation strategy includes electrifying car trips to the greatest extent possible (Measure T-2). Converting your fleet to electric, installing EV chargers in your workplace parking lot, and developing a workplace charging program for your employees will support this important effort.

RESOURCES:

- *Review this guide for developing a workplace charging program in Chapter 8 of BCAG's EV Readiness Plan*
- *Explore this Business Clean Vehicle Fleet Program*

INSTALL SOLAR PANELS AND/OR BATTERY STORAGE AT YOUR BUSINESS

IMPACT: High. Installing solar on at your business reduces your electricity emissions and increases Chico's electrical grid resiliency. These are key aspects of Chico's energy strategy (see Measures E-1 and E-4). Battery storage takes this one step further by allowing you to store solar energy for use at night, decreasing your emissions footprint even further at the time when the grid is supplying the most carbon intensive electricity. Battery storage can also increase your business's resiliency by providing electricity during power outages or disasters.

RESOURCES:

- *Get your business started with solar*
- *Use PG&E's solar calculator tool to estimate your solar savings potential*
- *10 benefits of solar energy for commercial buildings*

DEVELOP WORK-FROM-HOME POLICIES FOR EMPLOYEES

IMPACT: Moderate to high. Allowing your employees to work from home, even one day per week, will reduce vehicle miles traveled in Chico, save your employees money, improve air quality, and reduce traffic impacts. Most passenger vehicle miles in California are from commuting to and from work. Removing the need to commute to work via car supports Chico's efforts to reduce vehicle miles traveled and helps reduce Chico's GHG emissions.

RESOURCES:

- *Review suggestions for how to create an effective work-from-home policy from Builtin*
- *Take a look at this sample telecommuting policy from Global Workplace Analytics*

REDUCE YOUR WATER USAGE

IMPACT: Low. While water usage is only a small contributor to GHG emissions in Chico, smart water usage is imperative to maintaining the agricultural industry in California and reducing the impacts of drought.

RESOURCES:

- *Explore CalWater Rebates for commercial properties*

REDUCE FOOD WASTE

IMPACT: Low to moderate. Chico has adopted a strategy to divert organic waste from the landfill through enhanced composting programs in the City (Measure W-1). You can support this effort by reducing your food waste at your business.

RESOURCES:

- *Managing food waste at the workplace*
- *Managing food waste at your restaurant*
- *Learn about food donation programs*
- *Donate your left-over food to a local shelter such as the Torres Shelter*

PRACTICE SUSTAINABLE BUSINESS

IMPACT: Low to moderate. You can reduce your organization's GHG emissions by procuring sustainable materials and developing other employee-focused sustainability policies.

RESOURCES:

- *Review this business guide to sustainable business practices*
- *Learn more about small businesses and sustainability*
- *Explore rebates and incentives for energy savings*
- *Get innovative with energy saving solutions*
- *Explore energy saving options for the hospitality industry*

DEVELOPERS

Developers in Chico hold the keys to making new buildings in Chico less GHG intensive. A primary way to do that is by building all-electric and ensuring all new development comes with EV charging infrastructure.

BUILD ALL-ELECTRIC MULTIFAMILY AND SINGLE FAMILY HOMES

IMPACT: High. New multifamily and single family developments represent a unique opportunity for developers to save money and reduce GHG emissions at the same time by building all-electric. This action is consistent with Chico's efforts to eliminate natural gas in new building construction through an electrification ordinance starting in 2025 (Measure E-2). If you are a developer in Chico, you can support Chico's energy strategy and take advantage of the cost-saving benefits of building all-electric now.

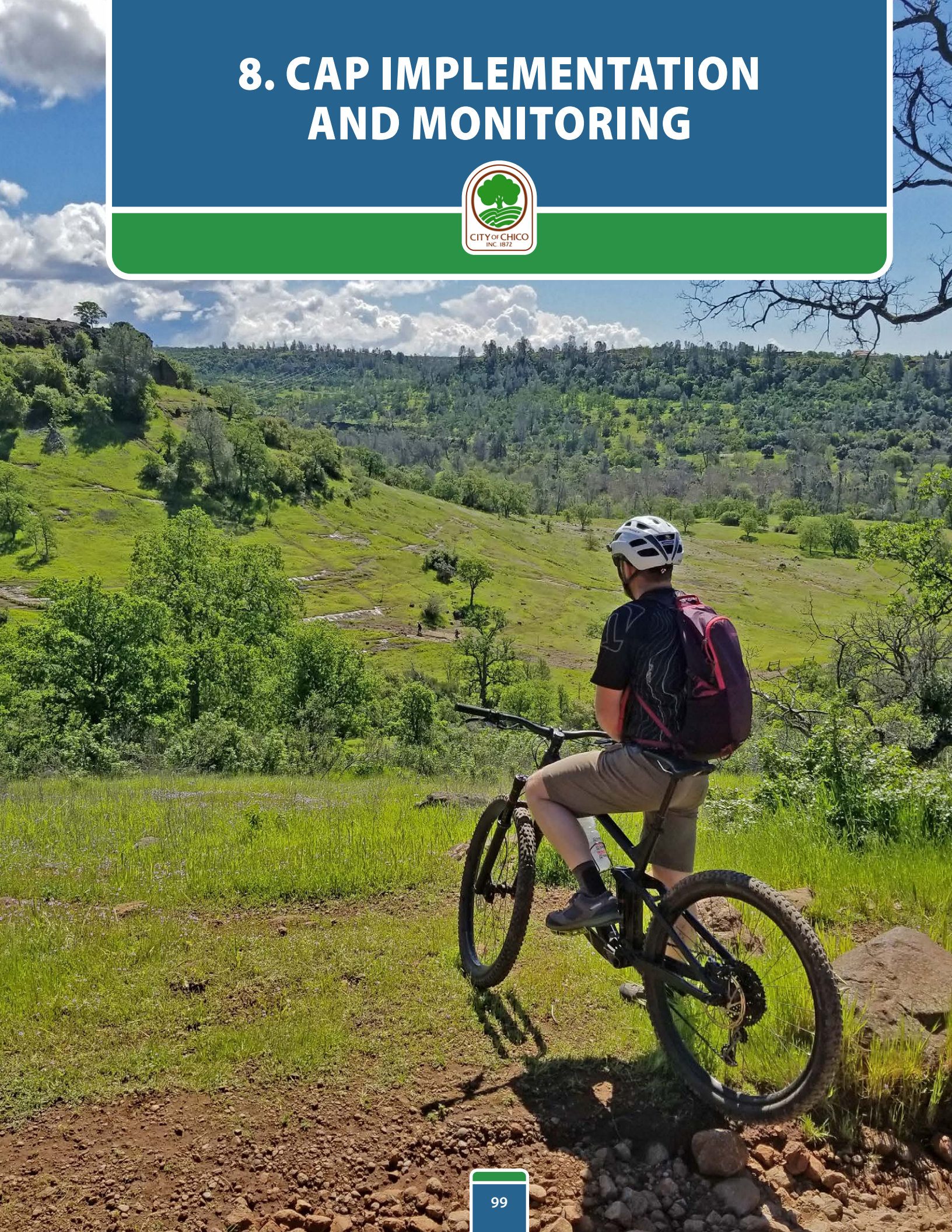
COST: Building all-electric generally costs less for the developer and for the residents of the building. Especially high savings are associated with avoiding the cost to run natural gas to the building; between $85,000 to $100,000 for multifamily homes. Additional cost savings are associated with avoiding the need to locate gas meters, lower Title 24 requirements, and expedited timelines from avoiding installing natural gas infrastructure. Cost increases from building all-electric may result from buying heat pump water heaters, which cost about $800 more than their natural gas counterparts. Building all-electric developments can be difficult without the right expertise. Make sure you are working with an architect and Title 24 team that understands electrification.

RESOURCES:

- *Building Decarbonization Coalition's best practices for designing decarbonized buildings*
- *Redwood Energy's Guide to zero emissions all-electric single family construction*
- *Redwood Energy's guide to zero emissions all-electric multifamily construction*


CITY OF CHICO
INC. 1872

8. CAP IMPLEMENTATION AND MONITORING



Chico's CAP includes a suite of strategies, measures, and actions that have been designed to achieve GHG emissions reductions in line with the City's 2030 emissions target and make substantial progress towards achieving the 2045 GHG emissions goal. As part of the CAP development process, the City also established a 2025 GHG emissions milestone to measure short-term progress. While the third-party evidence included in Appendix E establishes that the measures and actions in this CAP will achieve the 2025 milestone and 2030 target and make substantial progress towards the 2045 carbon neutrality goal, actual progress is best tracked by comparing Chico's GHG emissions targets to quantified GHG emissions in future years using activity data. As with any forecast there is some degree of uncertainty associated with implementation of the CAP, as adoption rates of new technologies and services, costs of each measure, changes to technology, and legislative changes will evolve over time. To help ensure this CAP is implemented, responsive to evolving real world conditions, and achieves the GHG emissions targets, this section includes a plan for funding, implementing, monitoring, and updating the CAP over time.

RESPONSIBLE PARTIES FOR IMPLEMENTATION

The CAP's implementation will be led by the City, with support from the community partners identified in the GHG reduction strategies and other key stakeholders identified in Appendix A, as well as the community itself, as detailed below and represented in Figure 8-1. The implementation and monitoring leads are identified for each CAP action in Chapter 6.

CITY RESPONSIBILITIES

The City is directly responsible for updating building codes, developing ordinances, conducting outreach, education, promotion, and feasibility studies, fostering partnerships, and providing specific infrastructure updates (e.g., EV charging infrastructure, bike lanes, municipal building electrification, etc.) from the CAP actions. As policies and programs are developed and infrastructure is constructed in alignment with the CAP's strategies, measures, and actions, City staff will engage the Chico community on opportunities or requirements for participating in these new structures as they become available.

PARTNER RESPONSIBILITIES

While the City is responsible for driving implementation of the CAP, local businesses, special districts, regional jurisdictions, community organizations, and other local groups are often better positioned to implement CAP actions. For example, Butte Regional Transit is better positioned to improve local transit than the City as it has responsibility for the B-Line. Through relationships identified and fostered by the City, key partners of the CAP will be responsible for assisting the City with outreach and promotion, conducting program tracking, developing incentives, rebates, and funding pathways for community level appliance upgrades, installing renewable energy and EV technologies, improving and expanding transit, and increasing organic waste collection capacity. Key partners include, but are not limited to:

- Build.com
- Butte Choice Energy (BCE)
- Butte County
- Butte County Association of Governments (BCAG)
- Butte Environmental Council
- California State University, Chico (CSU Chico)
- Chico Unified School District (CUSD)
- Chamber of Commerce
- Chico Builders Association
- Chico Velo
- Enloe Medical Center
- Fifth Sun
- North State Rendering
- Pacific Gas & Electric (PG&E)
- Recology
- Sierra Nevada Brewing Co.
- Valley Contractors Exchange
- Waste Management

COMMUNITY RESPONSIBILITIES

While the City and its partners will be responsible for CAP implementation, it is ultimately up to the broader community to embrace new services and technologies and gain the benefits outlined in this plan. Residents, local business owners, local developers, and building owners will be able to leverage new services and adopt new practices enabled by the CAP strategies. The key actions for the community are outlined in Chapter 7. Participation in these measures, feedback on implementation successes and hurdles, and ongoing collaboration with the City will all drive the successful implementation of the CAP.

Figure 8-1 CAP Implementation Responsible Parties

IMPLEMENTATION FUNDING AND COSTS

The strategies, measures, and actions developed for the CAP prioritize steps towards implementation that are low-cost to the community or have a positive return on investment. For example, CAP Measure E-1 decarbonizes Chico's electricity and reduces electricity emissions 90% by 2030 at low cost to the Chico community.[39] Other measures in the CAP, including the eventual electrification of existing buildings (Measure E-3) and buildout of active transportation infrastructure (Measure T-1), will require more significant cost investments for successful implementation but provide immediate GHG emissions reductions and a positive return on investment over time.

To help identify feasible cost pathways for the measures that require a higher capital investment, the CAP includes a Climate Action Financing Plan (Appendix D). The Climate Action Financing Plan identifies specific grant, partnership, loan, bond, fee, and tax pathways (prioritized in that order) as potential solutions to offset community costs and mitigate the larger City costs associated with the measures. Some expenditures will not represent net cost increases, but instead will involve the purchase of similar-cost climate-friendly alternatives to typically carbon intensive equipment, practices, and technologies. For example, home-owners and businesses are encouraged to make investments in water and energy conservation improvements, for which the initial expenditure will be offset by long-term savings from reduced water or energy usage. The CAP also includes actions that involve working

39 *While the costs for Butte Community Energy are not yet known, 100% renewable electricity options from other community choice aggregators are approximately $4-$6 more per month for the average homeowner depending on rate plan. https://www.pge.com/pge_global/common/pdfs/customer-service/other-services/alternative-energy-providers/community-choice-aggregation/ebce_rateclasscomparison.pdf*

with partners to develop and provide rebates and other low-cost financing programs to the community to close the cost-gap on higher cost climate friendly appliance or technology alternatives. The expected costs to the City and community for each measure in the CAP are described in Chapter 5, with additional detail added on residential, homeowner/property owner, business/employer, and developer costs in Chapter 7.

While funding and financing solutions have been identified for the CAP in the Climate Action Financing Plan, the City will ultimately identify the best funding pathway at the time of implementation of each action. The CAP's strategies, measures, and actions will be implemented over time, according to the specific implementation dates identified in Chapter 6.

TIMING OF IMPLEMENTATION

Implementation of the CAP's measures and actions will begin before the end of 2021 and continue through at least 2045. The implementation start date and other details on timing are identified for each action in Chapter 6.

MONITORING AND REPORTING

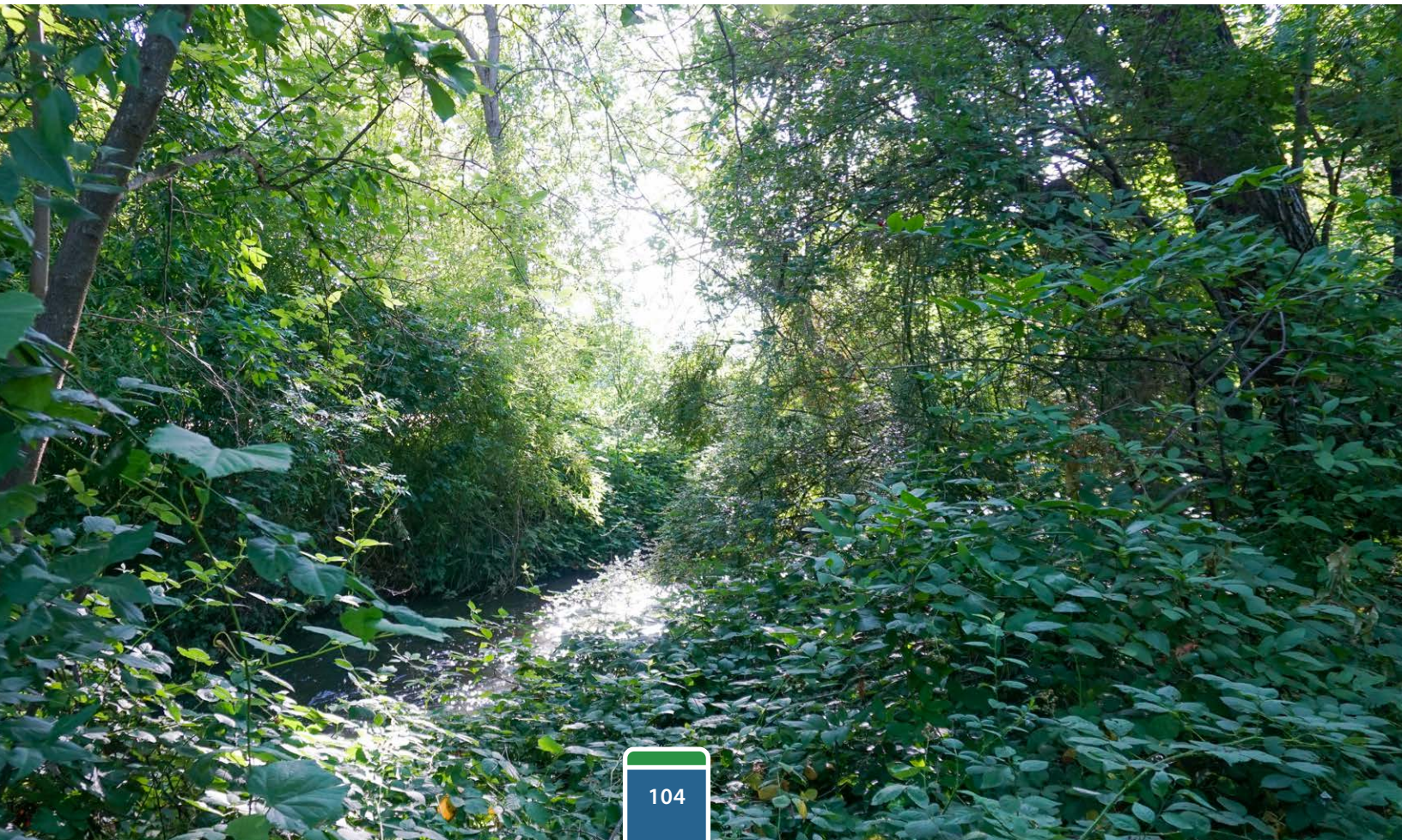
Monitoring of the CAP Update will be conducted by City departments with the aid of the CAP's partners listed above. Monitoring will consist of the following activities to be conducted on at least a bi-annual basis:

1. Identifying the implementation status for each CAP measure and action, and evaluating this against each action's implementation timeline
2. Completing an updated GHG emissions inventory, and evaluating the results against the City's GHG emissions targets
3. Providing a report with the above information and analysis to the Climate Action Commission and City Council

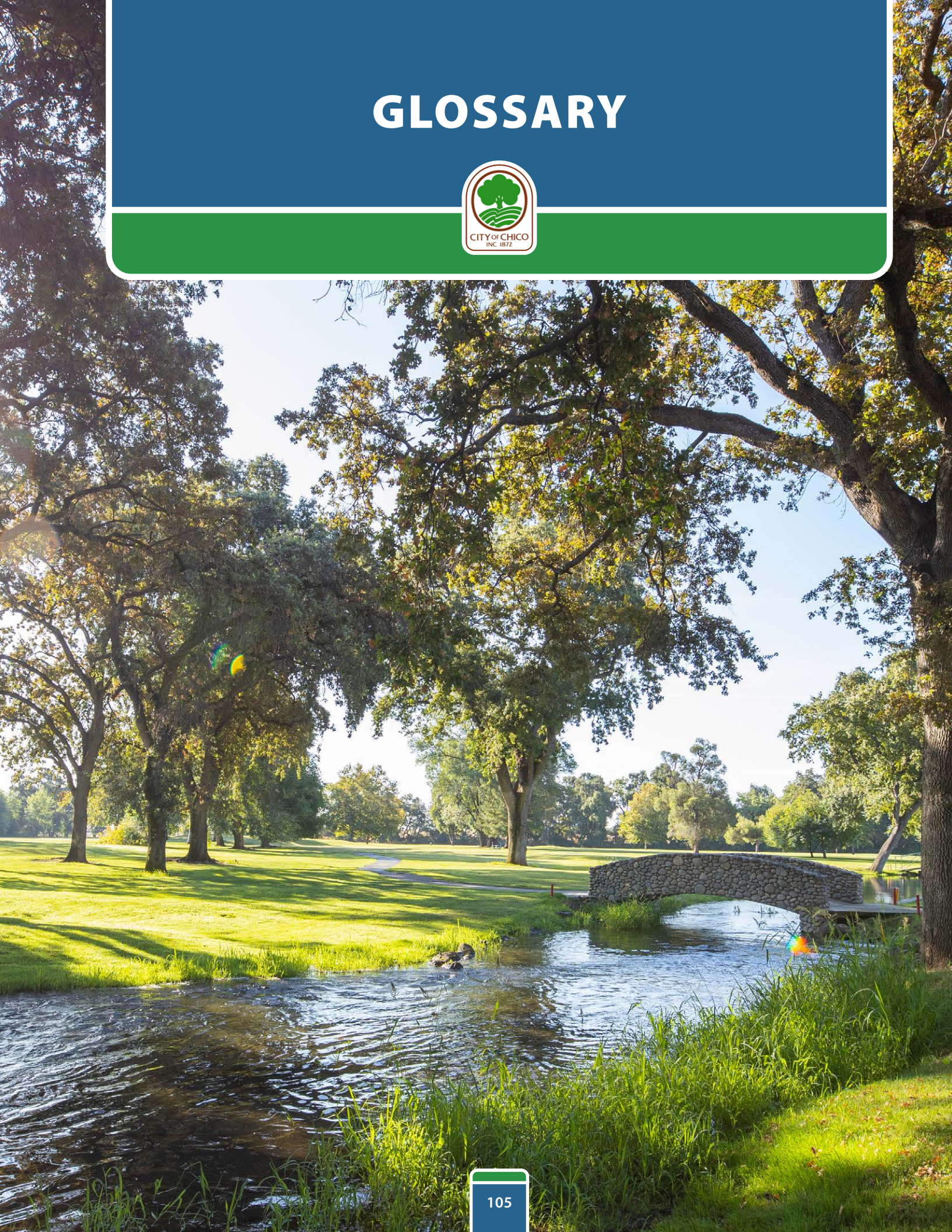
The monitoring activities and resulting reports will inform whether the City is on track to reach its 2030 target, or if changes to or additional measures and actions are needed. If the City is unable to achieve the 2025 GHG emissions milestone by 2025, the City will work to develop additional measures and actions beyond those identified here as part of a CAP update for Chico to stay on-track to meet the 2030 GHG emissions target. Based on progress towards the CAP targets, Chico may opt to conduct an update to the CAP after the milestone year of 2025 to ensure the 2030 targets are met.

CAP UPDATES

Regardless of potential interim updates for the CAP, a complete CAP update for post-2030 emissions reduction targets will be required, and the City's Planning Division will begin this effort in 2028. The CAP update will revisit and update the approach for reducing GHG emissions in Chico outlined in this CAP and establish new GHG emissions reduction targets based on current State legislation. It is anticipated that new technologies and legislation will facilitate GHG emissions reductions beyond what is currently possible and allow the City to continue towards its long-term goal of carbon neutrality by 2045.



GLOSSARY



GLOSSARY TERM	GLOSSARY DEFINITION
Active Transportation	Transportation methods which involve some level of physical activity (e.g., walking, running, biking, scootering, and skateboarding).
Adaptation	Changing social processes and existing infrastructure to make the potential impacts due to climate change more bearable or to benefit from opportunities associated with climate change.
Alternative Transportation	Any transportation method that does not rely on a fossil-fuel powered motorized vehicle.
Anthropogenic	Environmental processes or effects that originate from human activity.
Building Electrification	Installation of electricity-powered appliances, fixtures, and systems (e.g.,, including Heating, ventilation, and air conditioning [HVAC] systems, water heaters, and stoves. Electrification of existing buildings involves replacing fossil-fuel powered appliances, fixtures, and systems with all-electric versions.
California Environmental Quality Act (CEQA)	Passed in 1970, CEQA is a California statute that requires consideration of the environmental impacts of proposed development activities. CEQA requires detailed review of development projects, which informs government decision-makers and the public about potential project impacts to the environment and reduces those impacts to the extent feasible.
Carbon Dioxide Equivalent (CO_2e)	A unit of measure for greenhouse gas (GHG) emissions, which for the purposes of this Climate Action Plan (CAP), includes the most common human-caused GHG emissions - carbon dioxide (CO_2), methane(CH_4), and nitrous oxide (N_2O) gases converted to their carbon dioxide equivalents using each gas' global warming potential (GWP).
Carbon Neutrality	Achieving net-zero carbon dioxide equivalent (CO_2e) emissions, such that any GHG emissions created (including CO_2, CH_4, and N_2O emissions) are offset by GHG emissions sequestering activities.
Carbon Sequestration	The act of naturally or artificially removing carbon dioxide from the atmosphere and sequestering it in solid or liquid form. Common carbon sequestration activities include planting trees or composing organic waste.

GLOSSARY TERM	GLOSSARY DEFINITION
Co-Benefit	The positive effects that a climate action policy will have on other community attributes. For example, incentives for all-electric equipment can lower energy costs for residents and improve local air quality, in addition to reducing GHG emissions in the community.
Community Choice Aggregation (CCA)	A local, non-profit public agency that procures energy sources for electricity generation for use in the community. CCAs typically use existing infrastructure owned and operated by the incumbent utility provider but procure the electricity independently of the utility provider.
Electric Vehicle (EV)	A car, truck, or other on-road vehicle that is powered by electricity rather than fossil-fuels like diesel and gasoline. EVs store electricity in a large, rechargeable battery that can be recharged using an EV charger that is connected to the electrical grid.
Electric Vehicle Supply Equipment (EVSE)	EV chargers and all other EV charging equipment and infrastructure (e.g., electrical conduit and associated software).
Equity	The distribution of resources which provides for equal outcomes, given the understanding that many sub-groups and populations in the United States have experienced multi-generational disadvantages relative to others through historical and existing government policies, systems, and cultural institutions.
Funding and Financing Pathway	A combination of financial options which, together, generate the capital needed to support a project or program. In the context of this CAP, financial options include grants, partner sponsorships, state or utility incentive programs, loans, bonds, fees, and taxes.
GHG Emissions Forecast	A future estimate of a community's GHG emissions based on the community's existing GHG emissions profile, expected population, housing, job growth, and future conditions expected to change community behaviors. A business-as-usual (BAU) forecast only considers population, housing, and job growth. An adjusted forecast adjusts the BAU forecast to consider state-level legislation and policies expected to reduce emissions in the future.

GLOSSARY TERM	GLOSSARY DEFINITION
GHG Emissions Inventory	A complete accounting of the GHG emissions that arise from a community's activities which are within the jurisdictional control of the local government. Generally, a community inventory includes GHG emissions from electricity and natural gas usage to power buildings and other infrastructure within the community, such as the energy required to transport, treat, and manage water and wastewater; combustion of fuel for cars and other vehicles operated within the community; and processing of community-generated waste in the landfill. Inventories are geographically and temporally bounded by the jurisdictional boundary and the year activities were conducted.
GHG Emissions Target	A future GHG emissions reduction goal for a community that can be quantitatively achieved based on a CAP. GHG emissions targets for communities in California generally align with state-level goals for reducing GHG emissions, such as Senate Bill 32, which calls for a 40% reduction from 1990 emissions levels by 2030.
GHG Mitigation	Reduction or removal of GHG emissions in the atmosphere to slow climate change.
Mass Emissions	The total GHG emissions generated by a community within a year in units of metric tons (MT) of CO_2e.
Mode Share	A measurement of the percentage of residents and employees who commute using a given transportation mode. For example, a community with 6% bicycle mode share is one in which 6% of a community's total trips are taken by bicycle.
Parklet	A sidewalk extension that provides more space and amenities for pedestrians using the street or businesses on the block, usually installed in a parking lane adjacent to the sidewalk.
Per Capita Emissions	The GHG emissions generated per person in a community within a year in units of MT CO_2e/person.
Public-Private Partnership (PPP)	A collaborative partnership between a government agency and a private-sector company that can be used to finance, build, and operate projects.

GLOSSARY TERM	GLOSSARY DEFINITION
Qualified Greenhouse Gas Reduction Plan	A long-range planning document that meets the requirements of CEQA Guidelines § 15183.5(b). A qualified greenhouse gas reduction plan must (1) quantify existing and projected greenhouse gas emissions within the plan area, (2) establish a reduction target based on Senate Bill 32, (3) identify and analyze sector-specific greenhouse gas emissions from plan activities, (4) specify policies and actions (measures) that local jurisdictions will enact and implement over time to achieve a specified reduction target, (5) establish a tool to monitor progress and amend if necessary, (6) be adopted in a public process following environmental review. This CAP serves as a qualified GHG Reduction Plan.
Renewable/ Alternative Energy	Energy that is collected from renewable resources that are naturally replenished on a human timescale, including solar power, wind power, and geothermal power.
Resilience	The ability to anticipate, prepare for, and respond to hazardous climate events, trends, or disturbances. This involves taking action to improve the City's adaptative capacity.
Sector	A subset of GHG emissions generating activities. This CAP addresses GHG emissions in the building sector, transportation sector, waste sector, and carbon sequestration sector.
Shared Mobility	Transportation methods which involve publicly shared use of the vehicle. This includes carpooling, public transit, car-share, and bike-share.
Transportation Demand Management	A jurisdiction, company, or institution's application of strategies and policies to reduce mileage travelled by fossil-fuel powered passenger vehicles (usually among employees) and instead distribute it among other modes of transportation such as biking, taking public transit, or working from home.
Tree Canopy Cover	The total coverage of the ground in an area by leaves, branches, and stems when viewed from above.
Underserved Communities	A community or subset of the local population which has faced or currently faces barriers in accessing public resources and wealth due to generational disadvantages, language barriers, and/or discrimination.

GLOSSARY TERM	GLOSSARY DEFINITION
Vulnerable Populations	Subgroups of the population that are particularly vulnerable to climate change impacts. These generally include, but are not limited to, people in low-income areas, communities of color, young children and the elderly, people experiencing homelessness, outdoor workers, and socially or linguistically isolated people.
Waste Diversion	Waste that does not end up in the landfill but is instead composted, recycled, or incinerated.

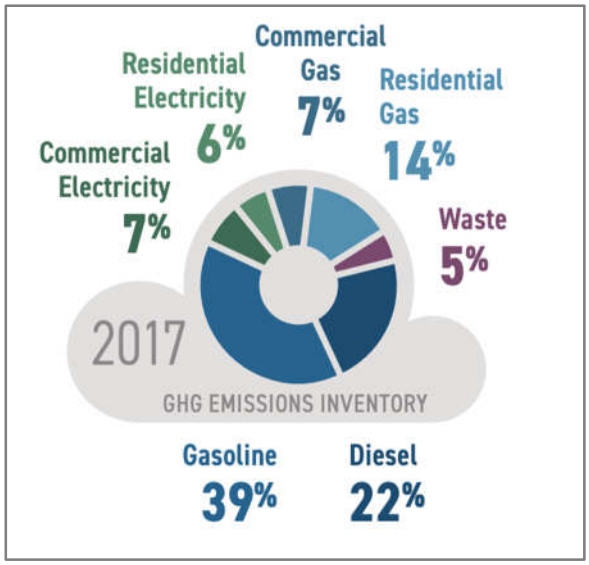
APPENDICES

This page is left blank intentionally

APPENDIX A:
Community Outreach Results and Feedback

Introduction

The City of Chico is developing a Climate Action Plan, which will provide the basis for prioritizing, budgeting, implementing, and monitoring greenhouse gas reduction strategies. The CAP will be the City's roadmap for achieving newly established greenhouse gas emission reduction goals for 2030-2050. Development of the Plan will be done in collaboration with decision makers and community leaders to increase awareness of climate change, establish new greenhouse gas emission reduction goals, and inform key CAP measures which will enable the City to achieve or exceed these goals.



Chico's greenhouse gas emissions inventory from 2017.

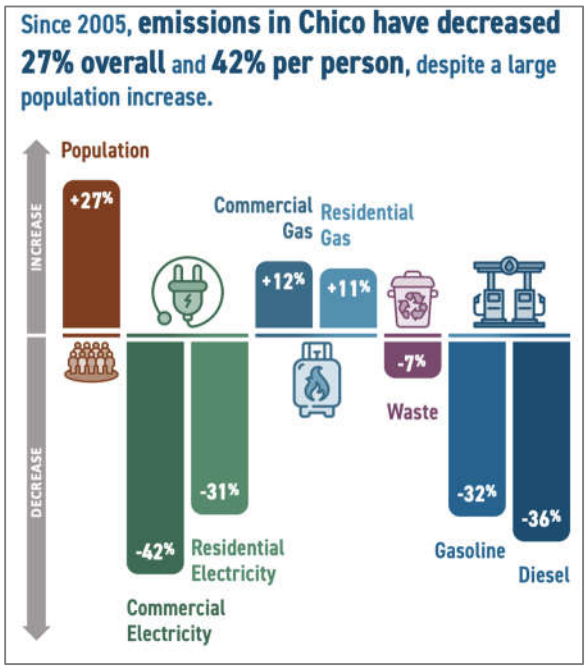
Methodology

The informational and animated video, online quiz, and community survey provided participants with an opportunity to test their knowledge about Chico's current greenhouse gas emission contributions, learn about the plan, and provide their thoughts on high-level potential climate action strategies at the early phase of the process.

The project team received 349 submissions from community members. A full list of the comments submitted is available in this document's appendix.

The online questionnaire consisted of fifteen questions on:

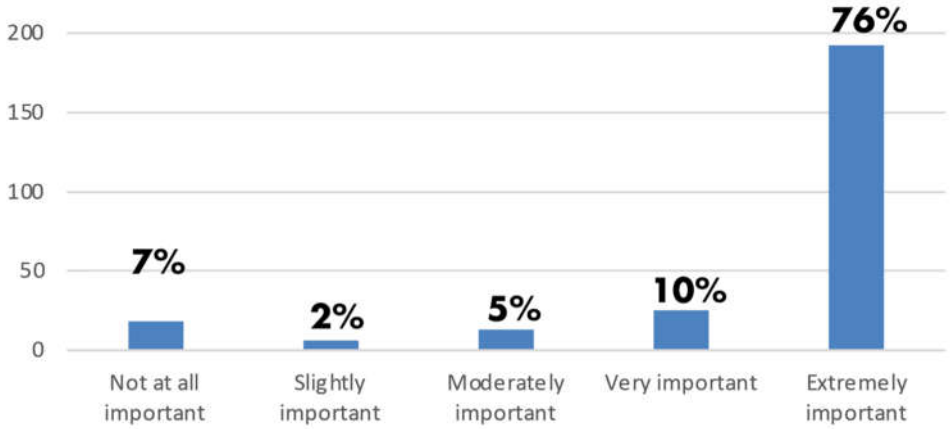
- How important it is for the City to implement programs and policies to reduce greenhouse gas emissions
- Concerns about climate change impacts
- Potential high-level greenhouse gas reduction strategies
- Concerns about the cost of implementing programs and policies to reduce greenhouse gas emissions
- Perceived barriers around switching to all-electric appliances and solar panels
- Barriers to walking, biking, and taking transit as a primary mode of transportation
- Compost services



Data illustrating the decrease in Chico's greenhouse gas emissions since 2005.

Overview of Results

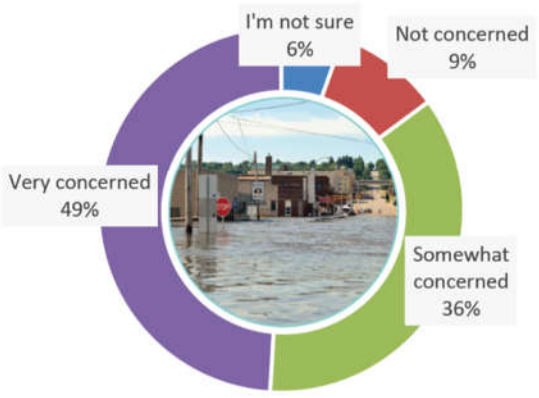
How important is it for the City to implement programs and policies to reduce greenhouse gas emissions?



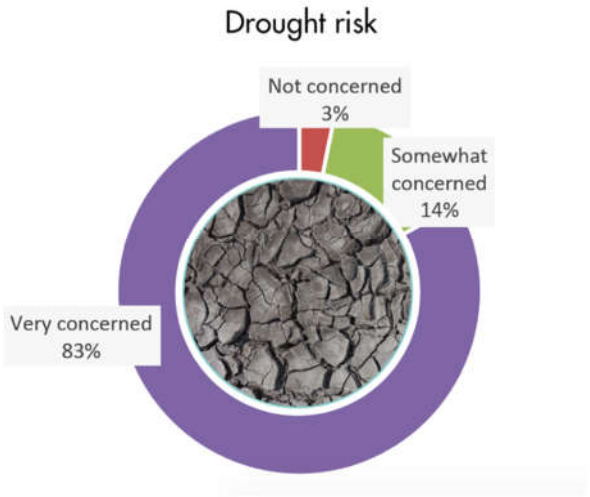
The majority of respondents – more than 90% - identified reducing greenhouse gas emissions as at least a moderately important priority for the City.

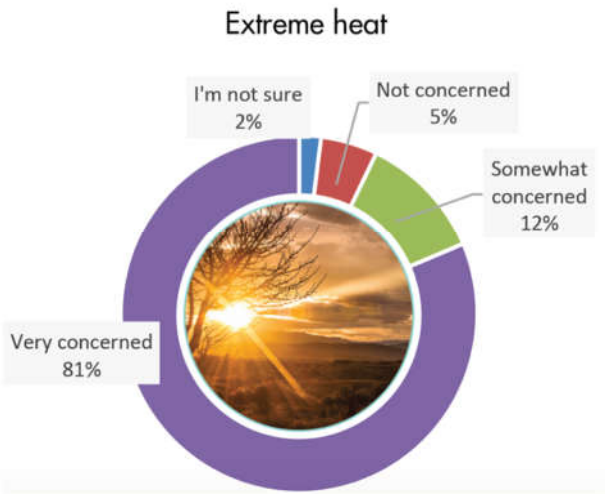
Climate change is expected to impact Chico in several ways including more extreme heat events, less but more intense rainfall, wildfires, and reduced water availability. How concerned are you about the following climate change impacts in Chico?

Heavy rainfall and flooding



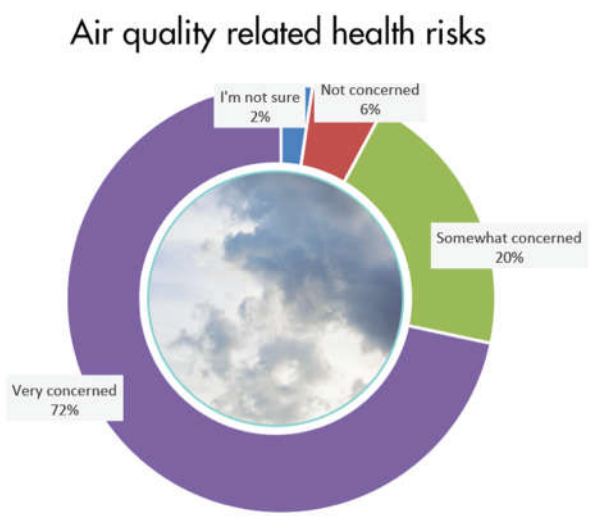
Changes to snowpack and water availability

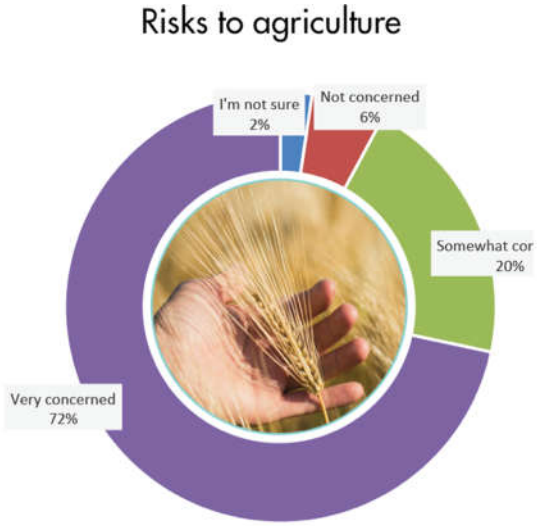




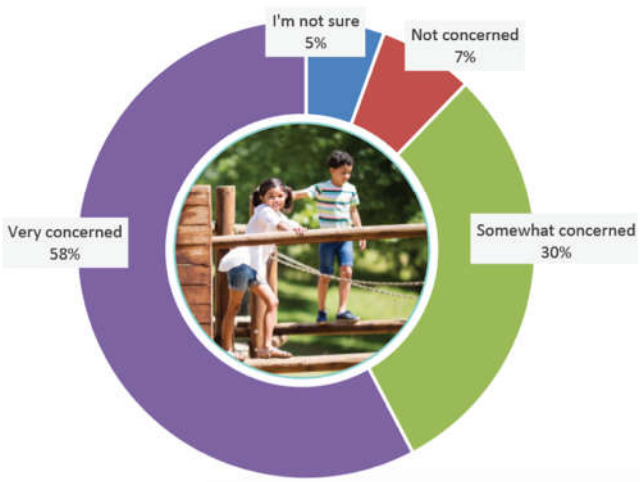
More than 80% of participants expressed they are very concerned about the risk of drought, extreme heat, and changes to snowpack and water availability as anticipated climate change impacts in Chico. Less than half identified heavy rainfall and flooding as an impact they are very concerned about, while 36% shared they were only somewhat concerned about this impact.

How concerned are you about the following climate change impacts in Chico?

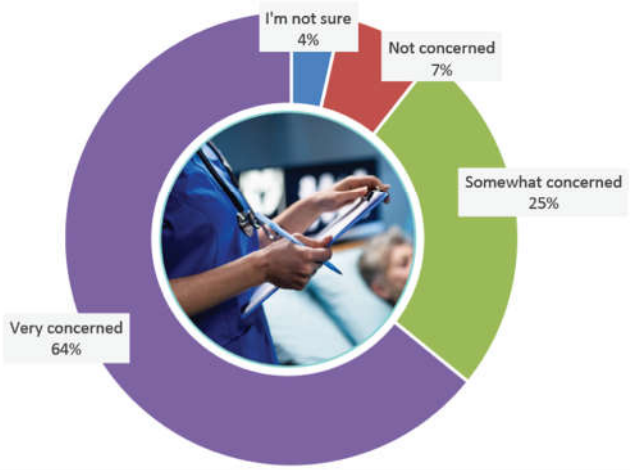




Loss of recreational opportunities



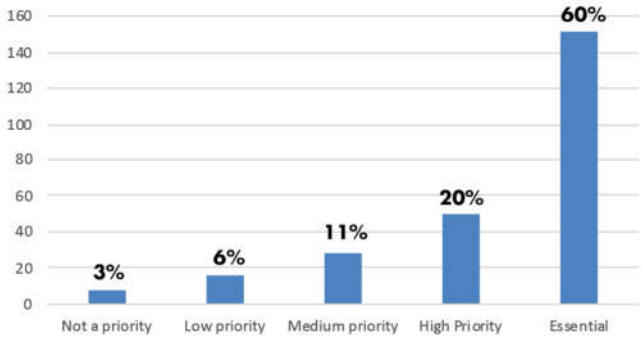
Health-related risks



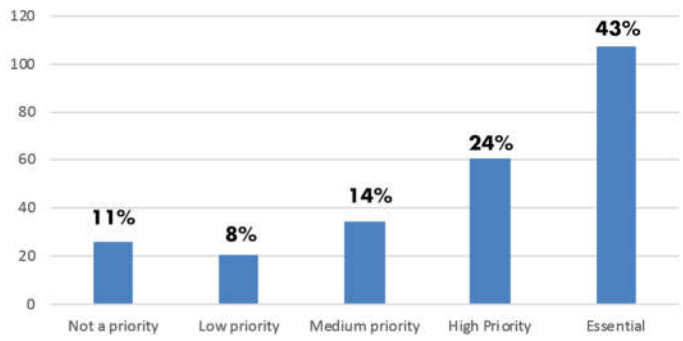
72% of respondents expressed the most concern about air quality related health risks and risks to agriculture as a result of climate change in Chico. Less than a third of community members, 30% and 25% respectively, expressed a loss of recreational opportunities and general health-related risks as impacts they are somewhat concerned about.

How should the City government prioritize the following GHG reduction strategies?

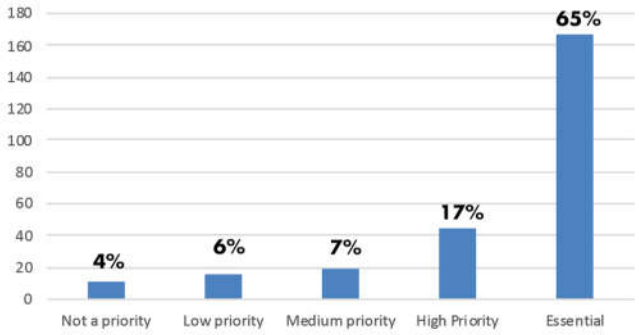
Energy efficient upgrades for buildings



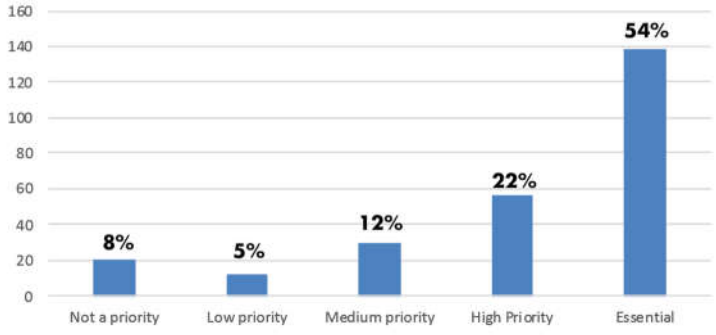
Electrification of buildings



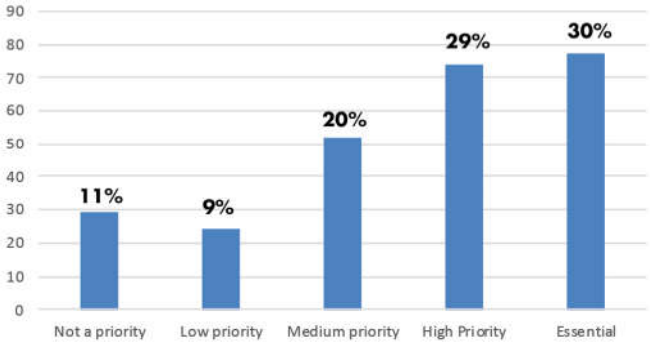
Solar panel and/or battery storage on buildings



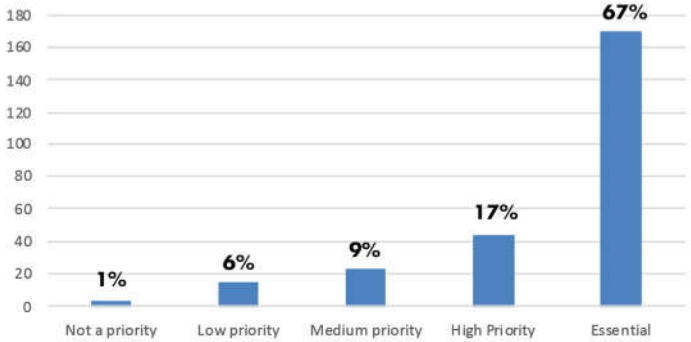
Improved infrastructure for cyclists & pedestrians

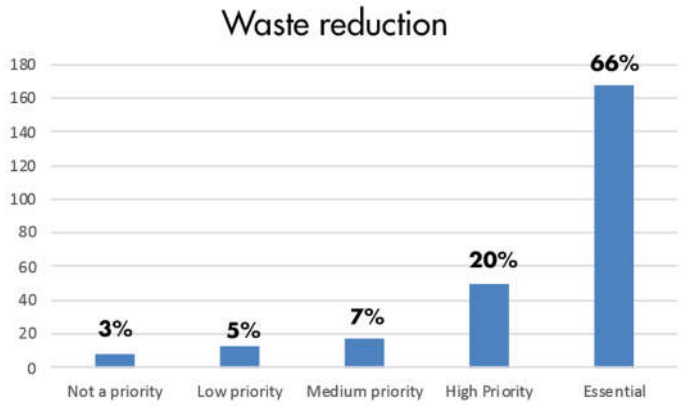


More electric vehicle chargers and infrastructure



Water conservation



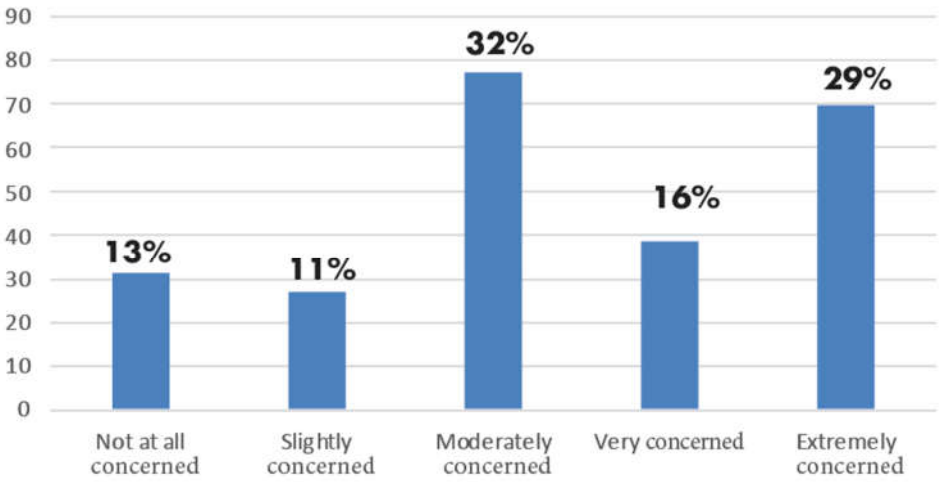


Water conservation received the largest number of respondents, 67%, prioritizing it as an essential reduction strategy for the City. At least 60% agreed that solar panel and/or battery storage on buildings in addition to energy efficient upgrades for buildings and waste management strategies are also essential strategies. Meanwhile, only 30% of participants expressed that more electric vehicle chargers and infrastructure should be an essential priority for the City.

Some of the other greenhouse gas reduction strategies suggested by participants include:

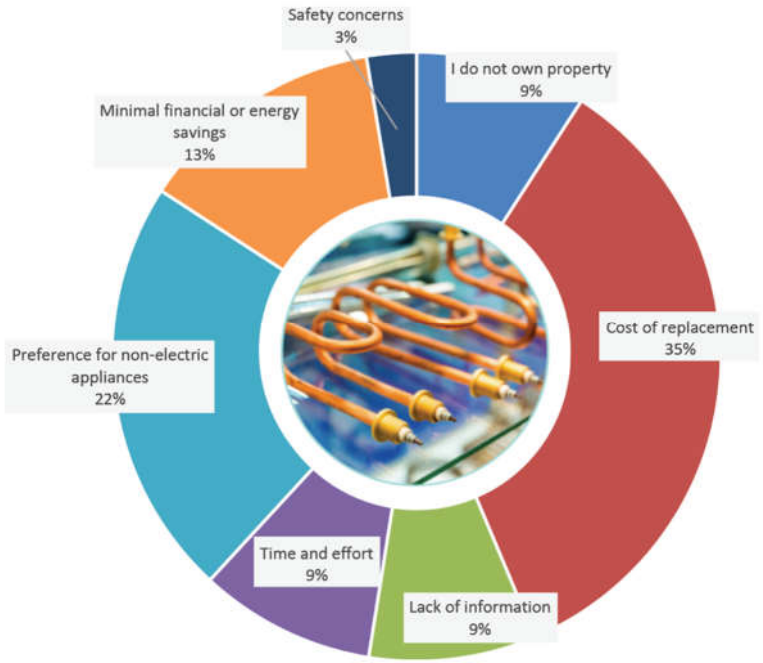
- Encourage localized production and consumption of goods
- Improve public transportation and create disincentives for driving cars
- Create gardens in empty lots
- Ban Styrofoam
- Make downtown Chico open to only pedestrians
- Plant more native trees to create shade throughout the city
- Build smaller and more efficient new buildings
- Increase community education about climate change

How concerned are you about the cost of implementing programs and policies to reduce greenhouse gas emissions?



Approximately 77% of respondents said they were at least moderately concerned about the cost of implementing programs and policies to reduce greenhouse gas emissions.

Which of the following perceived barriers would keep you from switching to all-electric appliances, such as electric or induction stovetops, electric furnace, etc.?

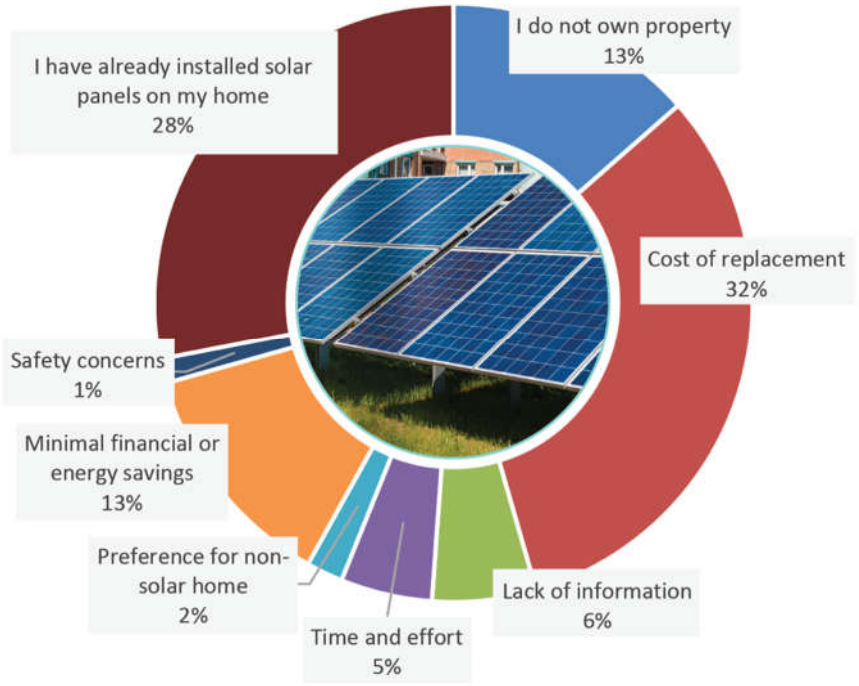


35% of participants said the cost of replacing the all-electric appliances is a key perceived barrier they have around switching their household appliances to all-electric ones. Additionally, 22% said they have a preference for non-electric appliances, and 13% shared they thought the electric appliances would not provide them with sufficient financial or energy savings.

Other perceived barriers respondents said would keep them from switching to electric appliances include:

- Safety concerns for children
- Power outages
- Associated waste of decommissioning existing functional appliances
- Cost of electricity bills
- Source of electricity and its impact on the natural environment

Which of the following perceived barriers would keep you from installing solar panels on your home?

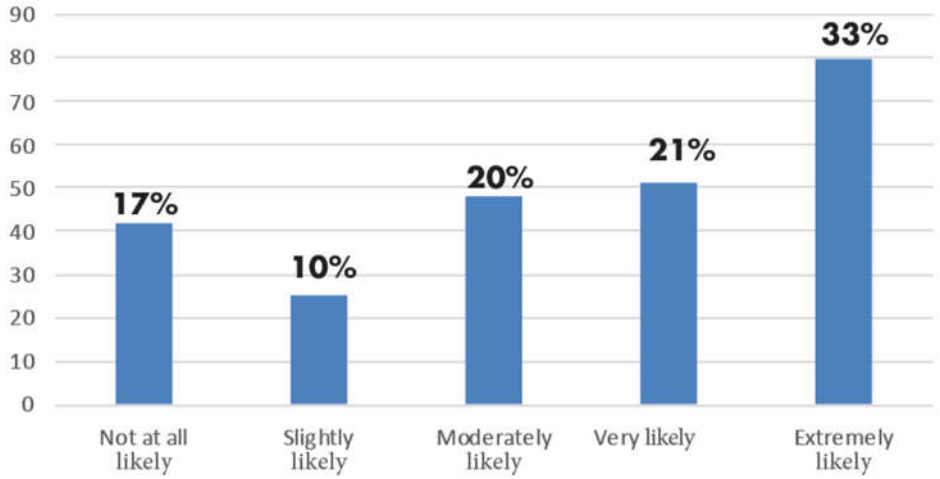


28%, more than a quarter, of respondents said they already have installed solar panels on their home. Meanwhile, of the participants who did not have solar panels on their home already, 32% they had concerns around the cost of replacing the panels. In addition, 13% of respondents said they do not own their home, and thus would not be able to make the decision regarding installing solar panels.

Other perceived barriers respondents said would keep them from installing solar panels in their home include:

- Minimal sun exposure
- Lack of knowledge about the best systems and management
- Homeowner association restrictions
- Disposal of the panels after their life is exhausted

How likely would you be to switch to walking/biking as your primary mode of transportation if this infrastructure was significantly improved in Chico?

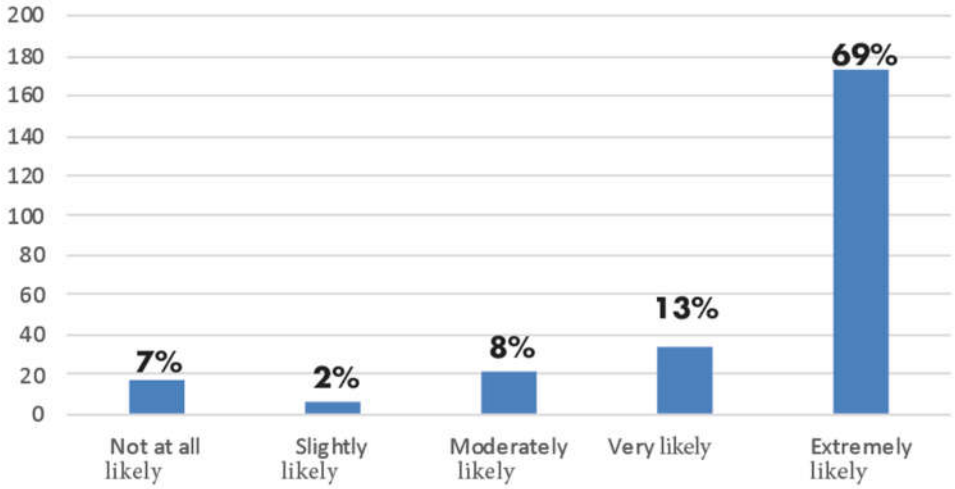


Approximately one-third of respondents (33%) said they would be extremely likely to switch to walking / biking as their primary mode of transportation if the infrastructure in Chico was significantly improved. A total of 74% said they would be at least moderately likely to make the switch, while 17% shared they would not be likely to at all.

What other hurdle, if removed, would encourage you to use biking/walking or transit as your primary mode of transportation?

The majority of respondents expressed a need for improved safety, especially at busy intersections and on bike trails, to encourage them to bike and/or walk as a main transportation mode. Other respondents shared that they have physical health issues that keep them from walking and/or biking, while some live too far away from their place of employment to feasibly walk or bike. Convenience was another key factor in whether or not a participant said they would be willing to bike, walk, or take transit; several respondents said they either did not have the time to use these alternate modes, or they have schedules that do not always allow for flexibility. There was also an expressed desire for more trees and shade, as summer months in Chico tend to be in the higher temperatures, which can be uncomfortable to walk and bike in. Finally, more frequent bus routes and places to shower at work upon arrival would also help community members make the transition from driving to biking, walking, and taking transit.

How likely would you be to compost, if compost services were provided to you?



The majority of respondents (90%) shared that they would be at least moderately likely to compost, if those services were provided to them.

What are the primary barriers you face in switching from a gasoline fueled car to some other form of transportation, such as walking, biking, public transit, carpool, or using a hybrid or electric vehicle?

Participants identified cost was the most common barrier associated with switching from a gas-fueled car to a hybrid or electric car. In addition to the cost of the new vehicle, the cost of charging it as well as the limited driving range were also key barriers discussed. While some participants expressed an interest in taking public transit, they stated a need for the City's bus service to be more frequent and convenient. For the respondents who identified biking as a potential mode of transportation, they identified the lack of safety for cyclists as a major concern in addition to concerns around bike theft, weather, and long distances.

What are your thoughts on an electrification ordinance in Chico?

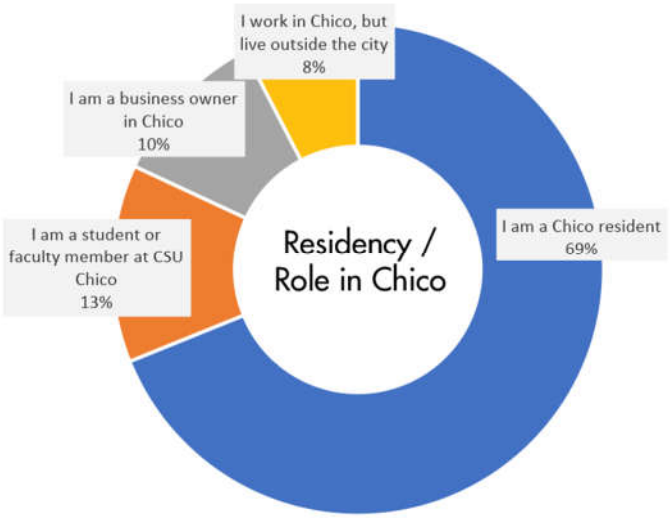
Approximately 47% of respondents said they would support an electrification ordinance, while 15% said they would oppose it. However, 38% of participants said they did not have enough information about the cost, implementation, or impacts on residents versus businesses to determine if they would support or oppose such an ordinance. Of the respondents opposing the idea, many said they wanted more details about how the ordinance would be implemented and how the City would handle costs. Additionally, some of these respondents identified that while it may be necessary to transition to electric buildings, it may not be feasible or the best approach to pass an ordinance to achieve this goal.

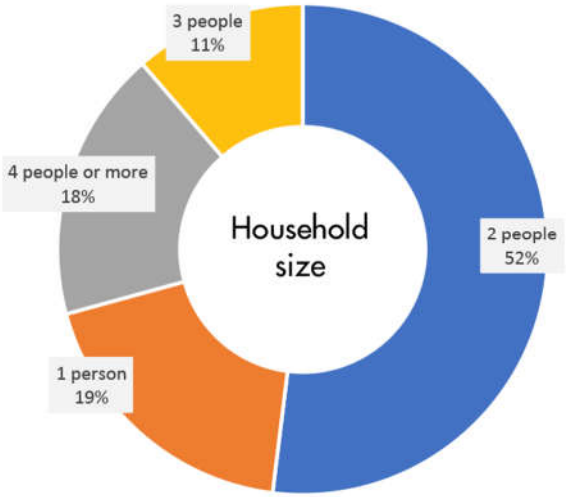
What are some important strategies the City could do to reduce its emissions to zero by 2045?
Some of the respondents' suggested strategies focused on a need for community education about the realities of the climate crisis and the potential to do something about it. Several participants said they would like to see public transit improved to encourage ridership and make it a feasible transportation mode for residents, and others shared the need for more accessible bike paths throughout the City. A few respondents shared that they thought the City could implement better waste management strategies, as well as ban Styrofoam. Finally, one respondent suggested the City partner with businesses to offer more telecommuting options for employees to reduce the number of vehicle trips in and out of Chico.

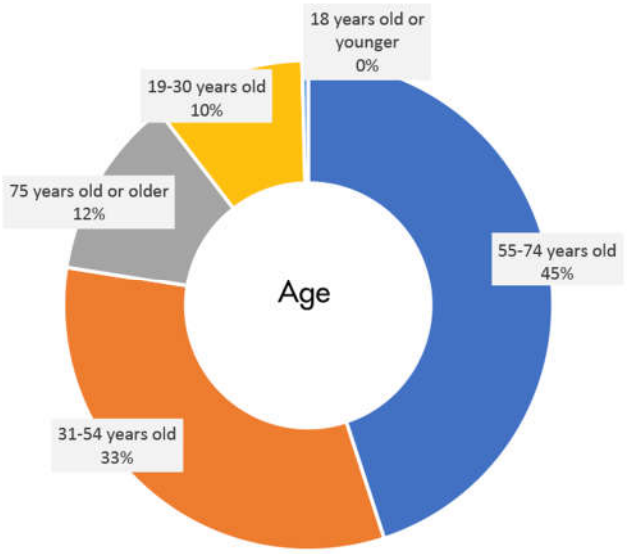
What else would you like the City to consider while developing their Climate Action Plan Update?
Participants shared a multitude of ideas for the City to consider as it develops the Climate Action Plan. Some of these ideas include: provide transportation services for the elderly who live in their homes; identify ways to protect Chico's parks and waterways from pollution; identify funding sources to implement the plan's strategies; and ensure low income and vulnerable populations have a voice and representation in the plan's development and implementation.

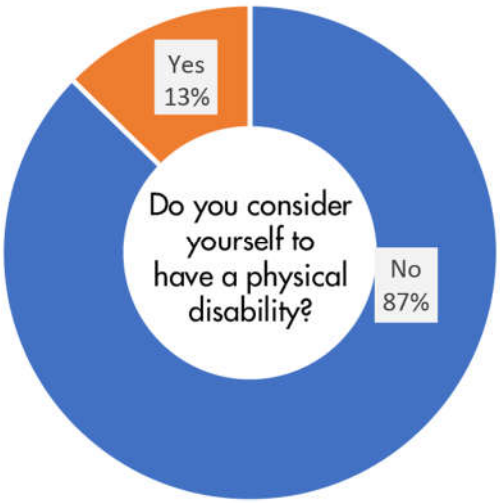
Demographics

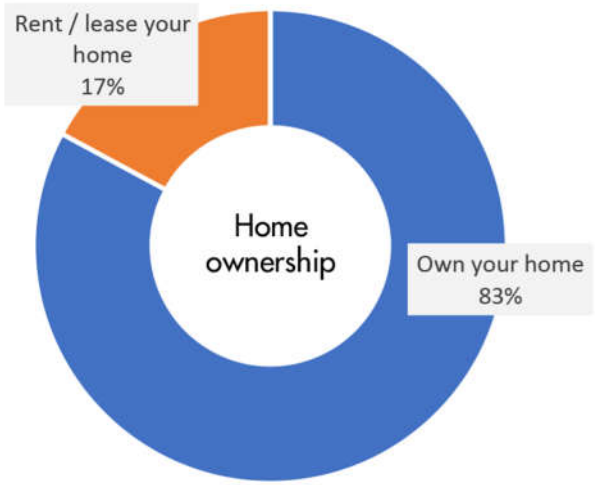
The online questionnaire also asked a series of optional demographics questions. Participants' responses are summarized by the graphs below.

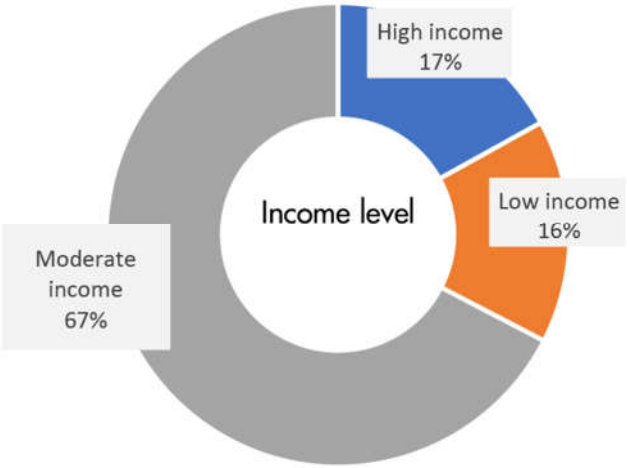





Age
18 years old or younger 0%
19-30 years old 10%
75 years old or older 12%
55-74 years old 45%
31-54 years old 33%


Do you consider yourself to have a physical disability?
Yes 13%
No 87%


Home ownership
Rent / lease your home 17%
Own your home 83%


Income level
High income 17%
Low income 16%
Moderate income 67%

Notification

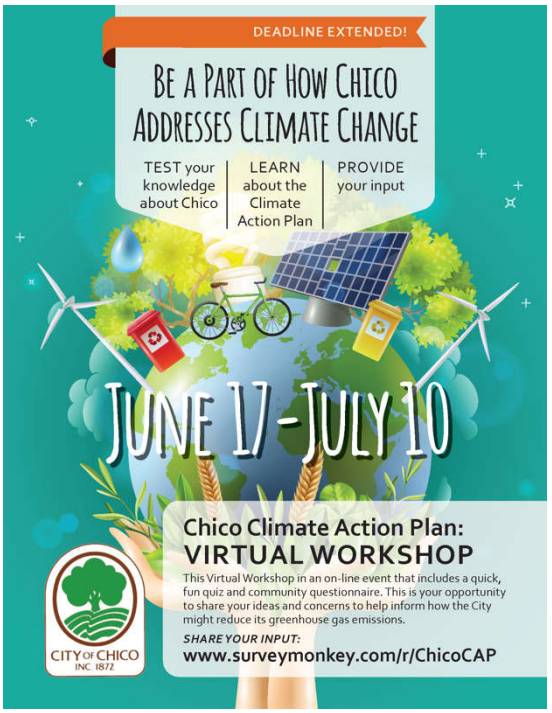
The City of Chico posted the online community questionnaire on the project website: http://chicocap.rinconconsultants.com/

Several email notifications were distributed to a database of more than 350 recipients, which included residents, businesses, and community groups.

Social media messages were posted on Facebook, Twitter, Instagram and Nextdoor resulting in more than 4,500 impressions.

The City shared the informational video via their email and social media. The City also coordinated with Telemundo, which aired a news story on the project and online questionnaire.

The project team reached out to more than 45 groups through personal phone calls and emails to notify them about the project and available outreach opportunity.



Thirteen groups agreed to share information with their members, including:

- Chico Sustainability
- Sunrise Movement Chico
- CSU Chico Gateway Science Museum
- Butte County Air Quality Management
- 350 Butte County
- Avenues Neighborhood Association
- North Valley Property Owners Association
- Valley Contractors Exchange
- Sierra Club – Yahi Group
- Butte Environmental Council
- CalWater
- Butte County Association of Governments
- Chico Buildres Association

Additionally, 10 community members shared information on social media through their personal pages.

Virtual Community Workshop Summary

Introduction

The City of Chico is developing a Climate Action Plan (CAP), which will provide the basis for prioritizing, budgeting, implementing, and monitoring greenhouse gas reduction strategies. The CAP will be the City's roadmap for achieving newly established greenhouse gas emission reduction goals for 2030-2050. Based upon an inventory analysis of Chico's current greenhouse gas emissions, best practices in the environmental science and planning industry, and stakeholder and community input, the City and project team have developed a list of proposed climate action measures.

The City hosted a virtual community workshop in both English and Spanish to build awareness about the CAP effort, present key proposed strategies that will support the City's goal of reducing greenhouse gas emissions and obtain informed input on these key strategies. The virtual workshop was open for one month, from November 19 through December 20.

Approximately 57 households participated and provided more than 275 comments and responses to the workshop prompts.

Methodology

The virtual community workshop consisted of a short informational video and nine-page interactive document. The video provided an introduction to the CAP effort and an overview of the eight key proposed strategies, or measures, developed for the plan.

You can watch the video at the following link: https://www.youtube.com/watch?v=OQxsRtbqThw

The interactive document included an introduction page and one page explaining each proposed measure, how it might be implemented, and anticipated associated costs. Each proposed measure page asked participants to respond to a yes or no question, "Do you think this measure could work in Chico?"

Additionally, respondents were able to submit open-ended comments about each measure, view other respondents' comments, and reply to them.

An overview of the virtual community workshop.

The proposed measures described in the workshop are as follows:

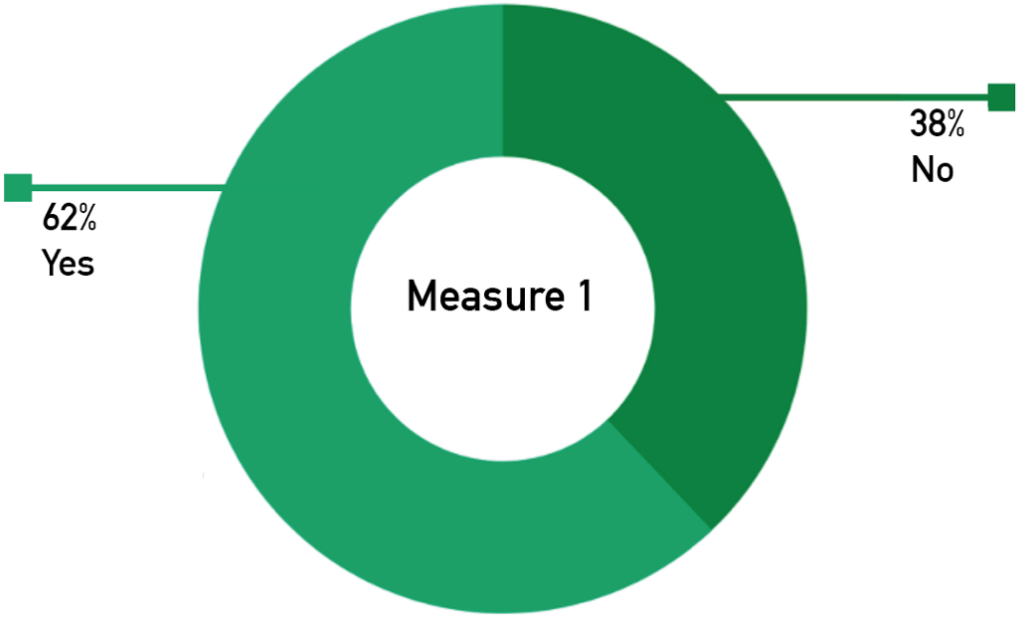
1. Require new construction to be all-electric: Adopt a new building ordinance which bans the installation of natural gas in new construction for building types where electrification is shown to be cost-effective.
2. Electrify existing residential buildings in two phases: first incentivize, and then require, electrification of existing buildings. Adopt an electrification ordinance for existing residential buildings in 2025 to transition natural gas appliances to electric at time-of-replacement.
3. Electrify municipal buildings: Adopt an electrification plan to convert municipal buildings to all-electric.
4. Provide 100% renewable electricity to the community.
5. Continue to implement the Chico Bicycle Master Plan.
6. Improve ZEV (zero emission vehicle) infrastructure to allow for a 25% shift from combustion vehicles to ZEVs by 2030.
7. Work with waste haulers and other stakeholders to meet the goals of SB1383 and divert at least 75% of organic waste from the landfill through an expansion of composting services and edible food diversion.
8. Expand the urban tree canopy by 700 trees by 2022 and 4,500 trees by 2030 to sequester carbon, decrease temperatures, save energy, and improve air quality within Chico.

Results

Below is a summary of community responses to the workshop, represented by graphs. A full list of all comments is available in this document's Appendix.

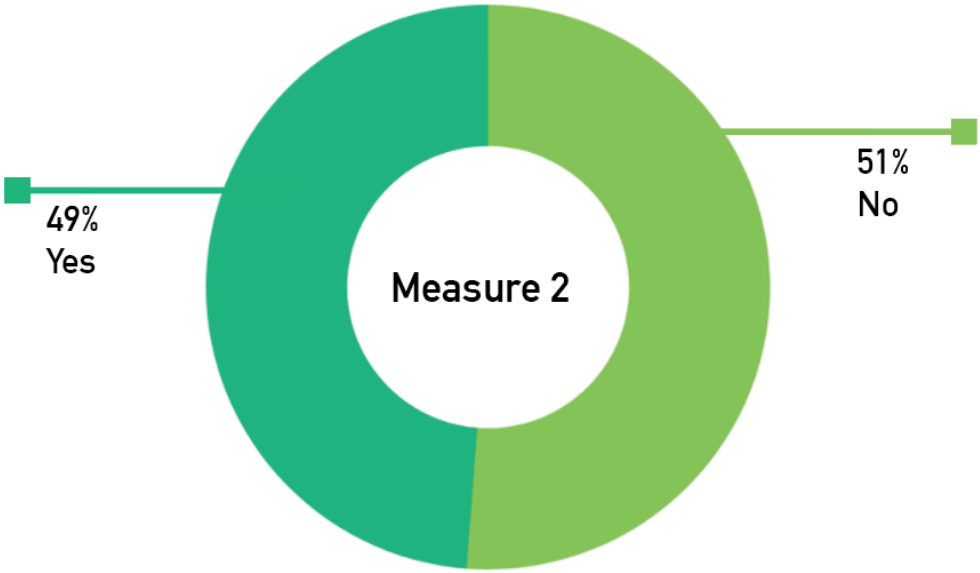
Measure 1: Require new construction to be all-electric

Do you think this measure could work in Chico?



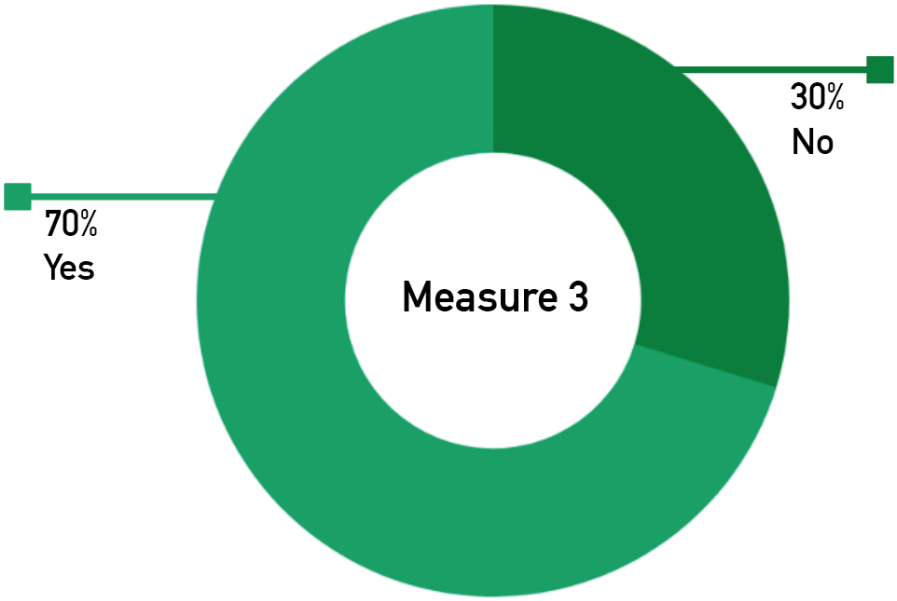
Measure 2: Electrify existing residential buildings

Do you think this measure could work in Chico?



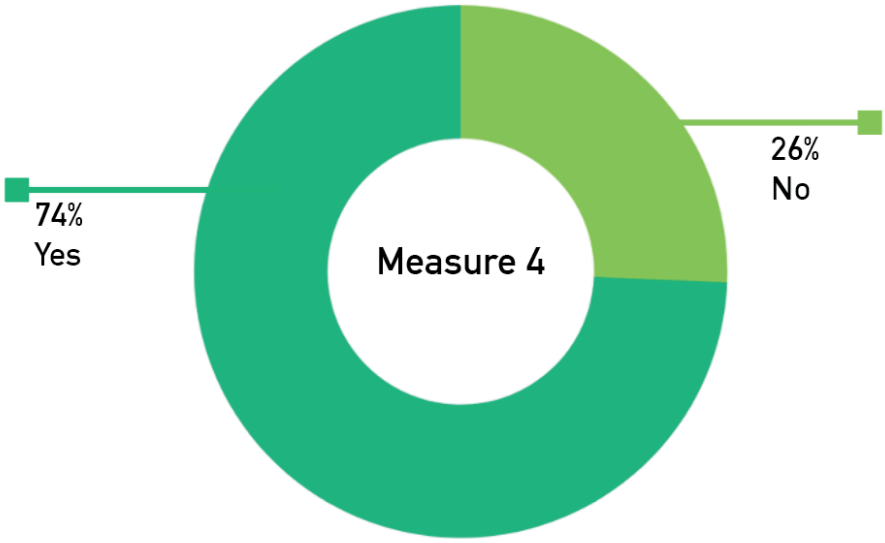
Measure 3: Electrify municipal buildings

Do you think this measure could work in Chico?



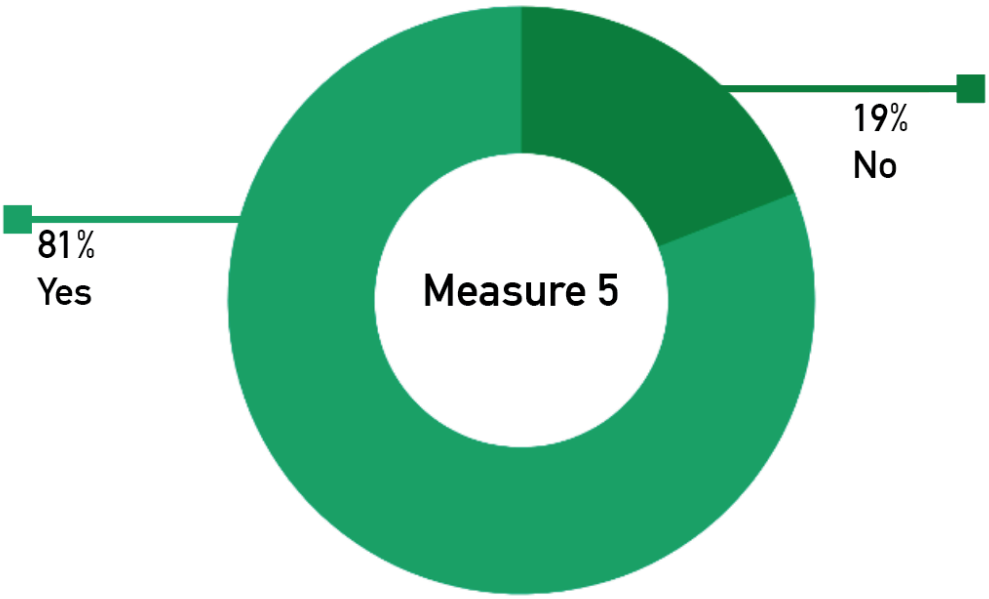
Measure 4: 100% renewable energy

Do you think this measure could work in Chico?



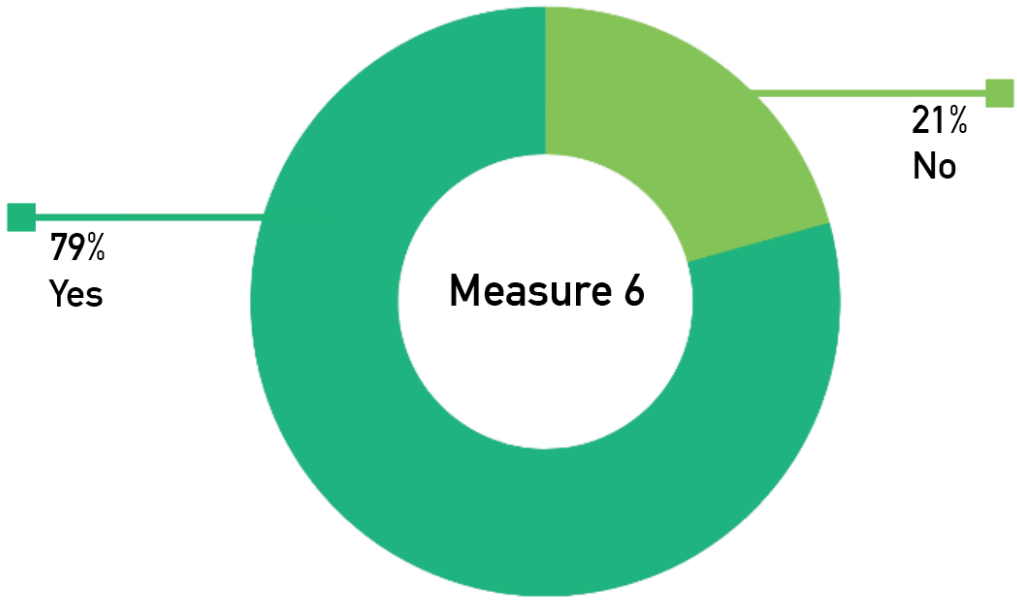
Measure 5: Implement the Chico Bicycle Master Plan

Do you think this measure could work in Chico?



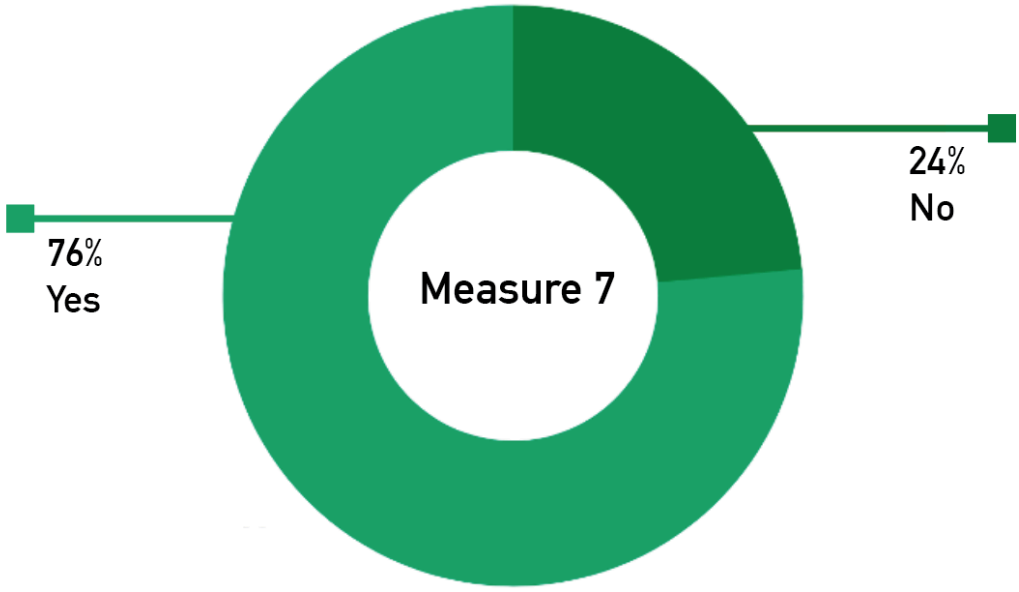
Measure 6: Improve zero-emission vehicle infrastructure

Do you think this measure could work in Chico?



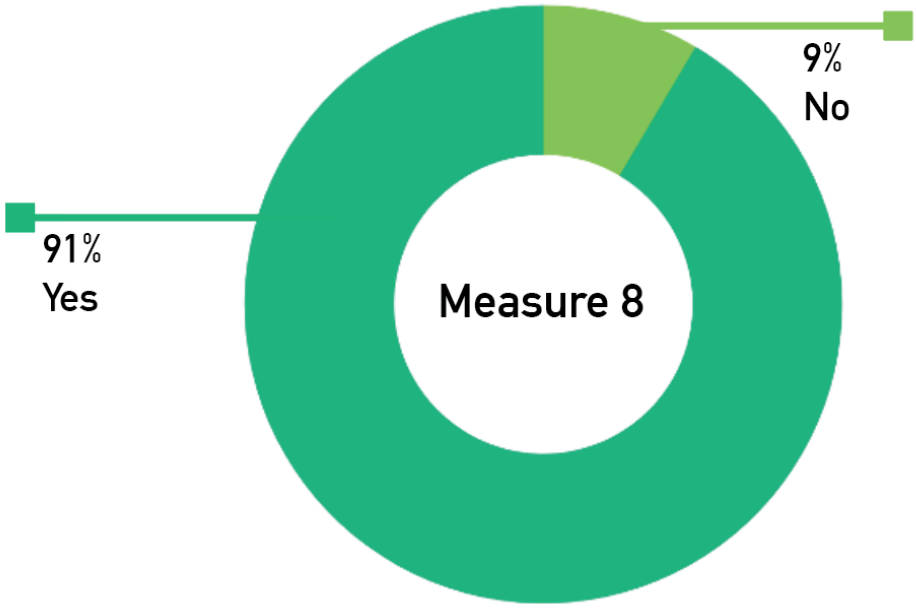
Measure 7: Reduce organic waste

Do you think this measure could work in Chico?



Measure 8: Expand the urban tree canopy

Do you think this measure could work in Chico?



Building Awareness

The overall virtual workshop effort included a public information campaign to build awareness about the project and the City of Chico's goal to reduce greenhouse gas emissions. The project team implemented a variety of strategies to reach the community at large and inform them about the second phase of the Chico Climate Action Plan and the virtual workshop. The project team reached more than 4,490 community members in the Chico area through the strategies described below.

Community Partnerships

Fifty stakeholders received personal calls and emails asking them to share information about the virtual workshop and project with their organization through their existing communication links, including e-newsletters and social media. The following organizations shared information:

- 350 Butte County – social media, email distribution
- Butte County Air Quality Management – email distribution
- Butte Environmental Council – email distribution
- California State University Chico – campus announcement to students / faculty / staff, Green Campus social media, Campus Sustainability Committee
- Chico Builders Association – email newsletter
- Chico Chamber of Commerce – information on their public calendar

- Chico Noon Rotary Club – email distribution
- Chico Unified School District – social media
- Chico Velo Cycling Club- social media
- City of Chico – news release to local and regional media outlets, social media
- Enloe Medical Center – email to staff
- Environmental Coalition of Butte County – email distribution
- Holiday Inn Express and Suites Chico – posted in lobby
- Sierra Club - Yahi Group – email distribution
- Valley Contractors Exchange – email newsletter

Digital Content Distribution

Email notifications were sent to more than 200 community members in the Chico area with information about the virtual workshop and a call to action to participate. The emails received a 39% open rate and 35% click rate.

The City of Chico shared information about the virtual workshop on their website, social media pages, and via a media release to local and regional news outlets.

Social Media Targeted Advertisements

The following social media analytics include reach, post engagement, and link clicks. Reach refers to the total number of people who have viewed the social media advertisement. Post engagement includes all actions that people take involving ads while they are running. Post engagements can include actions such as reacting to, commenting on or sharing the ad, claiming an offer, viewing a photo or video, or clicking on a link.

<u>By Geographic Location</u>

Post #1: Chico (11/20 – 11/25)

- Reach: 1,016
- Engagement: 58

Post #2: Chico (12/8 – 12/15)

- Reach: 622
- Engagement: 50

Post #3: Chico (12/8 – 12/15)

- Reach: 531
- Engagement: 12

<u>By Demographic</u>

Post #2: Spanish-speaking community (11/20 – 11/25)

- Reach: 624
- Engagement: 11

Social media messages were posted on Facebook and Instagram and reached a total of more than 4,490 residents.

Page Views

Based on the virtual community workshop website analytics report, workshop received approximately 2,375 views with more than 950 unique pages views. On average, workshop visitors spent about forty minutes reviewing the workshop's interactive document content.

Appendix

- Interactive Workshop Document
- Comprehensive List of Workshop Comments
- Notification Flier

Appendix

This page is left blank intentionally

WHY SHOULD WE ACT ON CLIMATE?

The City of Chico's Climate Change Vulnerability Assessment outlines the potential climate impacts Chico is expected to see over time. The number of extreme temperature days, heat waves, and wildfires vary greatly depending on the amount of greenhouse gasses (GHGs) that humans emit over time. These impacts have secondary impacts as well reducing snowpack, negatively effecting sensitive habitats like Bidwell Park, and potentially requiring human migrations like Chico has already experienced due to the Camp Fire.

International Panel on Climate Change (IPCC) projections show that a reduction in GHG emissions to carbon neutrality by mid-century is required to limit warming to 2.7 degrees Fahrenheit and limit the worst impacts of climate change. Chico's Climate Action Plan proposes to reduce GHG emissions to net zero by 2045 to be consistent with State and global targets.

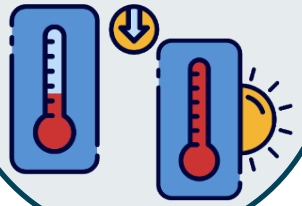
CHICO FACTS AT A GLANCE:

AVERAGE AREA BURNED EACH YEAR

Low Emission Scenario:
44 Hectares

High Emission Scenario:
59 Hectares

EXTREME HEAT DAYS EACH YEAR



Low Emission Scenario:
23 Days

High Emission Scenario:
44 Days

SIERRA MOUNTAIN SNOWPACK WATER

Low Emission Scenario:
3.6 inches

High Emission Scenario:
0.07 inches

CHICO'S PROPOSED GHG EMISSIONS REDUCTION TARGET

We need to reduce greenhouse gas emissions by the following amounts over the next 15 years:

2017: 5.1 MT CO_2e per Person

2030: 2.7 MT CO_2e per Person

2045: 0 MT CO_2e per Person

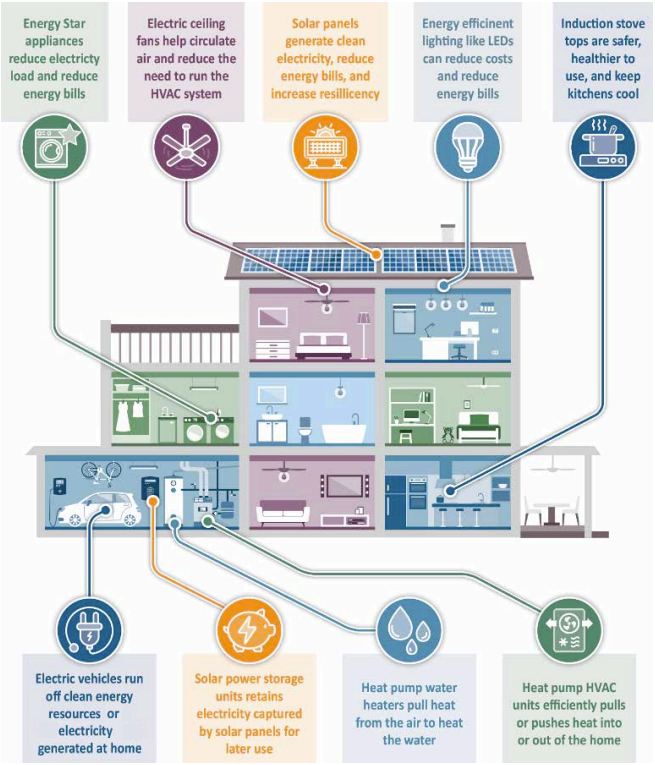
SCROLL DOWN TO LEARN ABOUT THE CITY'S TOP 8 PROPOSED MEASURES

PROPOSED MEASURE

Require new construction to be all-electric: Adopt a new building ordinance which bans the installation of natural gas in new construction for building types where electrification is shown to be cost-effective.

MORE ABOUT THE MEASURE

- This proposed ordinance takes advantage of increasingly renewable electricity in California and prevents future expensive retrofits to new natural gas equipment and infrastructure.
- This proposed ordinance will help support electric vehicle (EV) adoption by providing the necessary infrastructure for home charging in new developments.
- This ordinance would be implemented for new residential construction by 2022 and for new commercial construction by 2025.
- The ordinance would only apply for building types where electrification is shown to be cost-effective.
- Co-benefits of this ordinance include lower home-owner costs, improved air quality, and enhanced building safety.



WONDERING ABOUT COSTS?

- All-electric new construction is typically less expensive for contractors to build and for homeowners to live in when high efficiency appliances and solar are also installed.
- You can review a LocalEnergyCodes feasibility study at the following link: https://explorer.localenergycodes.com/studies/county-butte/

Chico's 2030 GOAL

Estimated carbon emissions reduced: 8,973 MT CO2e

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

PROPOSED MEASURE

Electrify existing residential buildings in two phases: first incentivize, and then require, electrificaiton of existing buildings. Adopt an electrification ordinance for existing residential buildings in 2025 to transition natural gas appliances to electric at time-of-replacement.

By adopting reach codes that incentivize energy efficiency & building electrification, cities can lead the way to a healther and more sustainable future.

BENEFITS

LOWER UTILITY BILLS
Renewable energy is becoming cheaper while natural gas prices are rising rapidly in many states.

SAFER BUILDINGS
In case of building damage (such as after an earthquake or other natural disaster), all-electric buildings are not exposed to fires from gas pipe breaks.

IMPROVED PUBLIC HEALTH
Electrification avoids prolonged exposure to natural gas fumes, which can lead to respiratory issues like asthma.

CLEANER AIR
All-electric buildings mean no natural gas combustion that generates toxic pollutants.

MORE AFFORDABLE HOUSING
All-electric homes cost less to build and operate than homes powered by natural gas.

LOWER CLIMATE IMPACT
Powering buildings with renewable energy is better for the climate.

Reach codes are local codes or ordinances that exceed the state code, providing increased flexibility to achieve local policy objectives. Reach codes must meet a particular set of criteria to be passed.

Chico's 2030 GOAL

Estimated carbon emissions reduced: 20,390 MT CO2e

MORE ABOUT THE MEASURE

- Voluntary adoption would be the focus of the first five years with education, outreach, and linking community to incentives from PG&E and others.
- The ordinance would also be implemented in two steps through the building permit process:
  - Phase I: Limit expansion of natural gas lines in existing buildings by 2022
  - Phase II: Starting in 2025, require HVAC systems and hot water heaters to be replaced with all-electric models at time of replacement.
- Starting in 2025, Chico residents would be required to meet building permit requirements by installing electric equipment when their water heaters and HVAC systems need to be replaced. The average life span of a water heater is 10 years and of an HVAC system is 18 years.

WONDERING ABOUT COSTS?

- The biggest barrier to this proposed ordinance is the potentially higher up-front cost for Chico residents. That's why Chico would only require all-electric equipment to be installed in existing buildings at time-of-replacement once funding or financing strategies are in place. While all-electric equipment is usually more expensive than natural gas equipment, this cost increase would be offset by incentives, rebates, and financing programs. In addition, when replacing both an HVAC and air conditioner with a single heat pump (that heats and cools) costs of electrification are actually lower!

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

PROPOSED MEASURE

Electrify municipal buildings: Adopt an electrification plan to convert municipal buildings to all-electric

MORE ABOUT THE MEASURE

- Municipal building electrification would be completed by 2045
- The electrification plan would include a new building electrification policy as well as an existing building natural gas phase-out policy
- Municipal electrification will help the City do its fair share in moving Chico to carbon neutrality by 2045
- When combined with a micro-grid electrification would allow municipal buildings to operate during power shutoffs or other emergencies.

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

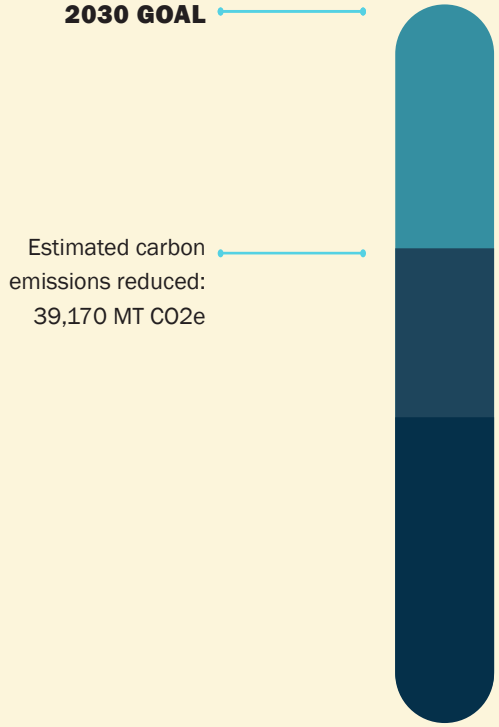
PROPOSED MEASURE

Provide 100% renewable electricity to the community.

CCA PURCHASES / GENERATES POWER

PG&E DELIVERS POWER, MAINTAINS LINES, BILLS CUSTOMERS

RESIDENTS RECEIVE POWER AT COMPETITVE / LOWER RATES + HAVE MORE LOCAL CONTROL



MORE ABOUT THE MEASURE

- Through this measure, the City of Chico will procure 100% renewable electricity for the community through Butte Choice Energy Community Choice Aggregation (CCA), in accordance with the ordinance authorizing the implementation of a CCA Program through a Joint Powers Agreement with Butte County, amending Title 15 of the Municipal Code. Automatically enroll community and municipal accounts to 100% renewable energy option by 2022 with an opt-out option.
- CCAs use the purchasing power of the community to procure electricity directly from electricity generators. This allows the community to choose its own grid mix, with an option to procure electricity from 100% carbon free generation sources.
- PG&E will continue to deliver power, maintain lines and infrastructure, and coordinate billing.
- To maximize the GHG reduction opportunity this presents, the City will automatically enroll all community accounts in a 100% carbon free option. Customers will have the option to opt-out of the CCA back to PG&E or opt-down to another grid mix option. It is expected that about 5% of residential customers and 15% of commercial customers will choose to opt-out. Municipal accounts will have 0% op-out.

WONDERING ABOUT COSTS?

- By 2022, BCE is expected to provide three power mix options for community members to choose from:
  - o Base Renewable Portfolio Standards (RPS) option with 33% renewable and 80% GHG free sourcing offered at a 2% rate savings
  - o 50% renewable option with 80% GHG free in 2020 and 95% GHG free in 2030 offered at a 2% rate savings
  - o A 100% renewable option offered at a slight price premium
  - o You can learn more at the following feasibility study link: http://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=512&meta_id=87146

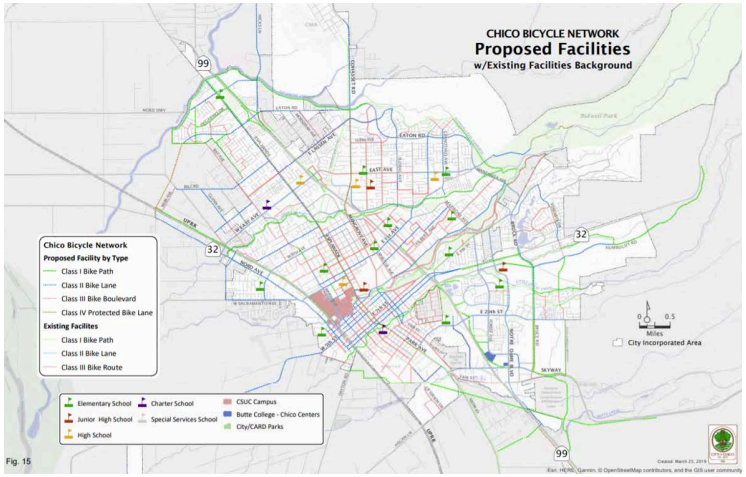
1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

PROPOSED MEASURE

Continue to implement the Chico Bicycle Master Plan.



MORE ABOUT THE MEASURE

- The Chico Bicycle Master Plan 2019 Update would be implemented by 2030 in accordance with the Plan's goals, objectives, and policies. Implementation of the Plan will include:
  - o Adding approximately 140 miles to the bikeway network
  - o Improving/expanding wayfinding, trail maintenance, safety, comfort, enforcement, and end-of-trip facilities
  - o Integrating with transit and other transport modes
  - o Conducting promotion and education around biking in Chico
  - o Identifying and competing for funding sources
- The overall goal of the Chico Bicycle Master Plan is to continue making Chico a more bike-friendly community, where people of all ages and abilities feel comfortable and safe choosing bicycles for transportation needs.
- A complete description of the goals, strategy, policy, and implementation framework for expanding and improving Chico's bikeway network is included in the Chico Bicycle Master Plan 2019 Update.

WONDERING ABOUT COSTS?

- Bicycle and pedestrian infrastructure has one of the highest price tags of the proposed measures due to the relatively high cost of infrastructure.
- Costs to cover the bike ped plan could be covered by a green bond (tax measure), grants, or other financing mechanisms.

Chico's 2030 GOAL

Estimated carbon emissions reduced: 1,531 MT CO2e

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

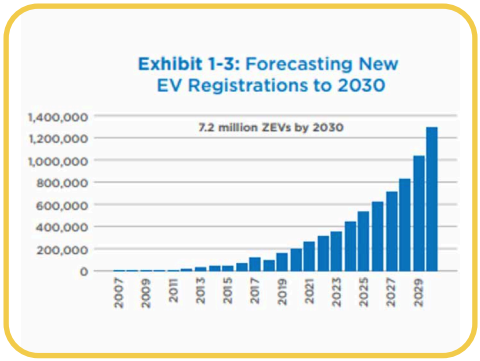
2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

PROPOSED MEASURE

Improve ZEV (zero emission vehicle) infrastructure to allow for a 25% shift from combustion vehicles to ZEVs by 2030

Chico's 2030 GOAL

Estimated carbon emissions reduced: 27,338 MT CO2e



MORE ABOUT THE MEASURE

- The City of Chico will encourage the community to increase EV adoption and prepare for an all EV future by providing the infrastructure necessary to support this shift. The state has established a goal of putting 5 million EVs on the road by 2030 and recent regulations require 100% of passenger vehicles sold to be electric by 2030 and 100% of commercial vehicles be electric by 2045.
- The City has established its own goal in line with State targets and aims to reach 23% EV adoption by 2030. Approximately 950 new public chargers are needed to meet the forecasted demand in Chico by 2030.
- Actions under this measure will include:
  - o Amending the City building code, in accordance with the Final Butte PEV (plug in electric vehicle) Readiness Plan, to require new construction and major retrofits to provide between 20%-30% EV capable charging spaces and panel capacity with 1% (at least 1) operable charger.
  - o Continue to work with public and private partners to install additional publicly accessible Direct Current Fast Chargers (DCFC's) and Level 2 EV chargers around the City, with a focus on providing access to low-income households and affordable housing.

WONDERING ABOUT COSTS?

- The cost to install EV ready spaces at time of construction is between $860 and $920. That same space costs between $3,710-$2,370 to retrofit. Since we know we need this infrastructure, we should do it now at a lower cost.
- Installation and operation of new electric vehicle (EV) chargers in existing spaces can be paid for through public/private partnerships, grants, or through financings.

EV CHARGERS: BY THE HOUR

LEVEL 1	4-5 MILES
LEVEL 2	12-60 MILES
LEVEL 3	FULL CHARGE

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

PROPOSED MEASURE

Work with waste haulers and other stakeholders to meet the goals of SB1383 and divert at least 75% of organic waste from the landfill through an expansion of composting services and edible food diversion.

Chico's 2030 GOAL

Estimated carbon emissions reduced: 7,693 MT CO2e

MORE ABOUT THE MEASURE

- This measure aligns the City of Chico with state efforts to reduce organic waste statewide 75% by 2025 through Senate Bill 1383
- Require residential and commercial organic waste collection through updated waste hauler contracts
- Pass an ordinance by 2022 requiring residential and commercial organics generators to subscribe to organics collection programs or alternatively report organics self-hauling and/or backhauling. Allow limited waivers and exemptions to generators for minor volumes and physical space constraints and maintain records for waivers/exemptions.
- Both waste haulers in Chico have been working diligently to expand composting services, and Recology is in the process of building their first composting facility. Chico residents are currently able to drop off yard and greenwaste at the composting facility at the airport. This action will capitalize on those efforts and expand them to meet the necessary composting capacity.

WONDERING ABOUT COSTS?

- CALRecycle estimates that full implementation of SB1383 will increase waste cost for households approximately $17 per year on average, depending on volumes collected. Direct costs to organic waste producing businesses will be approximately $662 on average.

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

CITY of CHICO

PROPOSED MEASURE

Expand the urban tree canopy by 700 trees by 2022 and 4,500 trees by 2030 to sequester carbon, decrease temperatures, save energy, and improve air quality within Chico.

Chico's Chico reaches 2030 GOAL!

Estimated carbon emissions reduced: 261 MT CO2e

MORE ABOUT THE MEASURE

- Planting trees will help sequester carbon within the City and provide a host of co-benefits like air quality improvements and providing shade and reduced temperatures.

WONDERING ABOUT COSTS?

- City costs associated with planting trees include planting, watering, and maintenance. Chico has received a grant to fund the planting of 700 trees by 2022.
- Additionally, trees provide a positive cost benefit ratio when all of their costs and benefits are summed.

1. CLICK THE SPEECH BUBBLE ICON TO LET US KNOW:

Do you think this could work in Chico? Why or why not?

2. SHARE YOUR THOUGHTS ABOUT THIS PROPOSED MEASURE! COMMENT BELOW.

¿POR QUÉ DEBEMOS ACTUAR SOBRE EL CLIMA?

La Evaluación de vulnerabilidad al cambio climático de la ciudad de Chico describe los posibles impactos climáticos que se espera que Chico vea con el tiempo. La cantidad de días de temperaturas extremas, olas de calor e incendios forestales varía mucho según la cantidad de gases de efecto invernadero (GEI) que los humanos emiten con el tiempo. Estos impactos tienen impactos secundarios, además de reducir la capa de nieve, afectar negativamente a hábitats sensibles como Bidwell Park, y potencialmente requerir migraciones humanas como Chico ya ha experimentado debido al Camp Fire.

Las proyecciones del Panel Internacional sobre Cambio Climático (IPCC) muestran que se requiere una reducción en las emisiones de GEI a neutralidad de carbono para mediados de siglo para limitar el calentamiento a 2.7 grados Fahrenheit y limitar los peores impactos del cambio climático. El Plan de Acción Climática de Chico propone reducir las emisiones de GEI a cero neto para 2045 para ser consistente con los objetivos estatales y globales.

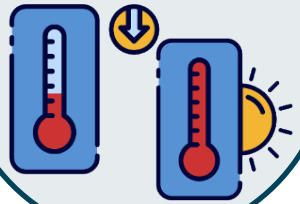
HECHOS DE CHICO DE UN VISTAZO:

AREA PROMEDIO QUEMADA CADA AÑO

Escenario de bajas emisiones:
44 hectáreas

Escenario de alta emisión:
59 hectáreas

DÍAS DE CALOR EXTREMO CADA AÑO



Escenario de bajas emisiones:
23 días

Escenario de alta emisión:
44 días

AGUA DE NIEVE DE LA SIERRA

Escenario de bajas emisiones:
3.6 pulgadas

Escenario de alta emisión:
0,07 pulgadas

OBJETIVO DE REDUCCIÓN DE EMISIONES DE GEI PROPUESTO POR CHICO:

Necesitamos reducir las emisiones de gases de efecto invernadero en las siguientes cantidades durante los próximos 15 años:

2017: 5.1 MT CO2e por persona

2030: 2.7 MT CO2e por persona

2045: 0 MT CO2e por persona

SCROLL DOWN TO LEARN ABOUT THE CITY'S TOP 8 PROPOSED MEASURES

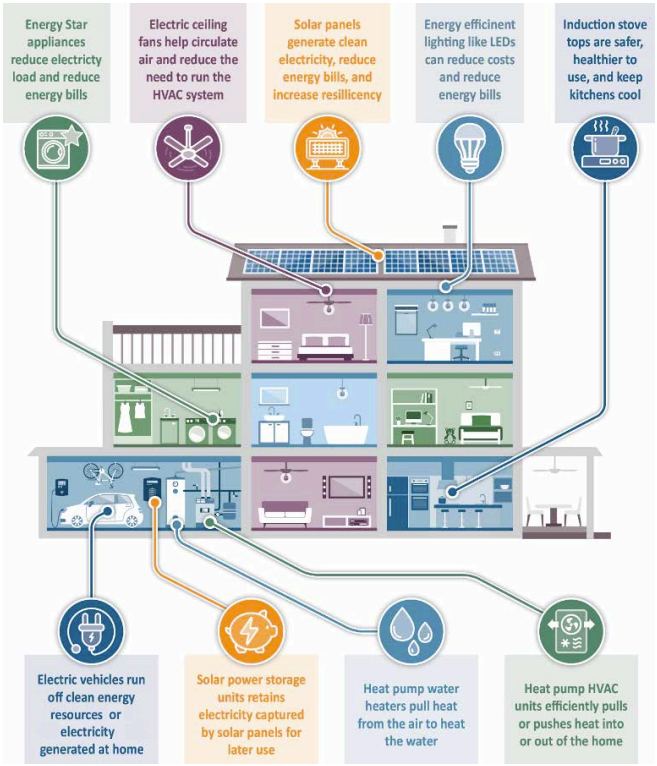
CITY of CHICO

MEDIDA PROPUESTA

Exigir que las nuevas construcciones sean totalmente eléctricas: Adopte una nueva ordenanza de construcción que prohíba la instalación de gas natural en nuevas construcciones para los tipos de edificios en los que se demuestra que la electrificación es rentable.

MORE ABOUT THE MEASURE

- Esta ordenanza propuesta aprovecha la electricidad cada vez más renovable en California y previene futuras modificaciones costosas a nuevos equipos e infraestructura de gas natural.
- Esta ordenanza propuesta ayudará a respaldar la adopción de vehículos eléctricos (EV) al proporcionar la infraestructura necesaria para la carga doméstica en nuevos desarrollos.
- Esta ordenanza se implementaría para nuevas construcciones residenciales para 2022 y para nuevas construcciones comerciales para 2025.
- La ordenanza solo se aplicaría a los tipos de edificios donde se demuestre que la electrificación es rentable.
- Los beneficios colaterales de esta ordenanza incluyen menores costos para los propietarios de viviendas, mejor calidad del aire y mayor seguridad en los edificios.



¿SE PREGUNTA SOBRE LOS COSTOS?

- Las construcciones nuevas completamente eléctricas suelen ser menos costosas para los contratistas y para los propietarios de viviendas cuando también se instalan electrodomésticos de alta eficiencia y energía solar.
- Puede revisar un estudio de viabilidad de LocalEnergyCodes en el siguiente enlace: https://explorer.localenergycodes.com/studies/county-butte/

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 8,973 TM de CO2e

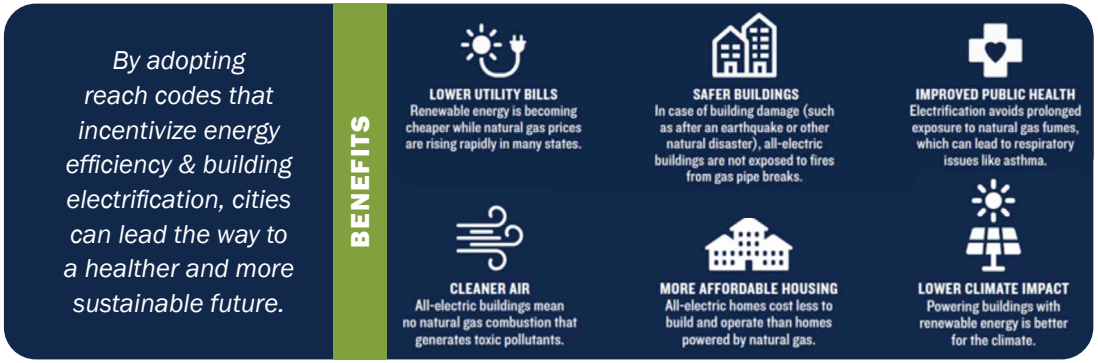
1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

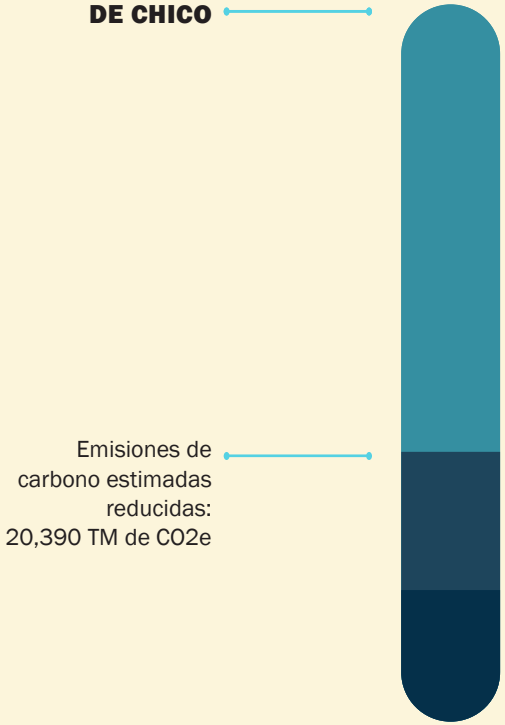
2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Electrificar los edificios residenciales existentes en dos fases: primero incentivar y luego exigir la electrificación de los edificios existentes. Adoptar una ordenanza de electrificación para edificios residenciales existentes en 2025 para hacer la transición de los electrodomésticos de gas natural a eléctricos en el momento del reemplazo.



Los códigos de alcance son códigos u ordenanzas locales que exceden el código estatal, lo que proporciona una mayor flexibilidad para lograr los objetivos de la política local. Los códigos de alcance deben cumplir con un conjunto particular de criterios para ser aprobados.



MÁS SOBRE LA MEDIDA

- La adopción voluntaria sería el enfoque de los primeros cinco años con educación, alcance y vinculación de la comunidad con incentivos de PG&E y otros.
- La ordenanza también se implementaría en dos pasos a través del proceso del permiso de construcción:
  - o Fase I: Limitar la expansión de las líneas de gas natural en los edificios existentes para 2022
  - o Fase II: a partir de 2025, se requiere que los sistemas de HVAC y los calentadores de agua caliente se reemplacen por modelos totalmente eléctricos al momento del reemplazo.
- A partir de 2025, los residentes de Chico deberán cumplir con los requisitos de permisos de construcción instalando equipos eléctricos cuando sus calentadores de agua y sistemas HVAC necesiten ser reemplazados. La vida útil promedio de un calentador de agua es de 10 años y de un sistema HVAC es de 18 años.

¿SE PREGUNTA SOBRE LOS COSTOS?

- La barrera más grande para esta ordenanza propuesta es el costo inicial potencialmente más alto para los residentes de Chico. Es por eso que Chico solo requeriría que se instalen equipos totalmente eléctricos en los edificios existentes en el momento del reemplazo una vez que se hayan implementado los fondos o las estrategias de financiamiento. Si bien los equipos totalmente eléctricos suelen ser más costosos que los equipos de gas natural, este aumento de costos se compensaría con incentivos, reembolsos y programas de financiamiento. Además, al reemplazar tanto un HVAC como un aire acondicionado con una sola bomba de calor (que calienta y enfría), los costos de electrificación son en realidad más bajos.

1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Electrificar los edificios municipales: adoptar un plan de electrificación para convertir los edificios municipales en totalmente eléctricos

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 460 MT CO2e

MÁS SOBRE LA MEDIDA

- La electrificación del edificio municipal se completará en 2045
- El plan de electrificación incluiría una nueva política de electrificación de edificios, así como una política de eliminación de gas natural de edificios existentes.
- La electrificación municipal ayudará a la Ciudad a hacer lo que le corresponde en llevar a Chico a la neutralidad de carbono para 2045
- Cuando se combina con una micro-red, la electrificación permitiría que los edificios municipales funcionen durante cortes de energía u otras emergencias.

1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Proporcionar electricidad 100% renovable a la comunidad.

CCA ADQUIERE / GENERA ENERGÍA

PG&E ENTREGA ENERGÍA, MANTENGA LÍNEAS, FACTURAS A LOS CLIENTES

LOS RESIDENTES RECIBEN ENERGÍA A TARIFAS COMPETITIVAS / MÁS BAJAS Y TIENEN MÁS CONTROL LOCAL

MÁS SOBRE LA MEDIDA

- A través de esta medida, la Ciudad de Chico adquirirá electricidad 100% renovable para la comunidad a través de Butte Choice Energy Community Choice Aggregation (CCA), de acuerdo con la ordenanza que autoriza la implementación de un Programa CCA a través de un Acuerdo de Poderes Conjuntos con el Condado de Butte, enmendando Título 15 del Código Municipal. Inscriba automáticamente las cuentas comunitarias y municipales en la opción de energía 100% renovable para 2022 con una opción de exclusión voluntaria.
- Las CCA utilizan el poder adquisitivo de la comunidad para adquirir electricidad directamente de los generadores de electricidad. Esto permite que la comunidad elija su propia combinación de redes, con la opción de adquirir electricidad de fuentes de generación 100% libres de carbono.
- PG&E continuará entregando energía, manteniendo líneas e infraestructura y coordinando la facturación.
- Para maximizar la oportunidad de reducción de GEI que esto presenta, la Ciudad inscribirá automáticamente todas las cuentas de la comunidad en una opción 100% libre de carbono. Los clientes tendrán la opción de optar por no participar en el CCA de regreso a PG&E o optar por otra opción de combinación de red. Se espera que alrededor del 5% de los clientes residenciales y el 15% de los clientes comerciales opten por no participar. Las cuentas municipales tendrán 0% de exclusión.

¿SE PREGUNTA SOBRE LOS COSTOS?

- Para el 2022, se espera que BCE brinde tres opciones de combinación de energía para que los miembros de la comunidad elijan:

  o Opción de estándares de cartera renovable básica (RPS) con un 33% de fuentes renovables y un 80% de fuentes libres de gases de efecto invernadero que se ofrecen a una tasa de ahorro del 2%
  o Opción 50% renovable con 80% libre de GEI en 2020 y 95% libre de GEI en 2030 ofrecida a una tasa de ahorro del 2%
  o Una opción 100% renovable ofrecida a un precio reducido
  o Puede obtener más información en el siguiente enlace del estudio de viabilidad:
  http://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=512&meta_id=87146

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 39,170 TM de CO2e

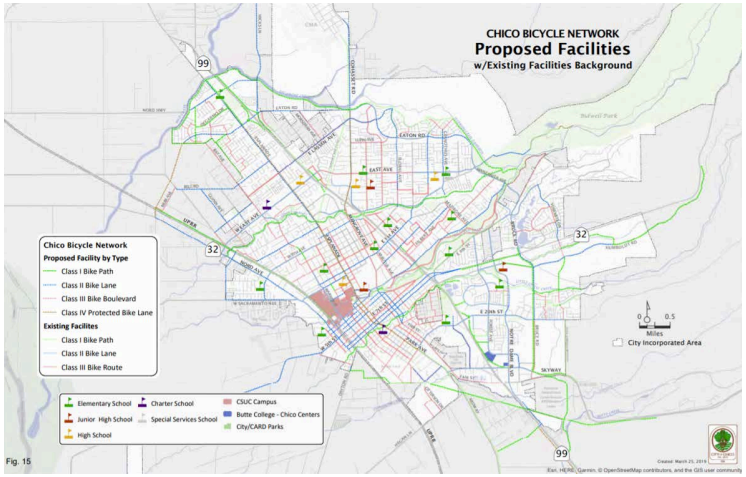
1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Continuar implementando el Plan Maestro de Bicicletas Chico.



MÁS SOBRE LA MEDIDA

- La Actualización 2019 del Plan Maestro de Bicicletas Chico se implementaría para 2030 de acuerdo con las metas, objetivos y políticas del Plan. La implementación del Plan incluirá:
  - o Agregar aproximadamente 140 millas a la red de ciclovías
  - o Mejorar / expandir la localización de caminos, el mantenimiento de senderos, la seguridad, la comodidad, el cumplimiento y las instalaciones para el final del viaje.
  - o Integrarse con el tránsito y otros modos de transporte
  - o Realización de promoción y educación en torno al ciclismo en Chico
  - o Identificar y competir por fuentes de financiamiento
- El objetivo general del Plan Maestro de Bicicletas de Chico es continuar haciendo de Chico una comunidad más amigable con las bicicletas, donde las personas de todas las edades y habilidades se sientan cómodas y seguras eligiendo bicicletas para sus necesidades de transporte.
- Se incluye una descripción completa de los objetivos, la estrategia, la política y el marco de implementación para expandir y mejorar la red de ciclovías de Chico en la Actualización del Plan Maestro de Bicicletas de Chico 2019.

¿SE PREGUNTA SOBRE LOS COSTOS?

- La infraestructura para bicicletas y peatones tiene uno de los precios más altos de las medidas propuestas debido al costo relativamente alto de la infraestructura.
- Los costos para cubrir el plan de bicicletas públicas podrían cubrirse con un bono verde (medida tributaria), subvenciones u otros mecanismos de financiamiento.

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 1,531 TM de CO2e

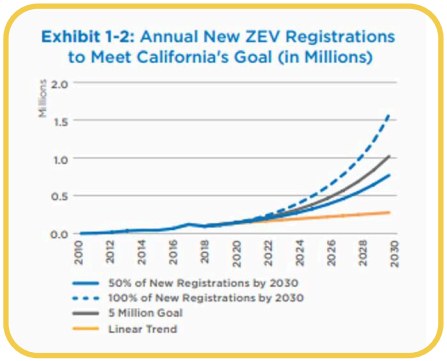
1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

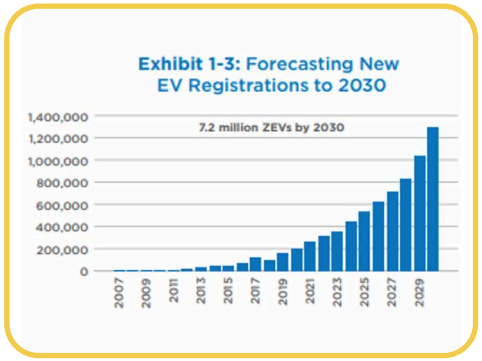
¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Mejorar la infraestructura ZEV (vehículo de emisión cero) para permitir un cambio del 25% de vehículos de combustión a ZEV para 2030.





OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 27,338 TM de CO2e

MÁS SOBRE LA MEDIDA

- La ciudad de Chico alentará a la comunidad a aumentar la adopción de vehículos eléctricos y prepararse para un futuro de vehículos eléctricos proporcionando la infraestructura necesaria para respaldar este cambio. El estado ha establecido el objetivo de poner 5 millones de vehículos eléctricos en las carreteras para 2030 y las regulaciones recientes requieren que el 100% de los vehículos de pasajeros vendidos sean eléctricos para 2030 y el 100% de los vehículos comerciales sean eléctricos para 2045.
- La ciudad ha establecido su propia meta en línea con los objetivos estatales y apunta a alcanzar una adopción de vehículos eléctricos del 23% para 2030.
- Se necesitan aproximadamente 950 nuevos cargadores públicos para satisfacer la demanda prevista en Chico para 2030.
- Las acciones bajo esta medida incluirán:

  o Modificar el código de construcción de la ciudad, de acuerdo con el PEV Final Butte (enchufe en vehículo eléctrico)
  Plan de preparación, para requerir nuevas construcciones y reformas importantes para proporcionar entre 20% y 30%

  o Espacios de carga con capacidad para vehículos eléctricos y capacidad del panel con un 1% (al menos 1) de cargador operativo.

  o Continuar trabajando con socios públicos y privados para instalar adicionales accesibles al público
- Cargadores rápidos de corriente continua (DCFC) y cargadores de EV de nivel 2 en la ciudad, con un enfoque en brindar acceso a hogares de bajos ingresos y viviendas asequibles.

¿SE PREGUNTA SOBRE LOS COSTOS?

- El costo de instalar espacios preparados para vehículos eléctricos en el momento de la construcción es de entre $ 860 y $ 920. Ese mismo espacio cuesta entre $ 3,710 y $ 2,370 para modernizar. Como sabemos que necesitamos esta infraestructura, deberíamos hacerlo ahora a un costo menor.
- La instalación y operación de nuevos cargadores de vehículos eléctricos (EV) en espacios existentes se puede pagar a través de asociaciones públicas / privadas, subvenciones o financiamiento.

CARGADORES EV: POR LA HORA

NIVEL 1	4-5 MILLAS
NIVEL 2	12-60 MILLAS
NIVEL 3	CARGA COMPLETA

1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Trabajar con los transportistas de desechos y otras partes interesadas para cumplir con los objetivos de SB1383 y desviar al menos el 75% de los desechos orgánicos del vertedero a través de una expansión de los servicios de compostaje y la desviación de alimentos comestibles.

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 7693 TM de CO2e

MÁS SOBRE LA MEDIDA

- Esta medida alinea a la Ciudad de Chico con los esfuerzos estatales para reducir los desechos orgánicos en todo el estado en un 75% para 2025 a través del Proyecto de Ley del Senado 1383.
- Exigir la recolección de desechos orgánicos residenciales y comerciales a través de contratos actualizados de transportistas de desechos.
- Aprobar una ordenanza para el 2022 que requiera que los generadores de productos orgánicos residenciales y comerciales se suscriban a programas de recolección de productos orgánicos o, alternativamente, informen sobre el transporte y / o retroceso de productos orgánicos. Permitir exenciones y exenciones limitadas a los generadores para volúmenes menores y limitaciones de espacio físico y mantener registros de exenciones / exenciones.
- Ambos transportistas de desechos en Chico han estado trabajando diligentemente para expandir los servicios de compostaje y Recology está en el proceso de construir su primera instalación de compostaje. Actualmente, los residentes de Chico pueden depositar los desechos verdes y los jardines en las instalaciones de compostaje del aeropuerto. Esta acción capitalizará esos esfuerzos y los ampliará para alcanzar la capacidad de compostaje necesaria.

¿SE PREGUNTA SOBRE LOS COSTOS?

- CALRecycle estima que la implementación completa de SB1383 aumentará el costo de desechos para los hogares aproximadamente $ 17 por año en promedio, dependiendo de los volúmenes recolectados. Los costos directos para las empresas productoras de desechos orgánicos serán de aproximadamente $662 en promedio.

1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

MEDIDA PROPUESTA

Expandir el dosel de árboles urbanos en 700 árboles para 2022 y 4.500 árboles para 2030 para secuestrar carbono, disminuir las temperaturas, ahorrar energía y mejorar la calidad del aire dentro de Chico.

LOS ÁRBOLES OFRECEN MUCHOS BENEFICIOS...

MÁS SOBRE LA MEDIDA

- La plantación de árboles ayudará a secuestrar carbono dentro de la ciudad y proporcionará una serie de beneficios colaterales como mejoras en la calidad del aire y proporcionar sombra y temperaturas reducidas.

¿SE PREGUNTA SOBRE LOS COSTOS?

- Los costos de la ciudad asociados con la plantación de árboles incluyen la plantación, el riego y el mantenimiento. Chico ha recibido una subvención para financiar la plantación de 700 árboles para 2022.
- Además, los árboles proporcionan una relación costo-beneficio positiva cuando se suman todos sus costos y beneficios.

OBJETIVO 2030 DE CHICO

Emisiones de carbono estimadas reducidas: 261 MT CO2e

1. HAGA CLIC EN EL ICONO DE BURBUJA DE DISCURSO PARA HACERLO SABER:

¿Crees que esto podría funcionar en Chico? ¿Por qué o por qué no?

2. ¡COMPARTA SUS PENSAMIENTOS SOBRE ESTA MEDIDA PROPUESTA! COMENTA ABAJO.

Appendix of Comments

Table of Contents

Measure 1: Require new construction to be all-electric

- I have an electric car and do not usually charge in town but have noted how hard it is to locate and sort out what entity controls the chargers and how to pay, what type they are... Cities that are most successful have clear, frequent signage and they locate chargers in comfortable, shaded places that are not hidden. They also keep the chargers maintained and do not allow nonelectric cars to park in the EV charger slots. There are apps for EV chargers-- Plug Share and Charge Point are the two I use. I noted that in Fort Bragg some chargers are free for an hour or two in tourist areas. Obviously, you need some chargers near Hwy 99, but you need others downtown and at both malls... if electric cars finally do dominate it will be important to have rapid chargers, regular chargers... many more parking spots for chargers! The simplest is to allow just a debit card for payment rather than proprietary chargers. It is very overwhelming to have Blink, plug share, Charge Point etc. cards as one moves across the west. Standardization would be fantastic within California or at least on the 99 corridor. Public parking is critical. In many towns they are only linked to motels! Please don't put them at gas stations in the sun... which is miserable! Thanks
- I am grateful to live in a town that seems to be taking the impacts of climate change seriously.
- This plan is packed! So much information in such a small, but readable package. We must act on multiple fronts, in multiple ways. This plan gives us a visual guide to what those actions should be or could be for Chico. We often think of the costs of acting on these plans in terms of dollars. We should be thinking instead of the impact to the quality of life with inaction. I am curious about the type of building, size, placement and the impact on climate change (e.g., sprawl into the Wildland-Urban Interface). I also am curious if this

plan needs to address the future of water for Chico. Maybe both of these questions are answered, but as I said earlier...there's a lot packed into this plan.

- What about a climate resilience plan? Does Chico have a climate disaster plan to ensure economic-social-cultural-basic needs are met during these times? What are the systems that can be created for community resilience, which is the local equitable access to healthy food, clean water, clean air, comfortable shelter, mental and physical health care, and cultural/artistic expression? What about supporting local projects focused on mutual aid, skill sharing programs, etc.
- I appreciate your putting this interactive document together and offering opportunities for public input on this important matter of policy and action.
- Great info, and thanks for providing it. One suggestion: The average Chico citizen doesn't know what hectares are. Let's be sure, moving forward, that we're speaking a language most people understand. Educating and communicating clearly about the situation will be vital to galvanizing grassroots support!

Measure 2: Electrify existing residential buildings

- Incentivizing construction of smaller housing units would be a great addition to this (it's often more affordable to live in too!). Smaller housing units use less energy for heating, cooling, water, and lights. Not to mention reducing the high up-front energy involved in construction. Allowing for "alternative" sustainable building materials is also a way to reduce the initial GHG impacts of construction.
    - Yes, small affordable housing why don't we start thinking apartment complexes or multi-family units bring the duplex back.
- Trying to install solar panels on existing and new construction will be difficult unless we can figure out how do protect a dwelling's sunlight. We may have to do this off-site.
- We couldn't do even a burning firewood ban in this city or even require EPA stoves since some people's only source of heating is wood burning.'
- Electric homes with power supplied by renewable energy are a must for the future. However affordable renewable energy must be made available to the public either via regional solar or wind generation. Also, storage facilities must be part of the plan so that when PG&E's power grid goes down people still have power available.
- The ordinance might also encourage the installation of residential natural gas-powered backup generators to provide electricity during power outages. This will be especially important for vulnerable populations harmed by temperature extremes.
    - Yes, and maybe in the future, we can have cooling or warming buildings for the most vulnerable to extreme heat and cold. A building with snacks and movie nights when it is too hot or too cold. Kind of like a community center.
- I like having the choice of gas or electric. The power lines are unsightly and when the grid goes down my gas hot water heater and stove still work. A better solution would be to require fewer houses per acre, quit packing them so close to each other and encourage the planting of trees and other native species of plants in everybody's yard.
- Yes, and it needs to work in order for Chico to survive and thrive in the future.

- Great Work thank you.
- I would expand on this to include electric charging stations in multifamily housing and even new construction of homes. Electric vehicles are key to climate resilience.
    - I would add that the actual construction of the house could be improved with thicker walls, so the design would reduce the need for heating and cooling. Why are houses still being built with designs that don't work for our hot, dry climate?
- Does this conflict with the desire to build more affordable housing? How do we do this with 'Tiny Houses"?
    - Well affordable housing should be sustainable for future needs I don't think they are separate issues. Tiny Houses are not my forte so I can't comment on those but affordable housing complexes that are sustainable do exist and we need large-scale affordable houses, not individual tiny homes. There is not enough land for individual tiny homes in Chico. We need to build up not out because of the constraints of the city.
- It seems that most developers are stuck in the old ways of doing things - how are you going to get them to buy into this without giving them money or letting them get away with not adhering to environmental protections?
    - Chico has held educational training in the past explaining that electrical is cheaper and most developers were happy to go cheaper. If we wanted to do something like Colorado, we could implement a list of materials that developers are allowed to use. But most people pay Chico to build here and hopefully we will get some permanently affordable housing coming our way with all the housing stock taken from the fires.
- While I think that this will work the timeline for requiring compliance is too short. There are already projects well into the planning stage that could not meet the 2022 deadline.
    - I think 2030 will be too late. The world has only a handful of years left, and the past years have been kind of squandered.
- On April 2, 2019 we at Chico 350 Butte County organized a broad local coalition and got the Chico City Council to pass our Declaration of Climate Emergency Resolutions - which proved along with our draft Implementation Plan that Chico can and must go 100% Zero Carbon Emissions by 2030. It passed by 5-1, with one abstention - Kasey Reynolds left mid-hailstorm because her sweets shop store was flooding! We worked hard to get the Sustainability Task Force upgraded to the first new commission in 20 years, the Climate Action Commission. We are disappointed that the city agencies have defaulted to the state's lower standards and deadline of 2045. We worked to get that SB100 bill passed, but it was just a placeholder benchmark for us to improve upon. Your video also sounds like happy talk not based in the real world where our Butte county is home to four climate-accelerated disasters in less than 3 years. 1) 2017 Oroville Dam Collapse 2) 2018 Camp firestorms killed 86 people, mostly elderly. 3) 20210 Bear Fires which morphed into gigantic 4) North Complex firestorms, which I read yesterday in the local news are not 100% contained yet.
- For all of the eight priorities, it seems critical to develop a plan to inform the public is critical, a plan that includes action steps with time deadlines. We also need an

educational component in the schools, one that provides factual information to young people and the kinds of actions they can choose to take to make a difference.
    - Individual action and most of the young people are on board with that information. Today though we are talking about a citywide action. Schools don't have to comply with city plans so a teaching issue would have to be taken up with the school district.
- Chico must have better access to renewable electricity to achieve this. Are you considering creating a SUMD type power resource?
    - I think that would be an awesome idea and it should be considered if and when PG and E berries power lines or Butte decides to make a SMUD because Chico is only 75 thousand plus people. Sacramento the city alone housing 500 hundred thousand people. SMUD covers 900 square miles for the entire district. Not everyone would be on board with that, but it could be something to discuss as a county or multi-county thing who knows.
- Nothing should be implemented at a local level that is stricter than the state building codes. Additionally, it has proven that electricity with solar, depending on the system, in the case of power outages can leave you without the ability to heat and cook. If you have a gas fireplace and gas stove, you can at least keep yourself warm and eat. Many solar users believed they would have power when there was an outage only to find themselves in the dark without heat, the ability to cook, and a warm fridge.
- If solar power isn't mandatory on new construction, it should be! ("Solar-ready" is good, but far better is actual solar paneling) The future of power generation will be distributed, as opposed to central massive powerplant/solar farm, because it's more efficient.
    - Right?? If there is anything, we have in abundance here in the north state, it's sunshine!
- Additionally, we have to start looking at the carbon footprint of building materials. Such assessments should be public information, easily attainable, so people not only start thinking that way but also don't have to do tons of research to make good choices.
- We don't have enough electrical power available right now (i.e., rolling blackouts.) And, while solar power is great during the day, we can't readily store any extra production at night (or it is very expensive to do so.) So, banning a clean-burning source of power like natural gas makes no sense, and places ANOTHER burden on business, and creates more regulation. This proposal is another example of the type of thinking that is driving good and productive citizens out of California.
    - The blackouts had as much to do with poor planning and management of the grid as having too much renewable energy. For example, the power plants actually exported electricity out of state at the same time that they needed it. While the shift away from fossil fuels may not be going perfectly, we still need to figure out how to do it, rather than just say we can't. I wonder why the power companies can't invest in batteries to store solar power for use at night, but I don't know much about that.
    - Natural gas is a marketing term that covers (and obscures) many forms of petroleum gas. In California it is methane gas, and it is far from "clean." The

emissions from leaky production facilities make this fuel source dirtier to use than coal.

- Yeah, I was highly motivated to get an induction stove in our new house, but the reasonably priced model was not being manufactured any longer, which meant we would have had to pay at least $500 more to get induction. Hopefully these come down in price.
- These are very expensive - not all families have $$ laying around to replace current stove/oven.
    - The average electric oven costs $400 or something. That's about my rent but my electric bill has gone down because the gas was more expensive.
- May want to consider electric dryers replacing gas dryers
- Requiring new construction to be all electric and contain solar panels is a good path forward to slowly transition away from fossil fuels and when coupled with statewide investment/shifts to more renewable electricity, storage, and power management. Replacing existing natural gas infrastructure could/should be incentivized but not required.
- For solar power to be viable - most trees would need to be removed to allow for needed sunlight. Thus, causing additional global warming (trees are critical to reduce global warming); follow the science.
    - "Most trees" would not "need to be removed". Some may need to be removed or simply trimmed. Full removal can be mitigated by planting other trees where they will not interfere with current or future solar collection or other alternative energy generation plans.
    - The city is planning on planting more trees and pruning companies will obviously be employed to help.
    - Another measure in the CAP is a "share the sun" provision that "encourage architects to design rooftops that can maximize solar TOF and minimize conflict with future street trees."
- New residential construction is already required to be all electric or Net Zero with Title 24. What about non-res construction? This needs to be addressed specifically for those building types, which I'm sure the Energy Commission is doing.
- Additional $$$, will require most to refinance homes to pay for it. City needs to reduce fee's, permits to allow homeowners and builders to be able to have/build affordable housing.
    - Let's not kid ourselves: addressing climate change is going to cost money. The question is where will it come from--and can something like a Green New Deal create jobs and economic wealth as well, helping to finance this shift?
- Ceiling fans are all you need on all but the very hottest days! We need to encourage people to kick the AC habit!
- What clean energy resources are available? We currently can't even cool our homes. How do you charge with solar? This would require additional $$$$ of solar panels to charge vehicles - at night (since you'll be at work during the day). No practical storage exists for common consumer at this time. Years away.

    - The city wants to add chargers in the city. They also want to add transport like busses, better bike routes, and electric trolleys service. So maybe people would not need a car except in a few cases.
- You are incorrect, all electric homes cost hundreds of dollars a month more than homes using clean natural gas. Electric appliances require additional source of power generation, that currently doesn't exist
    - Natural Gas is just methane that's not clean
- Today.... neither the grid nor electrical storage nor appliances nor consumers are ready for such a dramatic and sweeping change. Incrementally, water heaters for example, might be more acceptable to consumers who otherwise demand gas stoves and fireplaces. Regulations such as these, when implemented by a municipality rather than the state, force consumers to outlying areas worsening the commute. 100% electrification in Chico translates to more driving and more propane. neither are good for climate change.
    - Bill's idea of starting with Water Heaters is a good first step. If you take away people's ability to have a fireplace or a foodie's desire to have a gas cooktop, you are going to turn-people off and sabotage the effort. However, water heaters are a neutral space - something that would make big difference. If you want less gas usage beyond water heaters, put in an incentive, such as a break on permit fees in order to incentivize the change you want to see.
- What about initial costs? Buyers rarely look at long-term costs; they want to know how much it costs to get the dwelling.
- What are "future expensive retrofits to new gas infrastructure and equipment"? Statement doesn't make sense out of context. First, the utilities need to maintain existing gas lines to prevent gas loss and explosions, those need to be retrofitted. You don't retrofit "new" things.
- The first goal maybe should be to power our transportation system with renewable energy produce on our homes. Fossil fuel powered vehicles are the number one source of GHGs, not houses. Can a zero net energy home produce enough electricity for both transportation and residential needs without utility back-up systems? Now you are talking about a huge solar footprint on a lot. Tiny homes with huge solar doesn’t work.
- How do you define "cost effective"? Is it for the equipment purchases or running the equipment? It is more cost effective to burn natural gas to heat water than use electricity. Electric equipment is typically less costly than natural gas (ranges, dryers, heaters, etc.) but cost more to operate. What is the cost of solar power PV? Construction cost, operational costs, and replacement cost and how does that compare?
- This can only work for the consumer if they produce their own electricity. Purchasing electricity from a utility or CCA is very expensive and still comes from natural gas fired power-plants. To actually reduce GHGs the home would have to be off grid from a utility unless that utility was 100% renewable including storage. This means homes will have to be built with adequate solar electric and solar thermal and have a battery back-up system to support the home over night and during long periods of cloudiness. We are not there yet for most homes and people.

- For all of these remedies, it is unrealistic to believe in every case the changes must be "cost effective." In the long run, of course, they are, but in the short run, which is crucial, they may not be. We still must share the cost. More flexibility in homeowners' use of solar panels and car batteries [Baldy] is possible and a good step.
- What about all this fireplace inserts that have been replaced with natural gas inserts? And then there are the outside propane heaters.
- Ugh, I hate electric stoves. Our gas range is less than one year old. We also have gas heat. We have solar panels but that would mean also adding panels which we cannot afford. Where is all the money coming from? We are senior citizens.
- Does this mean that by 2045 even if one has e.g., a HVAC that is working fine it will have to be replaced with an electric heat pump?
- Nope, the operative words were "NEEDS REPLACING" if it's working fine, I don't think you would need to replace it.
- The cost to change over to just electric water heating is and will be prohibitive. Besides putting in the electric water heater it would cost big bucks to upgrade the wiring including an upgrade of the main panel to be able to cover the extra electricity. Then an upgrade of existing solar systems to cover the extra power would cost a fortune. This is a poor town with high housing prices. You will put local people out of the local real estate market. Seniors will not be able to afford it. Gas prices are a lot lower than electric. PGE can't provide us now with enough electricity. They will never put in enough money to cover the infrastructure to create this power. And then to think about new electric only heating/cooling units is just crazy. Your nuts and autocratic. Get rid of the Carl Roy crazies. And yes, I am a progressive voting Democrat. I'll vote no on anything that will destroy me.
    - What place do you live in that would require upgrades too so much wiring? It sounds like a historical house. Maybe the water heater is not your thing what about an on-demand water switch.
    - Gas rates are rising faster than electricity rates because of infrastructure repair cost and the price difference is expected to grow due to the age of the pipes. As more (affluent) people move to solar electric, the remaining (less affluent) customers will bear a greater financial burden for upkeep of the aging infrastructure. All electric is cheaper for seniors and it will leave a better planet for their children and grandchildren.
    - Switching over to electric water heating is not prohibitive. An electric water heater runs about $500-600 v. a gas water heater $600-900, while a hybrid electric, the best way to go, are around $1,500 and will payback in 4-5 years when compared to a standard electric water heater. Panel upgrades are typically not necessary. Most homes are wired for electric dryers and water heaters even though they might not have them because the builder doesn't know what appliances the homeowner will install.
- I live in a 1981 home with solar panels, all electric except my stove and oven. I like to cook with gas stovetop. I don't plan on buying an electric stovetop.

Measure 3: Electrify municipal buildings

- In case of power outages, is it possible for homeowners to use the electricity generated by their solar panels? Also, could they direct the electricity stored in their electric car batteries to power electric appliances?
    - So, if they are YOUR solar panels you would be using the solar as long as the sun shines. Any energy that is produced is not being used by the grid. That means any extra if you don't have extra you are using all the power.
- PG&E is the problem, not part of the solution. For example, recently they introduced micro grids to Magalia to offset all the power shut offs - and these are still gas-powered. Solar powered micro grids are the way forward, not fossil fuels.
- These measures are only directed at domestic changes. Where is the City's plan for larger-scale change, with business, manufacturing, government agencies, agriculture, and the university, etc.?
    - Please keep scrolling. There are other measures including the microgrid where power is spread over the town's solar panels. We are one town in the North State we should be able to take care of our own power needs. Enloe Hospital, Chico State, and schools don't follow the general plan.
- This addresses residential systems but how about big users, governmental, commercial and industrial in Chico? Will they be held to the same standard?
- We have just replaced our HVAC unit; it is gas with a 2-stage unit. It is very a very effective unit and cheaper to use. The previous one lasted 25 years. We also just replaced our gas water heater it has built in insulation, so it does not need the blanket. It too is a much more efficient unit. The previous unit also lasted 25 years. I believe your numbers are off. Implementing stricter codes locally than state building codes can lead the local jurisdiction to potential liability.
    - You have an anecdote. Here is my anecdote: My parent's latest HVAC replacement from gas to another two-stage unit lasted 8 years. The infographic is just an average please remember that folks.
- Incentives sound good, but there is no free lunch. P G & E incentives are paid for by charging everyone higher rates. Government incentives are paid for by the taxpayer. We must first ensure that electricity generation in California is adequate. Last summer there were some hot days when PG&E could not supply the north state and needed to shut down power to residences. I don't think that generation can be up to the necessary level in the stated time frame. Before mandates are made, we need to be sure that these premises are correct, I don't think the numbers are realistic.
- How about focusing on large buildings that use far more power (commercial, industrial, university, hospital, etc.) and new construction before requiring substantial investment to retrofit small homes?
    - Well Universities and Hospitals are exempt from following the cities plan regardless of that Enloe Hospital and Chico State have done retrofitting and sustainable energy changes. Industry is required to follows the general plan and the climate plan so as you read on you will see the industry has to follow these guidelines to.

- I don't like that there is only a yes or no option. All with qualifications. I think it may be possible but not in the timeline you are talking about. Seems like the people aren't going to want to put out this big outlay. Should be done in increments- first the City do it with all their buildings, then the University, the hospital etc. - - to prove that it works to the little guy
    - Chico State, Enloe Hospital and schools do not have to comply with city plans. Regardless though Chico State is writing up a plan to replace HVACs already in the year 2020. Page 17 then just follow the chart for the 5 buildings they are replacing HVAC and other units.
      https://www.csuchico.edu/sustainability/_assets/documents/chico-state-climateaction-plan-2011.pdf
- What kind of incentive, rebate, and financing programs are you considering or is that an after-the-fact to be worked out later? It is best to have this information or program developed up front. Will it be funded with city dollars? Where will those come from? I would suggest Chico's utility users' tax as a source of funds, even though it is the City's third largest revenue source after property taxes and sales taxes, and they don't like giving up revenue. Will the CCA use their sales revenue to provide rebates and incentives? Probably not. PG&E will certainly not provide incentives to reduce their energy sales without being compensated like they are now. Where are these incentives to come from? Making it a requirement in the future is a great idea but people will balk if it costs them more.
- Would like to see your information to support this claim. Currently all appliances in the State have to conform to the State's appliance efficiency standards, and they are pretty good, as far as efficiency goes. Purchasing equipment that is more efficient always costs more, not less, than the current efficient standard equipment. Solar PV also adds to the cost of a home by what $5,000 per kW, so a 10-kW system, which is probably a low-end system in terms of electricity needed to run a Net Zero home with a car charging station, ok maybe 15 kW, so an addition $50 - 75,000 to the price of a home is not less expensive.
- Gas prices will remain lower on a cost/BTU basis than electric, it is counter to the laws of physics to be other.
- What does "limit expansion natural gas lines in existing buildings" mean? Existing buildings have natural gas lines, how does one plan on limiting them? What incentives is the City of Chico planning? This is a costly proposal for residents, they aren't going to do by regulation - will never happen. It has to be incentivized and I don't see the incentivization plan anywhere in this document. Can this plan guarantee that by 2025 all the electricity available in Chico will be renewable? How is a CCA going to do that? The sun doesn't shine all the time. Wind don't blow all the time. The back-up power will come from what renewable source? If this becomes a requirement people will install what they want without getting building permits. Despite what Stemen asserts in his comments electrical prices are not going down, they are going up and they will not go down anytime soon. Large-scale renewable electricity is not cheap you have to pay a premium to get this from PG&E now and from your CCA. Your CCA savings is 5%? Wow that will really make someone tear out their gas appliances and go electric. Here is the problem with that. Once a home converts to all electric, and doesn't have a solar electric system on it, a

homeowner's utility bill will go sky hi. If I use $100 in electricity now and $100 in natural gas to heat space, water, and to cook with my bill will go to $500 - $600 a month in the winter without a significant solar system. For this program to work it will have to incentivize the replacement appliances (Natural gas water heaters cost about $600, electric about $500, heat pump water heaters cost about $1,500. If I install a heat pump water heater to replace my natural gas one my water heating costs go up too. A solar water heating system is a much better way to go, then you can use your solar electric for cooling and heating. BTW - HVAC is heating and air conditioning you don't replace both of them because it is one system. I keep seeing the statements that the cost of "electrification is actually lower" - where is your proof? If you rely on incentives to offset the addition costs where are those incentives coming from? The local tax base? PG&E? (Not if you have a CCA, PG&E won't incentivize electrical consumption because they aren't selling it.) You might want to think about a power co-op that could do all of that.

- Currently the cost equivalence between electricity and natural gas is almost 5 to 1 on a $/BTU basis, electricity cost 5 times more per BTU than natural gas, when used for space or water heating. An electrification requirement only works with home generated electricity and battery storage and that is at a higher than normal cost to install and use
- Not just municipal buildings need to be all electric. Clean Green Union Jobs can create $Millions to boost our economy - retrofitting every housing unit.
- Energy self-sufficiency for municipal buildings can work and would provide experience beneficial to policymakers when making policy decisions re: energy systems for residents of Chico. Also, Sierra Nevada Brewery already generates a large portion of their own power, so a model already exists.
- Municipal building should all have electric charging stations for city and citizen vehicles.
    - That would be a good idea I am just wondering how many electric vehicles are in the city. Like the comment, if you have an electric vehicle. Dislike the comment if you have gas or diesel vehicle. Anecdote evidence.
    - There is some circularity to this exchange-- one purpose of installing more charging stations is to make it more inviting and practical for folks to purchase electric cars. Let's do that. I have an electric car.
- Most office and commercial buildings, like municipal buildings, are pretty much electric utilizing. The only thing that currently requires natural gas is space and water heating. Water heating is a minor use in a municipal building and can be retrofitted easily. Space heating can also be modified for heat pumps depending on a building layout. So this isn't that big of a deal or hard to do, especially for small municipalities.

Measure 4: 100% renewable energy

- We have far better ways to spend taxpayer money than to convert buildings that were designed to use natural gas, to electricity only. The carbon savings would be teeny tiny in the whole scheme of things. These proposals are "feel good" measures, when compared to natural carbon pollution created by forest fires and organic decomposition.
    - Due to leaky gas pipes, the carbon saving would be substantial. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019GL082635

    - I don't think these are feel good measures. I think the city is making substantial changes to help our ecosystem have cleaner air and water by removing methane (natural gas) and replacing it with renewable energy like solar.
- Yes, and I think when Chico gets electrified people will do it more. Most people get solar panels when their neighbor gets solar.
- It appears that something was left out of the thought process. Currently a little less than half of the electricity generated in California is from natural gas. If we vastly increase our electricity consumption, we will be using natural gas to generate the power needed for our all-electric homes and municipal buildings. This may make Chico air cleaner, but not the entire state. Before this is logical, we must further develop renewable power generation. The obvious answer is nuclear fusion, not viable yet. We need to wait until the power is there for it to make sense.
    - Why not use solar in the meantime. Why not because what if by the time you're waiting has ended the world has already gone up too many degrees.
    - State law requires that 60% of all electricity come from renewable sources by 2030, and 100% by 2045, at which point no natural gas (methane in CA) will be used to create electricity.
    - Plus, California doesn't have a large natural gas supply so California would have to rely on different states or different countries to supply methane. Do you know the biggest suppliers of methane?
- Good place to test ideas such as microgrid electrification as a strategy to deal with power outages
    - This is part of the proposed microgrid the next step would be combining this measure with the next measure.
- Look, we HAVE to move away from fossil fuels if we want to stave off climate disaster. Electrification, powered by renewables, is the best answer. I thought we had committed to doing this in Chico by 2030. Yes, it's going to cost money at first, but if we don't prioritize this transition, we're going to have a lot more costly problems to deal with. Paradise and Berry Creek are early warnings, as were last winter's floods. Even without such disasters hitting Chico, going electric will be cost effective in the long run.
- Same concern as above.
- This is crazy stuff.
- This would be a good idea ONLY if the solar was set up to be accessible when the grid goes down. To be totally dependent on one single system like PG&E's power grid is totally foolish.
- Is there a plan for a municipal renewable plant or just purchasing it from sources via a CCA?
- Micro-grids are a great way to go, but remember if they are solar electric powered exclusively, they won't provide much if there are more than a few days of cloudy weather.
- Who's paying for it? Spend our money on better things like health and safety.
    - If a longer-term view is considered, we have all been deferring the costs of climate change for quite some time. No one wants to pay for the heedlessness of

the past, but if there is to be a future that includes clean air and water among other things many have for too long taken for granted, then we have to pay something now and for quite some time to come. It may also be the case that doing so now will also contribute to health and safety as well.
    - I have a sleeping problem that requires a machine to run and give me oxygen. This is for my health and safety that a renewable energy system is working in the future. I need clean air and clean water for my health and safety.
- If the city doesn't do this, no one will so it's a must!
- Why should the taxpayers pay for this? One of the HVAC units on top of city hall was just replaced with in the last year. Are you now going to replace it again because of this plan?
    - They would replace it when it needs replacing there is nothing in this measure that says a working HVAC is replaced by 2025. The city might replace the HVAC with an electric one or maybe it is electric I don't know this particular HVAC that you talk about. I am not part of the city or the installation team that replaced the old broken HVAC. The city might replace it to be a model for the citizens they might not. Do you want them to replace it?
- Again, another expensive idea that will not work because there is not enough renewable electricity in the state to utilize. Now, if you want to talk about building some current generation nuclear plants to provide clean electricity, you might actually have something.
    - Since September 2019, California has added 659 megawatts (MW) of utility-scale solar-powered generation capacity, increasing total solar capacity by 5.3% to more than 13,000 MW as of June 2020.
    - Norm there is an option to opt-out, but I think you are going to stay in the renewable energy program. I think Chico does not have enough room to put a nuclear power plant where would we store the rods? Nuclear power is not the answer.
- This has already passed Chico City Council and Butte County Board of Supervisors. "There are 19 CCAs statewide, and the Public Utilities Commission believes they will serve 80 percent of the residents in the state by 2020. Butte Choice Energy wouldn’t begin operations until Jan. 1, 2021." https://www.chicoer.com/2019/10/24/butte-county-finalizes-formation-of-power-buyingagency/ Evidently this has now been pushed back a year? PG&E's antiquated and decrepit infrastructure is the problem. Green Public Banks could solve that problem by funding clean green infrastructure capital investment.
- Yes
- A municipal power purchasing program will likely save Chico residents money. However, if we purchase only renewable power, somewhere else they will be purchasing more power from natural gas production. It does not make sense until the state can get to 100% renewable power generation. The timeline is too aggressive.
    - The state is going towards complete renewables, but a city needs to spread its power over a city, not just one city. Think of other cities that are already moving toward renewables? The cities are doing something, and we make up the city. It's like this cell-tissue-0rgan-system-body = Person-families-neighborhoods-cities-county-State. WE must start small with us our little town.

- Is there a possibility of building a solar farm as SMUD has done for its community?
- This measure should say something about supporting underground electric utilities in Code and financial support to property owners. Considering the carbon from human caused wildfires and the electrical grid, this would be key.
- 100% renewable has to be done; we all need to make it happen.... citizen to Fed
    - Well said it needs to start with us and go to the big honchos. City to the district, to the state, to the federal
- Don't really understand how this works - so hard to conclude viability. Don't trust PG&E - given their past practices and current difficulties. What about the City having its own?
    - To tell you the truth I am not sure but here is what I do know. I lived in a house powered by solar and when everyone else has no power we had power even though everyone else had a scheduled power outage. It worked great during the day.
    - Why not press for subsidies so that decentralized alternative energy production can be scaled down to individual dwellings?
    - Subsidies happen at the state and federal level. A CCA is something a City can do.
- Here is a list of other CCAs in California: Valley Clean Energy (Yolo County and Davis), Pioneer Community Energy (Placer County), Redwood Coast Energy Authority (Humboldt County), Apple Valley Clean Energy (San Bernardino County), CleanPowerSF East Bay, Community Energy (Alameda County), King City Community Power Lancaster Choice Energy Marin Clean Energy (Marin and Napa County), Monterey Bay Community Power (Monterey Bay, San Benito, and Santa Cruz), Peninsula Clean Energy (San Mateo), Pico Rivera Municipal Energy San Jacinto Power San Jose Clean Energy Silicon Valley Clean Energy (Campbell, Cupertino, Los Gatos, Saratoga and others), Solana Energy Alliance Sonoma Clean Power (Sonoma and Mendocino County), Rancho Mirage Energy Authority
    - When I moved to Chico or soon after we had this "green power" option on our power bills. It is a simple way of contributing a small increase in charge for becoming a supporter of this shift. People want to do that but don't have the option right now
- Since there is the opt-out, why yes or no? The City of Biggs runs their own power. Why does the City of Chico have to join with Butte County on anything? Of course, this would ultimately have the potential of allowing city staff to create another high paying department head position.
- Seems like a worthy pursuit.
- It seems like a shell game. Unless the country figures out a way to actually produce more green energy, then just shuffling around where we procure our energy from doesn't do any good.
- Nuclear power generation does not emit greenhouse gases. Might nuclear power be part of the "renewable" mix?
    - Well, that might be possible I am not sure people would be happy to live near the nuclear power station. Also, we have no way of disposing of the rods. Nuclear fuel remains dangerously radioactive for thousands of years after it is no longer useful

in a commercial reactor. Even though the power is Carbon-free it might be hard to sell nuclear power here in a fire-prone and flood-plain place.
    - Here come five words for you: Three Mile Island, Chernobyl, Fukushima.
- It will never maintain its paltry 2% rate savings as it adds more and more renewable energy to their portfolio as they will need storage and storage is not cheap.
- All good, but I think 2045 will be too late. It's compounded every year...!
- A 100% renewable portfolio will cost customers more! PERIOD. You say it right here and you also say electrification will be cheaper. You can't have it both ways. Electrification only make sense if it is all renewable! Solar electric will need huge battery storage systems to provide evening, night, and morning electricity. The cost will be enormous even with a distributed energy system.
- I pay something like $5/month to a company called Arcadia to provide me with all wind-powered energy, which they do by paying my PG&E bill in Renewable Energy Certificates. I'd much rather have an arrangement like this with a local source of renewables. CCAs seem like the answer.
- The city and unified school district managed to put solar collection infrastructure over school parking lots to generate electricity and provide shade for parked cars, just like Sierra Nevada Brewery. Why not do the same for our roadways where there is no shade from trees? Highway 99 could be made much more pleasant if it were shaded by solar panels, so could other streets like Eaton Road, Bruce Road, Highway 32, etc.
    - The Highway is not the cities to take care of, but I like the idea.
- What are the options for the city to generate its own renewable electricity? Wind turbines? Solar panels? Could the city build its own hydroelectric power plant on Big Chico Creek?

Measure 5: Implement the Chico Bicycle Master Plan

- Lower Bidwell Park could be an outstanding bike corridor from the east side residential communities to the downtown business district, but the park roads are in disrepair. It is an uncomfortable ride along either the north or south park roads.
- I bike and use the bike paths. I live near East Ave on the north side of town where many seniors like me live. It is unsafe to use the bike lanes there, and many other busy streets. Dividers with Native Plants could provide extra safety. Once again Public Green Banks can provide the funding infrastructure.
- For this to really work, and it might be able to, Chico has to stop sprawl and start high density transit-oriented developments. We need to develop villages throughout the city that are high density, walking/biking, cores to house people.
- I hope "end of trip facilities" includes bike lockers. Also, if work facilities have showers and changing rooms, more people would commute to work. Encourage school children to bike to school. Perhaps, charge for car parking at schools
    - I am not sure about the showers, but lockers and bike lock facilities sound amazing! The bike master plan is shaping up to be pretty good.

    - Bike lockers and other secure forms of bicycle storage are critical. Showers not so much. Holland and Denmark (and Vietnam) have some of the world's highest numbers of bicycle commuters, and they seem to do just fine - better in fact than many in the US - without showers etc.
    - Secure bike parking is a key missing link in Chico's bicycle infrastructure, especially downtown and around the university. There are dozens of car parking lots but not one truly secure space for cyclists to park their bikes. Central and secure bike parking facilities are 21st century necessities! Redding is way ahead of us with their new Shasta Bike Depot at the nexus of cycling in their downtown. Let's get serious in making bike commuting and shopping truly safe and secure by filling in this gap in our cycling infrastructure. Such a facility along 2nd Street between Cherry and the RR tracks, for example, would be a game-changer for thousands of potential university and downtown commuters.
    - Secure bike parking at destinations is important especially for businesses to thrive. The university and city have expanded bike parking capacity recently, but bicycle theft levels remain high in Chico. This deters commuters and shoppers, and bike parking facilities with more security than open racks could make an enormous contribution. Potential solutions abound and have been demonstrated here and worldwide – bike lockers (as at Meriam Library), bike cages (as on 5th Avenue by Enloe Hospital), supervised bike lots (as at the Sacramento State campus), video-surveilled racks, differently-priced tiers of bike parking, and prioritized bike parking by business and office windows – all of which are cheaper and use far less physical room than parking spaces for cars. Where such secure bike parking can be integrated into carpark structures, further economies of scale can be achieved
    - One bike locker put in place of a parking space would probably work great for downtown. Think about how many bikes could be put in one parking space per street.
- As a high-price-tag item, bike infrastructure should be matched by high-priority funding and actual behavioral civic goals and benchmarks for community change into a biking community. Is there a study (or plan for ongoing study) of citizen behavior in the biking area? Who rides bikes, who would if they had access to one, where in the city is biking most probable? "Promotion and education" need to be higher on the priority list, and study and benchmarks should precede infrastructure planning. Study other communities that have successfully transitioned to bike culture. What is use now, and how specifically will the city improve use of the expensive infrastructure it is planning to install?
    - That has already been done but the city has lagged behind putting in the infrastructure. What is the ham in fixing streets? I mean add bike trails will entice people to come and use the trails if nothing else it will add to tourism if none of the locals use the trails. BUT people do use the trails as evidenced by the cities comment page on improving the streets lots of people requested sidewalks and bike lanes of the many comments. People are asking and the city is promising.
    - I would add to Rina's good observations: increase in biking must be supported by the discouragement of car travel-- which itself must be provided the alternative of

efficient public transportation. How will the city provide a genuine system wide plan that will result in more bikes and-- the real point-- fewer cars?

- I find biking dangerous in Chico. The pathways have too many questionable characters on them. My daughter and I have been attacked. I no longer ride my bike because of that. My bike is for sale. If routes can be made safer from vagrants, they might work for some, but now most of my driving is for 10-mile round trips from the north to the south end of town and back and I can't use my bike for that type of shopping, anyway. Maybe it works for those living downtown?
- Chico is flat and has many clear days that are good for using a bicycle for transportation. I support this plan.
- In a recent study of more than sixty first-year CSU Chico students, their reported car travel near the campus was about *three times* that of bicycle travel. Car parking alone was more than twice as frequent as cycling, although few students reported paying any significant charge for such parking. More students reported owning a car or truck than a bicycle, despite the former being roughly 20 to 50 times more costly (!). Of those owning bicycles, less than half reported owning a helmet or front light, and only about a third a rear light, with reflective tape and/or clothing rarely reported. We can see in this data that there is great potential for increased bicycling in Chico's core, as well as enhancement of pedestrian safety and convenience, and a corresponding reduction in dependence on cars and in land and street use for car parking. A large majority of respondents said they would bicycle more if there were protected pleasant bike lanes and more secure bike parking. Our wide streets can accommodate 'complete street' enhancements, with what could be landmark bicycle- and pedestrian-friendly boulevards. Bicycle commuting and shopping can be made safer and cheaper by more secure bike parking. New facilities and development can be focused on abundant open space presently used for car parking lots. Not only have student respondents overwhelmingly supported these priorities, but these goals are also fully consonant with recent legislation, reports, guidelines, and revised standards across the state of California, including those in City of Chico, Butte County, and CSU Chico official statements, positions, and commitments.
- Yes, it can work. As long as citizens do not park their cars or pile their leaves in the bike lanes and the bike riders actually use the lanes it can work. But now the Grand Jury has found that the C of C roads need to be improved perhaps some actual dollars and energy will be allocated to fixing the streets with resurfacing such as seal coating, and restriping. Especially around the schools and other well-traveled routes.
- As we know, Chico is ideal for bicycling, as it is flat, and warm and dry most of the year, and the city has its own important histories and thriving subcultures of cycling. Yet our 'mode share' of cycling trips seems to remain below the 7% achieved in Portland, Oregon, with its cooler climate and its nine months of rain. But in the U.S., we all have much to learn from the cities and towns in northwestern Europe that achieve cycling mode share of above 35% for all trips, despite their own windy, wet, and chilly weather much of the year. Access there is broad and deep, with Dutch elderly, for example, logging a bike mode share about 60 times higher than the US average. At the same time safety has been sharply improved, with the Netherlands, for example, achieving an 81%

decline in cyclist deaths in the period from 1981 to 2006, and Denmark having a rate of non-fatal cyclist injury roughly 1/30th of that in the US overall (Pucher & Buehler 2008). Necessary for such numbers are protected bikeways and secure bike parking, among other things, but also smart growth plans that de-incentivize automobile use as they provide comprehensive alternatives. See the 16-minute online video 'Groningen: the world's cycling city' (Streetfilms 2013), for one university city example in Holland. See Pucher & Buehler's 'Making cycling irresistible' (2008), for a comprehensive review of exactly how the Netherlands, Denmark, and Germany have achieved these results.

- Yes, please! We need better infrastructure to get more people biking and walking. The city has lagged on this for too long, so now has substantial work to do, but it will benefit everyone. (more biking = less driving, so car drivers encounter less car traffic) Repaving our deteriorating streets is important for all users, not just cars -- though cars and trucks cause almost all the wear and tear.
- This could help, but it will take a very long time for the culture to change. Currently with the bicycle theft high in Chico, there is no safe place to secure a bike while the rider goes into a store. And if the bike is worth $950 or less, stealing it is only a misdemeanor, so no real penalty. Fix the security issue first.
    - Yes, the city should get to the root cause as to why someone steals a bike. In the meantime, maybe we can have more bikes that are rentable as well. Not just rent from a store but maybe rental from the city or like the CHASE bikes in San Francisco.
- I have bike I don't ride...sure I am not alone. Putting head together to figure out WHAT in/dis-incentives could change behavior?
    - I don't ride because the bike paths seem so disconnected and there are so many cars. I prefer to walk most of the time and commute to the grocery store with my roommate who has a car. I don't own a car a crash and then just don't have the money to fix it.
- The bicycle master plan should be given priority over all other projects. They say it comes at a high dollar cost, but they are not factoring in all the other benefits like, less air pollution form combustion engines and healthier lifestyles for the citizens. Bicycle lanes should take precedence over automobile roads.
- Even with such extensive trails, the roads in Chico are not safe for bikers. Making it safe to ride outside is critical
- The Bicycle Plan is a good start, but we need a larger focus on sustainable, multimodal transportation. A better bikeway network will encourage many people to bike instead of drive for some trips, especially if we install protected bikeways on major roads instead of just labeling side streets "bike routes". To really shift away from single-occupancy vehicle trips we also need reliable, frequent local transit and at least some intercity transit.
- On a trip to Victoria, BC last year we saw people of all ages bicycling as a means of transportation. We were told 10% of the people bicycle there. Improving bicycling safety and providing safe bicycle parking are important pieces of needed infrastructure. Reduced emissions and improved health care benefits. Chico is flat and easy to ride in so let's get more people out of their cars!

- yes yes yes--lots of additional benefits, including health, less traffic, and increased appreciation of natural surroundings!
- Yes, let's make Chico a more bike-friendly town we already have bike shops. That is local economy that should be supported.
- Resounding YES.
- We've got to fix the streets. It is unpleasant and unsafe to ride them as rotten as they currently are. Also, as E-bikes become more popular there has to be more secure bike parking since these bikes cost a lot. Can we get a public bike share program in here that uses E-bikes?
- YES, to the importance of the Chico Bicycle Master Plan. The rise of new urbanism and smart growth in the 1990s (Duany et al. 2000, 2010b) spurred an urban walkability and bicycling renaissance that has now transformed countless cities in the US and worldwide (Leinberger 2008; Shoup 2011; Speck 2012; Abbasi 2016; Mapes 2009; Pucher and Buehler 2008 and 2011; NACTO 2014). Results include reduced energy consumption, reduced noise, lower carbon emissions, lower air pollution, increased fitness and health, increased street safety, and reduced death and injury incidence from car crashes with cyclists and pedestrians (with protection especially of children and elderly). This revisioning of urban life also brings increased equality of transport options, lower costs of transport (especially important for households with lower incomes) and of engineering (crucial for financially constrained government entities like ours), increased vitality of urban businesses, and durably higher property values. I hope our city will continue to evolve with the times, and further invest in smart growth to reap the huge benefits that come with more walkable and bikeable urban spaces.
- Yes!! The City's 2020 Climate Action Plan (CAP) calls for coordination with the Butte County Association of Governments (BCAG) in provision of bicycle facilities and infrastructure, including bicycle parking. The CAP's prioritized measures to reduce vehicle miles traveled and fuel consumed include: expanded and enhanced bicycling and pedestrian infrastructure (1.11), 'complete streets' as indicated in the 2030 General Plan (1.12), traffic calming, including landscape medians and street corner bulb outs (1.13), new bike paths (1.14), and safe routes to schools (1.16). Updated city parking standards aim to reduce surface parking areas, require bicycle parking at higher ratios, and support convenient pedestrian pathways through parking areas (1.17). The CAP makes clear that effective actions in the transportation sector are 'critical' to reducing greenhouse gas emissions. Estimated emissions from transportation in Chico are roughly double those from all other energy uses, and fifteen times greater than those of solid waste processing (CAP 2.22). The low-hanging fruit offered by cost-effective and safe bicycle infrastructure has yet to be harvested.
- Re costs: effective bicycle plans SAVE MONEY for cities and their universities, while enhancing health and safety, increasing neighborhood quality and property values, and invigorating local businesses. Recent university leaders in the US in cost-saving collaborative projects with city governments have been MIT, CU Boulder, Portland State University, UC San Diego and of course UC Davis. Stanford University, for example, has saved close to $100 million overall through a combination of strategies to reduce private

car commuting rates, allowing campus size to increase 20% without increasing car traffic. Among other things, Stanford raised car parking prices 15% and invested $4 million in bicycle facilities, thereby motivating an estimated 900 people from cars onto bicycles – instead of spending $18 million for more car parking for them.

- I they can do it in Paris we can certainly do this in Chico!
- This town pays to much money for bicycle infrastructure. This not a bicycle rooted town. Some ride but the majority don't. Repair the roads. Charge a bike tax for them to use the roads that car users must pay for in gas taxes.
    - Why would a pedestrian or bicyclist pay to use roads? A walker and biker are not emitting GHG's and they are more likely to spend money on shops downtown than someone in a car. A car rides by shops but when a person walks downtown, they stop at more than one place most times. I do see the need to repair the roads but then again, I don't use the roads I use the sidewalks and those sidewalks have been eaten up by roots.
    - Cyclists do pay to use the roads. They too buy gas (gas tax) and they do pay all the taxes everyone else pays.
    - I forgot that I don't own a car anymore most cyclists or pedestrians have a car for certain trips or grocery runs. I think Barry's main concern would be when people stop buying gas. In which case most countries would transfer taxes currently on gas vehicles to batteries or electric charge stations or hydrogen taxes.
- The Master Bike Plan should have "stub outs" in mind to connect to regional bike plans and other cities. i.e., what route do you take to get to Oroville or Gridley.

Measure 6: Improve zero-emission vehicle infrastructure

- EV use is inevitable and it makes sense to adapt by installing more charging stations. These charging stations will need to use renewable energy, and we also need to plan a safer community for those who don't drive or would prefer to travel by walking, biking, or transit.
- Given the relatively high price of electric vehicles, it is absurd that the regulation suggests, "a focus on providing access to low-income households and affordable housing." Does that really make any sense?
- Replacing fossil fueled individual vehicles with individual EV's misses the point - we need mass people movers. For example, Neighborhood EV's, shared vehicles. Butte County bought "clean diesel" buses because electric buses are expensive is an obsolete mindset. Those vehicles are throwing away public tax dollars. There is no such thing as "clean gas" or "clean diesel."
- New technologies in energy storage are making this more and more attainable. It's happening regardless of Chico's Muni Code. Let the ZEV industry create products that consumers choose to buy rather than regulating what consumers can buy.
- ZEVs are certainly part of the answer, but one size does not fit all. To make access to clean transportation equitable, we also need to prioritize improved bicycle infrastructure, pedestrian improvements and transit enhancements to encourage safe active and public transportation usage.

- "lower cost now" sounds great, especially looking at the higher costs later. Make sure it's cost-effective for both consumers and the City -- but I would vote for charging stations to charge for service. There might also be the ability to provide free or lower cost charging in low-income neighborhoods.
- The C of C has installed numerous charging stations at City Hall already and some private companies have too in partnership with Tesla. But the C of C should not implement any codes on developers stricter than what is at the state level.
- EV cars obviously use batteries. The only place I've seen that makes batteries was in Canada and the city looked like a post nuclear disaster. No life, everything black, dead and apocalyptic looking. Until I find out what is different about battery making and the use of those precious metals to make batteries, I am staying away from EV. Does anyone have good info that might change my mind?
- I think requiring new construction to provide EV charging space is smart, but I am not for publicly funded charging stations. Keep charging stations a private enterprise so it can grow naturally in the private sector. That way it won't grow up relying on government subsidies.
- Charging stations need to be a private venture. It is wise to start mandating parking spaces that can be easily converted to charging stations. Again, I see a problem with power generation. It makes no sense to use natural gas to generate electricity for an electric car.
    - WE should definitely share the sun then and invest in solar panels
- Like all the proposals that impact residential customers, those of middle and lower income will need either incentives or grants to help make their participation possible. Equity is critical as we move into a clean energy economy. Will incentives and grants be available?
    - Great idea--and it will require subsidies, as many commenters are pointing out that we don't want to make living here anymore prohibitive to low-income folks than it already is.
- A high priority if we want to reduce tail-pipe emissions of GHG's
- We need a local gas tax.
- Why not reintroduce electric light rail and thereby reduce internal combustion vehicle traffic even further? Every European town of any significance has light rail, why can't we?
- It would be great to have an incentive for homeowners to purchase at least one electric vehicle per household and provide the charging systems which will require infrastructure modifications for the local power structure to handle the great increase in load and that isn’t the CCA’s problem it will be PG&E’s
- With the trend of U.S. auto manufacturers working toward more affordable electric vehicles we can do this.
- Another cost to homeowners. This is not San Francisco. This requirement to have to upgrade a remodeled home to have to also add charging systems will add thousands to a remodeled job. It makes it too hard to live in Chico. It's no wonder that businesses won't come to this town. Workers for their businesses can't afford to live here. In Santa Barbara they can't get police or fire people to work there because the housing is too expensive.

We are getting close to the same problem. Who else won't be able to live here, nurses, teachers, doctors? Get real and look at the overall picture. We can't house the people who live here now.

- Are you planning on building something with parking?
- All aspects of our lives are under strain. We have to adapt or die. The cost of a charging feature is trivial and could be zero if intelligently subsidized. Farmers who grow export crops with public water (thereby exporting water) for private profit are subsidized; why not assist homeowners and small businesses the same way?
- Ooh I like the way you think

Measure 7: Reduce organic waste

- Creative and assertive landfill management and edible food recovery programs city-wide and regionally are essential. https://www.epa.gov/sustainable-management-food/reduce-wasted-food-feeding-hungr y-people
- Every time we asked our recycling service companies about providing an extra bin to each household for organic waste composting - like other cities already do - we heard no plans to do so because so expensive. Even though the state will fine them $10K/day soon for not complying with state law. Last we heard was that there is vague plan to maybe have some congregate bin for larger complexes?
- There definitely needs to be more education about organic waste in our community. Leaves should be left for mulch and a simple home composter should be required.
- Yes
- Employ worms!
- It's so easy to compost regular household waste that an education program might me all that's needed. But we still need the larger yard waste that Waste Management provides for leaves and branches and stuff.
- You'll need to watch the movie Pollyanna.
    - Pollyanna: A young girl comes to an embittered town and confronts its attitude with her determination to see the best in life. That one? From 1960?
- Who gets to be the trash police? For months the Green Waste Facility at the Airport has been closed. These ideas are all great at the council, board, and commission levels but when it gets to implementation and actually following through with these feel-good ideas... some just fall through the cracks.
- We need to keep the green waste facility open, even if it requires a subsidy from the city or county. The waste can be made into mulch and the larger wood items could be burned in a cogeneration facility to generate renewable electricity.
- I would love to see community composting not relying solely on CAL Recycle.
- We definitely need food waste diversion and composting in our region and our way behind on this front.
- Seems to make sense.

- Yes! We can divert so much more from landfills (restaurants alone is a huge source). But the composting needs to happen locally -- not waste energy hauling it far away, plus provide local jobs.
    - Yes, let's provide some local waste hauling jobs and that can create more jobs from the money those jobs spending locally on our economy.
- Other cities like Berkeley are already doing this so we can learn from their practices and experiences.
- We need a compost solution that will employ local people and not be sent out miles away. Reducing organic waste will be a great solution and maybe bring 20 renewable jobs for the site. I hope you pass this measure we only have so many years left to slow down climate change.
    - Absolutely, and I could not agree more.
- In addition to the larger companies like Recology, have opportunities for smaller businesses been considered? "Drop in the Bucket Bicycled Powered Compost Service" is an excellent model.
- Would the fee schedule for composting and food waste be based on volume? A cafeteria e.g., has to be charged more than a very small cafe.
- Now we are going to have trash can police. Who's going to pay for this. Another fine on a poor town. Who is going to pay the extra fees for food garbage pick-up? We already pay the highest fees in the U.S. for power and trash removal. One of the local trash haulers in actuality is the MOB. What else can they bully out of us?
    - It does not seem very bully-like to help the Chico residents compost organic waste. If everyone composts at home, we will not need to do this. But not everyone has a yard. I don't have a yard I live in an apartment. I understand the high fees for trash removal and the high fees for electricity are not accessible to most people. I am on an unstable income myself, but I also recognize that trash needs to go somewhere. No one wants to live a zero-waste lifestyle. I can't. I don't think it's possible for someone in my income bracket, but I think composting is possible.
    - I have lived in places where people are fined for not separating recyclable waste - such fines could pay for monitoring. As for corrupt trash hauling, this is a serious problem that could be addressed by better regulation - and why not a municipal waste hauler not incentivized to cut costs and break laws to save money, rather than a private business that is notorious for doing so?
- WASTE-by Organics, I assume you mean organic material from the ground, not organically grown without pesticides, etc.

Measure 8: Expand the urban tree canopy

- TREES- as long as an urban forester is maintained on staff, plus other crew as needed. Consult with arborists and CNPS as to which trees are best for each location.
- Planting trees is important. Also, greener plans for drainage capture are essential.

- Collaboration with Tribal leaders who have the generational knowledge to be caretakers of the land is crucial in this proposed measure.
- Yes. Trees are good. Let's plant more trees.
    - Yes, and let's help the wetlands store more carbon and water.
- Planting native and diversity of trees and land management could be placed under Indigenous tribal leadership, such as https://tekchico.org/ If we have learned anything from our firestorms' devastation, it's that we have failed land management in ways that only going full circle to #LandBack and land management led by the Indigenous people of the territory that they successfully managed for tens of thousands of years is the best practice.
- Yes, totally support this, for reasons of beauty, shade, habitat, and sequestration. But remember these trees are carbon banks, they don't eliminate the stuff and eventually it will return to the atmosphere. We need to stop adding CO2 to the place.
- I think resources on forest management are better spent than diverting organic waste - if we have to choose. Otherwise do it all.
- This is very important to the overall health of our eco system, water shed, and air quality. But the City of Chico also needs to do a better job of maintaining the street trees and the trees in parks that we have. Some CARD is managing now but the tree police need to be more active. Such as Bidwell Fire Trap, this needs to be cleaned of dead wood. It is in the middle of town and a fire could spread very quickly.
    - I think the goats eating the detritus is helping but CAL-Fire really helped. But yes, I agree there should be more help in Bidwell to clear dead trees that are fire hazards. But the dead trees that are returning nutrients need to stay. I mean there is one tree in lower Bidwell that is a beehive now I don't think that tree should be removed.
- While any tree is better than none, it is extremely important that the majority of new trees planted be native to this area. Native trees, especially oaks, are keystone plants for local habitat - insects and birds, in particular.
- This is absolutely essential for the City of Trees. So many trees have been cut down in recent years--the Downtown Park, the orange trees, so many others, not to mention what's happening up on the Ridge. Planting trees is something everybody can do.
- Since a grant covers the cost moving forward makes sense. And to keep the trees alive we need a healthy aquifer. That requires diligence and preventing down state entities from transferring water out of our area.
- A city tree planner came by my house and wanted to know if I wanted the city to plant a tree next to my driveway and the sidewalk. We already have a 40' + eastern oak in our small front yard and a total of at least 20 trees on our 1/4 acre. Of course, I don't want another tree to maintain (we already pay about 2k per year for pruning services) and have sidewalks/driveway with root-lift issues. I hope that is taken in consideration when planting trees near concrete, as my husband and I have both tripped on neighborhood sidewalks and required months of medical attention as a result. The city has not been helpful on this. Some of the neighbors are painting the lifted walkways to warn of the

danger. Trees away from walk/driveways are great and I would love to see more. No liquid ambers with gum/sticker balls, please.

- Planting trees is good, but Chico needs to do a better job reducing undergrowth that can fuel wildfires.
- Yes! We need more trees in Chico and they are indeed important in Carbon sequestration! It is CRITICAL however that these trees are native, however! Non-native trees do not provide the necessary habitat for native insects which in turn support small mammals and birds, etc. Some species, like Pistache, are beautiful in the fall, but are also invasive. Biodiversity declines are at all time low, and NOTHING is sustainable without biodiversity! Thank you for your environmental work in Chico!
    - I agree - trees that are native are suited to our environment, so they don't need as much water, and as mentioned above support the local ecosystem. I hope the city sticks to native trees.
- Yes, this is extremely important for long-term health of the city. Every new construction area needs to protect existing trees plus set aside area for a higher concentration of new, diverse plant life. Our entire ecosystem, including groundwater, depends on it.
- Planting more trees is a wonderful way to reduce CO2. I think the goal should be closer to 7000 than 700. Reforestation throughout the state and nation is also a wonderful idea. The negative is that trees in the wrong spots will reduce the ability of solar arrays to generate power. We need to be thoughtful in selecting the locations for more trees.
    - I agree and the city will probably be thoughtful about placement once the plan is passed. There will be more comment periods and transparency about selecting areas. Keep coming back and encouraging trees the ecosystem like the wetlands that hold the Butte County Meadowfoam. The plant is found nowhere else in the world. I had no idea that was the case when I moved here for school. I am glad I have seen it though and learned about the Fairy Shrimp.
    - Conflict with solar arrays is an important factor in determining placement of trees, especially adjacent to single story homes. One of the many other suggestions made for this Climate Action Plan include codifying the requirement to plan for smarter street and roof layouts. This will enable community tree canopy and rooftop solar to co-exist. The City has identified over 8000 vacant tree planting locations. 700 is just the start.
- There is no reason all of these proposed measures would work in Chico, and every reason why they need to be implemented. Whether they will go or not will depend on the enthusiasm and commitment of the City leaders and the people of the community - that's what will make them go. There is NO reason they should not be implemented. In the case cost is an issue, GROW UP, people! You want a healthy environment - you might have to pay something for it!!
- If the trees are for home yards rather than street trees, then provide homeowners siting help, so the trees cast shade in the summer but do not block the warming sun in the winter and do not shad solar panels

    - I really like this idea it would not be that hard to factor in growth rate, solar map a home, then prune based on the home shape. I would just need a satellite image from winter and summer and some math.
- Just wondering where all these trees will be downtown has so many. Will it be along Deer Creek Highway or Along 99? Will it just be 700 spread out over the City? Like Town hall gets 5 more? Downtown each street gets 20 more? Then the Highway gets 10 each mile? Or does the town make a forest each time new affordable housing comes in?
- When grants become available, this is another area where paying attention to equity is important. Lower income neighborhoods can't afford trees like middle- and higher-income neighborhoods and should be prioritized for tree planting. The cost of water, depending upon the tree, is minimal but could get higher as the climate warms. Is equity a consideration in the planning of tree planting?
    - Good question I don't know how the city is determining the placement of trees for the urban forest. Equity is important though and low-income neighborhoods should be considered. Not to mention how many trees should be added with affordable housing that will need to be built through time. Trees that are native to the area and can tolerate some dryness should be considered as well. I am low-income thank you for thinking of me.
    - The City is currently in a Climate Change Investments Greenhouse Reduction Fund grant. The grant project is called "City of Chico Urban Forest Revitalization Project" Part of the grant commitment includes focusing tree planting in Low-income and Disadvantaged. neighborhoods. The City is committed to addressing disparities in urban greening and intends to continue focusing efforts where the benefits to citizens will be the greatest.
- The city needs to plan for expanding the urban tree canopy by 700 trees per year. This city has gone too long without a fully funded tree program and we are only beginning to see the damage this has done. Over the next several years I think we are going to see the canopy decline as there are more trees being removed than planted. Just talk to any tree service company in Chico and you will hear how busy they are.
- In a CSU Chico report to the City Council in 2016 that surveyed some sixty undergraduates who had studied carefully and first-hand the South Campus neighborhood, the most-liked aspect of the neighborhood was overwhelmingly the beautiful TREES for which Chico has long been known. This mature urban forest adds profoundly to the quality of experience throughout the town and has been cultivated as a highly valued attribute throughout its history. Where tree cover is lacking, streetscapes can feel bleak and blasted even where design is good, especially in summer heat. Where tree crowns and canopies shade sidewalks and streets, even mediocre settings are pleasant for residents and passersby. Drought, climate change, and budget challenges threaten this vital resource going forward. For our future, YES to expanding our forest canopy, investment, and maintenance!!
    - Thank you for sharing your thoughts on the south campus neighborhood. I do enjoy walking under the trees on my way to class. I have enjoyed walking because of the mature urban forest. Those trees won't block the solar panels either because they are mature, they won't grow that much taller and the houses in the

south campus neighborhood will probably enjoy solar when it becomes cheaper and rental companies realize the affordability of renewable energy once the houses are properly insulated. The south campus neighborhood is one of the oldest neighborhoods the houses are predominantly rented by students and don't have much say in what a company does to the building. BUT I think the Greek Houses will adopt renewable energies if they haven't already. Sigma Chi at a UC installed solar panels in 2016 with a green initiative fund. I think some of the students could do it out here with a similar grant.

- I think it's going to be/ is vitally important that we also recognize SOIL as the massive carbon sequestration/ giver of life that it is. It should be a huge consideration when deciding where we build moving forward. As much, in my opinion, as a consideration such as the urban/forest interface in other parts of our county. Chico and its surroundings are home to some of the best soil around, and it is getting more and more painful to see huge apartment complexes, subdivisions and development, and the infrastructure that currently exists, covering it all up and taking out of biological play. I know we need places for people to live...I understand that this is obviously a huge challenge.
- Fantastic a grant will help pay for the trees watering, maintenance, and planting
- Who is going to pay for the maintenance of the new trees? The property owners. It can cost a fortune to take care of trees.
    - It has "cost a fortune" to trash the life support system we call the environment; time to pay the piper.
    - The city said it was going to get a grant. So yes, we are all going to pay the piper by hiring a grant writer and get that grant. The environment has been hurt and Chico is just trying to reduce the pain.
    - If the trees are on City property or in the City's right-of-way, the City will maintain them. If a landowner accepts a tree from the City for their personal property, the landowner is responsible. The cost to water a tree for the summer (15 gallons a week for 16 weeks) is about $1.
    - And of course, pruning trees the landowner can do it or employees some tree service to help maintain the trees to ensure solar panels are not blocked. Another job created or kept employed for the local economy. Win!
- Only if low-water, native trees are planted. All the ornamentals do not provide habitat and can be difficult to maintain with a reduced water supply.
- How does this work when people now are cutting down their shade trees to put on solar electric systems on their homes? Is there a balance or a preference for one or the other?
    - There is a balance between shade trees and solar panels. Sharing the sun is all about planning where the solar panels can get the most sun and the trees can get light. One day people will realize like my dad did that trees and panels can both share the sun.

HELP TAKE THE City of Chico INTO THE Future!

The City of Chico is updating their Climate Action Plan. A climate action plan provides a comprehensive roadmap for how we can reduce our greenhouse gas emissions to help address climate change and make our City more resilient. You can help by participating in this self-directed online workshop. Go to the link below and share your thoughts on proposed strategies for this update.

CITY of CHICO

Share your input www.ChicoClimate.com

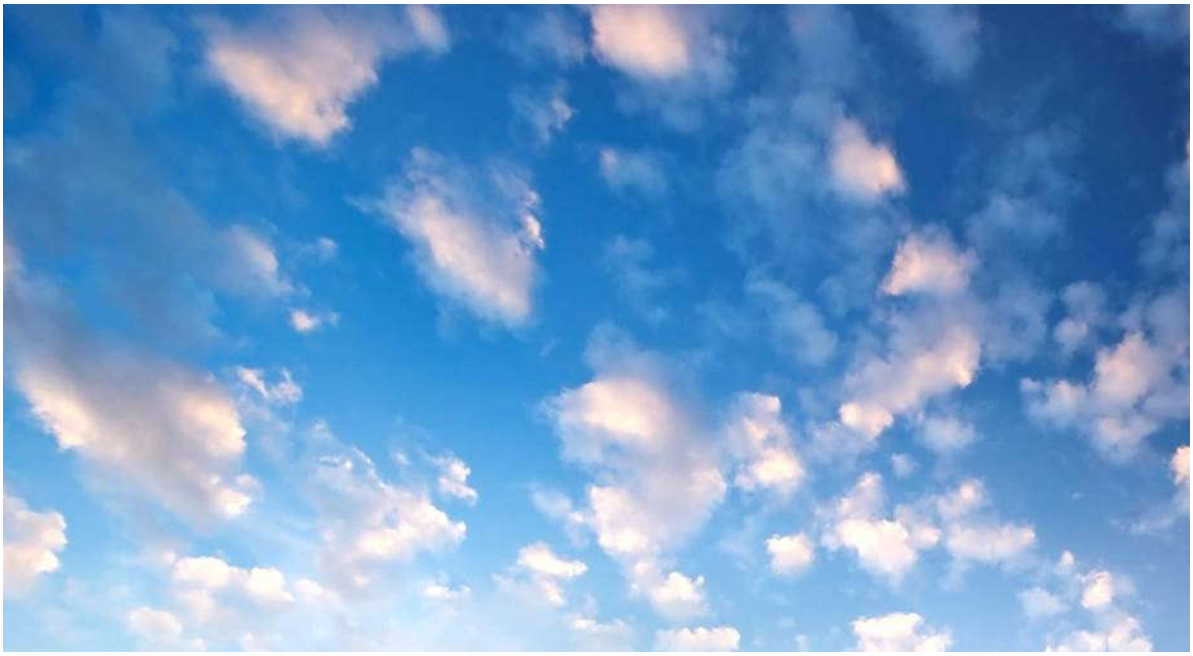
Participate in an Online Workshop: Nov. 19 - Dec. 3

Learn more about the top eight proposed strategies and provide your feedback!

This page is left blank intentionally

APPENDIX B:
GHG Emissions Inventory and Forecast

This page is left blank intentionally



City of Chico Climate Action Plan Update

Appendix B – GHG Emissions Inventory and Forecast

prepared for

City of Chico
411 Main Street
Chico, California 95928

prepared with the assistance of

Rincon Consultants, Inc.
4825 J Street, Suite 200
Sacramento, California 95819

April 2020

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

This page is left blank intentionally

Table of Contents

Tables

Figures

This page intentionally left blank.

1 Executive Summary

This document presents the methods for developing a greenhouse gas (GHG) inventory and forecast for the City of Chico from 1990 to 2045. Included is an analysis of findings and trends in the City's GHG emissions in order to support the City's GHG reduction targets, which align with Senate Bill (SB) 32 and Executive Order (EO) B-55-18, and ultimately the City's Climate Action Plan Update. Historical GHG emissions from 2005 to 2017 were itemized by the City of Chico in a multi-year inventory (Sustainability Task Force 2018) to measure the City's progress toward its 2020 GHG reduction goals set in the first City of Chico Climate Action Plan (City of Chico 2012). Based on the inventory, Rincon developed an updated back-cast of GHG emissions to 1990 as well as a forecast to 2020, 2025, 2030, 2040, and 2045. The forecast provides an up-to-date projection of how GHG emissions are expected to change in the City of Chico in the future based on changes in local demographics as well as existing State and federal legislation aimed at reducing GHG emissions through 2045. This document also presents a gap analysis, developed to identify climate action plan policies that will be needed to achieve the City's GHG reduction targets.

It is important to note that GHG reductions that resulted from measures codified in first Climate Action Plan and the City's General Plan (2011) were by default accounted for in the multi-year inventory through 2017. Since the forecast is developed based on the 2017 inventory, these reductions are carried through into the forecast due to the lower per capita emissions in 2017 which resulted from implementation of those measures. However, the forecast does not reduce future emissions based on any projects that were not implemented by 2017 (e.g., the Bicycle Plan Update [2018]). Rather, GHG reductions from efforts made since the last inventory year will be calculated and credited to the City during the Climate Action Plan Update process.

In 2017, the baseline year for the Climate Action Plan Update, the City of Chico estimated GHG emissions for the energy, transportation, and waste sectors of the community. GHG emissions over all inventory sectors are estimated to be 466,366 metric tons (MT) of carbon dioxide equivalent (CO_2e) (Table 1).

Table 1 2017 GHG Inventory

Sector	GHG Emissions Source	Activity Data	Emission factors	Emissions (MT CO_2e)
Energy	Residential Electricity (kilowatt hours)	235,187,470	0.00013 MT CO_2e/kWh	30,757
Energy	Residential Gas (therms)	12,204,431	0.00531 MT CO_2e/therm	64,769
Energy	Industrial and Commercial Electricity (kWh)	249,720,494	0.00013 MT CO_2e/kWh	32,658
Energy	Commercial Gas (therms)	6,015,786	0.00531 MT CO_2e/therm	31,926
Transportation	Gasoline Sales (gallons)	20,597,450	0.0088 MT CO_2e/gallon	181,031
Transportation	Diesel Sales (gallons)	9,965,177	0.010 MT CO_2e/gallon	101,854
Waste	Waste (tons)	82,440.3	0.2835 MT CO_2e/ton	23,372
Total				**466,366**

Between 2005 and 2017 the City of Chico reduced overall GHG emissions by 27% (Figure 1) despite a 27% increase in population (Figure 2). Major reductions were seen in the energy and transportation sectors in particular. Reductions in the transportation sector were driven primarily by reductions in diesel and gasoline consumption, whereas reductions in the energy sector were driven entirely by a reduction in emission factors, despite little change in actual electricity usage.

Figure 1 Changes in GHG Emissions (MT CO_2e) Over Time

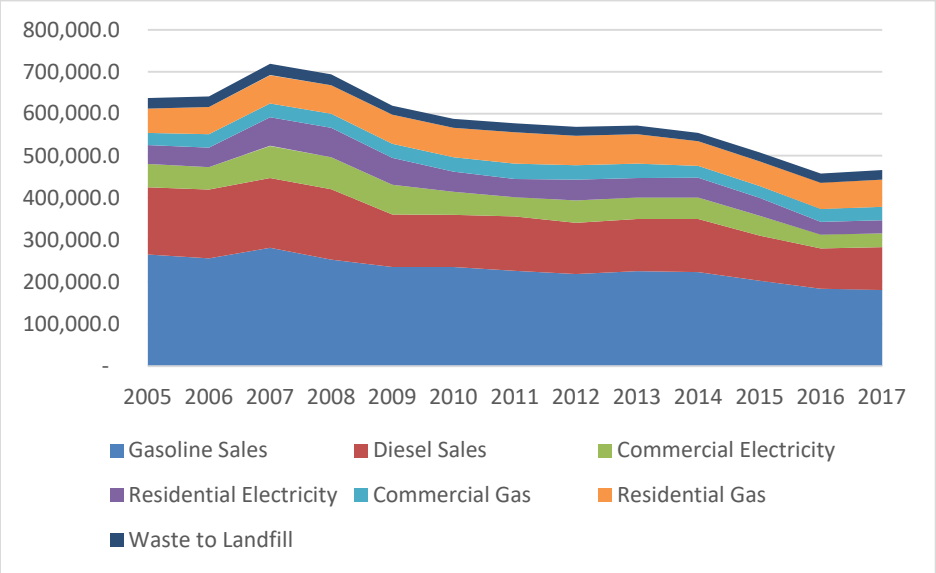
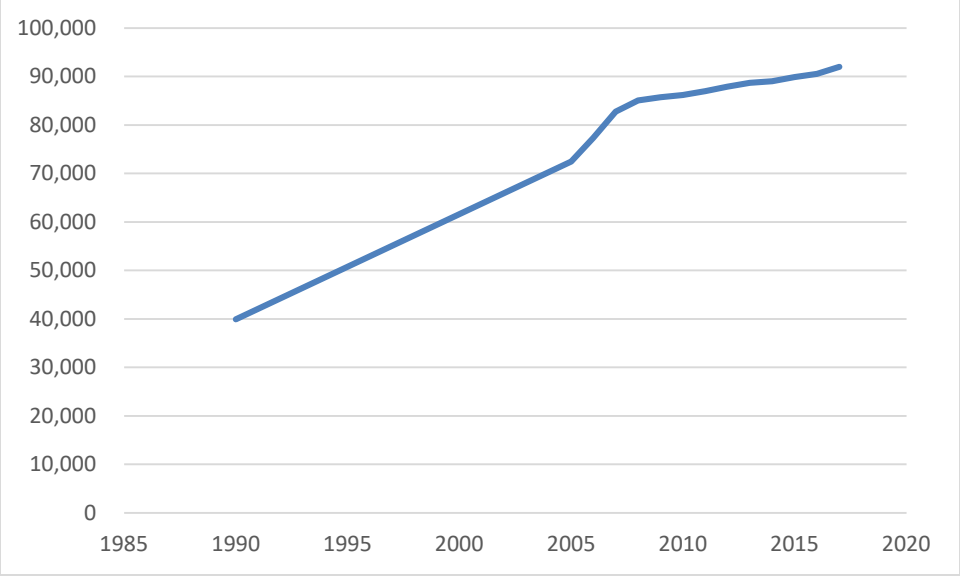


Figure 2 Population Changes (1990-2017)



Due to the significant population increase between 2005 and 2017, per capita emissions have seen an overall 42% decrease from 8.8 MT CO_2e per person to 5.1 MT CO_2e per person, exceeding the 2020 Climate Action Plan reduction target of 25% below 2005 levels by 2020.

Two forecasts were developed based on the 2017 baseline inventory: a business-as-usual (BAU) scenario and an adjusted scenario. The BAU forecast scenario projects the expected growth in all emission sectors based on job and population growth. The adjusted forecast also accounts for job and population growth, and additionally quantifies and incorporates all state regulations that are expected to help reduce Chico's GHG emissions in 2030 and 2045 (e.g., Senate Bill [SB] 100 and California Air Resource Board [CARB] tailpipe emissions standards). The adjusted forecast provides a more accurate picture of future emissions growth and the emission reduction the City and community will be responsible for after State regulations are implemented (Table 2).

Table 2 Adjusted Forecast Summary

Variable	2017 (MT CO_2e)	2020 (MT CO_2e)	2025 (MT CO_2e)	2030 (MT CO_2e)	2040 (MT CO_2e)	2045 (MT CO_2e)
Population	*92,022*	*111,892*	*107,593*	*107,712*	*113,303*	*116,420*
Jobs	*32,429*	*39,061*	*37,124*	*36,251*	*38,859*	*40,162*
Residential Electricity	30,757	33,722	29,829	21,318	7,284	0
Commercial Electricity	32,658	36,285	31,553	22,163	7,760	0
Residential Natural Gas	64,769	78,285	75,471	75,549	79,209	81,250
Commercial Natural Gas	31,926	38,248	36,474	35,675	38,063	39,256
Gasoline Sales	181,031	167,666	145,733	129,209	118,131	119,128
Diesel Sales	101,854	100,435	91,722	84,367	80,902	82,473
Waste	23,372	28,349	27,178	27,036	28,576	29,406
Total Emissions	**466,366**	**482,990**	**437,961**	**395,317**	**359,925**	**351,512**
Emissions Per Capita	5.07	4.32	4.07	3.67	3.18	3.02

Calculating the difference between the adjusted scenario forecast and the reduction targets set by the City determines the gap to be closed through City Climate Action Plan policies. A discussion of the reduction target pathways and gap analysis is provided at the end of this document.

2 Introduction

The State of California considers GHG emissions and the impacts of climate change to be a serious threat to the public health, environment, economic well-being, and natural resources of California, and has taken an aggressive stance to mitigate the State's impact on climate change through the adoption of legislation and policies. In particular, State agencies are required to reduce the State's GHG emissions to 1990 levels by 2020, as established by Assembly Bill (AB) 32. Further, Senate Bill (SB) 32 requires a 40 percent reduction in GHG emissions below 1990 levels by 2030. In the long term, Executive Order (EO) B-55-18 establishes a target of carbon neutrality by 2045. Many cities have developed local climate action plans and aligned goals to correspond with State emission reduction targets. The goals set by AB 32 were achieved by the State in 2016 (CARB 2019) and many jurisdictions are completing GHG inventories and forecasts to quantify progress toward their own 2020 goals as well as develop targets to align with the requirements of SB 32. In Chico, emissions overall have decreased since implementation of the first Climate Action Plan in 2012 and the City achieved its 2020 Climate Action Plan goal of reducing GHG emissions 24 percent below 2005 levels in 2016 and 2017 by achieving a 28% and 27% reduction from 2005 respectively. These reductions are attributed to community-wide reductions in transportation fuel and natural gas usage, as well as a decreasing electricity emission factor resulting from State legislation (i.e., SB 100).

Estimating GHG emissions in a GHG inventory enables local governments to quantify the major sources of GHG emissions produced by community-wide activities, establish an emissions baseline, track emissions trends, and identify the greatest sources of GHG emissions within their jurisdiction. The inventory is the basis for further quantification of future GHG emissions in a forecast. The forecast allows a jurisdiction to set targets for future reductions. Furthermore, an inventory that quantifies GHG emissions from activities within a defined geographic area is a required element of a "qualified" GHG reduction strategy, per Section 15183.5 of the California Environmental Quality Act (CEQA) Guidelines.

This document presents the methods for developing a GHG inventory and forecast for the City of Chico from 1990 to 2045. Included is an analysis of findings and trends in the City's GHG emissions in order to support the City's GHG reduction targets, which align with Senate Bill (SB) 32 and Executive Order (EO) B-55-18, and ultimately the City's Climate Action Plan Update. Historical GHG emissions from 2005 to 2017 were itemized by the City of Chico in a multi-year inventory to measure the City's progress toward its 2020 GHG reduction goals set in the first City of Chico Climate Action Plan. Based on the inventory, Rincon developed an updated back-cast of GHG emissions to 1990 as well as a forecast to 2020, 2025, 2030, 2040, and 2045. The forecast provides an up-to-date projection of how emissions are expected to change in the City of Chico in the future based on changes in local demographics as well as existing State and federal legislation aimed at reducing GHG emissions through 2045. This document also presents a gap analysis, developed to identify climate action plan policies that will be needed to achieve the City's GHG reduction targets.

The 2017 inventory is intended to inform completion of a qualified GHG reduction plan for the City of Chico and is compliant with the ICLEI – Local Governments for Sustainability (ICLEI) *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (ICLEI 2013) as well Section 15183.5(b) of the CEQA Guidelines for the requirements of a "qualified" GHG emission reduction plan. Emissions contained within the inventory and forecast include activities under the jurisdictional control or significant influence of the City of Chico, as recommended by the Association of Environmental Professionals (AEP) in preparing Community Protocol and CEQA-compliant inventories (AEP 2013). Like all GHG inventories and forecasts, the analysis in this document relies on the best available data and

calculation methodologies currently available. Developing a GHG inventory is an iterative process and each year must be viewed in the context of other inventories and relative trends of each sector to maintain consistency with the GHG inventory methods and factors.

3 Legislative Context

The State of California has developed State-wide legislative targets and programs to reduce GHG emissions in California. The State of California, via CARB, has issued several guidance documents concerning the establishment of GHG emission reduction targets for local climate action plans to comply with legislated GHG emission reductions goals and CEQA Guidelines Section 15183.5(b). In the first *Climate Change Scoping Plan* (hereafter referred to as the 2008 Scoping Plan), CARB encouraged local governments to adopt a reduction target for community emissions paralleling the State commitment to reduce GHG emissions (CARB 2008). In 2017, CARB published *California's 2017 Climate Change Scoping Plan* (hereafter referred to as the 2017 Scoping Plan Update) outlining the strategies the State will employ to reach the additional State targets set by Senate Bill 32 in 2016 (CARB 2018).

Publication of the next Climate Change Scoping Plan is expected to include recommendations for complying with the carbon neutrality goal established by EO B-55-18 in 2018. While currently no State plan exists to achieve the goal set by EO B-55-18, the executive order directs CARB to ensure future Scoping Plan updates identify and recommend measures to achieve the carbon neutrality goal. Executive Orders are binding only unto State agencies and are not binding on local governments or the private sector, however showing progress toward this goal is expected to be a mandatory component of CEQA analyses upon publication of the next Scoping Plan.

3.1 Legislative Targets and Background

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

- **Executive Order S-3-05,** signed by former Governor Schwarzenegger in 2005, establishes statewide GHG emission reduction goals to achieve long-term climate stabilization as follows: by 2020, reduce GHG emissions to 1990 levels and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The 2050 goal was accelerated by the 2045 carbon neutral goal established by EO B-55-18, as discussed below.[1]
- **Assembly Bill 32,** known as the Global Warming Solutions Act of 2006, requires California's GHG emissions be reduced to 1990 levels by the year 2020 (approximately a 15 percent reduction from 2005 to 2008 levels). The 2008 Scoping Plan identifies mandatory and voluntary measures to achieve the statewide 2020 emission limit and encourages local governments to reduce municipal and community GHG emissions proportionate with State goals.[2]
- **Senate Bill 32,** signed by former Governor Brown in 2016, establishes a statewide mid-term GHG reduction goal of 40 percent below 1990 levels by 2030. CARB formally adopted the 2017 Scoping Plan Update in December 2017, laying the roadmap to achieve 2030 goals and giving guidance to achieve substantial progress toward 2050 State goals.

[1] Executive Orders are binding only unto State agencies. Accordingly, EO S-03-05 will guide State agencies' efforts to control and regulate GHG emissions but will have no direct binding effect on local government or private actions.

[2] Specifically, the 2008 Scoping Plan states CARB, "encourages local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce GHG emissions by approximately 15 percent from current levels by 2020" (p. 27). "Current" as it pertains to the 2008 Scoping Plan is commonly understood as between 2005 and 2008.

- **Executive Order B-55-18,** signed by former Governor Brown in 2018, expanded upon EO S-3-05 by creating a statewide GHG goal of carbon neutrality by 2045. EO S-55-18 identifies CARB as the lead agency to develop a framework for implementation and progress tracking toward this goal in the next Climate Change Scoping Plan Update.

3.2 Legislative Reduction Programs

Additional legislative programs are expected to reduce emissions in specific emission sectors throughout California, as identified in the 2017 Scoping Plan Update. These programs were incorporated into the forecast analysis and are summarized in the subsections below.

Transportation Legislation

Signed into law in 2002, AB 1493 (Pavley Standards) required vehicle manufactures to reduce GHG emissions from new passenger vehicles and light trucks from 2009 through 2016, with a target of 30 percent reductions by 2016, while simultaneously improving fuel efficiency and reducing motorists' costs (CARB 2013).

Prior to 2012, mobile emissions regulations were implemented on a case-by-case basis for GHG and criteria pollutant emissions separately. In January 2012, CARB approved a new emissions-control program (the Advanced Clean Cars program) combining the control of smog, soot causing pollutants, and GHG emissions into a single coordinated package of requirements for passenger cars and light trucks model years 2017 through 2025. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles, Zero Emissions Vehicles, and Clean Fuels Outlet programs. The new standards will reduce Californian GHG emissions by 34 percent in 2025 (CARB 2011).[3]

Title 24

Although it was not originally intended to reduce GHG emissions, California Code of Regulations Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was adopted in 1978 in response to a legislative mandate to reduce California's energy consumption, which in turn reduces fossil fuel consumption and associated GHG emissions. The standards are updated triennially to allow consideration and possible incorporation of new energy-efficient technologies and methods. Starting in 2020, new residential developments will include on-site solar generation and near-zero net energy use. For projects implemented after January 1, 2020, the California Energy Commission estimates the 2019 standards will reduce consumption by seven percent for residential buildings and 30 percent for commercial buildings, relative to the 2016 standards. These percentage savings relate to heating, cooling, lighting, and water heating only and do not include other appliances, outdoor lighting not attached to buildings, plug loads, or other energy uses. The calculations and GHG forecast assume all growth in the residential and commercial/industrial sectors are from new construction.

The 2017 Scoping Plan Update calls for the continuation of ongoing triennial updates to Title 24 which will yield regular increases in the mandatory energy and water savings for new construction. Future

[3] On September 27, 2019, the U.S. Environmental Protection Agency and National Highway Traffic Safety Administrator published the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program that revokes state-level authority to set emission standards for vehicles. It is expected that the new rule will affect underlying assumptions of CARB's EMFAC2017 model, used to quantify forecasted emissions for gasoline and diesel sales for Chico in this document. Currently, little guidance exists regarding the magnitude of this impact, and the results from the model have been preserved in this document. However, if more information becomes available or the model is updated prior to the release of this document, the forecast will be updated accordingly.

updates to Title 24 standards for residential and non-residential alterations past 2023 are not taken into consideration in the forecast analysis due to lack of data and certainty about the magnitude of energy savings realized with each subsequent update.

Renewables Portfolio Standard (RPS) & Senate Bill 100

Established in 2002 under SB 1078, enhanced in 2015 by SB 350, and accelerated in 2018 under SB 100, California's RPS is one of the most ambitious renewable energy standards in the country. The RPS program requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 50 percent of total procurement by 2026 and 60 percent of total procurement by 2030. The RPS program further requires these entities to increase procurement from GHG-free sources to 100 percent of total procurement by 2045.

Assembly Bill 939 & Assembly Bill 341

In 2011, AB 341 set the target of 75 percent recycling, composting, or source reduction of solid waste by 2020 calling for the California Department of Resources Recycling and Recovery (also known as CalRecycle) to take a statewide approach to decreasing California's reliance on landfills. This target was an update to the former target of 50 percent waste diversion set by AB 939.

As actions under AB 341 are not assigned to specific local jurisdictions, potential future reductions from the bill were not included in the forecast analysis. Instead, actions beyond the projected waste diversion target set under AB 341 will be quantified and credited to the City during the Climate Action Plan measure development process.

Senate Bill 1383

SB 1383 established a methane emission reduction target for short-lived climate pollutants in various sectors of the economy, including waste. Specifically, SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025 (CalRecycle 2019). Additionally, SB 1383 requires a 20 percent reduction in "current" edible food disposal by 2025. Although SB 1383 has been signed into law, compliance at the jurisdiction-level has proven difficult. For example, Santa Clara County suggests the 75 percent reduction in organics is not likely achievable under the current structure; standardized bin colors are impractical; and the general requirement is too prescriptive (Santa Clara County 2018). As such, SB 1383 is not included as part of the forecast analysis. Instead measures addressing compliance with SB 1383 will be addressed through newly identified GHG reduction measures included in the Climate Action Plan.

4 GHG Inventory 2005-2017

The first community-level inventory for the City of Chico was completed in 2008 for the baseline year 2005 and served as the basis for the existing 2020 Climate Action Plan. This 2005 inventory was developed using the Clean Air and Climate Protection (CACP) software developed by the International Council for Local Environmental Initiatives (ICLEI). In 2018, the inventory was updated based on a Chico-specific methodology developed in 2015 by the Institute for Sustainable Development at California State University, Chico (Alexander 2017). The updated inventory provided overall community emissions for the years 2005-2015, which were updated again by the Chico Sustainability Task Force later in 2018 to include the years 2016 and 2017. The 2018 iteration of the inventory was adopted for use in this document, as it is the latest and most up to date inventory available for the City of Chico. A discussion of the methods and results associated with the inventory are included in this section. For more details on the City of Chico's multi-year inventory, refer to Alexander (2017).

4.1 Inventory Summary

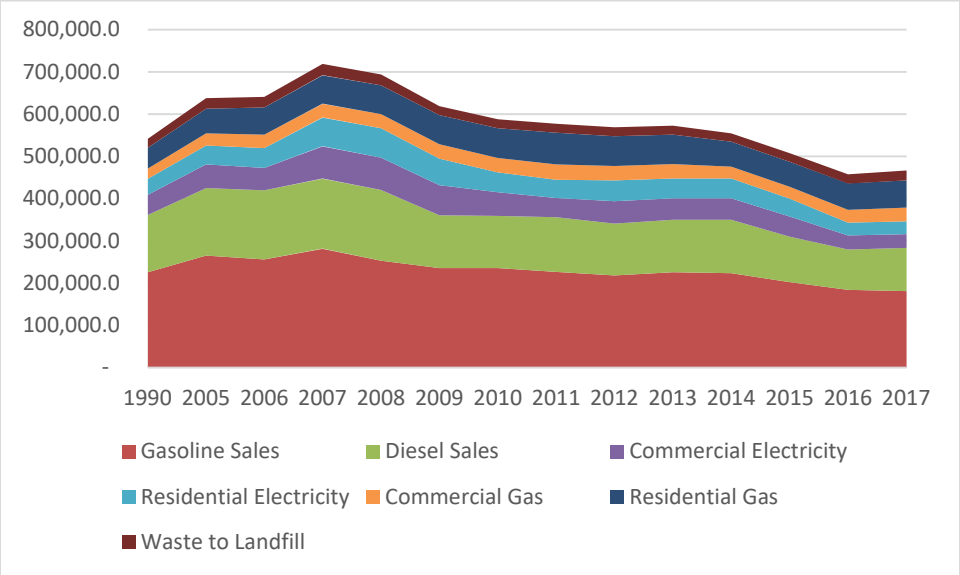
GHG emissions in the City of Chico for the years 1990, 2005, 2010, and 2017 are summarized in Table 3.

Table 3 GHG Inventory Summary

Sector/Emissions Source	1990 (MT CO_2e)	2005 (MT CO_2e)	2010 (MT CO_2e)	2017 (MT CO_2e)
Residential Electricity	38,054	44,769	47,506	30,757
Commercial Electricity	47,802	56,237	55,403	32,658
Residential Natural Gas	49,653	58,416	70,238	64,769
Commercial Natural Gas	24,161	28,425	34,178	31,926
Gasoline	225,374	265,145	235,606	181,031
Diesel	135,567	159,490	123,622	101,854
Landfilled Waste	21,280	25,035	21,346	23,372
Total Emissions	**541,891**	**637,519**	**587,900**	**466,366**
Emissions per person	13.6	8.8	8.1	6.4

A comparison of GHG emissions for all years between 1990 and 2017 is shown in Figure 3.

Figure 3 Historical Emissions (MT CO_2e)



4.2 Included and Excluded Emission Sectors

The GHG inventory is structured based on emission sectors. The ICLEI Community Protocol recommends local governments examine their emissions in the context of the sector responsible for those emissions. Many local governments will find a sector-based analysis more directly relevant to policy making and project management, as it assists in formulating sector-specific reduction measures for climate action planning. The reporting sectors are made up of subsectors to allow for easier identification of sources and targeting of reduction policies.

The inventory reports all Basic Emissions Generating Activities required by the Community Protocol in the following main sectors: [4]

- Energy (residential and commercial electricity and natural gas)
    - The energy sector includes the energy consumed by the water and wastewater treatment and distribution sectors.
- Transportation (gasoline and diesel fuel sales)
- Solid Waste

The following emission sectors are excluded from the inventory (and forecast).

- Consumption-based emissions; currently there exists no widely accepted standard methodology for reporting consumption-based inventories and these data sets are not widely available.
- Natural and working lands emissions; there is a lack of granular data and standardized methodology for reporting community-wide emissions from this sector. CARB has included a state-level inventory of natural and working lands in the 2017 Scoping Plan Update greenhouse gas inventory; however, at the time of this City of Chico community-wide inventory, sufficient data and tools were not

[4] Required emissions generating activities include use of electricity by the community, use of fuel in residential and commercial stationary combustion equipment, on-road passenger and freight motor vehicle travel, use of energy in potable water and wastewater treatment and distribution, and generation of solid waste by the community.

available to conduct a jurisdiction-specific working lands inventory. The Nature Conservancy and California Department of Conservation are exploring options for a tool which may be able to perform these inventories at a more specific geographic level (California Department of Conservation 2020).

- Agricultural emissions; the Community Protocol and California Supplement (AEP 2013) both note agricultural activity is not a required component of Community Protocol inventories and should be included only if relevant to the community conducting the inventory. No major commercial-scale livestock activity is noted within the city boundaries.
- High GWP emissions; high GWP emissions, including chlorofluorocarbons (CFCs) and hydrofluorocarbons (HFCs) used as substitutes for ozone-depleting substances are not a required component of the Community Protocol and the California Supplement notes these emissions are not generally included in California inventories.

4.3 Data and Methods

The data used to complete the inventory is detailed in Table 4 below.

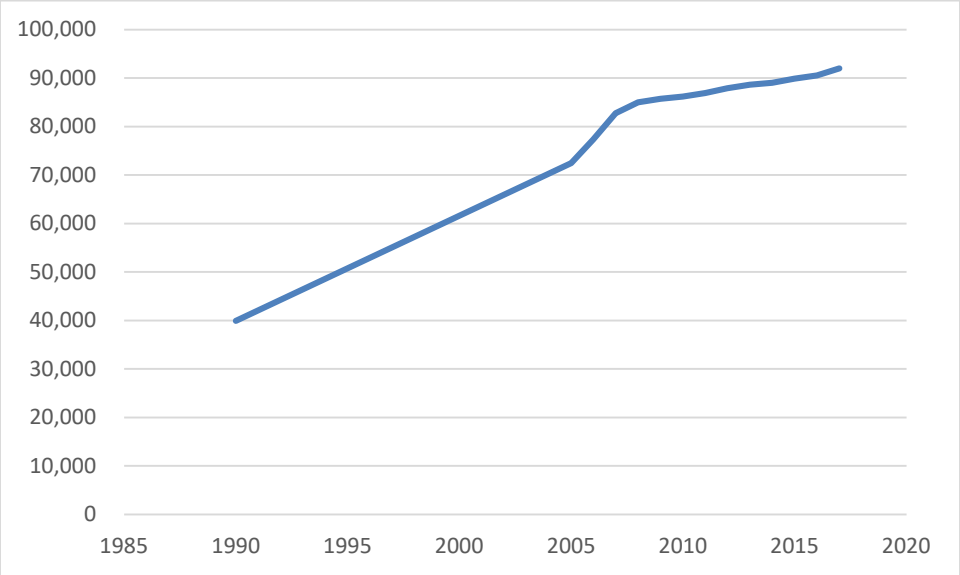
Table 4 Inventory Data Sources

Sector	Activity Data	Unit	Source
Demographics	Population	Residents	Department of Finance/BCAG[5]
Energy	Electricity consumption	Kilowatt hours	Pacific Gas & Electric
	Natural gas consumption	Therms	
Transportation	Gasoline fuel sales Diesel fuel sales	Gallons	State of California Board of Equalization Department of Tax and Fee Administration in Sacramento
Solid Waste	Tonnage sent to landfill	Tons	City of Chico Administrative Manager of General Services

Population trends, based on data obtained from the Department of Finance (2020), are shown in Figure 4.

[5] http://www.bcag.org/Demographics/Population-Estimates---Historical/

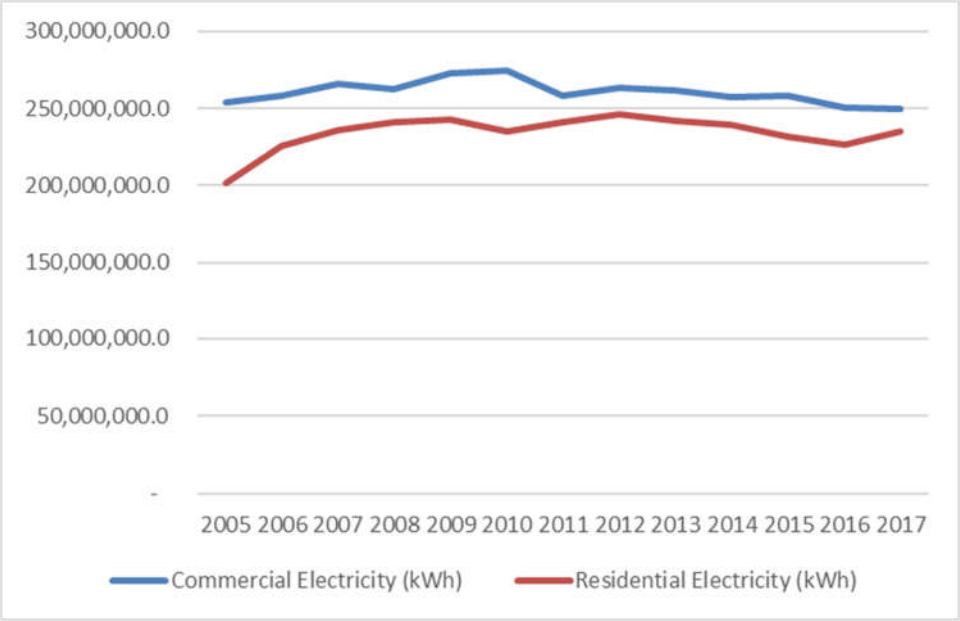
Figure 4 Historical Population 1990 - 2017



Energy

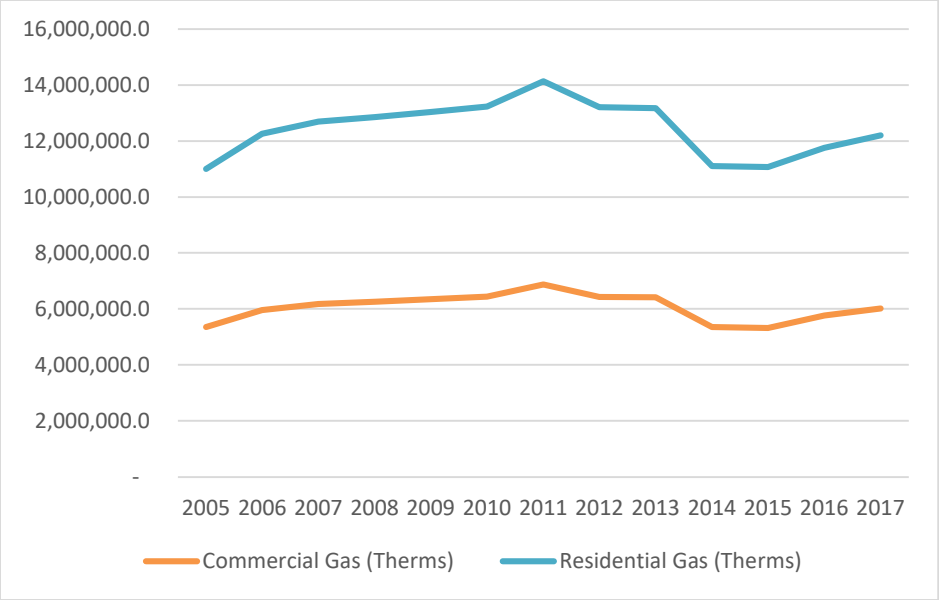
The energy sector includes GHG emissions resulting from the consumption of electricity and natural gas by residential and commercial customers within the City of Chico (Figure 5 and Figure 6). Both electricity and natural gas data were provided by Pacific Gas & Electric (PG&E) in kilowatt hours (kWh) and therms, respectively. Electricity data included in the inventory did not include Direct Access purchases by PG&E commercial customers. Further, while typically water and wastewater are characterized in a separate sector, the energy sector for the inventory includes all energy used to transport and treat water and wastewater used and produced within City limits. The two sectors were combined in this case for simplicity and easier replicability from year to year.

Figure 5 Electricity Consumption



After reviewing the natural gas data from PG&E, it was apparent that the commercial data reported between 2005 and 2013 included natural gas usage from both the commercial and industrial sectors, reported as a single number. However, between 2014 and 2017, natural gas usage from the industrial sector was withheld by PG&E due to the 15/15 privacy rule[6]. Since industrial natural gas usage is subject to the State's Cap-and-Trade program, and industrial data is not available moving forward while commercial data will be, industrial data was estimated and removed from all inventories between 2005 and 2013 as well as the 1990 back cast to allow for a consistent comparison between all inventory years. Commercial natural gas usage was estimated between 2005 and 2013 based on the observed ratio of commercial natural gas usage and residential natural gas usage between 2014 and 2017. This ratio is highly consistent from year-to-year (average of 0.486 and range of 0.481 and 0.493) and is therefore expected to apply accurately for natural gas usage between 2005 and 2013. Commercial natural gas usage between 2005 and 2013 was therefore calculated as residential gas usage in those years times the average ratio of residential to commercial natural gas usage from 2014 to 2017. If in future years this data becomes available to the City, it can update the GHG inventory at that time.

Figure 6 Natural Gas Consumption

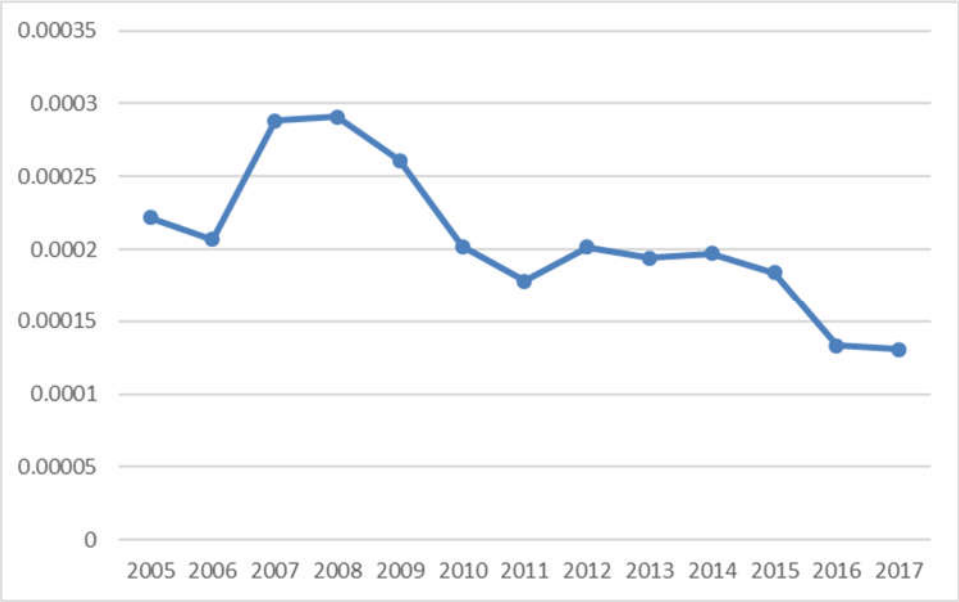


Emissions resulting from electricity consumption were estimated by multiplying annual electricity consumption by an electricity emission factor representing the average CO_2e emissions associated with generation of one kWh of electricity. Similarly, emissions resulting from natural gas consumption were estimated by multiplying annual natural gas consumption by a natural gas emission factor representing the average CO_2e emissions associated with combustion of on therm of natural gas. Emission factors for electricity and natural gas were provided by PG&E in an energy consumption summary spreadsheet provided by the utility to local government planning agencies. While the emission factor for natural gas is estimated to be constant in the inventory (0.00531 MT CO_2e/therm), the emission factor for electricity changes each year, with changes to the PG&E grid mix of energy sources used to produce the electricity (Figure 7). The electricity emission factor was 0.00131 MT CO_2e/kWh in 2017, lower than any previous

[6] The 15/15 rule states no data can be provided if there are less than 15 users in any sector or if one user makes up more than 15 percent of the total usage. This applies to natural gas and electricity consumption.

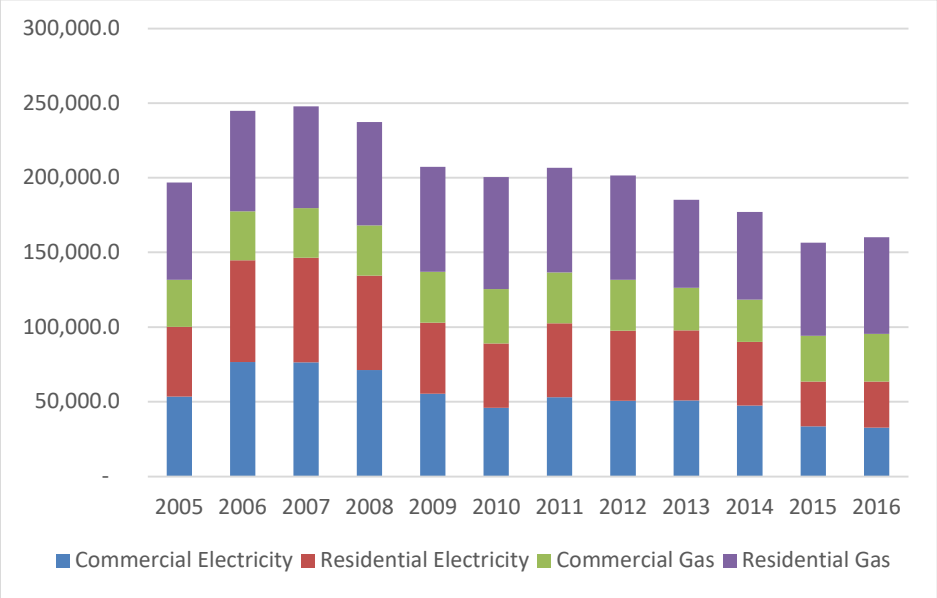
year since 2005. The emission factor decreases as the proportion of renewable energy increases in PG&E's grid mix.

Figure 7 PG&E Electricity Emission Factor (MT CO_2e/kWh)



In total, 160,109 MT CO_2e were generated from electricity and natural gas usage in 2017, 15 percent less than in 2005 (Figure 8). This decrease is primarily due to a decreasing electricity emission factor. Electricity usage has increased since 2005 and while natural gas usage declined overall between 2005 and 2014, it has been increasing steadily each year since then.

Figure 8 Energy Sector Emissions (MT CO_2e)

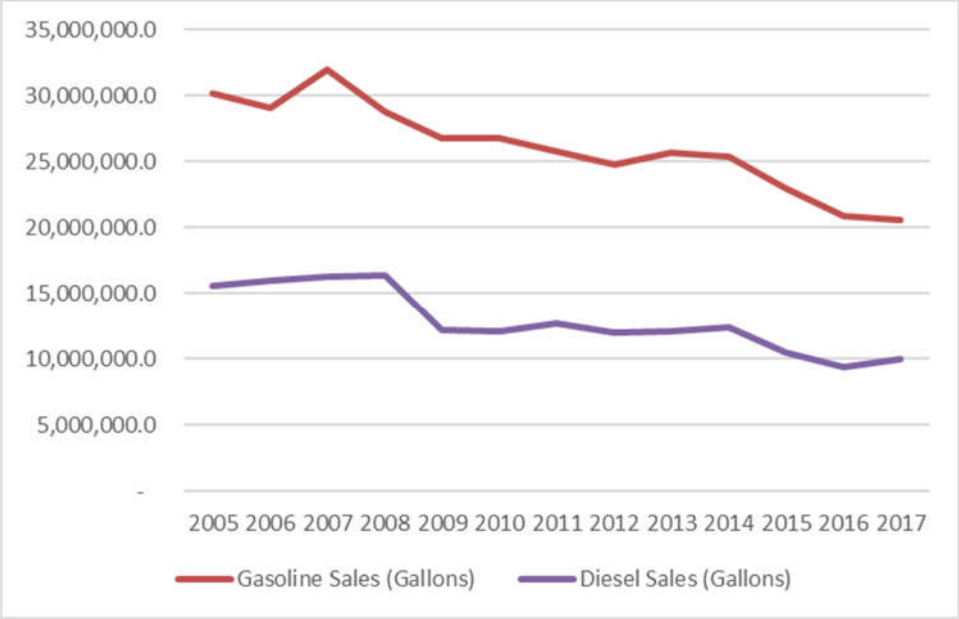


Transportation

The transportation sector includes GHG emissions associated with use of transportation fuels within the City of Chico. While the Community Protocol recommends modelling vehicle miles travelled (VMT), the City of Chico utilized a secondary approach involving fuel sales data that is recommended for jurisdictions with low proportions of trans-boundary travel. As Chico is rural and isolated from other municipalities, this approach was deemed appropriate for the City, and potentially more accurate than a VMT approach, which without a city-specific model can lead to inaccurate emissions estimations for this sector. Further discussion of this methodological choice is provided in Alexander (2017).

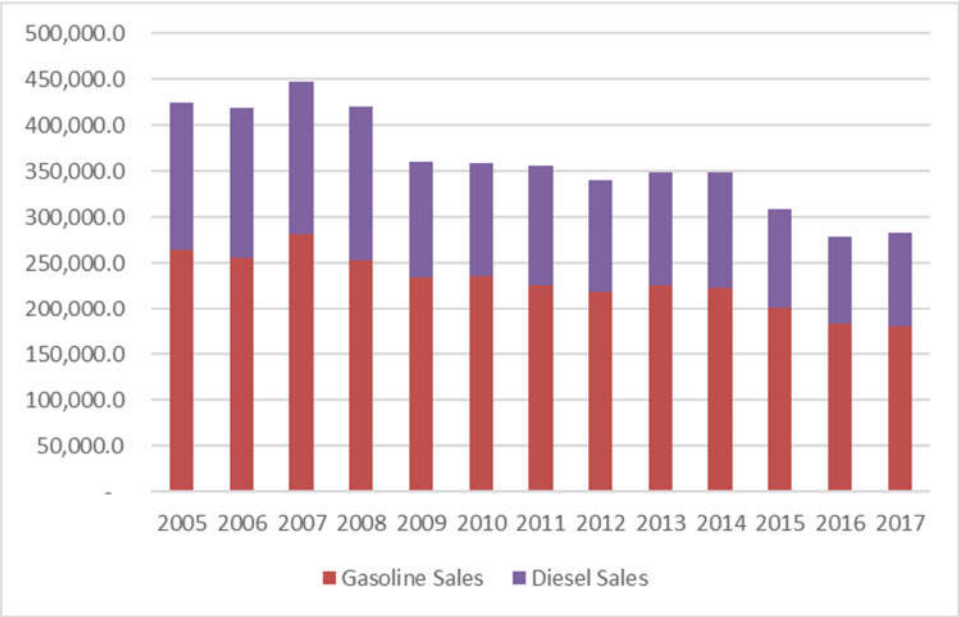
Fuel sales data for gasoline and diesel, in gallons, was provided by the State of California Board of Equalization for the Chico Urban Area (Figure 9).

Figure 9 Fuel Sales



The emission factors used for gasoline and diesel were obtained from the Environmental Protection Agency (2014) and were consistent from year to year. The emission factor was 0.00879 MT CO_2e/gallon for gasoline and 0.01 MT CO_2e/gallon for diesel. Fuel sales for both gasoline and diesel have decreased overall between 2005 and 2017, leading to decreases in emissions for the entire transportation sector (Figure 10).

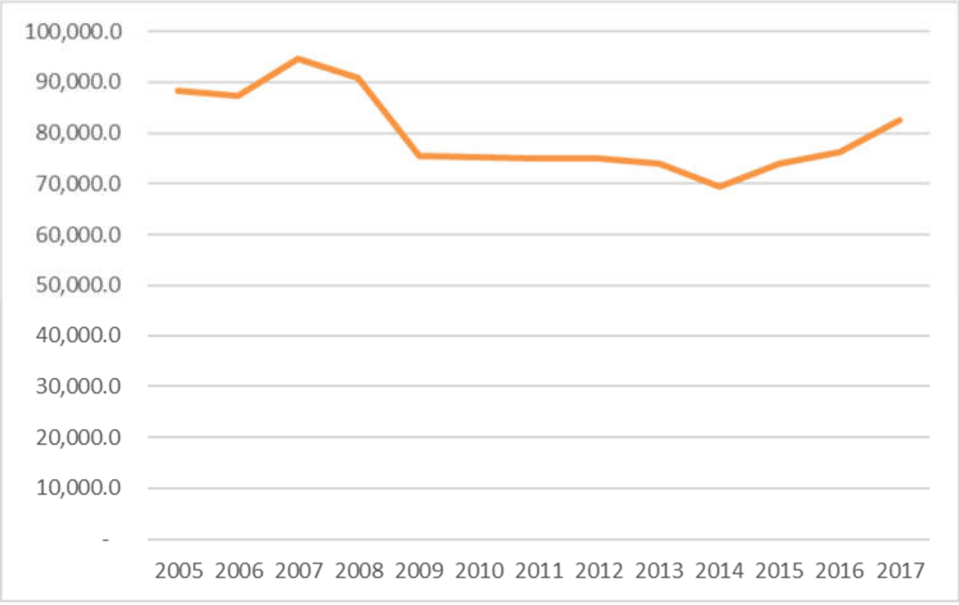
Figure 10 Transportation Sector Emissions (MT CO_2e)



Waste

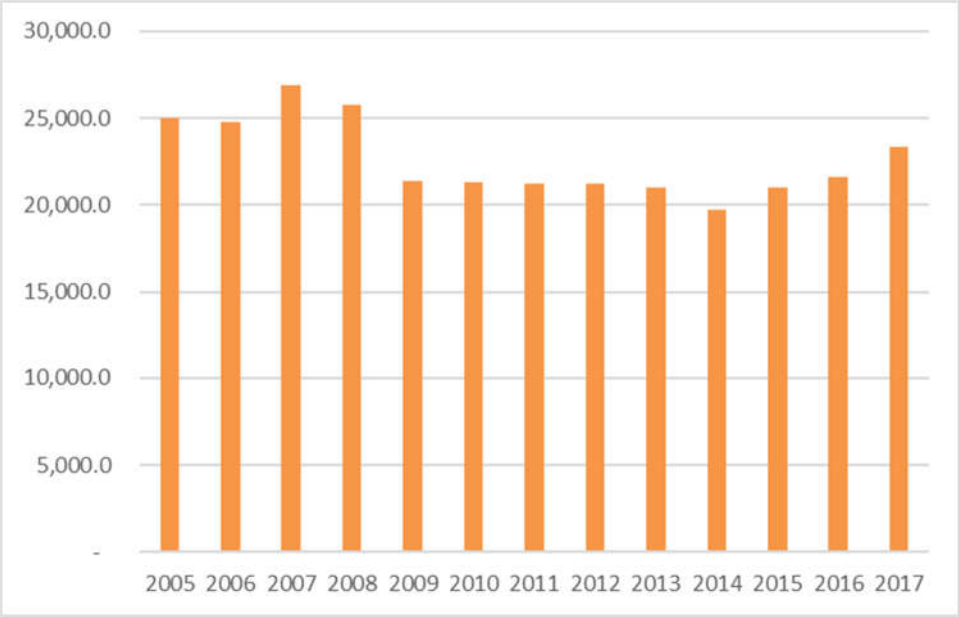
The waste sector includes methane emissions generated from decay of organic material solid waste disposed in a landfill. Emissions from vehicular transport of solid waste are included in the transportation sector. Waste data was provided by the City of Chico Administrative Manager for General Services in tonnage collected within City limits and tipped at the Neal Road Landfill (Figure 11). The emission factor used for waste was 0.284 MT CO_2e/ton, which was calculated utilizing methods from the Community Protocol *Appendix E – Solid Waste Emissions Activities and Sources*, as described in Alexander (2017).

Figure 11 Waste Collected (Tons)



Waste decreased overall between 2005 and 2014, but has been increasing steadily each year since 2014, similar to the trends seen in natural gas. Emissions from waste have therefore dropped only 7 percent from 2005 to 2017 (Figure 12).

Figure 12 Waste Sector Emissions (MT CO_2e)



4.4 1990 Baseline

The State of California uses 1990 as a reference year to remain consistent with AB 32 and SB 32, which codified the State's 2020 and 2030 GHG emission targets by directing CARB to reduce statewide emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030. The City of Chico has not conducted a GHG inventory for 1990, but the State indicated in the 2008 Scoping Plan that local governments wishing to remain consistent with State targets could use a 15 percent reduction from 2005-2009 levels as a proxy for a 1990 baseline. The City of Chico has reported a 2005 emission level of 637,519 MT CO_2e. A 1990 emission level of 541,891 MT CO_2e, or 13.6 MT CO_2e per person, was estimated for the City of Chico based on the 2005 inventory. These numbers were calculated by reducing the 2005 emission level by 15 percent and dividing by the 1990 population of 39,970 people.

5 Forecast

A baseline inventory (e.g., Chico's GHG inventory for 2005 or 2017) sets a reference point for a single year. However, annual emissions change over time due to external factors such as population and job growth. A GHG forecast accounts for projected growth using growth rates and presents an estimate of the level of GHG emissions in a future year. Calculating the difference between the forecasted GHG emissions and the reduction targets determines the gap to be closed through local climate action plan policies. This section presents two forecast scenarios: a business as usual (BAU) forecast scenario and an adjusted forecast scenario. The BAU forecast scenario projects the expected growth in all emission sectors based on job and population growth alone. The adjusted forecast accounts for job and population growth and additionally quantifies and incorporates all state regulations that are expected to help reduce Chico's GHG emissions through 2030 and 2045, as discussed in Section 3.2. The adjusted forecast provides a more accurate picture of future emissions growth and the responsibility of the City and community once State regulations to reduce GHG emissions have been implemented.

The GHG forecast uses benchmark years of 2020, 2025, 2030, 2040 and 2045, consistent with currently codified GHG reduction targets or executive orders which are expected to be codified in future. The forecast years align with the following targets:

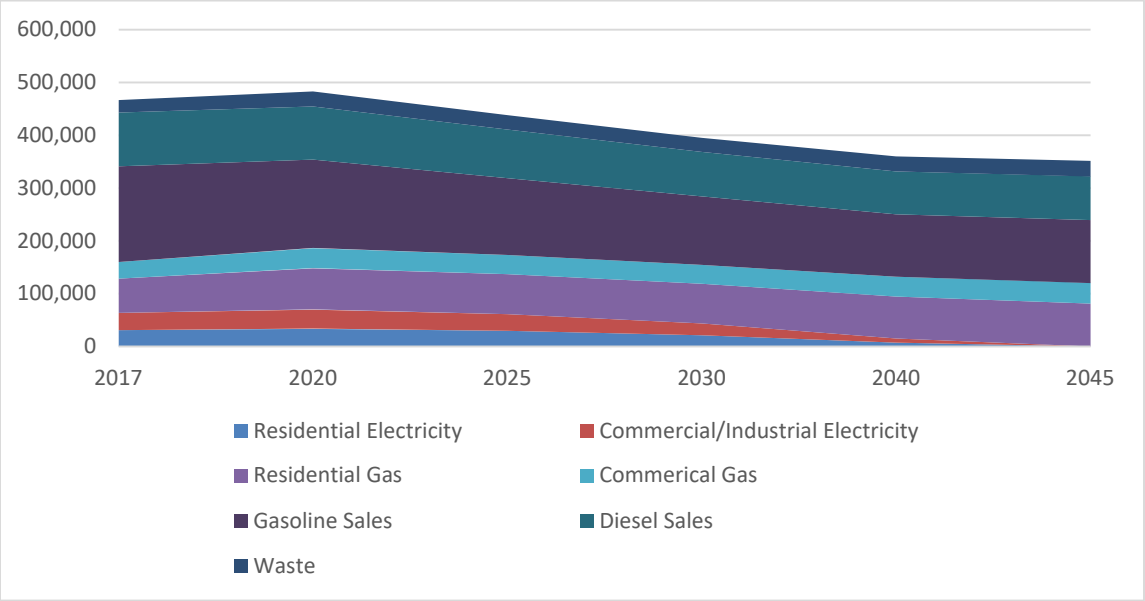
- 2020 (AB 32)
- 2025 (interim target year)
- 2030 (SB 32 and General Plan horizon year)
- 2040 (interim target year)
- 2045 (EO B-55-18)

The 2030 target is required for consistency with SB 32 and the Chico 2030 General Plan, while the remainder of the targets identify a clear path and milestones of progress toward the long-term State reduction goals.

5.1 Forecast Summary

Overall emissions in Chico are forecast under the realistic adjusted scenario to decrease 35 percent from 1990 levels by 2045 under existing State programs and regulations. Due to SB 100 requiring 100 percent carbon neutral electricity in 2045, electricity-related emissions are expected to gradually reduce to zero. Transportation, natural gas, and waste emissions are expected to constitute the majority of emissions by 2045 (Figure 13).

Figure 13 Emissions Forecast – Adjusted Scenario (MT CO_2e)



Waste emissions in future years will likely be much lower than the current forecast due to SB 1383. However, due to the uncertainty of how these will be enacted within the City of Chico, the potential emission reductions from SB 1383 have not been included in the forecast model and waste-reduction measures identified in the Climate Action Plan will be credited to the City.

State regulations will reduce community GHG emissions in Chico to approximately 395,317 MT CO_2e by 2030 and to 359,925 MT CO_2e by 2040 (Table 5). By the year 2045, a 351,512 MT CO_2e gap will remain between the forecast emissions and the 2045 carbon neutrality goal set in EO B-55-18. These reductions will come from existing and newly identified GHG reduction measures that will be included in this and future climate action plan iterations.

Table 5 Absolute and Per Capita GHG Forecast

Year	Absolute Emissions (MT CO_2e)	Population	Per Capita Emissions (MT CO_2e per person)
2017	466,366	92,022	5.07
2020	482,990	111,892	4.32
2025	437,961	107,593	4.07
2030	395,317	107,712	3.67
2040	359,925	113,303	3.18
2045	351,512	116,420	3.02

The first City of Chico Climate Action Plan was adopted in 2012. It identified how the City and broader community can reduce the City of Chico's GHG emissions and included a GHG emission reduction target of 25 percent reduction below 2005 emission levels by 2020. The forecast contained herein projects that the City of Chico will emit 482,990 MT CO_2e in 2020, 24 percent lower than in 2005. The inventory and forecast also considers per capita emission reductions due to the rate at which Chico has grown since 2005. In 2005, GHG emissions are estimated to be 8.8 MT CO_2e per person. In 2020, emissions are

forecast to be 4.3 MT CO_2e per person. This equates to an emission reduction of 51 percent per person. These estimated reductions suggest that the City will exceed its 2020 Climate Action Plan goal.

5.2 Data

Data used to develop the forecast included activity data from the 2017 forecast, as well as population and jobs data. The adjusted forecast additionally utilized quantitative data based on applicable state and federal regulatory requirements (Table 6). Applicable State and federal regulatory requirements included Corporate Average Fuel Economy (CAFE) standards, Advanced Clean Car Standards, Renewable Portfolio Standards, and Title 24 efficiencies.

Table 6 Forecast Data Sources

Sector	Activity Data	Unit	Source
Demographics	Population	Residents	BCAG Provisional Long-Term Growth Forecasts[1]
Commerce	Jobs in the City of Chico	Jobs	**2017 data** – Department of Finance and California Employment Development Department **2020-2040 data** – BCAG Provisional Long-Term Growth Forecasts
Transportation	CAFE and Advanced Clean Car Standards changes to fuel consumption	Percent	CARB EMFAC2017 transportation modeling program
Building Efficiency	Title 24 efficiency increases	Percent	California Energy Commission
Electricity Emissions	Renewable Portfolio Standard energy mix changes	Percent	SB 100

[1] BCAG population and employment forecasts included demographic changes in the City of Chico resulting from the Camp Fire in November 2018, which displaced residents of the Town of Paradise into surrounding cities in Butte County

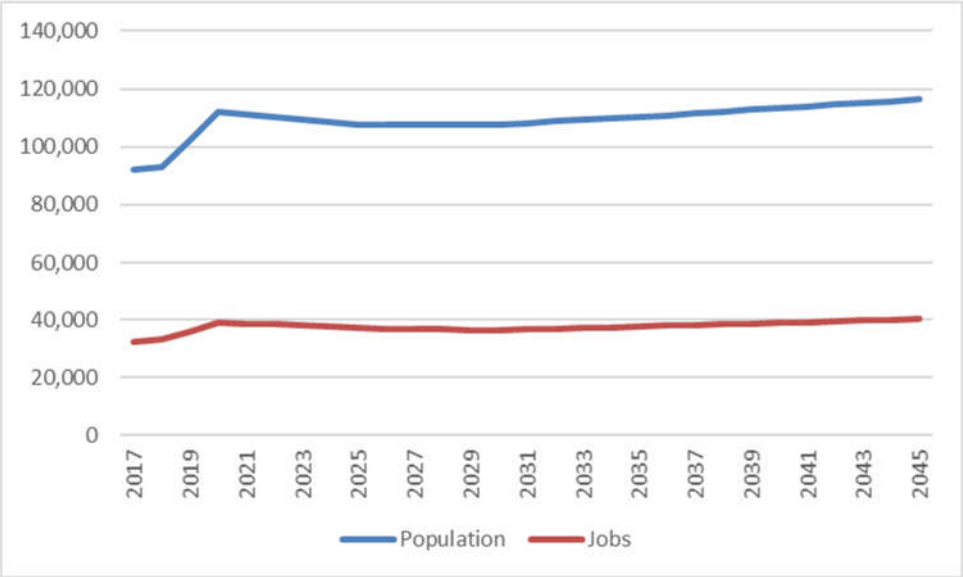
Population Data and Forecast

The emission forecast is primarily driven by the anticipated population and jobs growth for the City of Chico. Regardless of the impact of State legislation, changes in population and jobs data are the primary indicator of how activity data for different emissions sources will change. The City of Chico is a unique case due to its large population increases in 2018, a consequence of an in-migration from the Town of Paradise spurred by the November 2018 Camp Fire. The future effects of this in-migration were modeled by the Butte County Association of Governments (BCAG) to determine changes in population and jobs data through 2040. In its *Provisional Long-Term Regional Growth Forecasts 2018-2040 Draft* (BCAG Report), BCAG provides a forecast for housing, population, and employment within Butte County for the years 2018, 2020, 2025, 2030, 2035, and 2040 (BCAG 2019).

The forecast in this document uses the medium scenario population estimates for the City of Chico from the BCAG Report as the population activity data input through 2040. The population for 2045 was calculated by applying the growth factor observed between 2035 and 2040 to the 2040 activity data. Population for years in-between the forecasted years were linearly interpolated to create a smooth population forecast, as shown in Figure 14.

Between 2018 and 2020, the population is estimated to have increased 20 percent (in comparison, the population in Chico increased only three percent between 2016 and 2018, based on historical population data obtained from the Department of Finance). After 2020 and through 2030, the population in Chico is expected to begin decreasing, as displaced persons from the Town of Paradise move out of Chico, overriding natural growth in the City. The population will begin to rise naturally again after 2030 and continues to grow about five percent per year through 2045. The high spike in population between 2018 and 2020 accounts for high absolute emissions increases in even the adjusted forecast for 2020 (Section 5.4), though per capita emissions decline between those years.

Figure 14 Population and Jobs Forecast



While the BCAG Report provides population data for the City of Chico, employment forecasts are only provided for Butte County as a whole. BCAG calculates employment forecasts based on a ratio of jobs per housing unit. The ratio for the County is 0.83 in 2018, 0.96 in 2020, 0.86 in 2025, and 0.8 from 2030 to 2040. Rincon therefore applied these ratios to the housing forecasts for the City of Chico to determine the employment forecast for the City of Chico in particular. Employment for 2045 was extrapolated based on 2040 data and the growth rate between 2035 and 2040, and all results were interpolated for years in-between the forecast years. Employment data for 2017 was calculated using the methodology described in the BCAG Report for 2018, using data from Department of Finance (California Department of Finance 2020) and California Employment Development Department (California Employment Development Department 2020). For more details on these methods, refer to BCAG (2019). Employment data for the City of Chico is shown in Figure 14, and follows similar trends to those described for population. Population and jobs data are shown in Table 7 for years of interest.

Table 7 Population and Jobs Forecast

Variable	2017 (MT CO_2e)	2020 (MT CO_2e)	2025 (MT CO_2e)	2030 (MT CO_2e)	2040 (MT CO_2e)	2045 (MT CO_2e)
Population	*92,022*	*111,892*	*107,593*	*107,712*	*113,303*	*116,420*
Jobs	*32,429*	*39,061*	*37,124*	*36,251*	*38,859*	*40,162*

5.3 Business-as-usual Forecast

The City of Chico business-as-usual scenario forecast provides an estimate of how GHG emissions would change in the forecast years if consumption trends continue as in 2017, absent any new regulations which would reduce local emissions. Several growth factors were developed from 2017 activity levels and applied to the various emission sectors to project future year emissions (Table 8). Growth factors were developed based on population and employment data for the business-as-usual forecast and activity data from the 2017 inventory. Table 8 contains a list of growth factors used to develop the business-as-usual scenario forecast.

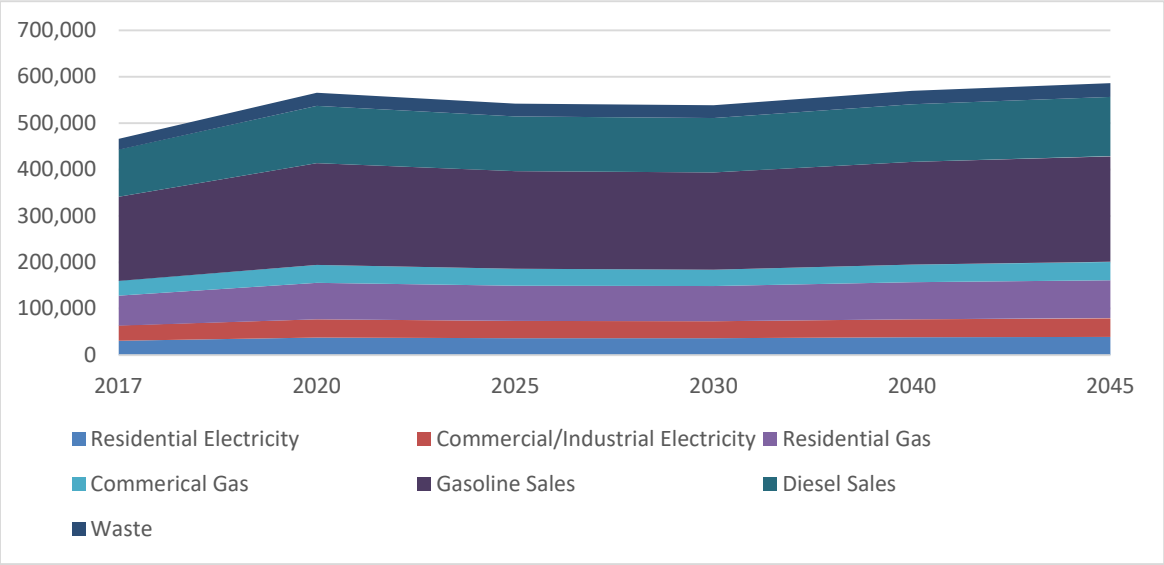
Table 8 Business-as-usual Growth Factors

Growth Factor	Value
Emissions per capita (MT CO_2e per person)	5.1
Residential electricity per capita (kWh per person)	2,555.8
Commercial electricity use per job (kWh per job)	7,700.5
Residential gas per capita (therm per person)	132.6
Commercial gas use per job (therm per job)	185.5
Waste per service population (tons per service person)	0.7
Emissions per ton of waste (MT CO_2e per ton)	0.3
Gasoline sales per service population (gallons per service person)	165.5
Diesel sales per service population (gallons per service person)	80.07
Natural gas constant (MT CO_2e per therm)	0.00531

service person: sum of population and employment

Under the business-as-usual forecast scenario, the City of Chico's GHG emissions are projected to continue increasing through 2045 (Figure 15). This increase is led primarily by increases in fuel sales, natural gas, and electricity usage driven by a strong growing population trend.

Figure 15 Emissions Forecast - Business-as-usual Scenario (MT CO_2e)



By 2045, the City is expected to produce 586,167 MT CO_2e under business-as-usual projections, a 27 percent increase from 2017 emissions (Table 9).

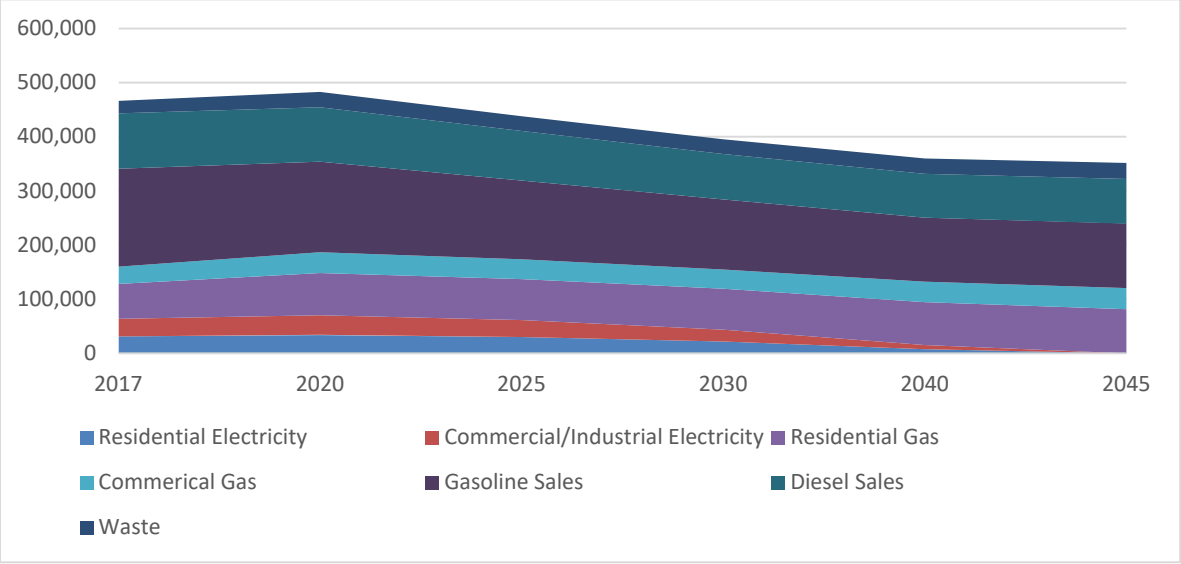
Table 9 Business-as-usual Forecast Summary

Sector/Emissions Source	2017 (MT CO_2e)	2020 (MT CO_2e)	2025 (MT CO_2e)	2030 (MT CO_2e)	2040 (MT CO_2e)	2045 (MT CO_2e)
Residential Electricity	30,757	37,398	35,961	36,001	37,870	38,912
Commercial Electricity	32,658	39,337	37,386	36,507	39,133	40,445
Residential Natural Gas	64,769	78,754	75,728	75,812	79,747	81,942
Commercial Natural Gas	31,926	38,455	36,548	35,689	38,256	39,539
Gasoline Sales	181,031	219,582	210,511	209,414	221,341	227,771
Diesel Sales	101,854	123,544	118,441	117,823	124,534	128,152
Landfilled Waste	23,372	28,349	27,178	27,036	28,576	29,406
Total Emissions	**466,366**	**565,420**	**541,754**	**538,282**	**569,457**	**586,167**
Emissions Per Capita	5.07	5.05	5.04	5.00	5.03	5.03

5.4 Adjusted Scenario Forecast

The adjusted scenario is based on the same information as the business-as-usual scenario but also includes the legislative actions and associated emission reductions occurring at the State and federal levels, as summarized in Section 3.2. Under the adjusted scenario, emissions are expected to decrease overall through 2045 (Figure 16).

Figure 16 Emissions Forecast – Adjusted Scenario (MT CO_2e)



The increase in overall emissions seen in 2020 is due to population increases between 2018 and 2020 from the 2018 Camp Fire. After 2020, the energy sector experiences a strong downward trend, approaching near-zero in 2045, due to extremely stringent electricity emissions reductions resulting from SB 100 reducing electricity emissions to zero by 2045. Residential natural gas emissions are

expected to continue an upward trajectory due to strong population growth projections in the city. This trend is partially offset due to the increasingly stringent efficiency requirements for new homes in the upcoming Title 24 code cycles. Commercial growth will also lead commercial natural gas emissions on a similar trajectory. Transportation emissions are expected to decrease sharply in the next 10 to 15 years due to existing fuel efficiency requirements and fleet turnover rates. As most current regulations expire in 2025 or 2030, emissions standards will experience diminishing returns while actual car usage continues to increase, leading to lower rates of emission reduction in the transportation sector. Emissions for each target year are broken down by sector in Table 10 below.

Table 10 Adjusted Scenario Forecast Summary

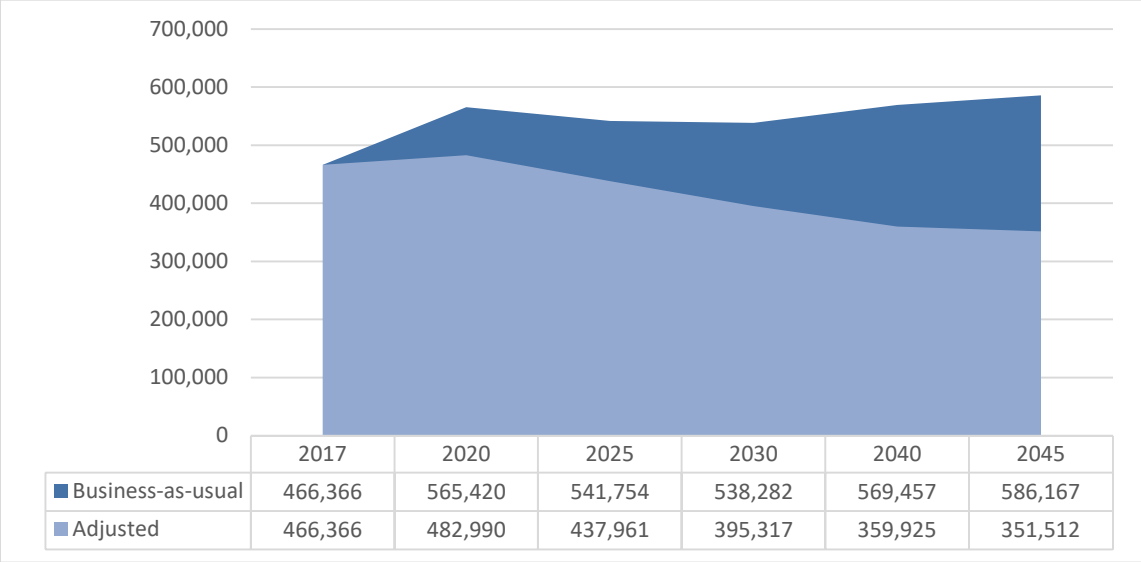
Variable	2017 (MT CO_2e)	2020 (MT CO_2e)	2025 (MT CO_2e)	2030 (MT CO_2e)	2040 (MT CO_2e)	2045 (MT CO_2e)
Residential Electricity	30,757	33,722	29,829	21,318	7,284	0
Commercial Electricity	32,658	36,285	31,553	22,163	7,760	0
Residential Natural Gas	64,769	78,285	75,471	75,549	79,209	81,250
Commercial Natural Gas	31,926	38,248	36,474	35,675	38,063	39,256
Gasoline Sales	181,031	167,666	145,733	129,209	118,131	119,128
Diesel Sales	101,854	100,435	91,722	84,367	80,902	82,473
Landfilled Waste	23,372	28,349	27,178	27,036	28,576	29,406
Total Emissions	**466,366**	**482,990**	**437,961**	**395,317**	**359,925**	**351,512**
Emissions Per Capita	5.07	4.32	4.07	3.67	3.18	3.02

As shown in Figure 17, without legislative reductions at the State level, the City's emissions would increase through 2045, proportionally with population and economic growth. In reality, several existing legislative reductions would limit the City's emissions growth, causing projected emissions to decrease (Table 11). The legislative reductions for each sector and methods used to project emissions are discussed in detail below.

Table 11 Summary of Legislative Reductions

Legislation	2020 (MT CO_2e)	2025 (MT CO_2e)	2030 (MT CO_2e)	2040 (MT CO_2e)	2045 (MT CO_2e)
Transportation Legislation	-75,026	-91,496	-113,662	-146,841	-154,322
Title 24	-3,271	-1,579	-1,282	-3,516	-4,705
SB 100	-4,133	-10,717	-28,021	-59,175	-75,628
Total	**-82,430**	**-103,792**	**-142,965**	**-209,532**	**-234,655**

Figure 17 Business-as-usual versus Adjusted Scenarios (MT CO_2e)



	2017	2020	2025	2030	2040	2045
Business-as-usual	466,366	565,420	541,754	538,282	569,457	586,167
Adjusted	466,366	482,990	437,961	395,317	359,925	351,512

Electricity

Emissions from future electricity use under the adjusted scenario were forecasted by projecting anticipated growth in residential and commercial sectors and multiplying by expected electricity emission factors. Anticipated growth in the residential sector was projected as a function of population growth within the City while commercial sector electricity use was projected as a function of employment projections. Legislative adjustments included in the electricity sector forecast include Renewable Portfolio Standard of 60 percent renewables by 2030 and 100 percent renewables by 2045. PG&E provides electricity in Chico and is subject to the RPS requirements. Additionally, Title 24 building code efficiency increases for the 2019 code cycle were applied to all new growth (after the 2017 baseline year) within the city. The methodologies for the electricity sector which were forecasted in the adjusted scenario are summarized in Table 12 and Table 13.

Table 12 Adjusted Forecast Methodology - Electricity

Source Category	Forecasted Activity Data (Scaling Factor)	Emission Factor	Applied Legislative Reductions
Residential Electricity	Population growth in Chico	Assumes an electricity mix of 44 percent, 60 percent, and 100 percent GHG-free by 2025, 2030, and 2045, respectively, for PG&E emission factors per RPS requirements.	Title 24 standards for new construction in 2019 (53 percent residential, 30 percent commercial), RPS requirements
Commercial & Industrial Electricity	Employment growth in Chico		

RPS: Renewable Portfolio Standard; GHG: greenhouse gas; SMUD: Chico Municipal Utility District

Table 13 Adjusted Forecast Results - Electricity

Activity Data	2020	2025	2030	2040	2045
Residential Electricity					
Population	111,892	107,593	107,712	113,303	116,420
BAU Per Capita Electricity (kWh/person)	2,556	2,556	2,556	2,556	2,556
BAU Total Electricity (kWh)	285,970,707	274,983,433	275,287,570	289,576,905	297,544,424
Adjusted Electricity (kWh; Title 24 applied)	273,081,387	267,917,368	268,060,313	274,776,300	278,521,034
Emission factor (MT CO_2e/MWh)	0.1235	0.1113	0.0795	0.0265	0.0000
Emissions (MT CO_2e)	**33,722**	**29,829**	**21,318**	**7,284**	**0**
Commercial Electricity					
Employment	39,061	37,124	36,251	38,859	40,162
BAU Per Capita Electricity (kWh/job)	7,701	7,701	7,701	7,701	7,701
BAU Total Electricity (kWh)	300,790,050	285,874,141	279,151,586	299,234,545	309,271,026
Adjusted Electricity (kWh; Title 24 applied)	293,840,861	283,399,940	278,692,643	292,750,714	299,775,067
Emission factor (MT CO_2e/MWh)	0.1235	0.1113	0.0795	0.0265	0.0000
Emissions (MT CO_2e)	**36,285**	**31,553**	**22,163**	**7,760**	**0**

Between 2017 and 2045, electricity emissions for commercial, residential, and industrial buildings in the city of Chico, together representing the building energy electricity sector, will decrease from 63,415 MT CO_2e to 0 MT CO_2e per year, despite growth in Chico's population and employment levels.

Natural Gas

Emissions from projected natural gas use were forecast using a similar methodology to the electricity sector. Anticipated natural gas use was projected for the residential and commercial sectors separately using population change and employment increase as growth indicators respectively. Adjustments based on the Title 24 building code updates for new construction after the 2019 code cycle begins were then applied to the natural gas activity data. These results were multiplied by a natural gas emission factor of 0.00531 MT CO_2e per therm of natural gas (The Climate Registry 2016). Unlike electricity, the natural gas emission factor is based on the quality of the gas and remains relatively constant over time. The methodologies and data used to calculate natural gas emissions over time are summarized in Table 14 and Table 15.

Table 14 Adjusted Forecast Methodology - Natural Gas

Source Category	Forecasted Activity Data (Scaling Factor)	Emission Factor	Applied Legislative Reductions
Residential Natural Gas	Population growth in Chico	0.00531 MT CO_2e/therm	Title 24 standards for efficiency in new construction in 2019 (7 percent residential, 30 percent commercial over 2016 Title 24)
Commercial & District Natural Gas	Employment growth in Chico		

Table 15 Adjusted Forecast Results - Natural Gas

Activity Data	2020	2025	2030	2040	2045
Residential Gas					
BAU Per Capita Natural Gas (therms/person)	133	133	133	133	133
BAU Natural Gas (therms)	14,839,693	14,269,537	14,285,320	15,026,827	15,440,280

Adjusted Natural Gas (therms; Title 24 applied)	14,751,353	14,221,108	14,235,786	14,925,388	15,309,899
Emission factor (MT CO_2e/therm)	0.00531	0.00531	0.00531	0.00531	0.00531
Emissions (MT CO_2e)	**78,285**	**75,471**	**75,549**	**79,209**	**81,250**
Commercial Gas					
BAU Per Capita Natural Gas (therms/employee)	186	186	186	186	186
BAU Natural Gas (therms)	7,246,137	6,886,819	6,724,820	7,208,620	7,450,359
Adjusted Natural Gas (therms; Title 24 applied)	7,207,057	6,872,891	6,722,232	7,172,166	7,396,983
Emission factor (MT CO_2e/therm)	0.00531	0.00531	0.00531	0.00531	0.00531
Emissions (MT CO_2e)	**38,248**	**36,474**	**35,675**	**38,063**	**39,256**

Transportation

Transportation GHG forecasts were developed based on outputs for each target year from the CARB EMFAC2017 model. The CARB EMFAC2017 transportation modeling program incorporates the legislative requirements and regulations regarding transportation in California described in Section 3.2, including Corporate Average Fuel Economy (CAFE) standards and Advanced Clean Car Standards (EMFAC 2018). The model was run for years 2017, 2020, 2025, 2030, 2040, and 2050 for Butte County. Based on model output for each year, total fuel consumption for gasoline and diesel was aggregated, and the percent change between each target year calculated. The percent change metrics indicated how gasoline and diesel fuel consumption is expected to change in Butte County generally through 2050, based on GHG reduction legislation related to transportation. The percent change metrics were then applied to the anticipated fuel sales growth. Anticipated growth in gasoline and diesel sales was projected as a function of service population growth (population plus jobs) within the City. The emission factor for both gasoline and diesel remained consistent through 2045 in the adjusted forecast. The methodologies and data used to calculate transportation emissions over time are included in Table 16 and Table 17.

Table 16 Adjusted Forecast Methodology - Transportation

Source Category	Forecasted Activity Data (Scaling Factor)	Emission Factor	Applied Legislative Reductions
Gasoline and Diesel Fuel Sales	Fuel consumption percent changes in Butte County	Gasoline – 0.0088 MT CO_2e/gallon Diesel – 0.0102 MT CO_2e/gallon	Advanced Clean Cars, Pavley Clean Car Standards, Tractor-Trailer Greenhouse Gas Regulation, and adopted fuel efficiency standards for medium- and heavy- duty vehicles (accounted for in the CARB EMFACT2017 model)

Table 17 Adjusted Forecast Results - Transportation

Activity Data	2020	2025	2030	2040	2045
Gasoline Fuel Sales					
BAU Per Service Person Sales (gallons/service person)	166	166	166	166	166
BAU Sales (gallons)	24,983,696	23,951,597	23,826,805	25,183,793	25,915,465
Percent Change Metric (%)	-7.38 (between 2017 and 2020)	-13.08 (between 2020 and 2025)	-11.34 (between 2025 and 2030)	-8.57 (between 2030 and 2040)	-8.44 (between 2040 and 2045)
Adjusted Sales (gallons)	19,076,787	16,581,336	14,701,198	13,440,808	13,554,245
Emission factor (MT CO_2e/gallon)	0.0088	0.0088	0.0088	0.0088	0.0088
Emissions (MT CO_2e)	**167,666**	**145,733**	**129,209**	**118,131**	**119,128**

Diesel Fuel Sales					
BAU Per Service Person Sales (gallons/service person)	80	80	80	80	80
BAU Sales (gallons)	12,087,270	11,587,935	11,527,560	12,184,079	12,538,067
Percent Change Metric (%)	-1.39 (between 2017 and 2020)	-8.68 (between 2020 and 2025)	-8.02 (between 2025 and 2030)	-4.11 (between 2030 and 2040)	-1.94 (between 2040 and 2045)
Adjusted Sales (gallons)	9,826,338	8,973,896	8,254,242	7,915,225	8,068,935
Emission factor (MT CO_2e/gallon)	0.0102	0.0102	0.0102	0.0102	0.0102
Emissions (MT CO_2e)	**100,435**	**91,722**	**84,367**	**80,902**	**82,473**

Waste

The forecast used a baseline emission rate of 0.662 tons of waste per service population along with projected growth in Chico to establish the estimated tonnage of waste being disposed yearly through 2045. As for the inventory, an emission factor of 0.284 MT CO_2e per ton of waste was used to forecast emissions. Emissions from the waste sector will likely be less than the projected totals due to decreasing rates of organic material in the waste stream and recent legislation such as SB 1383 discussed in previous sections. At this time no mandate exists for individual cities and the waste reductions from these bills are incorporated into the Climate Action Plan through City reduction measures to avoid double counting. A summary of the methodologies and data used to model waste emissions over time are provided in Table 18 and Table 19.

Table 18 Adjusted Forecast Methodology - Waste

Forecasted Activity Data (Scaling Factor)	Emission Factor	Applied Legislative Reductions
Service population growth	0.662 tons per service person, 0.284 MT CO_2e/ton of solid waste	N/A

Table 19 Adjusted Forecast Results - Waste

Activity Data	2020	2025	2030	2040	2045
Service Population	150,953	144,717	143,963	152,162	156,583
Ton waste per Service Population	0.662	0.662	0.662	0.662	0.662
Total tons waste	99,996	95,865	95,366	100,797	103,725
Waste Factor (MT CO_2e/ton)	0.284	0.284	0.284	0.284	0.284
MT CO_2e	**28,349**	**27,178**	**27,036**	**28,576**	**29,406**

6 Target Setting

Once an inventory and forecast are complete, it's possible to set GHG emission reduction targets that are consistent with State goals. The inventory is used to develop the GHG emission targets for each target year, which can then be compared to the forecast results to determine how much reduction falls to the responsibility of the City. This "gap" between the forecast and the targets determines the magnitude of action the City will need to take while developing the Climate Action Plan Update.

Setting GHG reduction targets for climate action planning that align with the State's goals will allow the City of Chico to develop its own emission reduction trajectory in a cost-effective manner and on the City's own terms. Target setting is an iterative process that must be informed by the reductions that can realistically be achieved through the development of feasible GHG reduction measures. As such, the targets identified herein should be re-evaluated on a periodic basis (every five years is recommended) and adjusted as more data and information become available to the City.

At this time, the State has codified a goal of reducing emissions to 40 percent below 1990 levels by 2030 (SB 32) and has developed the 2017 Scoping Plan to demonstrate how the State will achieve the 2030 goal. The State has also established a goal of achieving carbon neutrality by 2045 (EO-B-55-18). While currently no State plan exists to achieve this goal, EO B-55-18 directs CARB to ensure future Scoping Plan updates identify and recommend measures to achieve the carbon neutrality goal. Executive Orders are binding only unto State agencies and are not binding on local governments or the private sector, however showing progress toward this goal is expected to be a mandatory component of CEQA analyses upon publication of the next Scoping Plan.

In accordance with the 2017 Scoping Plan Update, target pathways can be set using either efficiency (MT CO_2e per capita or per service population per year) or absolute (total community-wide MT CO_2e per year) metrics. With CARB's publication of the 2017 Scoping Plan Update, the State recognized the inherent issues with setting an emission reduction target pathway using absolute metrics for cities with high expected growth patterns and adopted the efficiency metric as an acceptable form of target setting.

The City therefore has several potential target pathways to show consistency with State targets. The following pathways are described as a starting place for adopting both 2030 and 2045 targets. However, any emissions target that reaches at least a 40% reduction from 1990 levels (on a per capita or mass emissions reduction basis) and then moves to carbon neutrality by 2045 would be consistent with state goals. Four potential target pathways adopted by other cities are discussed below:

- **SB 32 Then Carbon Neutral Target:** achieve the minimum reductions required by SB 32 by 2030 (40 percent below 1990 levels) and then carbon neutrality in 2045.
    - **Absolute Pathway:** reduce absolute emissions to 40 percent below absolute emission level and to zero in 2045. This would require minimal community-wide reductions through 2030 and then relatively steep reductions from 2030 to 2045, regardless of population changes.
    - **Efficiency Pathway:** reduce per capita emissions to 40 percent below per capita emission level in 1990 and to zero in 2045. Due to high per capita emission levels in 1990, this would allow for a significant increase in community-wide emissions through 2030 and then very steep reductions through 2045.
- **Linear to Carbon Neutral Target:** move linearly from current emission levels to carbon neutrality in 2045. This pathway is also compliant with the 2030 State goal.

- **Absolute Pathway:** linearly reduce absolute emissions to zero in 2045. This would require consistent community-wide reductions from 2017 through 2045, regardless of population changes.
- **Efficiency Pathway:** linearly reduce per capita emissions to zero in 2045. This would allow for a small increase in community-wide emissions in 2020 and then consistent reductions through 2045.

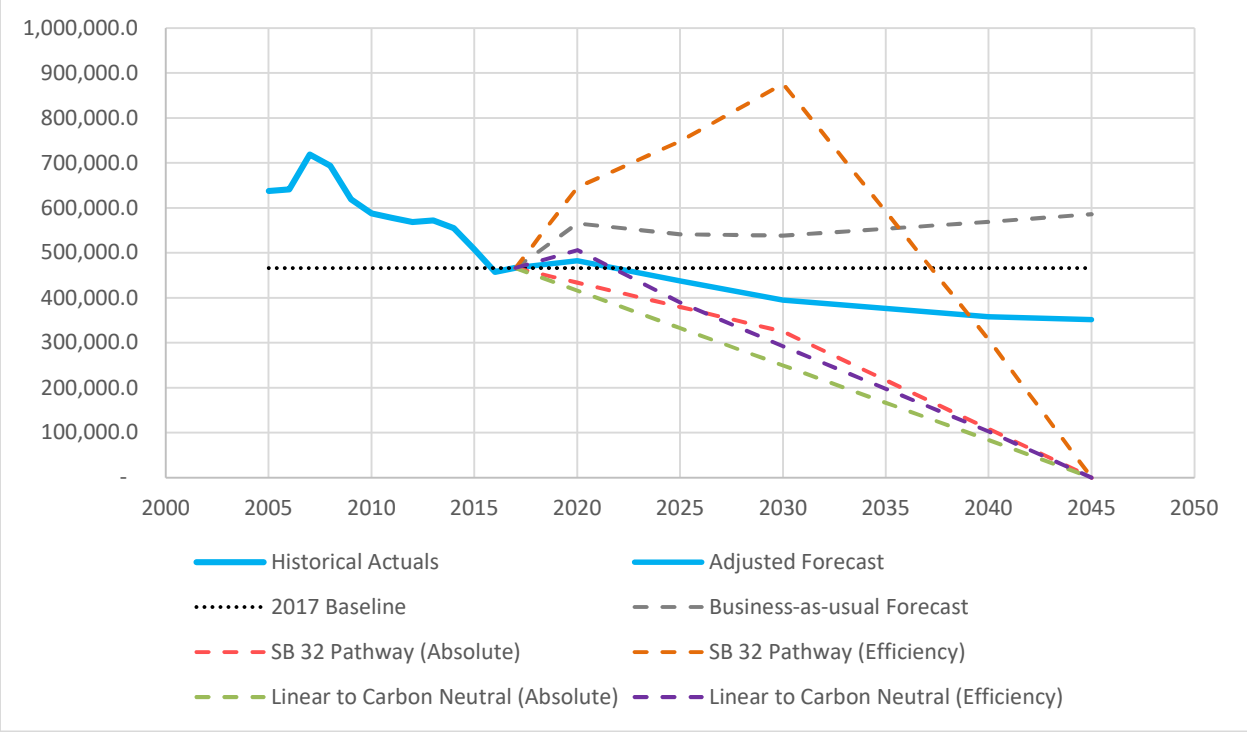
For a complete numerical comparison of each target pathway, the forecasted emissions and each potential target pathway (in both community-wide and per capita emissions) for the years 2020, 2025, 2030, 2040 and 2045 are provided in Table 20. Figure 18 shows the forecast and the different target pathway options that can be used to achieve consistency with SB 32 (2030) and B-55-18 (2045) goals.

Table 20 Target Pathways[1]

Year	GHG forecast ($MT CO_2e$)	SB 32 Then Carbon Neutral Target ($MT CO_2e$)		Linear to Carbon Neutral Target ($MT CO_2e$)	
		Absolute Pathway	Efficiency Pathway	Absolute Pathway	Efficiency Pathway
2020	482,990 (4.3)	433,774 (3.9)	646,247 (5.8)	416,398 (3.7)	506,310 (4.5)
2025	437,961 (4.1)	379,454 (3.5)	748,315 (7.0)	333,119 (3.1)	389,486 (3.6)
2030	395,317 (3.7)	325,135 (3.0)	876,179 (8.1)	249,839 (2.3)	292,437 (2.7)
2040	359,925 (3.2)	108,378 (1.0)	307,220 (2.7)	83,280 (0.7)	102,539 (0.9)
2045	351,512 (3.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

[1] Mass emissions (MT CO2e) with per capita emissions (MT CO2e per person) in parenthesis

Figure 18 Forecast and Target Setting Pathways ($MT CO_2e$)



The absolute GHG emission gap in 2030, 2040, and 2045 between each target pathway and the forecast emissions can be found in Table 21. Numbers in green indicate that the target will be achieved under the adjusted scenario forecast; numbers in red indicate the target would not be achieved under the adjusted scenario forecast. The emission gap will be bridged by local actions developed in the City of Chico Climate Action Plan Update.

Table 21 Emission Gap Analysis

Year	SB 32 Then Carbon Neutral Target ($MT CO_2e$)		Linear to Carbon Neutral Target ($MT CO_2e$)	
	Absolute Pathway	Efficiency Pathway	Absolute Pathway	Efficiency Pathway
2030	-70,183	480,862	-145,478	-102,880
2040	-251,547	-52,705	-276,645	-257,386
2045	-351,512	-351,512	-351,512	-351,512

The City of Chico has achieved both efficiency and absolute emission reductions between 2005 and 2017 and is on track to achieve the minimum 2030 target with only minor additional reduction measures despite high population growth rates. However, Chico was the fastest-growing city in California in 2018, due to an influx of citizens from the Town of Paradise spurred by the November 2018 Camp Fire. Although the City of Chico has reduced their per capita emissions significantly and are on pace to meet the 2030 reduction target with only a few additional reductions, the 2045 target of carbon neutrality will require significant changes to the community. Based on this information, Rincon is recommending establishing a linear to carbon neutral efficiency target pathway for 2020, 2025, 2030, and 2040 with a target of carbon neutrality on or before 2045. This will allow the City some leeway in emission reductions through 2020 due to population increases, while allowing the City to progress steadily towards the 2045 carbon neutrality target on its own terms without having to make inflexibly steep reductions later on. The measures developed for the Climate Action Plan Update will focus on meeting these short-term (2030) goals and putting the City on a path towards achieving carbon neutrality.

7 References

Alexander, Fletcher. 2017. Developing a High-Level Greenhouse Gas Emissions Inventorying Protocol for Local Government Climate Action Management: Chico, CA – A Case Study.

Association of Environmental Professionals (AEP). 2013. The California Supplement to the United States Community-Wide Greenhouse Gas (GHG) Protocol. Accessed at: https://califaep.org/docs/California_Supplement_to_the_National_Protocol.pdf.

Butte County Association of Governments. 2019. Provisional Long-Term Regional Growth Forecasts 2018-2040.

California Air Resources Board (CARB). 2008. Climate Change Scoping Plan. Accessed at: https://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

California Air Resources Board (CARB). 2011. Facts about the Advanced Clean Cars Program. Accessed at: http://www.arb.ca.gov/msprog/zevprog/factsheets/advanced_clean_cars_eng.pdf.

California Air Resources Board (CARB). 2013. Clean Car Standards – Pavley, Assembly Bill 1493.

California Air Resources Board (CARB). 2017. California's 2017 Climate Change Scoping Plan. Accessed at: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

California Air Resources Board (CARB). 2019. California Greenhouse Gas Emissions for 2000 to 2017: Trends of Emissions and Other Indicators. Accessed at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf.

California Department of Conservation. 2020. TerraCount Scenario Planning Tool. Accessed at: https://maps.conservation.ca.gov/terracount/.

California Department of Finance. 2019. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2010-2019, with 2010 Benchmark.

California Department of Finance. 2020. E-4 Historical Population Estimates for Cities, Counties, and the State. Accessed at: http://www.dof.ca.gov/Forecasting/Demographics/Estimates/.

California Employment Development Department. Industry Employment & Labor Force – by Annual Average, March 2018 Benchmark..

CalRecycle. 2019. Short-Lived Climate Pollutants (SLCP): Organic Waste Methane Emissions Reductions (General Information). Accessed at: https://www.calrecycle.ca.gov/climate/slcp.

City of Chico. 2012. City of Chico 2020 Climate Action Plan. Accessed at: http://chicosustainability.org/documents/ClimateActionPlan.pdf.

The Climate Registry. 2016. 2016 Default Emission Factors. Accessed at: https://www.theclimateregistry.org/wp-content/uploads/2014/11/2016-Climate-Registry-Default-Emission-Factors.pdf.

EMFAC. 2018. EMFAC 2017 Technical Documentation. Accessed at: https://www.arb.ca.gov/msei/downloads/emfac2017-volume-iii-technical-documentation.pdf.

Environmental Protection Agency. 2014. Emission Factors for Greenhouse Gas Inventories.

ICLEI. 2013. U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions.

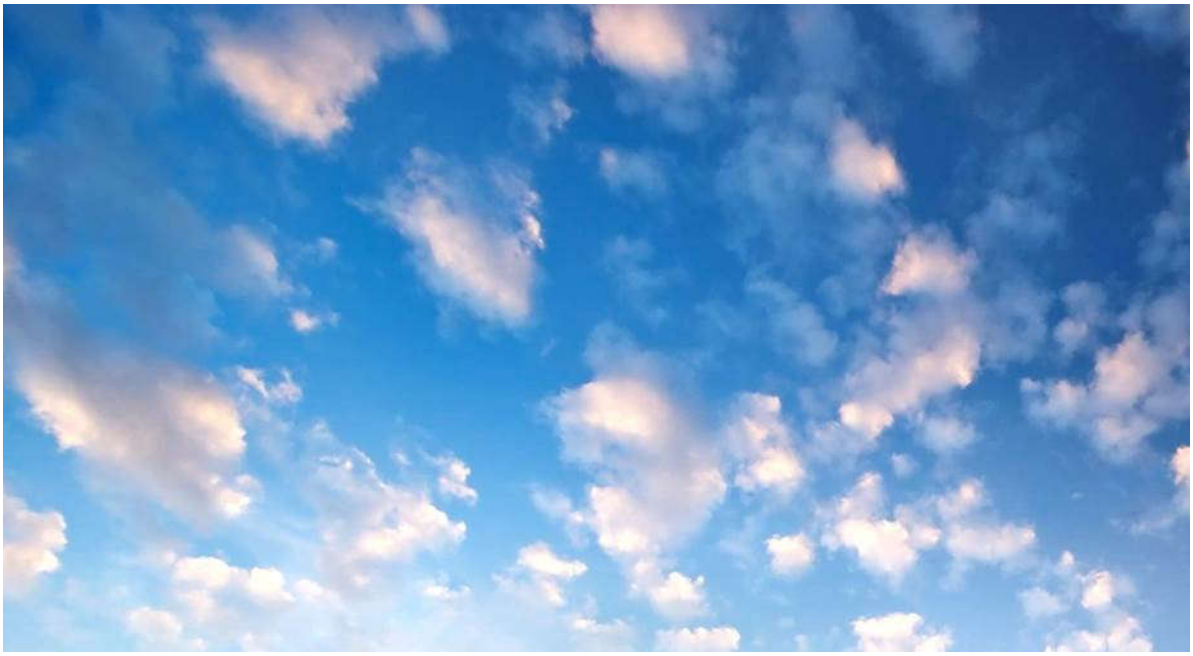
Santa Clara County. June 20, 2018. SB 1383 Rulemaking Overview. Accessed at: https://www.sccgov.org/sites/rwr/rwrc/Documents/SB%201383%20PowerPoint.pdf.

Sustainability Task Force. 2018. City of Chico Greenhouse Gas Emissions for 2005 to 2017: Trends of Emissions and Other Indicators.

This page is left blank intentionally

APPENDIX C:
Climate Action Legislation in California

This page is left blank intentionally



City of Chico Climate Action Plan Update

Appendix C – Climate Action Legislation in California

prepared for

City of Chico
411 Main Street
Chico, California 95928

prepared with the assistance of

Rincon Consultants, Inc.
4825 J Street, Suite 200
Sacramento, California 95819

July 2021

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

This page is left blank intentionally

Table of Contents

This page is left blank intentionally

Regulatory Context

As the impacts of climate change are becoming clearer, strategies to address climate change are emerging at all levels of government. This section provides an overview of the regulatory context at the international, state, and local levels.

International Climate Action Guidance

1992 United Nations Framework Convention on Climate Change

The primary international regulatory framework for GHG reduction is the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC is an international treaty adopted in 1992 with the objective of stabilizing atmospheric GHG concentrations to prevent disruptive anthropogenic climate change. The framework established non-binding limits on global GHG emissions and specified a process for negotiating future international climate-related agreements.[1]

1997 Kyoto Protocol

The Kyoto Protocol is an international treaty that was adopted in 1997 to extend and operationalize the UNFCCC. The protocol commits industrialized nations to reduce GHG emissions per country-specific targets, recognizing that they hold responsibility for existing atmospheric GHG levels. The Kyoto Protocol involves two commitment periods during which emissions reductions are to occur, the first of which took place between 2008-2012. The second commitment period set new targets and other changes but has not been entered into force (meaning it has not gone into effect).[2]

2015 The Paris Agreement

The Paris Agreement is the first universal, legally binding global climate agreement that was adopted in 2015 and has been ratified by 191 countries worldwide.[3] The Paris Agreement establishes a roadmap to keep the world under 2 degrees Celsius (°C) of warming with a goal of limiting an increase of temperature to 1.5°C. The Paris Agreement does not dictate one specific reduction target, instead relying on individual countries to set nationally determined contributions (NDCs) or reductions based on gross domestic product and other factors. According to the International Panel on Climate Change (IPCC), limiting global warming to 1.5°C will require global emissions to reduce through 2030 and hit carbon neutrality by mid-century.[4]

[1] United Nations Framework Convention on Climate Change (UNFCCC). United Nations Framework Convention on Climate Change. https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf
[2] UNFCCC. What is the Kyoto Protocol? https://unfccc.int/kyoto_protocol
[3] UNFCCC. Paris Agreement - Status of Ratification. https://unfccc.int/process/the-paris-agreement/status-of-ratification
[4] IPCC. Global Warming of 1.5 C. https://www.ipcc.ch/sr15/

California Regulations and State GHG Targets

California remains a global leader in the effort to reduce GHG emissions and combat climate change through its mitigation and adaptation strategies. By the early 2000's, California was passing climate change bills including Senate Bill (SB) 1078 and Executive Order (EO) S-3-05 which began to require state agencies and utilities to address climate change. With the passage of Assembly Bill (AB) 32 in 2006, California became the first state in the nation to mandate GHG emission reductions across its entire economy. To support AB 32, California has enacted legislation, regulations, and executive orders (EO) that put it on course to achieve robust emission reductions and address the impacts of a changing climate. The following is a summary of executive and legislative actions most relevant to the Climate Action Plan.

2002 Senate Bill 1078

In 2002, Senate Bill (SB) 1078 established the California Renewables Portfolio Standards (RPS) Program which requires that 20 percent of retail electricity sales be composed of renewable energy sources by 2017 and was accelerated in 2006 by SB 107,[5] which requires that 20 percent of retail electricity sales be composed of renewable energy sources by 2010, instead of 2017. EO S-14-08 was signed in 2008 to further streamline California's renewable energy project approval process and increase the state's RPS to the most aggressive in the nation requiring 33 percent renewable power by 2020.[6] SB 350, discussed further below, further accelerated the program which mandated a 50% RPS by 2030.

2002 Assembly Bill 1493

In 2002, AB 1493, also known as the Pavley Regulations, directed the California Air Resources Board (CARB) to establish regulations to reduce GHG emissions from passenger vehicles to the maximum and most cost-effective extent feasible. CARB approved the first set of regulations to reduce GHG emissions from passenger vehicles in 2004, with the regulations initially taking effect with the 2009 model year.

2005 Executive Order S-3-05

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

2006 Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main state strategies for reducing GHG emissions to meet the 2020 deadline. In

[5] California Public Utilities Commission.2021. Renewables Portfolio Standard (RPS) Program. https://www.cpuc.ca.gov/General.aspx?id=6442463710
[6] Executive Order S-14-08. http://www.climatestrategies.us/library/library/view/292

addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions.

Based on this guidance, CARB approved a 1990 statewide GHG baseline and 2020 emissions limit of 427 million metric tons of CO_2 equivalent (MMT CO_2e). The Scoping Plan was approved by CARB on December 11, 2008 and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards,[7] and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

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

2007 Executive Order S-1-07

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

2007 Senate Bill 97

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

2008 Senate Bill 375

SB 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPOs), to prepare a Sustainable Communities Strategy" that contains a growth strategy to meet these emission targets for inclusion in the MPO's Regional Transportation Plan.

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

In March 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. Each region was assigned a target for 2020 and 2035.8

2009 California Green Building Code

The California Green Building Standards Code (CALGreen) is Part 11 of the California Building Standards Code or Title 24 and is the first statewide "green" building code in the nation. The purpose of CALGreen is to improve public health, safety, and general welfare by enhancing the design and construction of buildings. Enhancements include higher energy efficiency, better air quality, and improved daylighting. The first CALGreen Code was adopted in 2009 and has been updated in 2013, 2016, and 2019. The CALGreen Code will have subsequent, and continually more stringent, updates every three years.

2009 Senate Bill X7-7

In 2009, SB X7-7, also known as the Water Conservation Act, was signed, requiring all water suppliers to increase water use efficiency. This legislation sets an overall goal of reducing per capita urban water use by 20 percent by2020.

2011 Senate Bill 2X

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

2012 Assembly Bill 341

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

2014 Assembly Bill 32 Scoping Plan Update

In 2014, CARB approved the first update to the Scoping Plan. This update defines CARB's climate change priorities and sets the groundwork to reach the post-2020 targets set forth in EO S-3-05. The update highlights California's progress toward meeting the near-term 2020 GHG emissions reduction target, defined in the original Scoping Plan. It also evaluates how to align California's longer-term GHG reduction strategies with other statewide policy priorities, such as water, waste, natural resources, clean energy, transportation, and land use.

2014 Assembly Bill 1826

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

8 https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Final_Targets_2018.pdf

2015 Senate Bill 350

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

2015 Executive Order B-30-15

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

2016 Senate Bill 32

In September 2016, the governor signed SB 32 into law, extending AB 32 by requiring the state to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged).

2016 Senate Bill 1383

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

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

SB 1383 also requires CalRecycle, in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills. SB 1383 further requires 20% of edible food disposed of at the time to be recovered by 2025.

2017 Scoping Plan Update

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

The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2014 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six metric tons (MT) CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (i.e., city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the state (CARB 2017).

2018 Senate Bill 100

Adopted in September 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's RPS Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

2018 Executive Order B-55-18

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

APPENDIX D:
Climate Action Finance Map

This page is left blank intentionally

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

CITY of CHICO

brought to you by HIP INVESTOR Human Impact + Profit

Relevant Projects and Initiatives	Capital Type	Top Funding and Finance Pathways	Resources or Partners	Case Examples
Public Transportation Infrastructure **T-3:1**: Partner with BCAG and Butte Regional Transit to improve and expand transit within the City	GRANT	Federal or State Grants	CalTrans Transit + Intercity Rail Capital Program (TIRCP)	SamTrans + more
	PARTNER	PPP or Sponsorship	DT Chico Business Association	San Diego Metro Transit System
	PARTNER	PPP with Transportation Operator	Butte County Assoc. of Gvts, Butte Regional Transit	LA Transportation Electrification Partnership
	LOAN	Federal or State Loan Programs	TIFIA Loan	San Luis Obispo, CA
	BOND	Green Bond or Revenue Bond	CAEATFA, CA Transportation Finance Authority	Ventura County
	FEE	Transportation Fee	Dept of Transportation	Chicago, IL
	TAX	Enhanced Infrastructure Financing District	Butte County Economic Development Company	LA County
Bike and Pedestrian Improvements **T-1:1**: Implement Chico Bicycle Master Plan **T-1:5**: Complete Active Transportation Plan **T-3-2:** Prepare for shared bike programs Active Transportation Funding Sources: https://catc.ca.gov/-/media/ctc-media/documents/programs/atp/2020/funding-programs-that-fund-active-transportation-a11y.pdf	GRANT	CA State Grants	CalTrans Active Transportation Program	Santa Barbara
	GRANT	CA State Grants	Transformative Climate Communities (TCC)	Ontario, CA
	GRANT	CA State Grants	CNRA Urban Greening	2020 Awardees
	GRANT	Foundation Grants	People for Bikes, Outride	Santa Cruz, CA
	PARTNER	PPP or Sponsorship	DT Chico Business Association, Alta	Zagster
	LOAN	State Government Loan Programs	ISRF Loan Program	Santa Cruz, CA
	LOAN	Federal Government Loan Programs	TIFIA Loan	State of Maryland
	BOND	General Obligation Bond	CA Transportation Finance Authority	San Diego County
	FEE	Transportation Fee	Dept. of Transportation	Chicago, IL
	FEE	Developer Impact Fee	Dept. of Transportation	Santa Monica
	TAX	Enhanced Infrastructure Financing District	Butte County Economic Development Corp.	Santa Rosa

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

CITY of CHICO

brought to you by HIP INVESTOR Human Impact + Profit

Relevant Projects and Initiatives	Capital Type	Top Funding and Finance Pathways	Resources or Partners	Case Examples
Municipal Energy Efficiency **E-4-3:** Conduct an energy generation feasibility study **E-4-4:** Install renewable energy technology at municipal facilities	GRANT	State and Foundation Grants	EPIC Grant, CPUC-SGIP	Fremont, CA
	PARTNER	Utility Energy Services Contract (UESC)	PG&E Sustainable Solutions Turnkey Prog.	CalPoly
	PARTNER	Energy Savings Performance Contracts	ENGIE, Ameresco	Enovity EE
	PARTNER	Collaborative Purchasing	Sourcewell	MAPC
	LOAN	Tax-Exempt Lease Purchase Agreement	GS $mart	DGS Building Retrofits
	LOAN	On-Bill Financing	PG&E, Butte Electric	Mass Saves
	LOAN	Green Bank or Revolving Loan Fund	Coalition For Green Capital	San Antonio, TX
	LOAN	Government Loan Program	CA CLEEN	Huntington Beach, CA
	LOAN	Investment Firm	Generate Capital	Hillsborough, FL
	BOND	General Obligation Bond (Green)	California iBank	Lakeport, CA
Tariff On-Bill Financing, Green Bank, RLV **E-2:7:** Identify + partner with stakeholders to develop resident-level funding pathways for implementing electrification ordinance **E-4:1:** Coordinate with stakeholders to provide local energy generation support and incentives for the community	GRANT	Government and Foundation Grants	Building Decarb Coalition	Baltimore, MD
	GRANT	Settlement Funds	Butte County Camp Fire Settlement Fund	Montgomery Co, MD
	PARTNER	Local Economic Development Corp Partnership	Chico Community Development Dept.	NYC RLF (eg. of PPP, but for development)
	LOAN	Program Related Investment or Endowments	Coalition for Green Capital	CT Green Bank + MacArthur
	LOAN	Private Investment or Bank Loan	Coalition for Green Capital	Colorado Clean Energy Fund
	BOND	Green or Revenue Bonds	California iBank	CT Green Bank - Green Liberty Bond
	FEE	Ratepayer Surcharge	PG&E, Butte Electric	CT Green Bank

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

CITY of CHICO

brought to you by HIP INVESTOR Human Impact + Profit

Relevant Projects and Initiatives	Capital Type	Top Funding and Finance Pathways	Resources or Partners	Case Examples
ffordable Electrification & fficiency Retrofits **E-2:7:** Identify and partner with stakeholders to develop resident-level funding pathways for implementing electrification ordinance (to include weatherization and efficiency retrofits)	GRANT	CA State Grant	Building Initiative for Low-Emissions Dev. (BUILD)	2021 launch
	GRANT	CA State Grant	Affordable Housing + Sustainable Communities (AHSC)	2019 Awardees
	GRANT	Federal and State Grants	LIHEAP or Butte Weatherization Assistance Program (WAP)	CA WAP
	PARTNER	Utility-Led Incentives	PG&E Rebate Program	CA CPUC
	LOAN	On-Bill Financing (Tariff)	PG&E, Butte Electric	Kansas City P&L
	LOAN	PACE or C-PACE Financing	PACENation	Greenville, MI - Cambridge Court Apts
	LOAN	Green Bank or Revolving Loan Fund	Coalition For Green Capital	CT Green Bank
	LOAN	Federal or State Loan Program	GoGreen Financing	CAEATFA - REEL
	LOAN	HomeStyle Energy Mortgage	Fannie Mae	Portland, OR
	LOAN	Federal Loan Guarantee	DOE Loan Program	All Projects
esidential and/or Commercial olar and Battery **E-4:1**: Coordinate with stakeholders to provide local energy generation support and incentives for the community	PARTNER	State-Led Utility Incentive Program	Solar on Multifamily Affordable Housing - SOMAH	Eligible Properties
	PARTNER	State-Led Utility Operating Program	Disadvantaged Communities - DAC SASH	New Program
	PARTNER	Community-Owned Solar Partnership	Solar in Your Community Challenge	Yale University
	PARTNER	Utility Rebates and Incentives	California PUC via PG&E	PG&E Solar Incentives
	LOAN	On-Bill Financing (Tariff)	PG&E, Butte Electric	Fort Collins Utilities
	LOAN	PACE or C-PACE Financing	CaliforniaFIRST	Saratoga, CA
	LOAN	Green Bank or Revolving Loan Fund	Coalition For Green Capital	PosiGen - Solar Lease
	LOAN	CA State Loan Program	GoGreen Financing	CAEATFA - REEL
	LOAN	HomeStyle Energy Mortgage	Fannie Mae	Portland, OR
	LOAN	Federal Loan Guarantee	DOE Loans Program	DOE Project Portfolio
	FEE	Ratepayer Surcharge or Utility Fee	PG&E, Butte Electric	CT Green Bank

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

brought to you by HIP INVESTOR Human Impact + Profit

Relevant Projects and Initiatives	Capital Type	Top Funding and Finance Pathways	Resources or Partners	Case Examples
Community Solar and Storage **E-4:1:** Coordinate with stakeholders to provide local energy generation support and incentives for the community. This could include a co-located community solar and storage project.	GRANT	Federal Grants	FEMA Hazard Mitigation Program (BRIC)	St. Croix, U.S.
	GRANT	State Grants	EPIC Grant, CPUC - SGIP	Fremont, CA
	PARTNER	Community Choice Aggregation	Butte Choice Energy	Silicon Valley Clean Energy (SVCE)
	PARTNER	State-Led Utility Operating Program	Community Solar Green Tariff	N/A: New Program
	PARTNER	State-Led Utility Operating Program	DAC - Green Tariff Prog	N/A: New Program
	PARTNER	Utility Rebates and Incentives	PG&E Community Microgrid Enablement Program	Redwood Coast, CA
	PARTNER	Power Purchasing Agreement	ENGIE, Ameresco	Enovity EE in CA
	PARTNER	Collaborative Community Ownership	Clean Energy Co.	Boardman Hill, VT
	PARTNER	Collaborative Purchasing	R-REP Bay Area	SV-REP
	LOAN	Tax-Exempt Lease Purchase Agreement	GS $mart	DGS Building Retrofits
	LOAN	On-Bill Financing	PG&E, Butte Electric	EESI Case Studies Grand Valley, CO
	LOAN	Green Bank or Revolving Loan Fund	Coalition For Green Capital	San Antonio, TX
	LOAN	Federal or State Loan Program	NREL	Orange County Library
	LOAN	Private Investment Firm Loan	Generate Capital	NYC Hudson, Hillsborough, FL
	BOND	General Obligation Bond (Green)	California iBank	Lakeport, CA
	FEE	Ratepayer Surcharge or Utility Fee	PG&E, Butte Electric	Hawaii Microgrid Tariff
	TAX	Enhanced Infrastructure Financing District	Butte County Economic Development Company	New Orleans, LA

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

CITY of CHICO

brought to you by HIP INVESTOR Human Impact + Profit

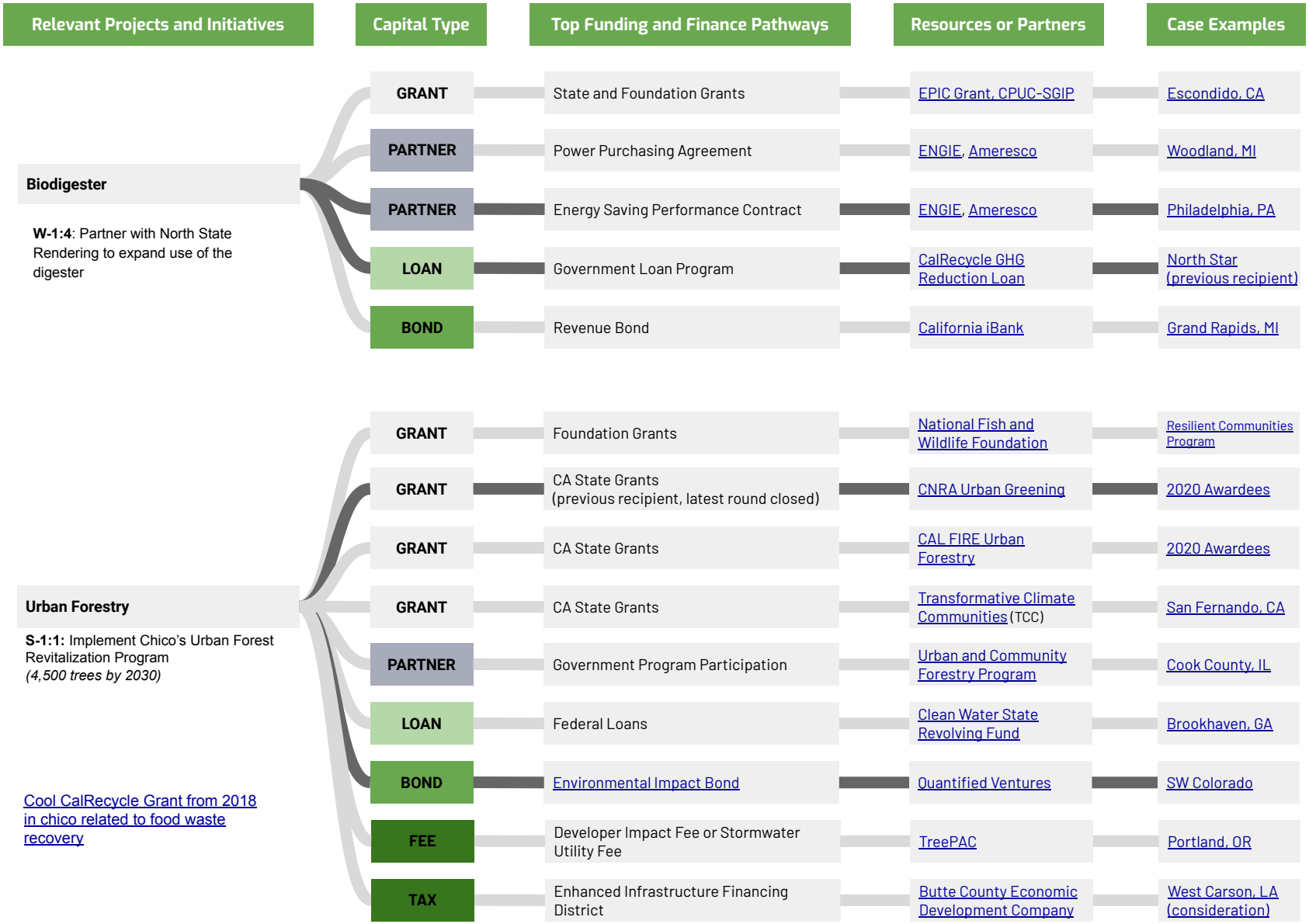
Relevant Projects and Initiatives	Capital Type	Top Funding and Finance Pathways	Resources or Partners	Case Examples
Privately-Owned EV Charging Infrastructure **T-2:1**: Increase privately owned EV charging infrastructure **T-2:2**: Increase publicly accessible EV charging infrastructure	GRANT	Government Grants *see this federal incentives list*	CEC CTP, Federal Transit Administration	Santa Clara, CA
	PARTNER	Public Private Partnership	Blink, ChargePoint	Laguna Beach, CA
	PARTNER	State Infrastructure Incentives Programs	CalevIP	Current Projects
	PARTNER	Utility Incentives or Rebates	PG&E	EV Charge Network
	LOAN	State Loan (with Loan Loss Reserve)	CalCAP (current lender list)	LA / Noodoe
City-Owned EV Charging Infrastructure **T-2:3**: Increase City-owned EV charging infrastructure **T-2:2**: Increase publicly accessible EV charging infrastructure	PARTNER	Utility Incentive	PG&E EV Fleet Program	Pittsburg Unified School District, CA
	PARTNER	Public Private Partnership	Charge Point	Alameda, CA
	PARTNER	Collaborative Purchasing	Sourcewell	Chula Vista, CA, Encinitas, CA
	PARTNER	State Infrastructure Incentives Programs	CalevIP - Inland Counties	Current Projects
	LOAN	State Loan Programs	CA CLEEN Loans	Fresno Airport
	BOND	General Obligation or Conduit Bond (Green)	California iBank	Westchester, NY

Climate Action Finance Map

Pathways to Capital for Projects in Chico's 2021 Climate Action Plan

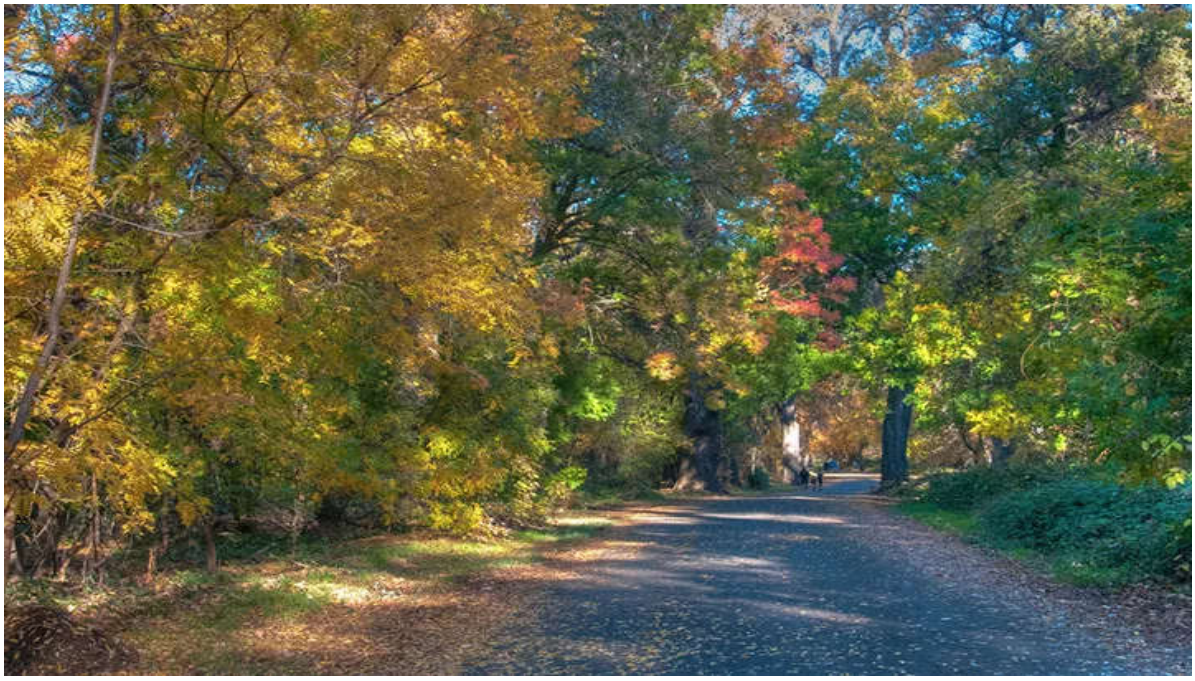
CITY of CHICO

brought to you by HIP INVESTOR Human Impact + Profit



APPENDIX E:
GHG Emissions Reductions Technical Evidence

This page is left blank intentionally



City of Chico Climate Action Plan Update

Appendix E – GHG Emissions Reductions Technical Evidence

prepared for

City of Chico
411 Main Street
Chico, California 95928

prepared with the assistance of

Rincon Consultants, Inc.
4825 J Street, Suite 200
Sacramento, California 95819

September 2020

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

Table of Contents

Tables

Figures

1 Introduction

This document presents the technical quantification and evidence supporting the greenhouse gas (GHG) emission reduction potential of the City of Chico's Climate Action Plan (CAP) Update. Section 15183.5(b)(1) of the CEQA guidelines establishes several criteria which must be met in order to allow for CEQA streamlining and to be considered a "qualified GHG reduction plan". This document provides the information substantiating the GHG reductions identified for the CAP measures pursuant to Subsection (D) which states, "measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level."

As part of the CAP Update process, the City of Chico – in coordination with Rincon Consultants, Inc. (Rincon), the Chico Climate Action Commission and the community of Chico – has developed a comprehensive strategy for reducing community-wide GHG emissions over time. The strategy is organized around three levels which include:

1. **Sectors:** Sectors define the category in which the GHG reductions will take place and include Energy, Transportation, Waste, Sequestration, and Outreach and Education
2. **Measures:** Measures define core strategies within each sector that will result in substantial reductions in GHG emissions
3. **Actions:** Each measure is driven by sets of actions that together support the GHG reductions necessary to achieve the City's targets

Measures and actions can be either quantitative or supportive and are defined as follows:

- **Quantitative:** These measures and actions are supported by case studies, scientific articles, calculations, or other third-party substantial evidence that demonstrate that the implementation of said measure/action will have a measurable GHG reduction when implemented. Quantitative measures/actions can be summed to quantify how the City of Chico will meets its 2030 target and show progress towards the 2045 emission target. These targets exceed the state goal set by Senate Bill 32 (SB32) of 40% below 1990 by 2030.[1] The GHG reductions were calculated using published evidence provided through adequately controlled investigations, studies, and articles carried out by qualified experts that establish the effectiveness for the reduction measures and actions. Further, the measures and actions were developed to achieve the 2030 target established by the City of Chico and make substantial progress towards the 2045 target. The estimates and underlying calculations, provided in this report, include the substantial evidence and a transparent approach to achieving the City's GHG emissions reduction target.
- **Supportive:** These measures and actions may also be quantifiable and have substantial evidence to support their overall contribution to GHG reduction. However, due to one of several factors – including a low GHG reduction benefit, indirect GHG reduction benefit, potential for double-counting, or simply a high level of difficulty in quantifying accurate GHG reductions – they have not been

[1] The Association of Environmental Professionals recommends limiting CEQA GHG Analysis to the State GHG Planning Horizon based on a State Legislatively Mandated Target (i.e., SB 32). Therefore at this time, it is recommended that cities demonstrate quantitatively how they plan to achieve GHG reductions that align with SB 32, but are not required to do the same for the 2045 carbon neutrality goal established by EO-B-55-18, as this goal has not yet been adopted by the State Legislature. Rather, it is recommended that cities demonstrate "substantial progress" towards the 2045 carbon neutrality goal. See *Final White Paper Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California* (Association of Environmental Professionals, 2016).

quantified and do not contribute directly to the expected GHG reduction target and consistency with the state goals. Despite not being quantified, supportive measures/actions are nevertheless critical to the overall success of the CAP.

Together, the quantitative and supportive measures and actions listed herein provide Chico with the GHG reductions necessary to achieve Chico's target of reducing mass emissions by 45% below 1990 levels by 2030 which is 5% more aggressive than SB32 which requires a 40% reduction below 1990 levels by 2030.[2] In addition, this reduction corresponds to a projected per capita emissions reduction of 80% below 1990 levels by 2030 to an estimated 2.76 MT CO_2e per person. The use of per capita emission targets is called for in the 2017 Scoping Plan Update provided by the California Air Resources Board.[3] The City has also established a target consistent with Executive Order (EO) B-55-18 to achieve carbon neutrality by 2045.[4] The measures identified in this CAP will lead to a significant reduction in GHG emissions by 2045, providing a foundation for achieving net carbon neutrality. However, the 2045 GHG emissions reductions quantified in this CAP are not yet enough to meet the long term 2045 goal. Achieving carbon neutrality will require significant changes to the technology and systems currently in place. This CAP aims to establish new systems that are resilient and equitable in the face of change and that will allow for a transition to carbon neutrality in the future. This includes electrification of building and transportation systems, an increased shift to shared and active mobility, carbon neutral electricity, increased water use efficiency, and waste reduction and diversion. As the current measures and actions are implemented, the City will gain more information, new technologies will emerge, and current pilot projects and programs will scale to the size needed to reach carbon neutrality. Furthermore, the State is expected to continue providing updated regulations and support once the 2030 target is achieved. Future CAP updates will outline new measures needed to reach Chico's long-term target of carbon neutrality.[5]

The quantification in this report is intended to illustrate one of several viable paths to pursue as the measures and actions of the CAP are implemented at full scale. As required in CEQA Guidelines Section 15183.5(b)(e), mechanisms to monitor the CAP's progress toward achieving the GHG emission reductions provided in this report have been established through the CAP development process. If, based on the tracking of community GHG emissions, the City is found to not be on target to reach the GHG reduction levels specified here for meeting SB 32 targets, the CAP as a whole or specific measures and actions will be required to be amended and a CAP update will be prepared that includes altered or additional measures and actions and evidence that upon implementation can achieve the City's targets.

Avoiding interference with and making substantial progress toward the state's 2030 and long-term goals is important as these have been set at levels that achieve California's fair share of international emissions reduction targets established by the Paris Agreement and the International Panel on Climate Change that will stabilize global climate change effects and avoid the adverse environmental consequences described under EO B-55-18 Section 3.1.3, Potential Effects of Climate Change.

---

[2] The percent reduction target is calculated as a reduction in projected absolute emissions from 1990 levels. However, total projected emissions, emission targets, and emission reductions in 2030 and 2045 are dependent on population levels and the targets established in this CAP are efficiency targets. Therefore, while absolute emissions in 2030 and 2045 may differ due to differences between the projected population and actual population, per capita emission targets and per capita emissions reductions will remain stable.

[3] https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf

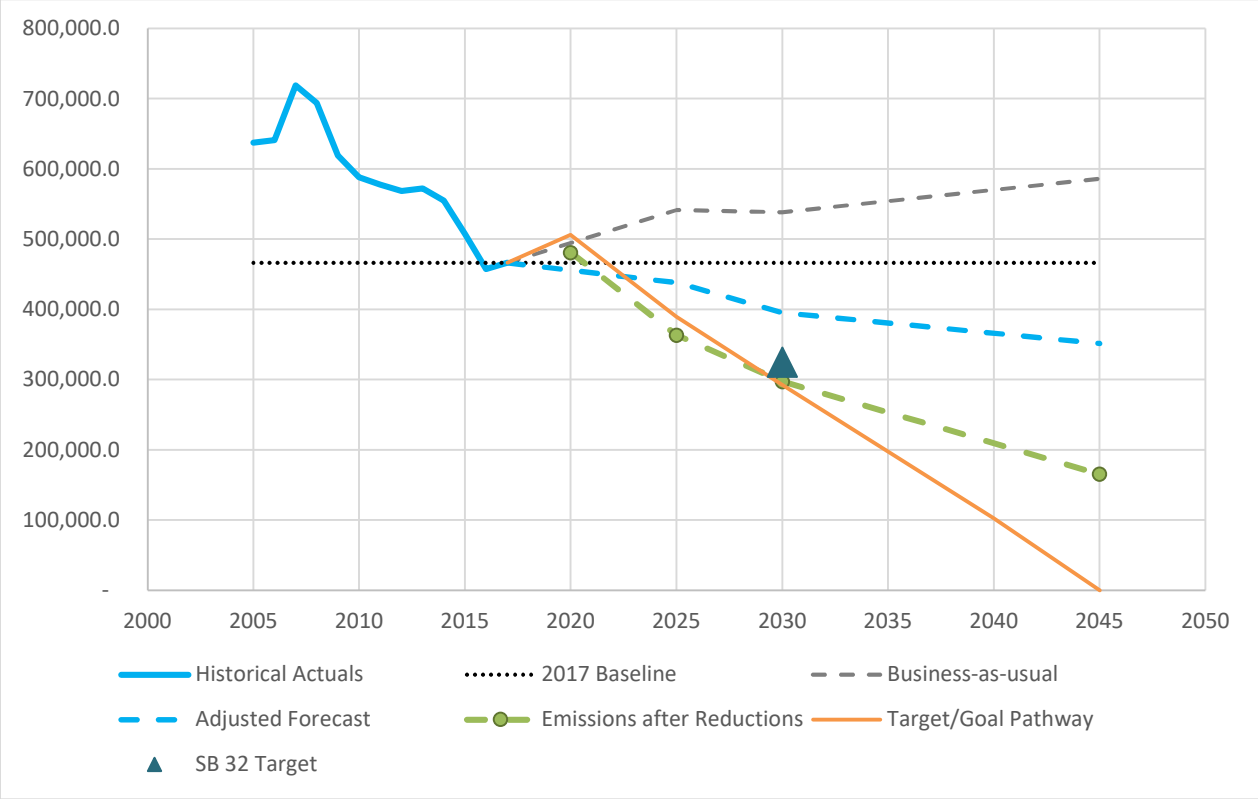
[4] The goal of carbon neutrality is also consistent with the Paris Agreement and the International Panel on Climate Change's target of carbon neutrality by mid-century.

[5] Association of Environmental Professionals, 2016.

2 Emission Reduction Summary

The measures and actions established by Chico's CAP Update are expected to reduce per capita emissions below 1990 levels by 80% in 2030 and 90% in 2045. The reductions expected in 2030 exceed the requirements of SB32, but reductions expected in 2045 fall short of the carbon neutrality goal established by EO B-55-18 (Figure 1). However, as described above, this climate action plan puts Chico on the pathway to achieve carbon neutrality by 2045.

Figure 1 Estimated Emission Reductions



A breakdown of the emission reductions calculated for each measure is included in

Table 1. A complete description of each measure and its contributing actions is included in the sections that follow.

Table 1 Estimated Emission Reduction Potential of CAP Measures

Measure #	Measure	Estimated Minimum 2030 Reduction (MT CO2e)	Estimated Minimum 2045 Reduction (MT CO2e)
Energy			
E-1	Eliminate natural gas in all new building construction by 2025 to reduce natural gas 6% by 2030 and 16% by 2045	6,729	19,565
E-2	Electrify existing buildings starting in 2027 to reduce natural gas 12% by 2030 and 43% by 2045	13,931	51,512
E-3	Decarbonize electricity by 2024 to reduce electricity emissions 90% by 2030	39,169	0
E-4	Increase generation and storage of local renewable energy	Supportive	Supportive
Transportation			
T-1	Improve active transportation infrastructure to achieve greater than 6% mode shift away from passenger vehicles by 2030 and 2045	1,531	1,504
T-2	Improve ZEV infrastructure to achieve greater than 23% shift to ZEVs by 2030, and 90% by 2045	28,616	105,496
T-3	Improve shared mobility and transit programs and infrastructure	Supportive	Supportive
T-4	Implement parking and curb management procedures that support the mode shift goals of the overall transportation strategy	Supportive	Supportive
T-5	Support sustainable infill development to reduce VMT	Supportive	Supportive
Waste			
W-1	Update waste hauler contracts to implement the requirements of SB 1383 and achieve 75% reduction in organic waste by 2025	7,693	7,693
Sequestration			
S-1	Increase carbon sequestration by increasing urban canopy cover at least 10% by 2030 through new greenscaping programs	261	261
S-2	Develop and Implement the Urban Forest Master Plan	Supportive	Supportive
Outreach and Education			
O-1	Conduct a wholistic community outreach and education program to optimize CAP implementation	Supportive	Supportive
Overall Reductions			
Total Reduction Needed to Meet Target/Goal		**97,931**	**351,512**
Estimated Reductions Achieved by Full Implementation of Measures		**97,931**	**186,031**
Absolute Emission Reductions from 1990 (%) (1)		**-45%**	**-69%**
Per Capita Emission Reductions from 1990 (%)		**-80%**	**-90%**
Gap to Target/Goal		**-**	**165,480**

1. Absolute emissions reduction values are estimated based on current population projections and are for reference. Actual progress toward the 2030 target will be determined by comparison to the per capita GHG emissions target of 2.76 MT of CO2e per person pursuant to the 2017 Scoping Plan Guidelines.

As shown in

Table 1, the measures adopted in Chico's CAP Update have the ability when fully implemented to reduce GHG emissions below the City of Chico's GHG reduction target in 2030. However, a gap still remains to reach the goal of carbon neutrality in 2045. As new technologies develop, and the state consolidates around the 2045 carbon neutrality goal, the City of Chico will monitor progress and adopt new strategies to achieve this long-term goal. Furthermore, the measures and actions in this CAP will create the basis for long-term carbon neutrality when implemented, including electrified buildings and vehicles coupled with decarbonized electricity, improved active transportation, decreased water usage and waste generation, and increased carbon sequestration.

The following sections contain the substation evidence and quantification methodology intended to provide reasonable assurance that the GHG reduction strategy adopted in the City of Chico's CAP Update will lead to the emission reductions necessary to achieve the City's ambitious 2030 emission target.

3 Energy

In order for Chico to reach its 2030 reduction target and 2045 carbon neutrality target, the majority of energy utilized by buildings in the City will need to be carbon neutral. The focusing strategy for the energy measures is electrification. All-electric buildings are powered 100% by electricity and when coupled with carbon free electricity generation become carbon neutral. Based on this strategy, the CAP's energy measures consist of the following:

- Measure E-1: Procure Carbon-Free Electricity for the Community Through a CCA by 2024 and Maintain Opt-Out Rates of 5% for Residential and 15% for Commercial Through 2030 and 2045
- Measure E-2: Eliminate Natural Gas in All New Building Construction Starting in 2025 to Reduce Natural Gas 6% by 2030 and 16% by 2045 Compared to the Adjusted Forecast
- Measure E-3: Electrify Existing Residential Buildings Starting in 2027 to Reduce Overall Residential Natural Gas Consumption to 100 Therms/Person by 2030 and 30 Therms/Person by 2045
- Measure E-4: Increase Generation and Storage of Local Renewable Energy

Senate Bill 100 (SB 100) requires all electricity providers in the State to provide carbon free electricity by 2045 which will also allow the operation of electrified buildings to become carbon free by 2045. Procuring community-wide carbon-free electricity through a Community Choice Aggregation (CCA) can expedite that timeline and offer significant GHG reductions in the short term. Measure E-1 directs the City to procure carbon free electricity through the Butte Choice Energy Community Choice Aggregation, decreasing community-wide electricity emissions to almost zero well before 2045. Chico's building stock currently relies heavily on natural gas and retrofitting existing buildings to be all-electric will be a substantial task. To ensure new buildings won't need to be retrofitted later, Measure E-2 will require new buildings and major retrofits be built to utilize only electricity as an energy sources through an electrification ordinance. Meanwhile, Measure E-3 will provide a framework of updated regulations, incentives, rebates, and outreach to drive the electrification of existing buildings. Together, Measures E-1, E-2, and E-3, will reduce emissions from Chico's residential and commercial building stock to zero. Measures E-2 and E-3 will increase electricity demand on the grid into the future. To compensate for this, and increase Chico's energy resiliency overall, Measure E-4 will support local energy generation and storage projects. The details of each energy measure, including their supporting actions and evidence of their GHG reduction potential, are included below.

Measure E-1: Procure Carbon-Free Electricity for the Community Through a CCA by 2024 and Maintain Opt-Out Rates of 5% for Residential and 15% for Commercial Through 2030 and 2045

Action #	Action	Anticipated Reduction (MT CO2e)
1	**Provide carbon neutral electricity to the community:** Procure carbon neutral electricity for the community through Butte Choice Energy Community Choice Aggregation (CCA), in accordance with the ordinance authorizing the implementation of a CCA Program through a Joint Powers Agreement with Butte County, amending Title 15 of the Municipal Code. Automatically enroll community and municipal accounts in the 100% renewable energy option by 2024 (or as market conditions prove favorable) with an opt-out option	2030: 39,169 2045: 0
2	**Partner with Butte Choice Energy to conduct community outreach and track opt-out rates:** Work with Butte Choice Energy to conduct targeted community outreach with the aim of maintaining low opt-out rates (5% or less for residential accounts and 15% or less for commercial accounts). Track opt-out rates through Butte Choice Energy and share results publicly on an annual basis.	Supportive

Action 1: Provide carbon neutral electricity to the community

Electricity in Chico is currently supplied by PG&E, which provides a power mix with 39% renewable resources, and 89% GHG free overall (including nuclear and large hydro).[6] While the portion of renewables in PG&E's grid mix is relatively high compared to other utility providers in the state, the emission factor associated with its electricity is not expected to decrease to zero until the state-mandated year of 2045. In order to reduce GHG emissions in the short-term, the City will provide 100% carbon free electricity to the community through the Butte Choice Energy (BCE) Community Choice Aggregation (CCA). In general, CCAs use the purchasing power of the community to procure electricity directly from electricity generators. This allows the community to choose its own grid mix, with an option to procure electricity from 100% carbon free renewable generation sources. PG&E will continue to deliver power, maintain lines and infrastructure, and coordinate billing. By 2025, BCE is expected to provide three power mix options[7] for community members to choose from:

- Base option with 33% renewable and 80% GHG free sourcing offered at a 2% rate savings
- 50% renewable option with 80% GHG free in 2020 and 95% GHG free in 2030 offered at a 2% rate savings
- 100% renewable option offered at a slight price premium

To maximize the GHG reduction opportunity this presents, the City will automatically enroll all community accounts in a 100% carbon free option. Customers will have the option to opt-out of the CCA back to PG&E or opt-down to another grid mix option. It is expected that about 5% of residential customers and 15% of commercial customers will choose to opt-out.[8] Municipal accounts will have 0% op-out.

6 https://www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page?WT.mc_id=Vanity_cleanenergy

7 https://www.buttechoiceenergy.org/what-is-cca

8 http://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=512&meta_id=87146

Calculations		
Year	**2030**	**2045**
Residential electricity usage (kWh)[1]	268,060,313	278,521,034
Commercial electricity usage (kWh)[1]	272,168,291	293,250,715
Municipal electricity usage (kWh)[2]	6,524,352	6,524,352
PG&E Electricity EF (MT CO_2e/kWh)[3]	0.0000795	0.0000000
Emissions from electricity usage before CCA (MT CO_2e)	43,481	-
CCA Electricity EF (MT CO_2e/kWh)[4]	0.0000000	0.0000000
Weighted residential electricity EF after accounting for opt-out (MT CO_2e/kWh)[5]	0.0000040	0.0000000
Weighted commercial electricity EF after accounting for opt-out (MT CO_2e/kWh)[6]	0.0000119	0.0000000
Emissions from electricity usage after CCA (MT CO_2e)	4,313	-
Total Reductions (MT CO_2e)	***39,169***	**-**

[1] Values from forecast. See Appendix A. Additional electricity load expected from Measures E-1 and E-2 not included here due to CCA reductions for the added electricity being accounted for in each measure's respective quantification. Municipal electricity usage subtracted from total commercial electricity usage for independent modelling. See note 2 for details on municipal electricity usage data.
[2] Based on electricity data provided by the City of Chico for 2018. Municipal usage not expected to change substantially between 2020 and 2045.
[3] Values from forecast. See Appendix A.
[4] All community accounts to be automatically enrolled in 100% renewable electricity package with an opt-out option.
[5] Assume 5% residential account opt-out such that 5% of accounts continue to have a PG&E emission factor, while 95% of accounts continue with the CCA-provided emission factor of 0 MT CO_2e/kWh. Opt-out rate provided by http://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=512&meta_id=87146.
[6] Assume 15% commercial account opt-out. Opt-out rate provided by http://buttecounty.granicus.com/MetaViewer.php?view_id=2&clip_id=512&meta_id=87146.

Action 2: Partner with Butte Choice Energy to conduct community outreach and track opt-out rates

Conducting outreach and tracking opt-out rates associated with electricity accounts in Chico will assist the City in maintaining low opt-out rates for maximum participation in the CCA.

Measure E-2: Eliminate Natural Gas in All New Building Construction Starting in 2025 to Reduce Natural Gas 6% by 2030 and 16% by 2045 Compared to the Adjusted Forecast

Action #	Action	Anticipated Reduction (MT CO2e)
1	**Require new construction to be all-electric:** Adopt a new ordinance which bans the installation of natural gas in new residential and commercial construction by 2025 if not already required by the State's 2025 cycle update to the Building Energy Efficiency Standards (California Code of Regulations Title 24, Parts 6 and 11). The ordinance will only apply for building types where electrification is shown to be cost-effective. Implementation will consist of the following: 1. Engage and educate the community and stakeholders 2. Conduct a Cost-effective study 3. Develop and draft the new building ordinance for public process and revisions 4. Formally adopt the new building ordinance 5. Apply to the California Energy Commission for final ordinance approval	2030: 6,727 2045: 19,565

Action 1: Require new construction to be all-electric

Continuing to allow natural gas in new buildings would result in an increase in GHG emissions through 2045, due to increases in the population and residential construction in the City projected through 2045 (see adjusted forecast in Appendix A). Conversely, GHG emissions from electricity generation are expected to decrease to almost zero by 2024 due to Measure E-3 (emissions from electricity would otherwise decrease to zero in 2045, due to SB 100). Requiring new construction to be all-electric would lead to a mandatory reduction in natural gas consumption compared to adjusted forecast projections by replacing natural gas with electricity.

Emission reductions for Action 1 were calculated separately for residential and commercial construction. It was assumed that with full implementation of the ordinance, no increases in residential and commercial natural gas demand would occur after 2025. Natural gas saved after ordinance implementation was converted to electricity usage (i.e., therms converted to kWh), with the assumption that a modern electric heat pump is on average three time more efficient than natural gas heater.[9] The emission factor for electricity was calculated based on the assumption that Measure E-3 would be fully implemented by 2024 (more details on how this emission factor was calculated are included in the section for Measure E-3). Total emissions saved are equivalent to emissions saved from eliminating natural gas in new construction, minus emissions from increased electricity usage.

Population forecast data from BCAG reflect a large spike in population between 2017 and 2020, after which population is expected to decrease through 2030 as formerly displaced residents leave Chico (see Appendix A). The forecast for natural gas therefore mirrors this pattern, with large increases in usage through 2020 and steady decreases through 2030. While overall natural gas usage is expected to decrease between 2020 and 2030, housing is expected to increase in Chico through 2045. Residential natural gas from new construction was therefore calculated based on housing estimates from BCAG. It was also assumed that the proportion of new residential gas usage relative to total residential gas usage would be about the same in each year as new commercial gas usage to total commercial gas usage. This relationship was used to infer new commercial natural gas usage.

[9] https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-

Calculations		
Year	**2030**	**2045**
Residential Reductions		
Housing units[1]	45,314	50,784
NG usage (therms)[2]	14,235,786	15,309,899
NG usage per housing unit (therms per house)	314	301
Additional housing units since implementation year[1]	2,775	8,245
NG usage avoided (therms)	871,790	2,485,657
Emissions from NG usage avoided (MT CO_2e)[3]	4,627	13,191
Electricity usage from converting to electric (kWh)[4]	8,514,514	24,276,669
Electricity EF (MT CO_2e/kWh)[5]	0.0000040	-
Emissions from converted electricity usage (MT CO_2e)	34	-
Emission reductions (MT CO_2e)	4,593	13,191
Commercial Reductions		
NG usage (therms)[1]	6,722,232	7,396,983
NG usage avoided (therms)	411,665	1,200,946
Emissions from NG usage avoided (MT CO_2e)[3]	2,185	6,373
Electricity usage from converting to electric (kWh)[4]	4,020,610	11,729,281
Electricity EF (MT CO_2e/kWh)[5]	0.0000119	-
Emissions from converted electricity usage (MT CO_2e)	48	-
Emission reductions (MT CO_2e)	2,137	6,373
Total Reductions (MT CO_2e)	**6,729**	**19,565**

[1] BCAG provisional long-term growth forecasts (2020)
[2] Values from GHG Emissions Forecast. See Appendix A.
[3] Based on an emission factor of 0.005307 MT CO_2e/therm, as established in Appendix A.
[4] Based on a conversion factor of 29.3001 kWh/therm and the assumption that electric appliances are generally three time more efficient than gas appliances. https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-
[5] The residential and commercial electricity emission factors were calculated based on opt-out rates for different CCA customers. See Measure E-3 for further details on this calculation.

Measure E-3: Electrify Existing Residential Buildings Starting in 2027 to Reduce Overall Residential Natural Gas Consumption to 100 Therms/Person by 2030 and 30 Therms/Person by 2045

Action #	Action	Anticipated Reduction (MT CO2e)
1	**Electrify existing residential buildings**: If not already required by the State's Building Energy Efficiency Standards (California Code of Regulations Title 24, Parts 6 and 11), adopt an electrification ordinance for existing residential buildings to transition natural gas to electric in two phases, to be implemented through the building permit process. PHASE I: Limit expansion of natural gas lines in existing buildings by 2025. PHASE II: Require HVAC system replacements and hot water heaters replacements to be all-electric by 2027. Implementation will consist of the following: 1. Engage and educate the community and stakeholders 2. Conduct a Cost-effective study 3. Develop and draft the new building ordinance for public process and revisions 4. Formally adopt the new building ordinance 5. Apply to the California Energy Commission for final ordinance approval	2030: 13,470 2045: 50,360
2	**Update RECO to support electrification :** Expand the City's Residential Energy Conservation Ordinance (RECO), Title 16 of the Municipal Code, to cover substantial remodels (over 50%). Amend RECO to require electrification and/or energy conservation improvements for substantial remodels (over 50%) in the same way that RECO currently requires these types of upgrades upon transfer/sale of homes and apartments. The amendment will include electrification options such as installation of a 200 amp panel and/or installation of electric heat pump appliances for HVAC and hot water heaters as well as the option to go beyond the base requirements for energy conservation set forth in the State's Building Energy Efficiency Standards (California Code of Regulations Title 24, Part 6).	
3	**Electrify municipal buildings:** Adopt decarbonization plan to decarbonize municipal buildings by 2045. This plan would include a new building electrification policy as well as an existing building natural gas phase-out policy. Decarbonization of municipal buildings will be driven by the PG&E Sustainable Solutions Turnkey Program, which aims to achieve net neutrality in electricity usage by 2030, and work towards full decarbonization by 2045.	2030: 460 2045: 1,150
4	**Perform an electrification feasibility study:** Conduct a feasibility study/existing building analysis to understand the costs associated with electrifying existing residential and commercial buildings in the City of Chico.	Supportive
5	**Track electrification progress:** Develop a permit tracking program for existing building electrification to track annual progress in achieving the City's electrification goals.	Supportive

Action #	Action	Anticipated Reduction (MT CO2e)
6	**Identify and partner with stakeholders to conduct electrification outreach, promotion, and education**: Leverage partnerships with stakeholders to conduct outreach, promotion, and education around new and existing building electrification, including: ▪ Induction/electric stove cooking competition to demonstrate the competitiveness of electric stoves for replacing gas stoves ▪ Information sessions/events that educate the public on safety concerns around gas stoves and health/cost benefits of replacing water heaters and space heaters with electric heat pumps ▪ Develop financial and technical resources, including hosting workforce development trainings for installers and building owners/operators to discuss benefits and technical requirements of electrification and move towards all-electric requirements ▪ Conduct internal trainings with planners and building officials on state decarbonization goals and incentives available for electric homes ▪ Establish a comprehensive, coordinated electrification education campaign for property owners and occupants, including an updated list of rebates and incentives available for residents wanting to electrify their homes	Supportive
7	**Partner with stakeholders to develop resident-level funding pathways for implementing electrification ordinance:** Leverage partnerships with stakeholders and establish funding pathways to ease community members' costs when complying with an electrification ordinance or meeting State standards, including: ▪ Investigation of a transfer tax rebate for electric panels and/or other upgrades ▪ Partner with PG&E, Butte Choice Energy, and/or other stakeholders to create or expand electrification/retrofit programs and incentives, especially for low-income residents. These could include the PACE program, PG&E's low-income weatherization program, tariffed on-bill financing, metered energy efficiency, or others.	Supportive

Actions 1 & 2: Electrify existing Residential buildings & update RECO to support electrification

Actions 1 and 2 were quantified together for simplicity and to avoid double counting. Natural gas usage from existing buildings accounted for about 20% of emissions in Chico in 2017. While the City is limited in its ability to require whole-building all-electric retrofits, the City can adjust the building permitting process to limit natural gas line expansion and ensure that natural gas appliances such as hot water heaters and space heaters are replaced with electric appliances at time-of-replacement (Action 1) or during major retrofits or at time-of-sale (Action 2). Approximately 34% of residential natural gas usage is used for water heaters, while 40% is used for space heating.[10] The average life-span for water heaters and HVAC systems is 10 years and 18 years, respectively, and the ordinance would be fully implemented by 2025.[11] Action 1 would require the City of Chico no longer accept permits to replace natural gas HVAC and hot water heaters starting in 2027, especially if voluntary efforts have not been successful. These

[10] https://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf

[11] https://www.lowes.com/n/how-to/when-to-replace-a-water-heater

https://www.thisoldhouse.com/ideas/how-long-things-last

units have been selected due to their large contribution to natural gas use and their cost effectiveness.[12] Based on a 2027 implementation date and the assumed life span of the covered equipment natural gas usage in existing buildings should decrease 30% by 2030, and 74% by 2045. This timeline would be expedited along the way by Action 2, which updates RECO to encourage electrification at time-of-retrofit or at time-of-sale. Based on data provided by the Sierra North Valley Realtors, approximately 4% of homes in Chico are sold annually, though this number can fluctuate between years.

Similar to calculations used for Measure E-1, avoided natural gas usage was assumed to be replaced by additional electricity usage, and electric appliances were assumed to be three times more efficient than their natural gas counterparts. The emission factor for electricity is assumed to be consistent with Measure E-3.

[12] https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Calculations		
Year	**2030**	**2045**
Residential NG usage (therms)[1]	14,235,786	15,309,899
Residential NG usage after new building electrification is implemented (therms)[2]	13,363,996	12,824,242
Percentage of homes with replaced water heaters[3]	33%	100%
NG reduction from water heater replacement (%)[4]	11%	34%
NG saved from water heater replacement (therms)	1,489,362	4,360,242
Percentage of homes with replaced HVAC[5]	20%	100%
NG reduction from HVAC replacement (%)[6]	8%	40%
NG saved from HVAC replacement (therms)	1,067,732	5,129,697
Total NG saved (therms)	2,557,094	9,489,939
Emissions from total NG saved (MT CO_2e)[7]	13,570	50,363
Electricity usage from converting to electric (kWh)[8]	24,974,372	92,685,388
Electricity EF (MT CO_2e/kWh)[9]	0.0000040	-
Emissions from converted electricity usage (MT CO_2e)	99	-
Total Reductions (MT CO_2e)	13,471	50,363

[1] Values from forecast. See Appendix A.
[2] Forecasted natural gas minus natural gas lost to new building electrification
[3] Assume 100% of homes replace their water heaters 10 years after ordinance is first passed, with 4% of homes replacing each year as they are sold and the remaining 96% replacing incrementally with each year. Based on average water heater lifetime of 10 years. https://www.lowes.com/n/how-to/when-to-replace-a-water-heater. 4% sale rate based on data provided by the Sierra North Valley Realtors.
[4] Assume 34% of natural gas usage goes to water heaters. https://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf. Multiply by percentage of homes with replaced water heaters to derive total percentage of natural gas reduction from water heater replacement.
[5] Assume 100% of homes replace their HVAC 18 years after ordinance is first passed, with 4% of homes replacing each year as they are sold and the remaining 96% replacing incrementally with each year. Based on average HVAC lifetime of 18 years. https://www.thisoldhouse.com/ideas/how-long-things-last. 4% sale rate based on data provided by the Sierra North Valley Realtors.
[6] Assume 40% of natural gas usage goes to heating/cooling. https://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf. Multiply by percentage of homes with replaced water heaters to derive total percentage of natural gas reduction from HVAC replacement.
[7] Based on an emission factor of 0.005307 MT CO_2e/therm, as established in Appendix A.
[8] Based on a conversion factor of 29.3001 kWh/therm and the assumption that electric appliances are generally three time more efficient than gas appliances. https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-
[9] The residential electricity emission factor was calculated based on opt-out rates for different CCA customers. See Measure E-3 for further details on this calculation.

Action 3: Electrify municipal buildings

This action commits the City of Chico to electrifying the buildings it owns and operates by 2045. Annual natural gas usage for all municipal buildings was provided by the City for 2018 and assumed to be approximately consistent from year to year, as no major expansions or reductions are planned. The electricity emission factor was estimated to be zero in 2030 and 2045 due to implementation of the CCA with 100% carbon-free electricity by 2024 (Measure E-3) and assuming 0% opt-out for municipal electricity accounts. Emission reductions are calculated as avoided natural gas emissions minus replacement electricity emissions, as for Actions 1 and 2.

Calculations		
Year	**2030**	**2045**
Expected NG usage (therms)[1]	216,490	216,490
Expected emissions (MT CO_2e)[2]	1,149	1,149
NG reduction from electrification (%)[3]	40%	100%
NG saved (therms)	86,596	216,490
Emissions from NG saved (MT CO_2e)[2]	460	1,149
Electricity usage from converting to electric[4]	845,757	2,114,393
Electricity EF (MT CO_2e/kWh)[5]	-	-
Emissions from converted electricity usage (MT CO_2e)	-	-
Total Reductions (MT CO_2e)	**460**	**1,149**

[1] Values from forecast. See Appendix A.
[2] Based on an emission factor of 0.005307 MT CO2e/therm, as established in Appendix A.
[3] Assuming linear electrification progress from 0% in 2020 to 100% in 2045
[4] Based on a conversion factor of 29.3001 kWh/therm and the assumption that electric appliances are generally three time more efficient than gas appliances. https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-
[5] Assuming 0% opt-out from the CCA for municipal accounts

Action 4: Perform an electrification feasibility study

Performing an electrification feasibility study will support implementation of Actions 1 and 2, contributing to achieving the GHG reduction benefits of those actions. The feasibility study will help determine which buildings in Chico can be electrified, how to make electrification cost effective in specific cases, clarify the timeline on which electrification will happen, and investigate more concretely how to implement electrification equitably. A feasibility study could also investigate if and how commercial buildings in Chico could be electrified cost effectively, leading to additional GHG reduction potential not accounted for here.

Action 5: Track electrification progress

The best mechanism the City will have for tracking electrification progress – and accurately measuring its GHG reduction benefit as it happens – is through a permit tracking program. Tracking electrification progress on a yearly schedule will allow the City to adjust its electrification approach and respond to potential obstacles as they occur and as new information about electrification becomes available.

Action 6: Identify and partner with stakeholders to conduct electrification outreach, promotion, and education

The impacts associated with promotional and educational outreach for electrification have not been well documented due to the cutting-edge nature of the strategy. Electrification as a GHG reduction strategy has only begun to gain traction in California mostly due to the implementation of SB 100 and the expansion of community choice aggregations. While it is not clear how the community will respond to electrification, energy efficiency outreach has been conducted since as early as the 1970's and some research has been conducted on the effects of outreach and education on energy. One study in New York showed that out of the 8,991 people who participated in informational programs, 69% implemented the recommended practices.[13] Another research meta-analysis reviewed dozens of papers covering various energy efficiency, water efficiency, and waste outreach and found that education-only campaigns could produce between 10-12% energy savings.[14]

Electrification is a new idea and not well understood by the community. The education associated with this action as well as the Climate Action Plan itself will facilitate adoption of all-electric technologies. The City will conduct a CAP update between 3 and 5 years to check progress and adopt more voluntary or potentially mandatory measures if necessary. Due to the indirect causal link between education and community-wide action, this measure is not quantified but considered supportive to the overall measure.

Action 7: Partner with stakeholders to develop resident-level funding pathways for implementing electrification ordinance

This action would focus on building the funding pathway to make existing building electrification (Actions 1 and 2) possible, particularly for low-income residents of Chico. The largest barrier to existing building electrification is higher up-front capital costs compared to natural gas. [15] Utility-offered incentives to offset these costs for the end-user are therefore among the most promising opportunities for updating this technology.[16] Once up-front costs are financed, long term savings can be used to achieve cash flow positive retrofits and/or acceptable ROI's. Demonstrating cost effective pathways for existing building electrification will be a key step before mandatory requirements can be set. Examples of funding/financing strategies include:

Low-income electrification/retrofit programs: Electrification programs that target low-income residents are the most cost-effective and potentially successful approach for equitable decarbonization to combat climate change.[17] For example, the Low-Income Weatherization Program (LIWP) is the state's first energy efficiency program that targets low-income Californians and has reduced energy bills in participating multifamily buildings by 30% and overall energy usage by an average of 40%.[18] A case study on a major energy retrofit in a Lancaster 100-unit low income multifamily complex resulted in a one-third reduction

---

[13] https://www.joe.org/joe/2009december/pdf/JOE_v47_6a6.pdf

[14] https://aceee.org/files/proceedings/2000/data/papers/SS00_Panel8_Paper10.pdf

[15] California Center for Sustainable Energy. 2009. Solar Water Heating Pilot Program: Interim Evaluation Report.

https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

[16] https://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf

[17] http://greenlining.org/wp-content/uploads/2019/10/Greenlining_EquitableElectrification_Report_2019_WEB.pdf

[18] California Housing Partnership Corporation and Association for Energy Affordability (2018). California's Cap-and-Trade-Funded Low Income Weatherization Program Multifamily: Impact Report, 3.

in natural gas use (approximately 145 therms per apartment).[19] The study also showed that such retrofits can result in increased tenant retention, improved health and comfort, and better ability to afford necessities like food, medicine, health care, and rent.

On-bill financing: A case study from affordable multi-family residential complexes in Santa Monica showed that electricity savings from the program ranged from 1,811-17,712 kWh and natural gas savings ranged from 914-2,567 therms, with overall energy improvement ranging from 10-35%.[20]

Energy efficiency retrofit programs (e.g. PACE, PG&E's low-income weatherization program, Million Watt Challenge, metered energy efficiency): While the use of carbon neutral electricity by 2045 due to SB100 ensures all-electric buildings have zero energy emissions, there is still a need to reduce energy consumption within Chico. Reducing energy consumption will reduce stress on the electricity grid, require less renewable energy generation to meet needs thereby saving resources, and help reduce energy bills within the community.

Action 7 is considered supportive to Actions 1 and 2 and therefore not quantified.

[19] https://ww2.energy.ca.gov/2019publications/CEC-500-2019-021/CEC-500-2019-021.pdf

[20] https://1p08d91kd0c03rlxhmhtydpr-wpengine.netdna-ssl.com/wp-content/uploads/2017/03/Santa-Monica-Test-Web.pdf

Measure E-4: Increase Generation and Storage of Local Renewable Energy

Action #	Action	Anticipated Reduction (MT CO2e)
1	**Coordinate with stakeholders to provide local energy generation support and incentives for the community:** Partner with PG&E and/or other stakeholders to support and incentivize local on-site energy generation and storage resources within the community with a focus on underserved communities. This could include a co-located community solar and storage project.	Supportive
2	**Streamline battery storage building permit requirements:** Coordinate City departments to establish and streamline battery storage building permit requirements to allow for easier implementation of these technologies within the community.	Supportive
3	**Conduct an energy generation feasibility study:** Conduct a feasibility study through the PG&E Sustainable Solutions Turnkey (SST) program to assess cost and applicable locations for installation of battery back-up systems, generators, or a micro-grid throughout the City. Engage with the community to determine how local energy generation systems can support community infrastructure as well as critical public infrastructure	Supportive
4	**Install renewable energy technology at municipal facilities:** Implement the comprehensive PG&E Sustainable Solutions Turnkey Program to install renewable energy technology at municipal facilities. Key energy conservation measures include: ▪ Increasing backup generation capacity and adding battery storage at City facilities ▪ Upgrading aeration systems at the Wastewater Treatment Plan to reduce energy consumption by 11% ▪ Upgrading and automating all City HVAC systems ▪ Installing solar PV at the Municipal Services Parking Lot to create 290 kW energy savings ▪ Replacing aging 1MW solar PV system at the Wastewater Treatment Plan, and adding an additional 738 kW of solar PV within the existing footprint to create a total of 1.75 MW energy savings ▪ Updating City-operated irrigation control system design and development City-wide.	Supportive

Action 1: Coordinate with stakeholders to provide local energy generation and storage support and incentives for the community

This action will support the overall transition to an electrified building stock at the lowest cost and with the most resilience. Distributed local energy generation and storage, such as on-site solar and storage batteries, can be used instead of traditional transmission and distribution infrastructure upgrades to help meet the increasing demand that electrification will put on the grid. While it's hard to know exactly how effective incentives for on-site solar and battery storage will be, current solar adoption trends in Chico indicate that these options are desirable for local business owners and homeowners alike.

Residential solar installations have demonstrated success in reducing emissions. A residential solar panel system has the capability of providing for the electricity needs of an entire home with about 80% lower carbon emissions than fossil fuels.[21] The largest barrier to residential solar is up-front installation costs[22], suggesting that utility-provided incentives would lead to installation increases. Battery storage can greatly maximize the benefits of renewable energy systems like solar PV. A recent 2019 study from the University of Michigan found that in California as a whole, adding 60GW of renewables could achieve

[21] https://nature.berkeley.edu/classes/es196/projects/2013final/ArifM_2013.pdf

[22] Ibid

72% CO_2 reductions with close to one third curtailment.[23] Adding energy storage technologies could increase this to 90% reduction and only 9% curtailment, under one modeled scenario.[24] While industrial and commercial battery storage will drive these reductions, residential energy storage will also play an important part in the effort to increase battery storage across the state. Residential energy storage is often more flexible and resilient than larger utility-owned systems because the network is well-distributed and has buy-in from both the utility and the owners/residents. [25] Residential energy storage exceeded utility-scale storage installations in the U.S. in 2018, reflecting the high value customers are placing on having their own storage systems.[26]

Action 2: Streamline battery storage requirements

To further support battery storage installation projects in the community, the City will work to streamline battery storage requirements to reduce the development barrier for these kinds of projects. While difficult to quantify direct GHG reduction effects of this action, it will still play a key role in the overall local energy generation goals of the measure.

Action 3: Conduct an energy generation feasibility study

An energy generation feasibility study will help the City to determine where and how to build local renewable energy to benefit the community. A feasibility study will provide information on what type of energy generation technology is available, at what cost, and for what purpose. The process of developing the feasibility study will also help the City identify potential stakeholders to partner with and funding sources to use in implementing an energy generation project. This action is currently being pursued through the PG&E Sustainable Solutions Turnkey Program.

Action 4: Install renewable energy technology at municipal facilities

While difficult to directly quantify the effects of this action on community-wide emissions, this action will allow the City to do its part in providing local energy generation and storage. City-driven energy generation and storage projects help local governments and their communities achieve substantial energy, environmental, resilience, and economic benefits.[27] Projects like these can also indirectly reduce community emissions by creating publicity and awareness around the issue.[28]

The City is currently working with PG&E through the Sustainable Solutions Turnkey (SST) program to achieve energy cost reductions and environmental stewardship goals. Past projects with the SST program include a significant LED retrofit project in 2016 (estimated to save 519,725.75 kWh annually) and a preliminary energy assessment of City facilities in 2018. Ten preliminary projects have been identified to pursue through the SST program, including expanding the existing one-megawatt solar array at the wastewater treatment plant (the wastewater treatment plant accounts for 45% of electricity usage at the City), and adding backup generation capacity and battery storage. The City is also currently working on

---

[23] Curtailment occurs when more power is produced than needed at a given time, leading to energy losses

[24] http://css.umich.edu/publication/role-energy-storage-deep-decarbonization-electricity-production

[25] https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/how-residential-energy-storage-could-help-support-the-power-grid

[26] Ibid

[27] https://www.energy.gov/sites/prod/files/2017/02/f34/onsiterenewables508.pdf

[28] https://www.energy.gov/sites/prod/files/2017/02/f34/onsiterenewables508.pdf

identifying paths towards potential projects to become a zero net energy organization, meaning the City would generate or offset its complete annual energy usage and would not incur any electrical utility costs. In 2019, the City moved forward with phase three of the SST program and entered into a contract with PG&E for an investment grade audit (IGA). The IGA is an in-depth evaluation providing further calculations, implementation costs of each project, identifying eligible utility rebates and incentives, confirming energy savings, and producing 30% engineering design documents. The City will make a final decision on which of the ten identified projects to move forward on during phase four of the SST program. As part of the decision electrification and achievement of the long-term carbon neutrality target will be considered.

4 Transportation

Reducing transportation emissions and becoming a carbon neutral City means reducing the number of miles driven by fossil fuel-powered vehicles, particularly passenger vehicles, which account for 98% of gasoline usage in the Butte County region.[29] Chico has set a target of 35% reduction in transportation fuels by 2030 and will accomplish this through the following measures:

- Measure T-1: Improve Active Transportation Infrastructure to Achieve Greater Than 6% Bicycle Mode Share by 2030 and 12% Bicycle Mode Share by 2045
- Measure T-2: Improve EV Infrastructure to Achieve Greater Than 23% EV Share of Car Registrations by 2030, and 90% by 2045
- Measure T-3: Improve Shared Mobility and Transit Programs and Infrastructure
- Measure T-4: Implement Parking and Curb Management Procedures that Support the Mode Shift Goals of the Overall Transportation Strategy
- Measure T-5: Support Implementation of the City's General Plan that Promotes Sustainable Infill development and Mixed-use development in New Growth Areas to Reduce Vehicle Miles Traveled (VMT)

The City's transportation strategy consists of a multi-pronged approach for incentivizing alternatives to fossil fuel-powered vehicle trips, including shifting transportation mode share to active transportation and public transit options, especially biking, through Measures T-1 and T-3; then electrifying to the greatest extent possible the remaining passenger vehicle trips through Measure T-2. Measures T-4 and T-5 will further maximize the effects of Measures T-1, T-2, and T-3.

To successfully achieve a greater than 6% mode shift to active transportation (Measure T-1), the City must provide low stress and convenient infrastructure and prioritize active transportation movement. Infrastructure needs including bikeways, sidewalk improvements, and expansions of both kinds of infrastructure to all areas of the City. Once the infrastructure is available and stress/comfort is not an issue, comparison with other cities around the world suggest more people will choose active transportation.

Improving shared mobility and transit programs and infrastructure through Measure T-3 will also help to shift mode share to public transit. To do this the City must work with its partners, including BCAG/Butte Regional Transit, to expand service lines and increase the convenience of transit by reducing the time it takes to reach a destination via transit as well as reducing wait times (headways) for transit. By making transit more convenient and making decisions to prioritize transit over single occupancy vehicles Chico will begin to shift towards shared transit.

While the City cannot require its residents to buy ZEVs and electrify remaining passenger vehicle trips, Measure T-3 will ensure the infrastructure and support is present in the City to begin to remove present barriers to ZEV adoption.

Finally, Measure T-4 will help create behavior disincentives for owning a fossil fuel-powered vehicle through dynamic parking pricing, improved curbside management, and overall support for active transportation and ZEVs in place of fossil fuel-powered transportation. Measure T-5 will provide the long-term planning and development framework that will continue to make Chico as a whole highly accessible

[29] CARB EMFAC2017 model.

for active transportation and public transit options. The details of each transportation measure, including their supporting actions and evidence of their GHG reduction potential, are included below.

Measure T-1: Improve Active Transportation Infrastructure to Achieve Greater Than 6% Bicycle Mode Share by 2030 and 12% Bicycle Mode Share by 2045

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Implement Chico Bicycle Master Plan:** Implement the Chico Bicycle Plan 2019 Update in accordance with the Plan's goals, objectives, and policies. Implementation of the Plan may include: ▪ Adding additional miles to the bikeway network ▪ Implementing new end-of-trip facilities and enforcement protocols to reduce bicycle theft ▪ Conducting road repairs and road maintenance ▪ Improving/expanding wayfinding, safety, and comfort ▪ Integrating with transit and other transport modes ▪ Conducting promotion and education around biking in Chico ▪ Identifying and competing for funding sources	2030: 1,530 2045: 1,500
2	**Require shaded and convenient bike parking:** Require shaded Park-a-Bike style rack or equivalent when installing bike parking in new developments.	Supportive
3	**Require major road upgrades to include bicycle infrastructure:** Require major road upgrades to include bicycle infrastructure and its maintenance unless a significant cost/feasibility issue is shown. Update Title 18 Standard Details on each roadway section type to include the applicable bikeway modifications such as Type II lanes and buffered bikeway.	Supportive
4	**Perform a street/intersection study:** Conduct a street/intersection study to identify streets and intersections that can be improved for pedestrians and bicyclists through traffic calming measures and/or where multi-use pathway opportunities exist to increase active transportation.	Supportive
5	**Complete an Active Transportation Plan:** Develop and implement an Active Transportation Plan (consistent with the General Plan) that identifies funding strategies and policies for development of pedestrian, bicycle, and other modes of alternative transportation projects. Work with the City's bike/ped working group to identify high priority areas. Example improvements include: ▪ Pave shoulders of streets that have high traffic counts ▪ Separate bike lanes from motor traffic with concrete bumper blocks or better ▪ Establish a safe east-west connection over highway 99	Supportive
6	**Identify and partner with stakeholders to conduct outreach, promotion, and education:** Leverage partnerships with stakeholders to conduct ongoing outreach, promotion, and education around active transportation in Chico. This could include: ▪ Establishing City-wide events or programs that promote active transportation in the community ▪ Regularly updating the City's Bicycle and Pedestrian Network Map and sharing through City and stakeholder partnership platforms ▪ Supporting Chico Velo in hosting workshops and classes on bike riding, safety, and maintenance by certified instructors ▪ Instituting car-free days downtown, potentially coupled with Farmer's Market or other large and regular events ▪ Consolidating a list of local employer-provided bicycle parking, lockers, showers, and incentives as a demonstration tool for other interested employers	Supportive
7	**Create a Bike/Ped/Parking Coordinator Position:** Create a Bike/Ped/Parking Coordinator position for the City to ensure implementation of active and shared mobility measures.	Supportive

Action 1: Implement Chico Bicycle Master Plan

The overall goal of the Chico Bicycle Master Plan is to continue making Chico a more bike-friendly community, where people of all ages and abilities feel comfortable and safe choosing bicycles for transportation needs. Implementing the Chico Bicycle Master Plan 2019 Update will consist of coordinating City departments with stakeholders (e.g., Chico Velo, CUSD, Butte County, and frontline communities) to accomplish the following:

- Adding approximately 140 miles to the bikeway network based on a list of 250 prioritized projects and regular community outreach and feedback with the goal of improving connectivity throughout Chico between residential areas (especially low-income neighborhoods), schools, transit stations, recreational areas, and other key destinations
- Designing and implementing an effective network-wide wayfinding system
- Continuing current maintenance programs (e.g., monthly sweeping of all bikeway facilities and the Right-of-Way Hotline) and implementing new ones (e.g., Adopt-a-Trail program with Chico Velo, prioritizing key bike routes for paving)
- Improving safety on bike paths with regular maintenance, lighting, and video cameras, by supporting development of the Butte County Bicycle Ticket Diversion program, developing programmatic enforcement procedures, and providing bicycle safety education programs in partnership with stakeholders
- Improving comfort on bike paths by providing for and maintaining shaded routes where possible
- Improve and increase end-of-trip facilities such as secure, shaded, and well-lit bicycle parking by working with partners/stakeholders and using the permitting process for new development. The City will make bike lockers at City Hall usable for the public and add bike locker facilities at off-street parking lots
- Working with Butte Regional Transit, Greyhound Bus, and Amtrak's Coast Starlight to integrate with transit and other transport modes to address the first/last mile challenge
- Partnering with stakeholders (e.g., CUSD, Chico Velo) to promote and encourage biking in Chico.
- Identifying and competing for available funding sources for bicycle projects

A complete description of the goals, strategy, policy, and implementation framework for expanding and improving Chico's bikeway network is included in the Chico Bicycle Master Plan 2019 Update. The Plan will be updated every three years to ensure improvement projects are correctly prioritized and the Plan continues to meet grant funding requirements.

Fully implementing the Bicycle Master Plan is expected to increase bicycle mode share from 6% in 2017 to 12% in 2030. In order to estimate the mode shift potential associated with implementing the Bicycle Master Plan, other cities with similar buildouts were compared. Currently the City of Davis has a bike network similar to what Chico would have at full implementation. Davis currently has a 20% mode share.[30] Therefore, an increase in mode share from 6% to 12% is considered conservative. Emission reduction calculations assumed the average bike trip length was 1.5 miles[31] and used model results from EMFAC to characterize gasoline usage in Chico.

Calculations

[30] https://www.theguardian.com/cities/2015/aug/03/davis-california-the-american-city-which-fell-in-love-with-the-bicycle

[31] Caltrans California Household Travel Survey (2013)/CARB Bike Path Reductions Technical Documentation (2019)

Year	2030	2045
Mode share shift[1]	6%	6%
Average passenger car mileage (mpg)[2]	32	38
Gasoline usage (gallons)[3]	14,701,198	13,554,245
Estimated % of gasoline that is used for passenger vehicles (EMFAC)[2]	98.0%	99.7%
Passenger vehicle gasoline usage	14,400,705	13,507,979
Estimated trips/gallon gasoline for passenger vehicles (EMFAC)[2]	4.32	5.37
Estimated passenger vehicle trips	62,157,314	72,471,010
New bike trips substituted for vehicle trips	3,729,439	4,348,261
New bike trips substituted for vehicle trips (miles) [4]	5,594,158	6,522,391
Gasoline avoided from switch to bikes (gallons)	174,242	171,083
Total Reductions (MT CO_2e)	**1,531**	**1,504**

[1] Chico Bicycle Master Plan Update (2018) projects that Chico will achieve a 12% bicycle mode share by 2030 assuming the plan is fully implemented. As Chico is currently at 6% bicycle mode share, the remaining mode share shift in 2030 and 2045 is expected to be 6%.
[2] Derived from EMFAC model output for Butte County 2030 and 2045
[3] Values from forecast. See Appendix A.
[4] Assume the average bicycle trip is 1.5 miles. Caltrans California Household Travel Survey (2013)/CARB Bike Path Reductions Technical Documentation (2019)

Action 2: Require shaded and convenient bike parking

High quality bike parking leads to increased comfort for bikers, making it easier for residents to choose biking as a primary method of transportation. Shaded bike parking is important in areas subject to high temperatures, like Chico. Park-a-bike style racks are often preferred by cyclists because they facilitate better bike security.

Action 3: Require major road upgrades to include bicycle infrastructure

Including bicycle infrastructure at the time of major road upgrades significantly decreases the cost of installation. This action is included as a best practice to decrease the cost burden on the City and further facilitating its timely implementation of the Bicycle Master Plan.

Actions 4 & 5: Perform a street/intersection study & complete an Active Transportation Plan

Performing a street/intersection study will provide the necessary traffic pattern information and firsthand feedback from the community to better identify and eliminate the hurdles which keep people from walking and biking. This information can be used to complete an Active Transportation Plan – a key recommendation of the Chico Bicycle Master Plan to integrate bicycle, pedestrian, and transit planning in Chico. These actions would be undertaken in coordination with the City's bike/ped working group, which has already identified some high-priority projects.

Currently, the engineering department is applying for a grant to update all 106 traffic signals throughout the City to smart technologies. The grant would replace the hard and software of traffic lights to an Intelligent transportation system (ITS). The system adapts to peak demand times to increase traffic flow and reduce idling between 20-50%. Roundabout on East Avenue and Wildwood Avenue leading to Upper Park Road was completed in 2011. The City is also looking into installing a flashing yellow arrow pilot project on 5th and Mangrove. Flashing yellow arrows have been proven to be more easily and intuitively understood by drivers. The City has also completed a number of roundabout installation projects and has identified funding for more. Roundabouts improve safety and reduce vehicle emissions by eliminating engine idling times at red lights.

Improving active transportation networks is an important part of building Complete Streets – streets that accommodate bikes, cars, shared transit, and pedestrians in an accessible way. Nationally, 16.4% of vehicle trips were one mile or less in 2017, a distance easily travelled by foot or bicycle. An improved and expanded pedestrian network is the most effective and direct approach for shifting those shorter vehicle trips to walking, and studies show that distance to destinations is one of the strongest predictors of walking as a mode choice. However, not much research has been conducted to determine quantitatively how improving the pedestrian network translates to increased pedestrian mode share. This is further complicated by the fact that while improved pedestrian networks almost always have a positive correlation with increased walking, that does not always translate to decreased VMT. In other words, increased walking does not mean that walking trips are replacing driving trips. One study from 1993 looked at how improving a pedestrian network affected the number of vehicle miles travelled in Portland, OR in 1985 and found that a 1% increase in the pedestrian network was associated with a 0.14% decrease in number of vehicle trips travelled.

Action 6: Identify and partner with stakeholders to conduct outreach, promotion, and education

Providing education on the benefits of active transportation as well as technical information such as trip planning, incentives and other programs will help generate momentum around active transportation and support the overall measure. The City currently runs a program that provides a $50 credit for City employees who bike to work and coordinates with Chico Velo to run a Bike-to-Work month. The additional promotional activities identified under this action will continue to build these kinds of programs.

Action 7: Create a Bike/Ped/Parking Coordinator Position

A bike/ped/parking coordinator position has been discussed for multiple years by City staff, to help coordinate active transportation promotional and education programs and work with the Bike & Ped working group as well as other City partners and stakeholders. This action is supportive to the overall measure and particularly supportive to Action 6.

Measure T-2: Improve EV Infrastructure to Achieve Greater Than 23% EV Share of Car Registrations by 2030, and 90% by 2045

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Increase privately owned EV charging infrastructure:** If not already required by the State's Building Energy Efficiency Standards, consistent with the Final Butte PEV Readiness Plan, amend the City's Building Code by 2023 to require the following: ▪ EV capable private garages for new single-family and duplex residential development ▪ 20% EV charging capable spaces and panel capacity for new multi-family residential development ▪ 20% EV charging capable spaces for new commercial development ▪ At least 1% working EV charging spaces for all new development and major retrofits	2030: 28,620 2045: 105,500
2	**Increase publicly accessible EV charging infrastructure:** Work with public and private partners to ensure there are at least 942 publicly accessible DCFC and Level 2 EV chargers with the City's Sphere of Influence, with a focus on providing access to low-income households and affordable housing by 2030. Prioritize locations based on analysis in the Final Butte PEV Readiness Plan.	
3	**Increase City-owned EV charging infrastructure:** Install new publicly accessible EV chargers at City-owned facilities. Develop and implement a fee for use of City-owned chargers to encourage efficient use and turnover, especially for those without home charging capability. Allocate parking fee revenue towards projects that support EV infrastructure, alternative fuel projects, and active transportation projects.	
4	**Identify and partner with stakeholders to develop ZEV-related rebates:** Investigate partnerships with public and private stakeholders to develop rebates on at-home electric circuits, panel upgrades, and Level 2 chargers.	Supportive
5	**Encourage EV adoption and infrastructure improvements:** Conduct outreach, promotion, and education to encourage EV adoption and infrastructure improvements. This could include the following: ▪ Providing education and outreach to the community on the benefits of ZEVs, availability of public charging, and relevant rebates and incentives available for businesses and residents ▪ Working with major employers (e.g., CSUC, Fifth Sun, Build.com, Enloe) to provide EV charging for employees and encourage EV adoption among employees	Supportive
6	**Establish electrical and technical standards for electric vehicle supply equipment (EVSE).** EVSE standards to be established include construction of equipment, wiring methods, and safety protection, consistent with the California Electrical Code and the Underwriter's Laboratories guidance on EVSE.	Supportive
7	**Establish universal EV signage:** Establish universal signage and marking requirements for EV parking spaces.	Supportive

Action #	Action	Anticipated Reduction (MT CO_2e)
8	**Streamline the EVSE permitting and inspection processes:** Streamline both the EVSE permitting and inspection processes, which may include: ▪ Prioritizing EVSE permitting for faster turnaround times ▪ Establishing flat fees for standard installations ▪ Enabling homeowners and licensed contractors to submit EVSE permit applications online ▪ Allowing EVSE across different zoning classifications ▪ Considering simple EVSE installations as exempt from CEQA on a case-by-case basis ▪ Allowing installation of EVSE as a mitigation measure for large projects ▪ Condensing inspections for more complex installations that do not include panel upgrades or underground conduit ▪ Establishing a 24-hour flexible inspection request program online ▪ Providing shorter inspection windows ▪ Removing requirement for electrician to be present during inspection to decrease consumer costs	Supportive

[1] EV = electric vehicle

[2] EVSE = electric vehicle supply equipment

Actions 1, 2, and 3: Increase privately owned, publicly accessible, and City-owned EV charging infrastructure

Actions 1, 2, and 3 together will provide the primary mechanism through which the City of Chico will encourage electric vehicle (EV) adoption within the community. The state has established a goal of putting 5 million EVs on the road by 2030. However, the recent passing of executive order N-79-20 calls for 100% of passenger vehicles to be all electric by 2035. This new executive order puts the total number of EV's on the road by 2035 at approximately 15 million.[32] Based on the current number of vehicles registered in California and a 2% growth rate per year, 15 million EV's accounts for 35% of total vehicles in 2035. Interpolating between todays EV percentage (5%) gives us an expected EV adoption rate of 25%. The City has established its own goal in line with this and aims to reach 23% EV adoption by 2030 and 90% by 2045. Chico currently has 299 electric vehicles and 311 plug-in hybrid vehicles out of 86,548 currently registered, accounting for 0.7% of the vehicles registered within the City.[33] If EV adoption rates are outpacing EV charging infrastructure, adjustments can be made over time to reflect total EVs as well as charging technologies and consumer behaviors.

While the City cannot require residents to buy and use ZEVs rather than gas-powered vehicles, the City will take actions to incentivize this behavior change and support this level of EV adoption. The City's primary target to achieve this measure is to provide one public EV charger for every 20 EVs and ensure as many privately owned chargers are installed in new development as practicable, in line with the leading Cities in California (San Francisco, Los Angeles, and San Jose) and recent charging infrastructure studies. Since the City of Chico already has 12 existing public charging stations with another 4 funded, 942 new public chargers are needed to meet the forecasted demand by 2030. The need for charging infrastructure may change over time, depending on new technologies such as smart chargers and trends in personal EV

[32] https://spectrumnews1.com/ca/la-west/transportation/2020/10/05/what-it-will-take-to-sell-100--evs-in-california

[33] https://www.dmv.ca.gov/portal/uploads/2020/09/MotorVehicleFuelTypes_City_01012020.pdf

adoption. The City will continue to monitor the most recent research on EV infrastructure needs and update long-term goals as necessary.

Action 1: This action will account for the majority of the targeted number of EV chargers in 2025 and 2030. EV-ready building codes are one of the most effective and low-cost strategies for states and local governments to encourage consumers to buy or lease electric vehicles and can save consumers thousands of dollars in installation costs.[34]

Actions 2 & 3: The City of Chico currently hosts 12 publicly available EV charging stations, with an additional 4 installations in the works. In the City, public charging stations are clustered along the Hwy 99 corridor, with a new Level 2 charging station opening at the new CA Hwy Patrol offices at Hwy 99 and Southgate Avenue. Chico has DC Fast Charging Stations at 3 locations; Butte College Skyway Center, Chico Nissan Cohasset Rd, and Sierra Nevada Brewing Company. Additional Level 2 public charging stations are located at Sierra Nevada Brewing Company, Butte College Chico Center, Oxford Suites on Business Lane, Enloe Medical Center parking garage on the Esplanade, Chico Volkswagen on Main Street, CSUC on Cherry Street, Sun Valley Acoustical on Ivy Street, and Alternative Energy Systems at Hwy 99. In addition to increasing EV charging infrastructure, Chico has committed to replacing fleet vehicles with electric vehicles when feasible.

The Public Works Department established a fee to recover the costs for use of City-owned EV charging units at the rate of 0.2$ per Kilowatt hour. This fee will be used to maintain the charging units and to cover electricity costs. While not directly quantifiable, EV charging fees will increase turnover at charging stations, helping to promote equitable access to EV charging infrastructure and encourage widespread EV adoption across a greater demographic range.

The next phase for electric vehicle supply equipment (EVSE) expansion will provide additional publicly accessible charging. Emission reductions from Actions 1, 2, and 3 were calculated together as emissions saved by meeting EV adoption goals in 2030 and 2045.

Calculations		
Year	**2030**	**2045**
Gasoline sales after mode shift to bikes (gallons)[1]	14,226,463	13,336,896
Emissions from gasoline (MT CO_2e)[2]	125,036	117,218
EV adoption[3]	23%	90%
Emissions from gasoline saved (MT CO_2e)	28,758	105,496
Average gas mileage (MPG from EMFAC)[4]	32	38
Average kWh/gallon of gas	11	13
Electricity EF (MT CO_2e/kWh)[5]	0.0000040	0.0000000
Emissions from electricity usage for EVs	142	0
Total Reductions (MT CO_2e)	28,616	105,496

[34] https://www.swenergy.org/cracking-the-code-on-ev-ready-building-codes

[1] Gasoline sales from forecast (see Appendix A) minus gasoline avoided from mode shift to bikes
[2] Based on an emission factor of 0.008789 MT CO_2e/gallon gasoline, as established in Appendix A
[3] Based on executive order N-79-20 100% of passenger vehicle sales will electric by 2035. Assuming 15 million EV's by 2035 due to N-79-20 and a 2% growth rate from current vehicle registrations (32,000,000) and a 5% current share of EV's California would be projected to have 25% EV's by 2030. 23% is therefore a more conservative estimate in line with State goals. (https://spectrumnews1.com/ca/la-west/transportation/2020/10/05/what-it-will-take-to-sell-100--evs-in-california)
[4] Derived from EMFAC model output for Butte County 2030 and 2045
[5] The residential electricity emission factor was calculated based on opt-out rates for different CCA customers. See Measure E-3 for further details on this calculation.

The number of new public chargers needed to support Chico's EV adoption goals were also calculated, based on 2020 vehicle registration data from the DMV and the assumption that one public charger should be available for every 20 EVs, taking into account the 12 built and 4 funded public EV charging stations already in the City. Total registered vehicles were forecasted based on the 2020 ratio of registered vehicles to population.

EV Charger Count Calculations		
Year	**2030**	**2045**
Population[1]	107,712	116,420
Total registered vehicles[2]	83,315	90,051
Registered EV goal[3]	19,162	81,046
EV's per Charger[4]	20	20
New public EV chargers needed[5]	942	4,036

[1] Values from forecast. See Appendix A.
[2] Based on a calculated value for cars for capita (0.773) derived by dividing the total number of registered vehicles in Chico in 2020 (https://www.dmv.ca.gov/portal/uploads/2020/09/MotorVehicleFuelTypes_City_01012020.pdf) by the 2020 population of Chico as established in Appendix A.
[3] Calculated as total registered vehicles multiplied by EV adoption percentage in above table
[4] https://theicct.org/sites/default/files/publications/US_charging_Gap_20190124.pdf
[5] Based on the assumption that approximately one public EV charger is needed per 20 EVs, taking into account the existing 16 EV chargers already in Chico. This assumption may change over time due to better technology, changes to consumer behavior, or both. The total number of chargers especially in 2045 will need to be revisited to ensure the numbers reflect the current EV landscape[35]

Action 4: Identify and partner with stakeholders to develop ZEV-related rebates

The primary barrier to EV adoption is consumer costs related to the purchase of the vehicle and associated home charging equipment. Developing ZEV-related rebates in partnership with City stakeholders will shift the cost burden away from community members, encouraging higher EV adoption rates.

Action 5: Encourage EV adoption and infrastructure improvements

Providing information on existing and future programs, incentives, resources, and benefits of electric vehicle adoption to the community will increase adoption and contribute to the overall goal of EV adoption in the City. The City will encourage EV adoption and infrastructure improvements through a coordinated education, promotion, and outreach campaign. Educating the community on the benefits of EVs and partnering with stakeholders to provide more targeted outreach to specific community groups will support the overall goals of the measure. To facilitate the installation of EVSE by residents, Chico will

[35] https://theicct.org/sites/default/files/publications/US_charging_Gap_20190124.pdf

additionally develop guidance documents that summarize local building code and permitting requirements related to EVSE installation, to be provided online

Action 6: Establish electrical and technical standards for EVSE

The Final Butte PEV Readiness Plan recommends that local agencies establish electrical and technical standards for EVSE, including construction of equipment, wiring methods, and safety protection. Relevant standards can be found in the California Electrical Code and the Underwriter's Laboratories guidance on EVSE. This measure ensures that Chico will have clear guidelines and standards in place for installing EVSE infrastructure.

Action 7: Establish universal EV signage

The Final Butte PEV Readiness Plan identifies clear, consistent, and visible EV signage as vital for ease of use and reduction of potential issues and conflicts associated with EV charging. The Readiness Plan recommends using standard signs and markings for EV charging stations and parking stalls contained in the California Manual of Uniform Traffic Control Devices to ensure signage consistency throughout the Butte County region.

Action 8: Streamline the EVSE permitting and inspection processes

Streamlining the permitting and inspection procedures for EVSE ensures reduced wait times and costs for new EV owners. Applying for a permit and waiting for an inspector can be time intensive and costly – as many as three separate visits by the installer may be required to apply for the permit, perform the work, and complete the inspection, and a fourth visit may be needed if the utility requires a separate inspection. To avoid this, the City will streamline the EVSE permitting and inspection process to further ease the burden on new EV owners and support the goals of the measure.

Measure T-3: Improve Shared Mobility and Transit Programs and Infrastructure

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Partner with BCAG to improve and expand transit within the City:** This could include: ▪ Expanded transit service, especially along transit priority corridors, and more frequent and reliable transit service. More frequent transit can begin to act as a shuttle, especially since downtown employees and CSUC students and faculty are eligible for free transit passes ▪ Improved and/or more efficient transit technology ▪ Improved service/communication through interactive service maps, app payments, and real time arrival info ▪ Increased active transportation access to transit stops ▪ Enhanced, comfortable stops and stations ▪ Education and outreach to the community on new and existing shared transit options ▪ Subsidized transit passes ▪ New electric hop-on hop-off trolley service through major points of interest (e.g., downtown, Bidwell Park, Bidwell Mansion, Sierra Nevada, fair grounds, Chico State)	Supportive
2	**Prepare for shared bike programs:** Conduct an active transportation share (e.g., bike-share, scooter-share) feasibility study. Update municipal ordinances to prepare the City for shared mobility programs in accordance with the Bicycle Master Plan and the Downtown Access Plan. Consider starting a bike share pilot program in Downtown, ideally with docked e-bikes.	Supportive
3	**New employer trip reduction programs:** Implement General Plan Action CIRC 9.1.2 to reduce single occupancy vehicle trips associated with work commutes. As a condition of project approval, require new non-residential projects that will employ more than 100 people to submit a Travel Demand Management Plan that identifies strategies to reduce single-occupancy vehicle trips, including encouraging employers to provide transit subsidies, bicycle facilities, alternative work schedules, telecommuting and preferential parking for carpool/vanpools.	Supportive
4	**Conduct a transportation equity study:** Partner with CSUC to conduct a transportation equity study to investigate current barriers for minority, low-income, and senior populations in disadvantaged communities to take transit, walk, bike, use rideshare, or carshare.	Supportive
5	**Conduct a local transportation survey:** Support BCAG in conducting local transportation surveys every five years to better understand the community's needs and motivation for traveling by car versus other alternatives such as by bike or bus. Use survey results to inform transit expansion and improvement projects.	Supportive
6	**Encourage and facilitate carsharing services:** Perform ongoing outreach to carsharing companies about the potential to implement a carsharing program in Chico, preferably electric.	Supportive
7	**Encourage use of local transit:** Promote use of B-Line for Downtown transit especially. This could include bus open houses and promotion of DoubleMap app	Supportive
8	**Invest in TDM strategies:** In accordance with the Downtown Access Plan, designate and use a portion of paid parking revenue to invest in TDM strategies including Actions T-3-1 to T-3-7 that will ensure cost-effective Downtown access by improving transit, bicycle facilities, and create incentives for people to avoid driving	Supportive

Action 1: Partner with BCAG to improve and expand transit within the City

In general, increases and improvements to public transportation systems reduce a city's dependence on fossil fuels and reduce VMT. The best ways to improve a transit system and reduce driving is to expand its

geographical reach and increase the frequency and reliability of transit service. Each new mile of transit usage replaces VMT on much more than a 1:1 basis. Approximately 1% increase in transit frequency saves 0.5% in VMT.[36] Bus Rapid Transit can also yield a corridor-level VMT reduction of 1-2%.[37]

In addition, effective communication, especially communication that takes advantage of new and emerging technologies to accurately and easily disseminate trip planning and real-time status information, is a strong factor in helping customers decide to use transit for business or leisure trips.[38] Further, improving transit access has the potential to shift trips from cars to transit, which may reduce vehicle trips, VMT, and greenhouse gas emissions, with time spent getting to a transit stop being the key indicator of transit access.[39] While difficult to directly quantify, improving transit stops and stations can contribute to improved transit access, and is therefore an important component of the overall measure.

Action 2: Prepare for shared bike programs

A 2019 report from the City of Santa Monica found that 49% of shared rideable trips replaced vehicle trips based on answers to survey questions.[40] A 2014 study from Utrecht University suggests that the car substitution rate of shared rideables is dependent on what proportion of trips are already taken by car in a city. [41] In the study, Minneapolis and Melbourne had between 70% and 76% vehicle mode share in 2014 and showed high rates of car mode substitution (19% to 21%) after shared rideables were introduced. On the other hand, London and Washington DC had between 36% and 46% vehicle mode share in 2014 and showed much lower rates of car mode substitution where shared rideables were introduced (2% to 7%). Sacramento and Santa Monica both had high vehicle mode share (83% and 72% respectively) before shared rideables were introduced, suggesting that the City of Chico would see a similar if not higher car substitution rate of shared rideables as Santa Monica and Sacramento. Both studies previously mentioned suggest that average trip duration of shared rideable trips is about 2 miles (this is seen consistently across the six diverse cities mentioned above) and appears to be largely independent of other city metrics.

An e-bike ride share program has the potential to be even more successful, as e-bike riders can go longer distances and are more accessible to non-riders. A study in Portland, OR found that a 15% e-bike mode share could result in a 12% reduction in transportation-related emissions.[42]

Action 3: New employer trip reduction programs

Requiring new projects to develop a transportation system management plan will help control expansion of passenger vehicle trips in the future and contribute to providing much-needed infrastructure for active transportation options as part of the cost of new projects. Newly construction office buildings or other places of work could also consider meeting these requirements through a telecommuting strategy. In light of the recent changes made to combat the spread of COVID-19, telecommuting has proven to be an implementable and effective strategy for reducing reliance on passenger vehicles. Continuing to leverage

---

36 https://www.smartgrowthamerica.org/app/legacy/documents/smartgrowthclimatepolicies.pdf

37 https://www.smartgrowthamerica.org/app/legacy/documents/smartgrowthclimatepolicies.pdf

38 https://transitleadership.org/docs/TLS-WP-Improving-the-Customer-Experience.pdf

39 https://ww3.arb.ca.gov/cc/sb375/policies/transitaccess/transit_access_brief120313.pdf

40 https://www.smgov.net/uploadedFiles/Departments/PCD/Transportation/SantaMonicaSharedMobilityEvaluation_Final_110419.pdf

41 http://mobility-workspace.eu/wp-content/uploads/Bike-shares-impact-on-car-use-3.pdf

42 https://www.sciencedirect.com/science/article/pii/S1361920920306696

the telecommuting and remote work lessons learned during the pandemic will allow the City of Chico to reduce transportation emissions well into the future.

Action 4: Conduct a transportation equity study

A transportation equity study would help ensure the actions supporting shared mobility are implemented in an equitable way. From an emission reduction perspective, this is important because it ensures the active transportation programs and infrastructure built going forward facilitates rather than inhibits all segments of the population to take part. Ensuring all residents can take part in these programs means maximizing GHG reduction benefits. From an equity perspective, it can increase transportation access for those who need it most and decrease the social burdens experienced by many frontline communities. Comprehensive equity analysis allows planners to better anticipate problems and incorporate equity objectives in planning.[43]

Action 5: Conduct a local transportation survey

Conducting local transportation surveys will help the City to better understand the community's needs and motivations for travelling by car versus other alternatives such as by bike or bus. This will allow the City to respond dynamically to the needs of the community and optimize active transportation projects. The surveys will also help inform the evolving list of projects included as part of the Bicycle Master Plan.

Action 6: Encourage and facilitate carsharing services

Research from the Transportation Sustainability Research Center at the University of California Berkeley shows that car share programs lower vehicle ownership and overall VMT.[44] While a majority of car share members use the program to add or replace vehicle trips (leading generally to small VMT increases), a minority of members (2-5%) use car share as a replacement for vehicle ownership (leading generally to larger VMT reductions). The net effect is overall decrease in vehicle ownership, VMT, and ultimately GHG emissions. Approximately one car share vehicle replaces seven to eleven cars and VMT is reduced, on average, between 6% to 16% per car share household assuming one-way usage.

Action 7: Encourage use of local transit

Encouraging use of local transit could help shift Chico residents away from passenger vehicles and increase transit mode share. The City currently partners with BCAG to subsidize transit passes for employers and employees who work or live within the Central Business District of Chico. Bus passes are also provided to City of Chico employees and CSUC staff and students. This will be especially effective when combined with improvement and expansion of transit services, as described under Action 1.

Action 8: Invest in TDM strategies

This action will help provide funding for the other actions under Measure T-3.

[43] https://www.vtpi.org/equity.pdf

[44] http://innovativemobility.org/wp-content/uploads/2016/07/Impactsofcar2go_FiveCities_2016.pdf

Measure T-4: Implement Parking and Curb Management Procedures that Support the Mode Shift Goals of the Overall Transportation Strategy

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Utilize dynamic parking pricing Downtown:** In accordance with the Downtown Access Plan, utilize dynamic pricing for Downtown area parking, increasing costs of parking during times of high usage and special events.	Supportive
2	**Improve curbside management:** Improve curbside management in accordance with the Downtown Access Plan. This may include updating the Municipal Code to require active loading only, prohibit double parking, define locations for additional loading zones, and design loading zone signage.	Supportive
3	**Encourage parklets downtown:** Identify opportunities for development of parklets throughout the City's Downtown, to replace parking spaces with bike parking or outdoor restaurant seating.	Supportive
4	**Establish carpool/vanpool/shuttle parking minimums:** Update the Zoning Code to establish minimums for carpool/vanpool/shuttle parking requirements in new non-residential development.	Supportive

Action 1: Utilize dynamic parking pricing Downtown

Curbside management strategies can help shift cities towards sustainable citywide mobility without compromising space and business needs.[45] In San Francisco, a parking pilot program called SFPark instituted dynamic parking pricing for on-street parking and experienced a 30% drop in VMT for the area, 8% drop in traffic volume, and improved meter compliance and parking turnover.[46] In general, increasing the price to park is one of several related factors that can reduce VMT and promote mode switching.[47] This approach is more effective when combined with infill development, investments in alternative transportation, and travel demand management programs.

Action 2: Improve curbside management

Curb space is a major resource within the City serving multiple functions relating to mobility. By continuing to price curb space appropriately and preparing for a change to autonomous vehicles, the City of Chico can ensure the highest and best use of this limited resource.

Action 3: Encourage parklets downtown

Over the past 6 years, Chico has seen an influx of outdoor restaurant seating that has replaced parking spaces in downtown. Encouraging this type of expansion is not only good for businesses[48] downtown but reduces parking spaces to help the City reduce emissions from cars.[49]

---

45 https://nacto.org/wp-content/uploads/2017/11/NACTO-Curb-Appeal-Curbside-Management.pdf

46 https://www.ite.org/pub/?id=C2D66E96%2DFF01%2D0BA8%2D68C3%2D65CC9116A5AE

47 https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/f0016902-final-pricing-parking-management-to-reduce-vehicles-miles-travelled-pi.pdf

48 https://www.bloomberg.com/news/articles/2014-10-13/3-ways-that-turning-parking-spots-into-parklets-helps-businesses

49 https://www.scientificamerican.com/article/reducing-parking-cut-auto-emission/

Action 4: Establish carpool/vanpool/shuttle parking minimums

Establishing parking minimums for carpool, vanpool, and shuttles in new non-residential development can incentivize shared transportation and encourage a shift away from single passenger vehicles.

Measure T-5: Support Implementation of the City's General Plan that Promotes Sustainable Infill development and Mixed-use development in New Growth Areas to Reduce Vehicle Miles Traveled (VMT)

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Support infill growth:** Continue to support infill growth and thoughtful mixed-use development in new growth areas consistent with the Chico 2030 General Plan and the regional Sustainable Communities Strategy.	Supportive

Action 1: Support infill growth

While not easily quantifiable, infill growth that increases density within areas of the community that provide multiple services and better access to jobs can help reduce per capita emissions in those areas due to reduced VMT. This is especially effective if paired with affordable housing policies and programs, as this allows a greater portion of the population to access high density areas and reduce their emissions. Affordable housing can therefore also help reduce suburban sprawl. A Berkeley study on carbon footprint planning suggests that a 10-fold increase in population density in central cities corresponds to 25% lower GHG emissions[50] due mostly to decreases in VMT. This can be substantially increased if efforts are additionally made to reduce suburban sprawl. Another study conducted by UC Davis found that a 10% increase in residential density would reduce VMT by 1.9%.[51] University of Waterloo performed a case study in Toronto to determine how quickly existing areas could be densified to meet minimum transit supportive density thresholds. The study found that 3.8 million additional residents could be residing in transit supportive environments if about 1.2 million units were added with current unit densities between 5 and 20 units per hectare. Given historic growth rates, units could be built within 34 to 95 years. Co-benefits of these action include increased stability and access to services for disadvantaged communities.

50 https://www.cogitatiopress.com/urbanplanning/article/view/1218/1218

51 https://www.sciencedirect.com/science/article/pii/S0191261510000536

5 Waste

Emission reductions in the waste sector are driven by compliance with SB 1383, which requires all jurisdictions in California to reduce organic waste disposal 75% and increase edible food recovery 20% relative to 2014 levels by 2025. CalRecycle has provided a suite of recommendations and requirements for complying with SB 1383, including the following:

- Conduct capacity planning and ensure there is adequate capacity and collection services to comply with SB 1383 requirements
- Increase organic waste collection services for all residents and businesses
- Implement an edible food recovery program for commercial edible food generators, with compliance beginning between 2022 and 2024.
- Adopt enforceable ordinances prior to 2022 to ensure that all organics generators and edible food generators are compliant
- Procure organic waste to meet or exceed organic waste product procurement targets for the City, as notified by CalRecycle by 2022
- Conduct education and outreach to all businesses, residents, and commercial edible food generators by 2022
- Monitor compliance beginning in 2022, conduct enforcement beginning in 2024, and maintain records of implementation

The main mechanism through which Chico will comply with SB 1383 is by updating waste hauler contracts and identifying and partnering with appropriate stakeholders to ensure requirements for organic waste reduction and edible food recovery are met (Measure W-1). The details of the measure, including its supporting actions and evidence of its GHG reduction potential, are included below.

Measure W-1: Update Waste Hauler Franchise Agreements to Implement Requirements of SB 1383 and Achieve 75% Reduction Below 2014 Levels in Organic Waste to 0.4 Tons of Waste/Person by 2025 and Maintain Through 2045

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Require residential and commercial organic waste collection through updated waste hauler contracts:** Update waste hauler contracts to include expanded organic waste collection. Pass an ordinance by 2022 requiring residential and commercial organics generators to subscribe to organics collection programs or alternatively report organics self-hauling and/or backhauling. Allow limited waivers and exemptions to generators for de minimis volumes and physical space constraints and maintain records for waivers/exemptions	2030: 7,690 2045: 7,690
2	**Require edible food recovery:** Adopt an edible food recovery ordinance or similarly enforceable mechanism to ensure edible food generators, food recovery services, and food recovery organizations comply with State requirements to increase recovery rates.	Supportive
3	**Partner with North State Rendering to expand use of the digester:** Work with North State Rendering to expand use of organics in the digester. Conduct a pilot to demonstrate effectiveness and identify funding sources for a larger expansion.	Supportive
4	**Conduct capacity planning for organic waste collection:** Engage in organic waste collection capacity planning by executing the following: ▪ Estimate Chico's disposal of organic waste in tons ▪ Identify and verify amount of available organics waste recycling infrastructure ▪ Estimate the amount of new or expanded capacity needed to process organic waste ▪ Work with the City of Chico's Recycling and Solid Waste Division and waste haulers to coordinate organic waste delivery to Recology's Oroville Transfer Station and Ostrom Road organics facility ▪ Develop and submit an implementation schedule highlighting planning effort to provide enough new or expanded organics capacity, including timelines and relevant milestones by the end of the report period Identify proposed new or expanded facilities that could be used for additional capacity	Supportive
5	**Conduct capacity planning for edible food recovery:** Engage in edible food recovery capacity planning by executing the following actions: ▪ Estimate the amount of edible food that will be disposed by organics generators in Chico ▪ Work with commercial food generators to reduce excess edible food generation ▪ Work regionally to establish a full list of food recovery organizations that can receive edible food from Chico businesses ▪ Identify proposed new or expanded food recovery capacity ▪ Identify the minimum capacity required to recover 20% of edible food that is estimated to be disposed ▪ If existing and planned capacity is insufficient based on the above process, the City of Chico must develop and submit an implementation schedule highlighting the planning effort to provide enough new or expanded capacity for increasing edible food donations and identify proposed new or expanded facilities to be used to for additional capacity	Supportive

Action #	Action	Anticipated Reduction (MT CO_2e)
6	**Develop and implement a partnered education and outreach program:** Update waste hauler contracts and partner with stakeholders (e.g., Recology, CSUC, Chico State, BEC) to develop and implement an education and outreach program around SB 1383: ▪ Coordinate with Recology's education and outreach personnel to expand on existing community outreach ▪ Conduct outreach and education at schools on composting, recycling, and waste reduction ▪ Provide education to the community on home composting techniques ▪ Inform organics generators/edible food generators on requirements to properly separate materials, organic waste prevention and on-site recycling, methane reduction benefits of composting, and information related to edible food donation ▪ Hold a compost give-away event for Chico residents ▪ Identify percentage of organics generators who are "limited English-Speaking households" or "linguistically isolated." If more than five percent (5%) of Chico's organics generators are defined as "limited English-speaking households" or linguistically isolated," provide education and outreach in a language or languages that will assure the information is understood by that community	Supportive
7	**Develop and implement an inspection and compliance program:** Update waste hauler contracts to implement an inspection and compliance program for the edible food recovery program and organics procurement program with defined enforcement mechanisms and penalties, to begin prior to 2024. Maintain records of compliance in accordance with SB 1383.	Supportive

Action 1: Require residential and commercial organic waste collection through updated waste hauler contracts

Requiring residential and commercial organic waste generators to subscribe to an organics collection program (provided through updated waste hauler contracts) is expected to provide the level of composting required to reduce Chico's organic waste disposal 75% below 2014 levels by 2025, one of the primary goals of SB 1383. Both waste haulers in Chico have been working diligently to expand composting services, and Recology has completed construction of a new facility at Ostrom Road. Chico residents are currently able to drop off yard and greenwaste at the composting facility at the airport. This action will capitalize on those efforts and expand them to meet the necessary composting capacity.

Chico sent almost 70,000 tons of municipal solid waste to the landfill in 2014 (see Appendix A), of which approximately 45% was organic (18% food, 17% mixed paper, and 9% yard waste).[52] Calculations assumed that emission reductions would come from diverting that waste to compost, decreasing the disposal emission factor to zero. In fact, the emission factor for composting those materials is negative, due to the carbon sequestration potential of compost, but these negative emissions were not credited to the City of Chico as carbon sequestration of the compost would occur at the location of procurement. For the purposes of emission calculations, landfill emission factors were assumed to be 0.388 MT CO_2e/ton for food, 0.334 MT CO_2e/ton for mixed paper, and 0.207 MT CO_2e/ton for yard waste.[53]

Calculations		
Year	**2030**	**2045**

[52] Percentages are state averages. https://www2.calrecycle.ca.gov/Publications/Download/1301

[53] Method for Estimating Greenhouse Gas Emission Reductions from Diversion of Organic Waste from Landfills to Compost Facilities (CARB, 2017)

Organics reduction from 2014[1]	75%	75%
Diverted food (tons)[2]	9,447	9,447
Diverted mixed paper (tons)[2]	9,082	9,082
Diverted yard waste (tons)[2]	4,802	4,802
Emissions from landfilling (MT CO_2e)[3]	7,693	7,693
Total Reductions (MT CO_2e)	**7,693**	**7,693**

[1] SB 1383 requires 75% reduction in organic waste from 2014 levels by 2025.
[2] Total diverted organic waste calculated as 75% of 2014 waste levels, as established in Appendix A (69,595 tons). Per CalRecycle, approximately 18.1% of organic waste is food, 17.4% is mixed paper, and 9.2% is yard waste. https://www2.calrecycle.ca.gov/Publications/Download/1301
[3] Assumes the emission factor is 0.338 MT CO_2e/ton for food, 0.334 MT CO_2e/ton for mixed paper, and 0.207 MT CO_2e/ton for yard waste per *Method for Estimating Greenhouse Gas Emission Reductions from Diversion of Organic Waste from Landfills to Compost Facilities* (CARB, 2017)

Action 2: Require edible food recovery

An edible food recovery ordinance will provide an enforceable mechanism through which the City can help organics generators meet the edible food recovery requirements of SB 1383. Jurisdictions are responsible for implementing an edible food recovery program for commercial edible food generators. This means ensuring that there are edible food recovery organizations that have enough capacity and collection services, which will be accomplished through implementation of Action 6. Commercial edible food generators must recover for human consumption the maximum amount of their edible food that they would otherwise dispose of in landfills by making written agreements with food recovery organizations or services to accept this food instead. "Tier One" food generators — supermarkets and large grocery stores, food services providers, food distributors and wholesale food vendors — must comply beginning January 1, 2022. "Tier Two" food generators — large restaurants, hotels with an on-site food facility and 200 or more rooms, health facilities with an on-site food facility and 100 or more beds, large venues and large events, state agencies with large cafeterias and local educations agencies with on-site food facilities — have until January 1, 2024 to comply.

CalRecycle currently does not have an estimate for what percentage of the California waste stream is edible, therefore the effects of this action have not been quantified but characterized as supportive. However, CalRecycle estimates that every 2 ½ tons of edible food recovered is the equivalent of taking one car off the road for a year.[54]

Action 3: Partner with North State Rendering to expand use of the digester

North State Rendering is located in Oroville, CA and manages the anaerobic digester at the old rendering plant. Digestate is currently being buried at the landfill, leading to avoidable emissions. Anaerobic digestion can help develop clean energy sources and reduce GHG emissions.[55] Anaerobic digestion systems capture methane from feedstock that might otherwise be released into the atmosphere as a potent gas. The captured methane can then serve as an energy source to produce heat or generate electricity. The main barrier to expanded use of the digester is the high capital costs to operate it, which may be offset by grant opportunities. California offers credits through its Low Carbon Fuel Standard program that could provide funding for this type of project.

[54] https://www.calrecycle.ca.gov/blogs/in-the-loop/in-the-loop/2020/03/02/yolo-county-edible-food-recovery-kick-off

[55] https://www.everycrsreport.com/reports/R40667.html

Actions 4 & 5: Conduct capacity planning for organic waste collection and edible food recovery

SB 1383 requires jurisdictions to conduct capacity planning around SB 1383 to ensure organics recovery and edible food recovery targets can be reasonably met. Conducting capacity planning will help the City develop an implementation plan for SB 1383 and provide information for discussions with waste haulers and other stakeholders, providing support for the GHG reductions expected from overall measure implementation.

Action 6: Develop and implement a partnered education and outreach program

While this action will not lead to direct GHG emission reductions, it is an important component of the strategy behind Measure W-1 and will help maximize the success of direct GHG reduction actions such as Actions 1 and 2. For example, education and outreach around composting and food waste reduction can provide the information needed by residents to start a home compost pile and/or reduce their overall waste. Providing these materials in English and Spanish will further the impacts of this action.

Action 7: Develop and implement an inspection and compliance program

Conducting inspection and compliance activities around the requirements of SB 1383 will help ensure the community is doing its best to achieve the desired organics waste reduction and edible food recovery targets, thereby supporting the GHG emission reductions inherent to Actions 1 and 2.

6 Sequestration

A carbon neutral future includes carbon sequestration mechanisms which take carbon out of the atmosphere. The best technology cities have for achieving higher rates of carbon sequestration is through increasing the urban tree canopy by planting more trees and greenscaping. The CAP measures supporting this goal will do just that – increase carbon sequestration through greenscaping programs:

- Measure S-1: Increase Carbon Sequestration by Increasing urban Canopy Cover at Least 10% by 2030 Through New Greenscaping Programs
- Measure S-2: Develop and Implement the urban Forest Master Plan

The details of each action supporting the carbon sequestration measures and evidence of their GHG reduction potential are included below.

Measure S-1: Increase Carbon Sequestration by Increasing urban Canopy Cover at Least 10% by 2030 Through New Greenscaping Programs

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Implement Chico's Urban Forest Revitalization Program:** Implement the Urban Forest Revitalization Program to plant 700 trees by March 2022 (adopted) and 4,500 trees by 2030 (new goal). Focus on areas of the City with low tree canopy cover based on canopy map and optimize carbon sequestration through management of the existing urban forest.	2030: 261 2045: 261
2	**Increase greenspace in Chico:** Identify and participate in partnership opportunities necessary to convert public and private spaces into water efficient greenspace and increase the City's carbon sequestering greenspace by 2030.	Supportive
3	**Improve greenspace management to maximize carbon sequestration:** Improve management of public open space and park lands, including use of compost, to maximize carbon sequestration. Through permit review, evaluate and ensure that landscaping plans utilize native species identified in the Urban Forest Management Plan where feasible.	Supportive
5	**Require shade trees in new major developments:** Require new development to include shade trees for enhanced energy savings, provided it would not interfere with solar installation. Tree species and location would be determined in coordination with the City's Urban Forester. Street tree planting shall also be required for all new single-family subdivisions	Supportive

Action 1: Implement Chico's Urban Forest Revitalization Program

Chico's Urban Forest Revitalization Program identifies the goal of planting 700 trees by March 2022 in currently identified low-income communities with low tree canopy cover. Action 1 extends the goals of this program with the additional goal of planting 4,500 trees by 2030. As of September 2020, the City has identified approximately 9,000 tree planting locations in its Right-of-Way, suggesting that an even higher tree planting goal could be set for 2045. Emission reduction calculations associated with this action assume that both the 2022 and 2030 tree planting goals will be met, and that the carbon sequestration potential for seedlings averaged over 40 years is about 0.058 MT CO_2e per tree per year. This number is an average of the 40-year carbon sequestration potential for four common tree species already being planted in Chico: red oak, black tupelo, valley/white oak, and red maple.[56]

Calculations		
Year	**2030**	**2045**
Trees Planted[1]	4500	4500
Total Reductions (MT CO_2e)[2]	**261**	**261**

[1] Per the City's Urban Forest Revitalization Program
[2] Assuming a carbon sequestration potential of 0.057979 MT CO_2e/tree/year; an average of four common municipal tree types (red oak – 0.05268 MT CO_2e/tree/year, black tupelo – 0.03816 MT CO_2e/tree/year, valley/white oak – 0.08466 MT CO_2e/tree/year, and red maple – 0.05641 MT CO_2e/tree/year). https://planting.itreetools.org/app/report/

[56] https://planting.itreetools.org/app/report/

Actions 2-5: Increase greenspace, improve greenspace management to maximize carbon sequestration & require shade trees in new major developments

In addition to the concrete tree planting goals the City has established under Action 1, Actions 2-5 will help create additional carbon sequestration potential for the City. However, emission reductions from these actions are not quantified, due to the difficulty in determining the exact impact these actions will have on GHG emissions in Chico. As the City moves forward in implementing these actions, an updated inventory will help quantify their impacts.

Past efforts to increase greenspace include efforts to develop multiple community gardens. Staff collaborated with a CSUC class to develop an inventory of sites appropriate for community gardens and shared the results with local, interested parties. In 2012, the City collaborated with BEC to develop a 1-acre community garden on the City-owned vacant property at Notre Dame and Humboldt Avenue. In 2014, BEC developed another community garden on City-owned property on Nord Avenue. There are 3 farmers markets, two year-round, that operate within the city.

Measure S-2: Develop and Implement the Urban Forest Master Plan

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Develop, adopt and implement the urban Forest Master Plan**: Create an actionable strategic plan for the City's urban forest that will guide it to its vision of a healthy, robust and resilient urban forest over the next 40 years. The plan shall include sections on work programs, policies, ordinances, sustainable urban forest management, design, planting, staffing, stewardship, carbon offset, storm water management, creek, open space and natural resource management, public tree inventory, and community participation and education.	Supportive
2	**Conduct a canopy cover analysis:** Conduct a tree canopy coverage analysis that includes all trees within the city limits, including public and private property trees, open space, natural resources area, creek and riparian areas, and golf courses. The resulting study should provide information on the number of trees and tree density on all identified areas and provide analysis if trees are equitably distributed throughout the city and present a clear picture on where city should strategically invest resources.	Supportive
3	**Conduct citywide tree planting analysis:** Conduct a tree planting analysis to gain a better understanding of the urban forest's overall condition. The resulting information should be used to develop management recommendations associated with tree removal, tree planting, trimming cycle adjustments and related maintenance activities. Additionally, the results of this analysis should be used to develop a list of recommended tree species that will be suitable for the city's current environmental conditions as well as anticipated conditions caused by climate change.	Supportive

Actions 1-3: Implement Urban Forest Master Plan, conduct canopy cover analysis & citywide tree planting analysis

The Urban Forest Management Plan will provide Chico with a comprehensive strategy for urban greening within the City, to be supported by a canopy cover and tree planting analysis. Further greening within the City will increase the carbon sequestration potential of the City.

7 Outreach and Education

A coordinated outreach and education effort is an important part of any CAP to provide the information and context to the community that is necessary for successful measure implementation. Most measures included in the CAP have a measure-specific outreach, education, and promotion component; the purpose of the outreach and education measure included here is to provide over-arching promotion for why the City has a CAP and how the CAP's big-picture strategies will help decrease emissions and improve life in Chico. During the CAP development process, the City identified many potential partners in developing measure-specific outreach and education programs. These partners will be crucial in the over-arching outreach and education efforts included here as well.

Measure O-1: Conduct a wholistic community outreach and education program to optimize CAP implementation

Action #	Action	Anticipated Reduction (MT CO_2e)
1	**Conduct partnered community outreach and education:** Develop a plan for ongoing community outreach strategies to maintain education and promotion of the CAP. This includes regular maintenance of the City's CAP webpage and ongoing PR, working with CUSD to create K-12 lesson plans, and partnering with CSUC and non-profits.	Supportive

Action 1: Conduct partnered community outreach and education

This action will serve as an umbrella for all education, outreach, and promotion actions under each emissions sector, and will help promote the CAP within the community and ensure the CAP is implemented equitably. A coordinated and partnered outreach and education program will help increase buy-in among community members and educate residents, business-owners, and students in Chico about doing their part to reduce emissions within the community.

The City has already established a good track record to support this Action. The City has participated in CSUC's This Way to Sustainability conference and attends other meetings and conferences locally that address issues effecting the environment, economy, and social equity. City employees often are invited to speak at CSUC classes on the topics of environment, economy, and social equity.

This page is left blank intentionally

City of Chico, California

411 Main Street
Chico, CA 95928
530-896-7200
chico.ca.us