

City of Chico
2020
Climate
Action Plan

Initial Draft



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Chapter One: Context for Chico's Climate Action Plan

The City of Chico's 2020 Climate Action Plan outlines strategies, organized within a flexible ten-year framework, for a significant reduction of greenhouse gas emissions that are directly and indirectly generated by local activities. The Plan includes actions to reduce energy, water, and fuel consumption and to reduce the amount of waste going into the landfill.

Introduction

While Chico plays a very small role in the global problem of climate change, the City of Chico is committed to reducing greenhouse gas (GHG) emissions as a part of its sustainability efforts. The Chico 2030 General Plan states this goal, and in support, calls for implementation of a Climate Action Plan (CAP or Plan). The State of California has set aggressive goals to combat climate change by lowering GHG emissions. Local governments are following suit by taking the initiative to reduce locally-generated greenhouse gas emissions. Local governments like the City of Chico have influence and, in some cases, exclusive authority over activities that contribute to direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and municipal operations.

The purpose of the Climate Action Plan is to provide the means for Chico to meet its GHG reduction goal of 25% below 2005 emission levels by the end of 2020. The CAP lists, and estimates GHG emission reductions for, actions that will directly or indirectly reduce emissions from local activities. It distinguishes between actions that can be taken by the City and those that require action by the local community. To meet the 2020 goal, the Plan divides actions into two phases, with the first phase ending in 2015. Full implementation of the Plan will significantly reduce GHG emissions as well as yield economic and other benefits, such as cleaner air, reduced traffic, less dependence on fossil fuels, and improved quality of life.

2030 General Plan

In April 2011, the City of Chico adopted the 2030 General Plan, which guides the growth and preservation of Chico. Many of the actions in the Climate Action Plan are mandated in the twelve elements of the General Plan. Adoption of the 2030 General Plan may arguably be the most important and efficacious action the City can take to reduce local sources of GHG emissions.

Strategies in the General Plan that will help reduce greenhouse gas emissions include promoting compact, walkable, infill and mixed-use development; focusing redevelopment along transit corridors and at other central locations; promoting the efficient use of energy and resources; improving local air quality; directing waste diversion and reduction; and establishing energy and water conservation measures in building, landscaping, and municipal operations.

In particular, the Sustainability Element contains goals, policies, and actions that confirm and support the City's ongoing commitment to reducing GHG emissions, including policies and actions directing adoption and implementation of a Climate Action Plan. This element identifies several actions for increasing energy efficiency, such as increased coordination with PG&E to provide education about reducing energy use, and consideration of a City-sponsored low-interest loan program for energy efficiency improvements and renewable energy devices.

The City can help reduce GHG emissions locally through the wise utilization of land. The Land Use Element, therefore, identifies and promotes efficient development patterns, including compact development, infill and mixed-use development, redevelopment, and complete neighborhoods. Growth consistent with the Land Use Diagram and policies throughout the General Plan will result in reduced contributions to global climate change, reduced reliance on oil and other fossil-fuel sources, and decreased consumption of natural resources.

Additional goals, policies, and actions in the other General Plan elements directly or indirectly support the reduction of GHG emissions. For example, the Circulation Element promotes infrastructure that fosters walking and bicycling to reduce the need for single occupant vehicle trips and other transportation related GHG emissions, the Open Space and Environment Element preserves natural resources and helps improve local air quality, and the Parks, Public Facilities, and Services Element includes policies to reduce waste, and water and energy use. Goals from the General Plan that are related to Climate Action Plan actions are cross-referenced under each applicable CAP action in Chapter Three.

Greenhouse Gas Emissions and Climate Change

To understand global climate change, it is important to recognize the naturally occurring “greenhouse effect” and to define the greenhouse gases (GHGs) that contribute to this phenomenon. Parts of the Earth’s atmosphere act as an insulating blanket of just the right thickness to trap sufficient solar energy to keep the global average temperature in a suitable range. The “blanket” is a collection of atmospheric gases called “greenhouse gases,” that trap heat like the glass walls of a greenhouse. These GHG, consist mainly of water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and chlorofluorocarbons (CFCs), and all act as effective global insulators, reflecting back to earth infrared radiation, as demonstrated in **Figure 1.1**. Carbon dioxide is an example of a greenhouse gas that is emitted to the atmosphere both naturally, through the Earth’s carbon cycle, and through human activities, such as the burning of fossil fuels (natural gas, coal, gasoline, etc.) or cement production. Other greenhouse gases, fluorinated gases for example, are created and emitted solely through human activities.

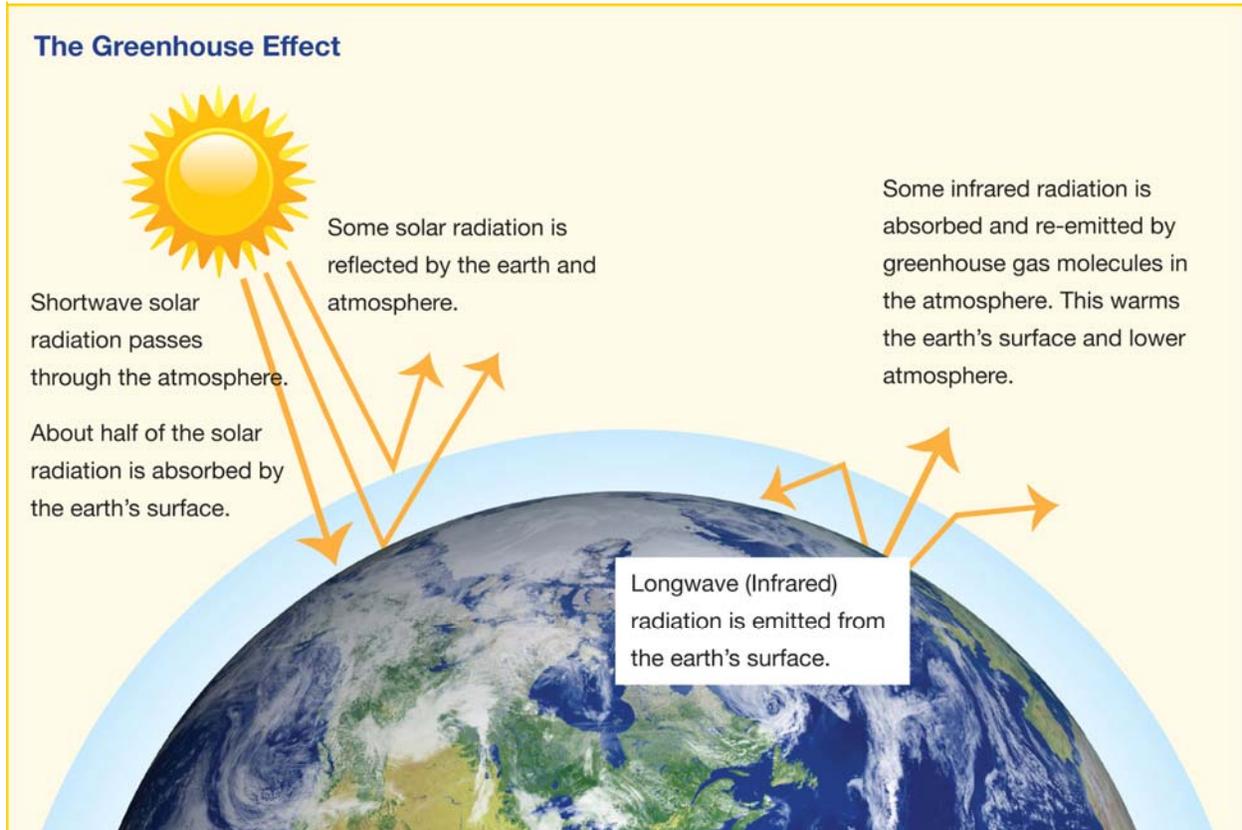


FIGURE 1.1

Over the past century, humans have contributed to the amount of GHGs in the atmosphere by activities such as burning fossil fuels to power cars, factories, and utilities. The gases produced from these activities, primarily carbon dioxide and methane, are enhancing the natural greenhouse effect and likely contributing to an increase in global average temperature and related climate changes. (sources: <http://epa.gov/climatechange/science/index.html>).

Because GHGs have variable potencies, a common metric of carbon dioxide equivalents (CO₂e) is used to report a combined potency from all GHGs. The potency of each GHG is measured as a combination of the volume of its emissions and its global warming potential (U.S. EPA), and is expressed as a function of the potency with respect to the same mass of CO₂. Thus, by multiplying the individual gas volume by its global warming potential, the emissions of each individual gas can be measured in terms of metric tons of carbon dioxide equivalent emissions (MtCO₂e).

Implications of Climate Change for California

The State of California Climate Change Center prepared a report on the potential impacts of climate change in California with collaboration from the California Air Resources Board, California Department of Water Resources, California Environmental Protection Agency, California Energy Commission, and the Union of Concerned Scientists. The broad-ranging impacts identified have the potential to negatively affect agriculture, forestry, water resources, coastal areas, energy production, air quality, public infrastructure, sensitive species and habitats, public health and safety, and, as a result, multiple economic sectors throughout the state. The potential impacts will not occur evenly throughout the state. Those most likely to affect the local region are described below. The City's efforts to prepare for adaptation to these impacts are discussed later in this chapter.

Public Health

Climate change could affect Californians' health by intensifying heat waves, exacerbating air pollution, and expanding the range of infectious diseases. The primary concern is not as much a change in average climate but the projected increase in extreme conditions, such as extreme heat, which pose the most serious health risks.

Californians would face greater risks of dehydration, heat stroke, heat exhaustion, heart attack, stroke, and respiratory distress with exposure to extreme heat. The elderly, children, people who are already ill, and the poor, who may lack access to air conditioning and medical assistance, are the most vulnerable to the effects of extreme heat. Warmer temperatures, when combined with increased precipitation, also can encourage mosquito-breeding, thereby increasing the risk of exposure to diseases carried by mosquitoes, such as the West Nile Virus.

Air Quality

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions that are conducive to the formation of unhealthy air pollution: ozone and particulate matter (O₃, PM₁₀, and PM_{2.5}). An increase in air pollutants can cause or aggravate a wide range of health problems, including asthma, other acute respiratory diseases, cardiovascular diseases, and decreased lung capacity for the elderly and children. In California, more than 90% of the population is living in areas that already violate the state's air quality standards, and Butte County currently does not meet the State and Federal standards for ozone and fine particulate matter (PM 2.5).

In hot weather, air pollution also worsens due to increases in natural hydrocarbon emissions and evaporative emissions of fuels and solvents. The greater number of wildfires predicted to accompany climate change will also contribute to higher levels of fine particulate matter in the air, which significantly impacts human health, natural ecosystems, and indirectly, the economy.

Water Supply

California already faces challenges in providing water for its large and growing population. Climate change is predicted to exacerbate these challenges through increased temperatures, and possibly, changes in precipitation patterns. The California Natural Resources Agency anticipates that the variability in hydrologic trends experienced during the last century will likely intensify this century.

While most climate models project relatively moderate changes in precipitation over this century, rising global temperatures are expected to result in reductions in snowpack for the Sierra Nevada, with precipitation changing from snow to rain. The Sierra Nevada snowpack acts as natural water storage by holding winter precipitation and releasing it as snow melt during the spring and early summer months. Reductions of the winter snowpack would result in water storage shortages, while an increased proportion of precipitation in the form of rain, together with larger storms, would mean more frequent severe flood events.

With California's unpredictable patterns of rain and snowfall, elaborate systems of dams and reservoirs keep a steady supply of water available and handle flood control. As snow and rain patterns shift, it becomes increasingly difficult to know when to keep reservoirs full and when to allow them to empty and make space for flood control. These impacts on water supply would affect California's farms, municipalities, and ecosystems.

Agriculture

Potential impacts on California's agriculture industry include a reduced water supply, potential droughts, increased winter floods, increased pests and plant diseases, and hotter growing seasons. Many farms, especially in the fruit, nut and rice industries prevalent around Chico, require long-term investments, which makes adaptation to climate changes difficult and necessitates advance preparation.

Forests and Wildfires

Extended periods of heat and drought make forests particularly susceptible to pests and diseases that could compromise forest health. Extended periods of heat and drought also may compromise a forest's ability to provide habitat, protect the watershed from erosion and excess runoff, and store carbon. Climate models suggest that the factors contributing to catastrophic fire risk (fuel loads, high temperatures, dry conditions, wind, etc.) may be more prevalent under future climate conditions, likely leading to increases in the number and severity of wildfires. The California Regional Assessment Group in its 2002 report "Preparing for a Changing Climate -The Potential Consequences of Climate Variability and

Change” already noted an increase in the number and extent of areas burned by wildfires in recent years. Larger and more frequent wildfires will impact California’s economy by increasing costs for fire suppression, interagency emergency response, post-fire recovery efforts, and expenses for replacing structures, timberlands, water supplies, and lost tourism and recreation opportunities.

Ecosystems

Predicted increases in temperature and changes in precipitation patterns would likely shift California’s current vegetation and habitat zones northward by approximately 100 to 400 miles, as well as upwards in elevation by 500 to 1,500 feet. The distribution, abundance, and vitality of species and their habitats strongly depend on climatic and microclimatic conditions. Changes in these conditions would necessitate the geographic movement of species in accordance with the predicted shifts in habitats, making native plant habitats vulnerable to invasive species. Changes in climatic conditions would also present problems for many species that are unable to migrate.

Fish and Fishing

Potential hydrological changes associated with global climate change could influence the aquatic life in California, with particularly negative effects on cold-water fish. For example, according to the Department of Water Resources, if climate change raises air temperature by just a few degrees Celsius, water temperatures could rise above the tolerance of salmon and trout in many streams, and result in an environment favorable to non-native fish such as sunfish and carp. Rises in summer temperatures would be particularly problematic for many of the threatened and endangered fish that spend summers in cold-water streams, but could also threaten and endanger fish that are currently in plentiful supply.

Economic Impacts

The same impacts from climate change that threaten our physical environment also have economic implications. Industries that are directly dependent on natural systems, such as forestry, fishing, and agriculture, would be compromised by climate change if their product or product’s habitat were impacted by environmental changes. Other businesses and economic sectors would be indirectly impacted by climate change through associated costs such as preparing for or responding to natural events such as flooding, extreme weather, challenges to water supplies, increased food costs, and threats to public health.

Climate Change Regulations

In an effort to stabilize GHG emissions and reduce impacts associated with climate change, international agreements, as well as federal and state actions were implemented as early as 1988. The international, federal, state, regional, and local government agencies discussed below work jointly, as well as individually, to address GHG emissions through legislation, regulations, planning, policy-making, education, and a variety of programs.

International and Federal Climate Actions

International Climate Action - Kyoto Protocol

In 1994, the United States signed onto the United Nations Framework Convention on Climate Change (UNFCCC). The Kyoto Protocol, adopted in 1997 by 37 industrialized nations, is a treaty made under the UNFCCC, which sets binding targets for GHG reductions over a five-year period from 2008 to 2012 to meet a goal to reduce GHG emissions below 1990 levels. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 7% from 1990 levels by 2012. It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol's commitments.

Federal Climate Action

In lieu of the Kyoto Protocol's mandatory framework, the United States has opted for a voluntary, incentive-based approach toward emissions reductions. The Climate Change Technology Program is a multi-agency research and development coordination effort which is charged with carrying out the President's National Climate Change Technology Initiative.

The United States Environmental Protection Agency (USEPA) is responsible for implementing federal policy to address global climate change. The Federal government administers a wide array of public-private partnerships to reduce GHG emissions. These voluntary programs focus on energy efficiency, renewable energy, methane and other non-CO₂ gases, agricultural practices, and implementation of technologies to achieve GHG reductions.

In 2010, the USEPA issued a "Final Rule" to address GHG emissions from stationary sources, such as fossil fuel and industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and engines, using the Clean Air Act permitting process. The Rule does not regulate the generation of GHG emissions, but instead requires mandatory monitoring and reporting of GHG emissions from sources that exceed a GHG emissions threshold of 75,000 MtCO₂e per year.

California Climate Action

With the largest population in the United States and an economy that is larger than that of most countries, California produces about 1.4% of worldwide GHG emissions and 6.2% of U.S. GHG emissions (State of California, 2011). During the last decade, California emerged as the leading state taking actions to reduce GHG emissions. On the private side, alternative energy industries have flourished in California. On the public policy side, California has enacted unprecedented climate legislation. In addition to

statewide legislation, a local grassroots action to address climate change has also taken hold in California. Of the 677 colleges and universities in the country that have signed onto the American Colleges and Universities Presidents' Climate Commitment (ACUPCC), 66 (or nearly 10%) are in California (ACUPCC, 2011).

Prior to action at the federal level, and ahead of any other state in the nation, California has enacted the following series of standards:

Executive Order S-3-05

In June 2005, Governor Arnold Schwarzenegger issued a landmark executive order establishing GHG reduction targets for the entire state:

- By 2010, reduce emissions to 2000 levels;
- By 2020, reduce emissions to 1990 levels;
- By 2050, reduce emissions to 80% below 1990 levels to reach a stable level.

Assembly Bill 32

To support these GHG-reduction targets, the California Legislature adopted the California Global Warming Solutions Act of 2006, also known as Assembly Bill 32. The law requires the California Air Resources Board (CARB) to develop regulatory and market mechanisms to reduce statewide GHG emissions to 1990 levels by 2020. Three new regulations are proposed as discrete preliminary GHG reduction measures, including:

- A low carbon fuel standard;
- Reduction of HFC-34a emissions from non-professional servicing of motor vehicle air conditioning systems; and
- Improved landfill methane capture (CARB 2007).

CARB has estimated that statewide GHG emissions for the year 1990 were 427 million MtCO_{2e} and for the period of 2002-2004 were 469 million MtCO_{2e}. CARB also determined that in the absence of action to reduce or mitigate GHG emissions the state would emit 596 million MtCO_{2e} by 2020. CARB's 2020 projection is known as a business as usual (BAU) projection. To achieve the AB 32 GHG emission reduction goal to reduce emissions to 1990 levels by 2020, the state of California would have to reduce 2020 BAU emissions by approximately 30%. CARB has determined that meeting the 1990 emissions level goal is equivalent to reducing current emissions by approximately 15%.

In December 2008, CARB adopted the Climate Change Scoping Plan, which outlines the State's strategy to achieve the AB 32 GHG reduction goal for 2020. This Scoping Plan proposes a cap-and-trade program and a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify energy sources, save energy, create new jobs, and enhance public health. The State's cap-and-trade program and its complementary measures are estimated to account for about 85% of GHG emissions reductions throughout California. The State's

measures listed in the Scoping Plan will also have a local impact, helping Chico achieve its GHG emissions reduction goal. Where possible, those projected local emissions reductions have been accounted for in this Climate Action Plan.

Senate Bill 97

Enacted in 2007, this legislation amended the California Environmental Quality Act (CEQA) to establish that GHG emissions and their effects are appropriate subjects for CEQA analysis. SB 97 directed the California Office of Planning and Research (OPR) to draft State CEQA Guidelines “for the mitigation of GHG emissions or the effects of GHG emissions” and directed the Resources Agency to certify and adopt the State CEQA Guidelines.

Senate Bill 375

This bill, signed in 2008, links regional transportation plans with state GHG-reduction goals. Under SB 375, state agencies and local metropolitan planning organizations, such as the Butte County Association of Governments (BCAG), must develop Sustainable Community Strategies to reduce GHG emissions. The focus of the legislation is to reduce single passenger vehicle trips through smart growth and sustainable land use decisions.

Executive Order S-13-08

In November 2008, the governor instructed the California Natural Resources Agency (CNRA) to spearhead the creation of a climate adaptation strategy. The resulting 2009 Climate Adaptation Strategy, a cooperative effort among multiple state agencies, articulates how the state could respond to consequences of climate change, such as rising temperatures and sea levels, new rainfall patterns, and extreme weather events. In November 2010, the state released the First Year Progress Report to detail how the Adaptation Strategy was being implemented.

2010 California Green Building Standards Code- CALGreen

California’s Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations Title 24, Part 6) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow for consideration and incorporation of new energy efficiency technologies and methods. Energy efficient buildings require less electricity, which is often produced from fossil fuels resulting in GHG emissions, and the increased energy efficiency results in decreased GHG emissions.

In 2010, Title 24 was updated to include the “California Green Building Standards Code”, referred to as CALGreen. CALGreen requires that new buildings reduce water consumption, increase system efficiencies, divert construction waste from landfills, and install low pollutant-emitting finish materials. CALGreen has approximately 52 nonresidential mandatory measures and an additional 130 optional provisions. This landmark code will significantly contribute to reducing GHG emissions, energy consumption, and water conservation throughout the state.

Chico Climate Action Efforts

Chico is the largest city in Butte County, with approximately 87,000 people living within the city limits and about 100,000 residing in the Chico urban area. Recognizing the impact of its GHG emissions on the northern portion of the Sacramento Valley, the City of Chico did not wait for state directives to address GHG emissions and climate change. Following are some of the early steps the city has undertaken on its own accord:

Mayor's Climate Protection Agreement

In 2006, the City signed the U.S. Conference of Mayors' Climate Protection Agreement (USCMCPA), adding Chico to a group of over 1,000 municipalities, 138 of which are in California, united in pledging to reduce greenhouse gas emissions.

Under the USCMCPA, Chico committed to take the following three actions:

1. Strive to meet or beat the Kyoto Protocol targets through actions such as anti-sprawl land-use policies, urban forest restoration projects, and public information campaigns.
2. Urge state and federal governments to enact policies and programs to meet or beat the GHG-emission reduction target suggested for the United States in the Kyoto Protocol.
3. Urge the U.S. Congress to pass bipartisan GHG reduction legislation which would establish a national emission-trading system.

Formation of Sustainability Task Force

Signing the Mayors' Climate Protection Agreement precipitated the creation of the Sustainability Task Force (STF) in 2007. Members of the STF represent various sectors of the community to provide input to the City Council on sustainability issues. One of the primary tasks of the STF is to assist the City in meeting the objectives of the Mayor's Agreement and to conduct preliminary steps to develop a Climate Action Plan (CAP).

In preparation for drafting the CAP, the STF formed the following Ad-Hoc Committees: Outreach & Education, Sustainable Business Outreach, Innovators' Pilot Outreach, Transportation Planning, and Climate Change Adaptation & Resiliency. The STF designated these Committees to focus resources on the development and implementation of specific components of the CAP, and to represent and promote these components throughout the community. These committees are comprised of STF members, city staff, representatives of institutions and utilities, and members of the general public.

Adaptation Planning for the Chico Area

While it is imperative that we act quickly and boldly to reduce our contributions to GHG emissions, it is also necessary to simultaneously prepare for adaptation to regional changes that may result from climate change. Adaptation in this context means making long-term adjustments to maintain a level of

community well-being, economic prosperity, and environmental quality in the face of changing circumstances.

The State of California developed a plan for adapting to potential impacts of climate change entitled, “2009 California Climate Adaptation Strategy.” The plan summarizes the best known science on climate change impacts in the state and outlines possible solutions that can be implemented within and across state agencies to promote resiliency. Effective adaptation will require local action that complements state initiatives, and early planning will significantly lessen the negative effects and costs of adaptation.

The Sustainability Task Force’s Adaptation and Resiliency Ad-Hoc Committee developed a work plan consisting of three primary tasks:

- 1) Consider the range of potential impacts to California from climate change, and assess which will be the most prevalent in our local region.
- 2) Identify and engage key stakeholders within the City, Butte County, and the greater community in the process of addressing climate change.
- 3) Develop a Climate Change Adaptation Plan for the Chico Area that outlines long-term strategies for mitigating anticipated local impacts of climate change. The Climate Change Adaptation Plan will be developed as a companion document to the Climate Action Plan.

CAP and CEQA

Creation of this CAP is called for by 2030 General Plan Goal SUS-6 (requiring reduction of citywide GHG emissions), and the implementation of this goal will rely on many other goals, policies, and actions throughout the General Plan. The CAP does not change the level of development activity for Chico anticipated in the General Plan EIR. The actions in the CAP, in most cases, mirror adopted General Plan policies calling for energy efficiency, water conservation, waste minimization and diversion, reduction of vehicle miles traveled, and preservation of open space and sensitive habitat. As such, many of the potential effects of implementing the CAP were covered broadly by the General Plan EIR.

As discussed in the Climate Change Regulations section above, Senate Bill 97 established that GHG emissions and their effects are appropriate subjects for analysis under the California Environmental Quality Act (CEQA). One of the primary goals of the CAP, therefore, is to establish it as a qualified GHG emissions reduction plan for which future projects within the City can tier and thereby streamline the environmental analysis necessary for CEQA.

SB 226, adopted in 2011, states that a project's greenhouse gas emissions shall not, in and of themselves, be deemed to cause an exemption to be inapplicable if the project complies with all applicable regulations or requirements adopted to implement statewide, regional, or local plans consistent with Section 15183.5 of Title 14 of the California Code of Regulations. This section of the Regulations was amended in March 2010 to state that a GHG Reduction Plan, or Climate Action Plan, may be used for tiering and streamlining the analysis of GHG emissions in subsequent CEQA project evaluation provided that the CAP does the following:

- Quantifies greenhouse gas emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.

The GHG Inventory, which was the basis for the CAP, fulfills this requirement.

- Establishes a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.

The CAP establishes this level with its emissions reduction target of 25% below 2005 levels, which supports the AB 32 reduction target.

- Identifies and analyzes the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area.
- Specifies 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.
- Establishes a mechanism to monitor the plan's progress toward meeting its GHG reduction goal.
- Lastly, the CAP must be adopted in a public process following environmental review. Chico's CAP will be adopted in a public process following compliance with CEQA.

A plan for the reduction of GHG, such as the CAP, which meets the factors set forth above may be used in the cumulative impacts analysis for individual projects and may be the basis for a determination that a project's incremental contribution to the cumulative effect is not cumulatively considerable if the project complies with the requirements of the plan. The environmental documents for later projects that rely on a GHG reduction plan of a cumulative impacts analysis must identify those requirements specified in the plan that apply to the project, and, if they are not otherwise binding and enforceable, incorporate them as mitigation measures. An Environmental Impact Report (EIR) may still be required for a project even though it does comply with the CAP if there is substantial evidence that the particular project may have cumulatively considerable impacts notwithstanding the project's compliance (14CCR 15183.5).

GHG Emissions: Inventory, Future Projection, and Reduction Target

GHG Emissions Inventory

In 2008, the City of Chico, with the assistance of the California State University Chico Research Foundation, completed an inventory of the GHG emissions generated by both the City as an organization and the Chico community (GHG Inventory). The International Council for Local Environmental Initiatives (ICLEI) provides a five-milestone framework for reducing GHG emissions and addressing climate change (**Figure 1.2**) that served as a model for development of the GHG Inventory and the CAP.



Figure 1.2

The GHG Inventory identified the 2005 baseline emissions level as **514,332 MtCO₂e** and highlighted which sectors generated the greatest GHG emissions. As shown in **Figure 1.3** the inventory found 64.7% of the emissions came from the transportation sector, 16.4% from commercial energy consumption, 15.0% from residential energy consumption, 3.9% from solid waste sent to the landfill, and 0.8% from industrial energy consumption. A copy of the inventory is in **Appendix A**.

The data collection and analysis for the GHG Inventory was conducted using ICLEI's Clean Air and Climate Protection, Version 1 (CACP) software and methodology. The CACP software allowed tracking and quantification of GHG emissions generated from electricity and natural gas consumption, vehicle miles traveled, and solid waste tonnages from both the City of Chico and the community during one year. The inventory measured emissions generated in the year 2005, making it the baseline year from which to measure emissions reductions. The inventory additionally allows the City to track and compare emissions with other California cities that use the same baseline year, as many do.

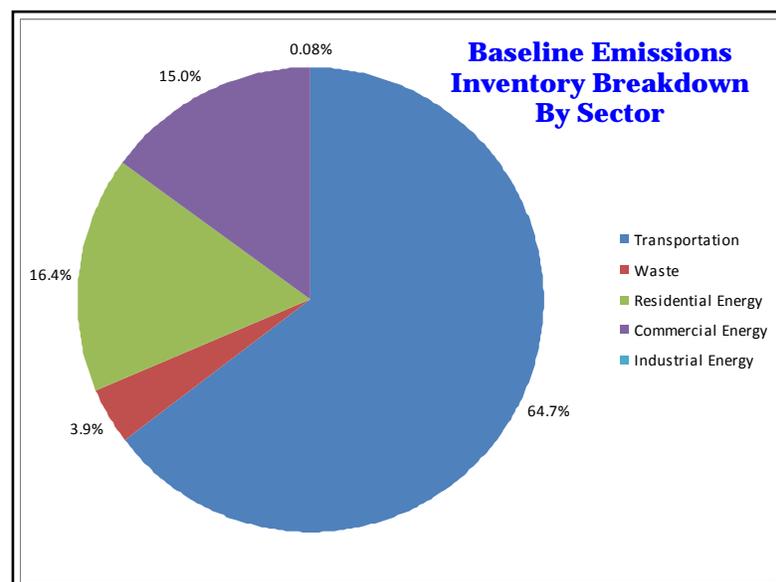


Figure 1.3

Future Emissions/“Business as Usual” Projection for 2020

The GHG inventory also projected emissions levels for the year 2020 in the five sectors of the Inventory: solid waste, transportation, and residential, commercial, and industrial energy use. Since this projection assumed that all emissions-producing activities would continue at their 2005 rates with no actions taken to reduce emissions, it is called the Business as Usual (BAU) emissions scenario.

The growth rates used in the BAU scenario were derived from multiple-year data measuring annual increases in population, residential and commercial growth, waste tonnage, and use of gasoline, diesel, natural gas, and electricity. The combined average growth rates for the five sectors was just over 2% per year, which is consistent with the historical trend of approximately 2% annual population growth for Chico. As shown in **Figure 1.4** below, the BAU scenario projects that emissions from the Chico area will increase beyond the baseline to **695,504 MtCO₂e** for the year 2020 if no reductions are made to emissions rates. (For further details on the BAU scenario, see **Appendix B.**)

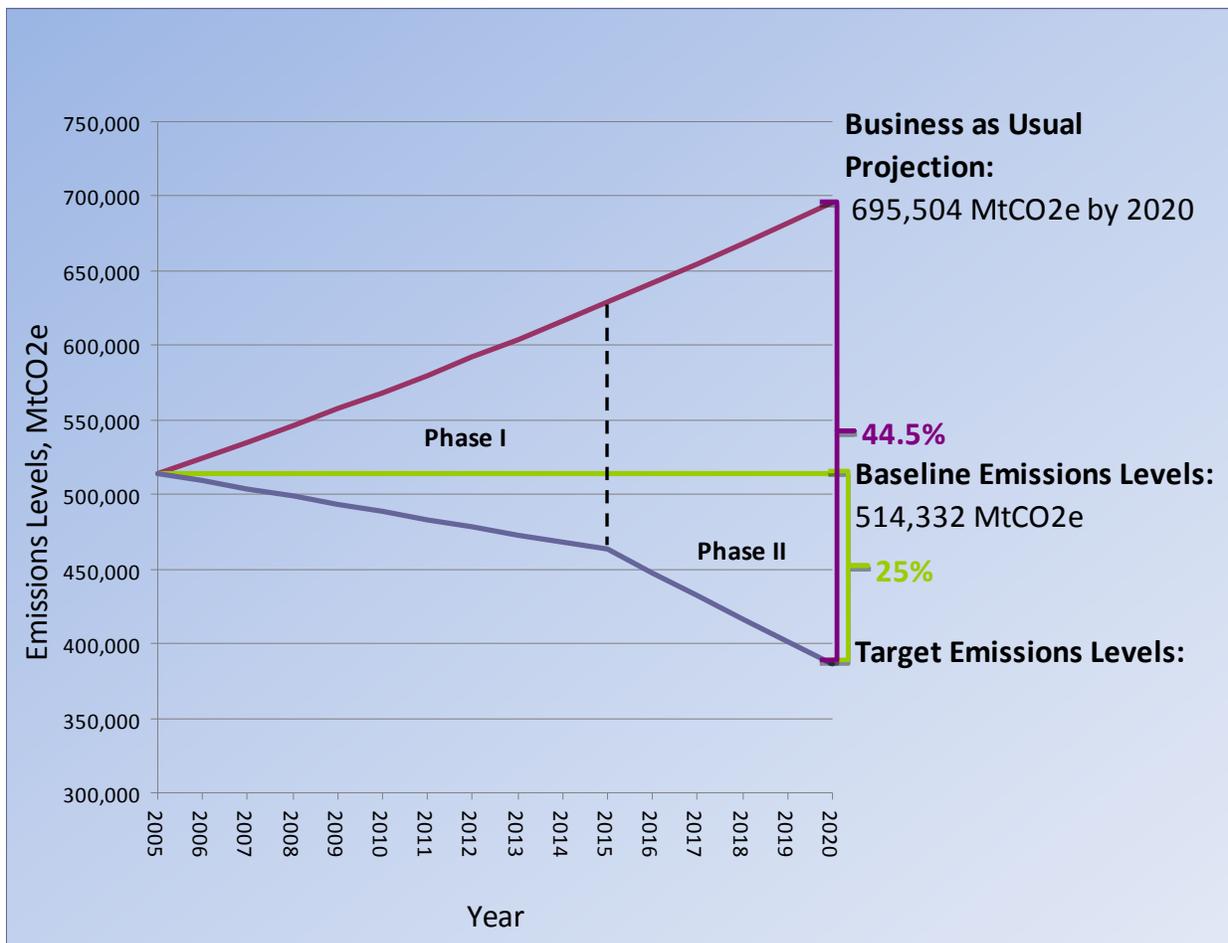


Figure 1.4

Emissions Reduction Target

The AB 32 Scoping Plan recommends, but does not require, that municipalities reduce current GHG emissions by 15%. The Scoping Plan did not define the specific base year to define what “current” meant, but the State of California considers current emissions as emissions generated in the year 2008 or earlier. For the purposes of this CAP and for establishing a GHG emissions reduction target, the City is considering current emissions as the GHG emissions identified in the inventory base year of 2005.

Consistent with the Mayors’ Climate Agreement, in 2008 the City Council established an overall GHG-reduction goal of 25% below 2005 base-year emissions levels to be achieved by December 2020. This target level is roughly equivalent to the Kyoto Protocol target and exceeds the 15% reduction goal of AB 32. Using the GHG inventory, this target emissions level was calculated to be **385,749 MtCO₂e** generated in the year 2020. The BAU scenario described above shows that achieving the GHG emission reductions target of a 25% reduction from 2005 levels equates to a 44.5% reduction from the BAU scenario projected emissions for 2020.

Chapter Two: Climate Action Goals

The ultimate goal of the Climate Action Plan (CAP) is to reduce emissions for the year 2020 to 385,749 MtCO₂e, 25% below the base year (2005) levels.

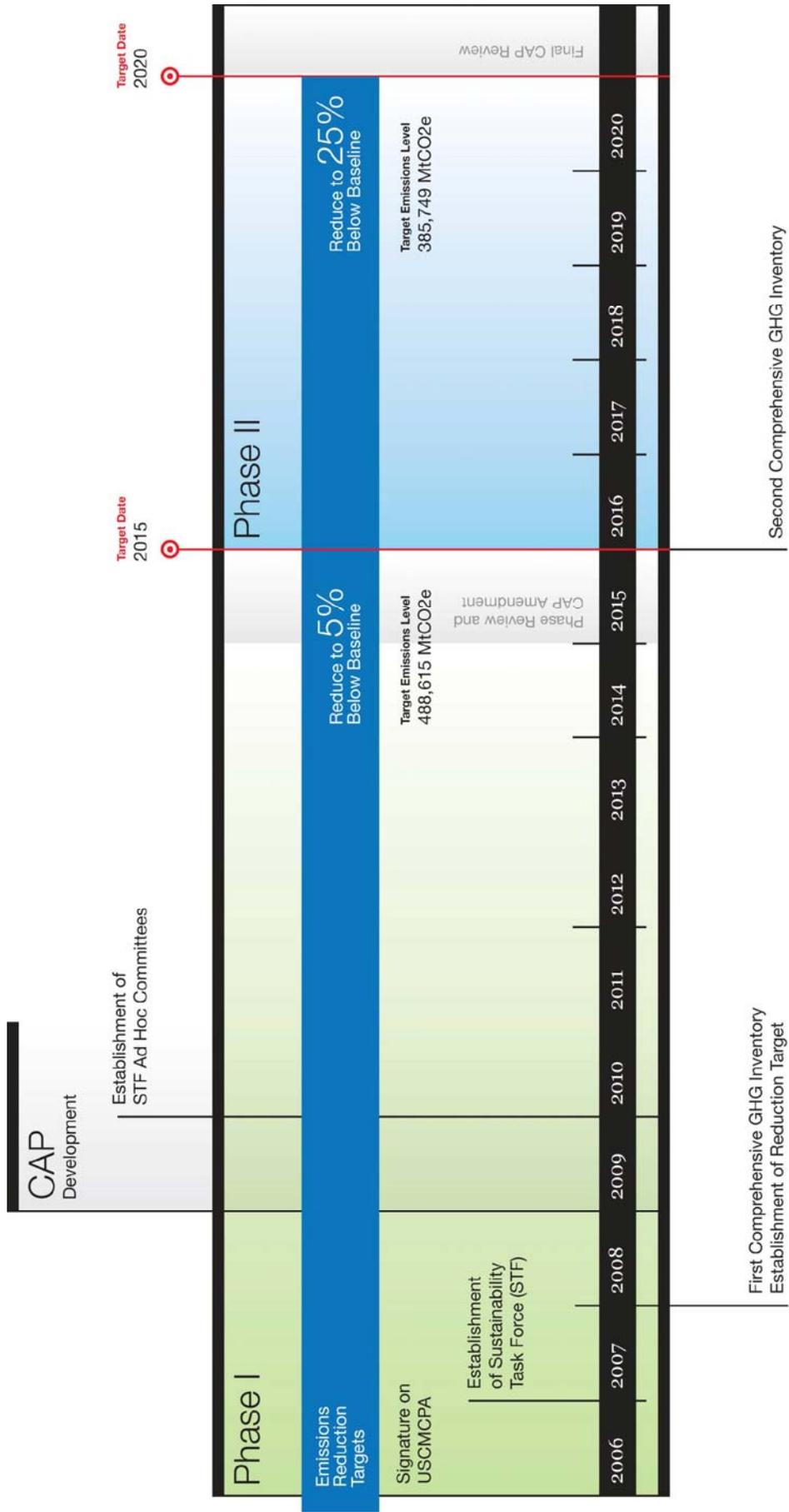
The Plan is divided into two implementation phases, and specific emissions reduction targets have been established for both phases. Supporting these reductions targets are a range of sector goals for the five sectors identified in the GHG inventory: transportation, solid waste, and residential, commercial, and industrial energy use. Reductions are anticipated from actions taken locally and externally at the regional, state, federal, and international levels.

Climate Action Plan Timeline & Targets

The CAP will be implemented in two phases, Phase I through 2015 and Phase II for the remaining five years to 2020. After Phase I, the CAP will be reviewed and amended to respond to changing technology, policies, and updated GHG emissions measurements in a subsequent GHG inventory. The target for Phase I is to reduce emissions by 10% below the 2005 base year level, or an emissions for the year 2015 that are 165,820 MtCO₂e below those projected for 2015 in the BAU scenario. The focus of the first phase will be implementing broad community outreach measures, building public support for the Plan, and capitalizing on the most cost effective opportunities to reduce emissions. The actions begun during Phase I will continue to reduce emissions during Phase II.

The CAP schedule includes a review period between the two phases to evaluate the success of Phase I in achieving GHG emissions reductions. At that time, the CAP will likely be amended to revise Phase I actions and outline additional actions for Phase II (See **Chapter 4**).

Phase II will begin in 2016 and end in 2020. The target for Phase II is to further reduce emissions, ultimately achieving the overall CAP goal of 2020 emissions being 25% below the 2005 base year levels. The focus in the second phase will be building on successful Phase I actions, expanding community support for the Plan, and implementing additional Phase II actions. **Figure 2.1** depicts the timeline and the emission reduction targets for the two phases of the CAP.



Sector Goals

Five emissions sectors were identified in the GHG Inventory: solid waste, transportation, and residential, commercial, and industrial energy use. Each of the sectors has a considerably different contribution to overall emissions levels. Each emissions sector also has significantly different circumstances and opportunities for emissions reductions. Accordingly, the CAP establishes a goal for each of the five emissions sectors, which in combination will achieve the overall 2020 emissions reduction goal, as shown in **Table 2.1**. These goals were established by considering the potential emissions-reducing actions for each sector and the perceived ability of the City and the community to adjust related behaviors.

Emissions Comparison				
	Metric Tons of CO ₂ e			
Sector	2005	BAU 2020	2020 Goal	Total Reduction
Energy, Residential	84,039	106,003	68,902	37,101
Energy, Commercial	77,313	95,100	52,305	42,795
Energy, Industrial	391	481	265	217
Transportation	332,602	468,485	243,929	224,556
Solid Waste	19,987	25,435	20,348	5,087
Total	514,332	695,504	385,749	309,756

Table 2.1

The percentage that each sector will contribute to emissions reductions to meet the 2020 goal is shown in the pie chart in **Figure 2.2**. Clearly, reductions in the transportation sector are critical for meeting the goal, and many of the actions are focused on reducing transportation-related emissions.

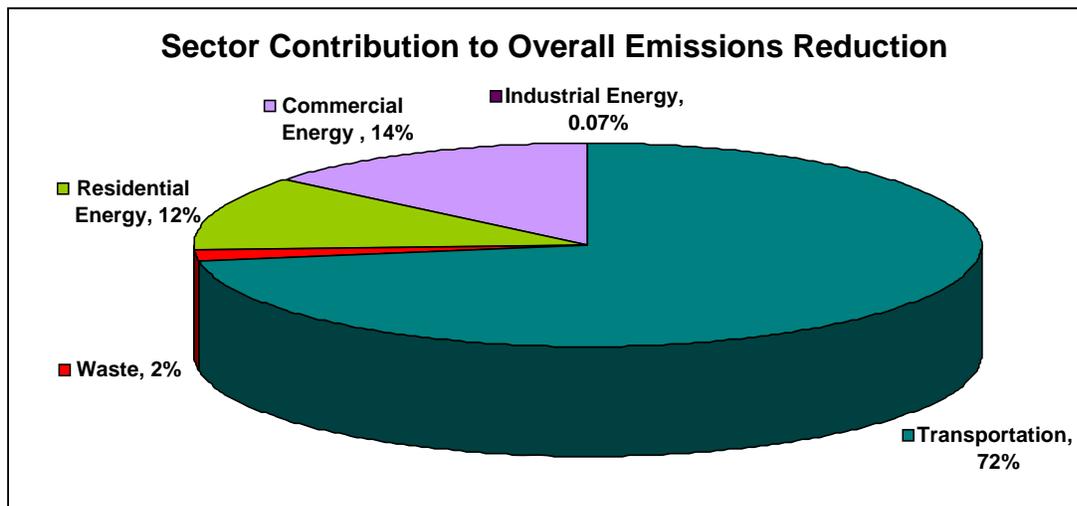


Figure 2.2

Business as Usual (BAU) projected emissions levels for each sector account for growth through 2020 and assume no reductions are made. BAU, therefore, acts as a reasonable benchmark against which emission reductions can be measured. Since the CAP identifies new actions that will reduce emissions, the sector goals are stated as a percentage of the BAU projected emissions for each sector. **Table 2.2** below, shows each sector goal as a percentage of the BAU emissions projected for 2020.

Sector	Target 2020 Emissions	
	MtCO ₂ e	% below BAU
Energy, Residential	68,902	35
Energy, Commercial	52,305	45
Energy, Industrial	265	45
Transportation	243,929	48
Solid Waste	20,348	20
Total	385,749	

Table 2.2

Local and External Emissions Reductions

The sector goals are 2020 target emissions levels set for each sector, and it is anticipated that these sector goals will be achieved through a combination of local actions and actions taken externally at the regional, state, federal, and international levels (external actions). For example, state and federal mandates for increased vehicle efficiency would represent an external action, while expanding bike lanes on City streets and increased use of bikes for local transportation would represent a local action. The local actions outlined in **Chapters 3 and 4** include actions to be taken by the Chico community and the City. **Table 2.3** lists reduction targets, by sector, for local and for external actions.

Sector	2020 CAP Sector Goals			
	Local Reductions		External Reductions	
	MtCO ₂ e	% below BAU	MtCO ₂ e	% below BAU
Energy, Residential	12,720	12	24,381	23
Energy, Commercial	20,922	22	21,873	23
Energy, Industrial	106	22	111	23
Transportation	112,278	24	112,278	24
Solid Waste	2,544	10	2,543	10
Total	148,570		161,186	

Table 2.3

External Actions

The estimated emissions reductions from external actions for each sector are listed in **Table 2.3** above. The estimates were prepared using information from the California Air Resources Board AB 32 Scoping Plan and from Pacific Gas & Electric staff.

An example of an external action is the expansion of the renewable (non-GHG-emitting) components in PG&E's grid mix, also known as the Renewable Portfolio Standard. As more renewable energy is used in the grid mix, fewer emissions will result from each unit of energy consumed. During Phase I, PG&E's expanded use of renewable energy is expected to be the greatest source of emissions reduction from external actions. As of January 2010, PG&E had already doubled the amount of energy it generates from renewable sources since the 2005 base year.

As discussed earlier, the AB32 Scoping Plan was also used in estimating reductions from external actions. The Scoping Plan sets specific targets and actions for reducing statewide GHG emissions from the burning of fossil fuels in both power plants and vehicles, and by setting state energy efficiency and renewable energy requirements. Although the Scoping Plan contains many measures that will directly or indirectly reduce emissions generated within the Chico area, only the actions that most directly impact the Chico area and have the potential to reduce emissions from activities that were measured in the baseline GHG Inventory were included in this CAP.

Descriptions of the external actions chosen for inclusion in the CAP are described in the boxes on this page and discussed in **Chapters 3 and 4**.

Renewable Portfolio Standard (RPS)

Established in 2002 by Senate Bill 1078, the State of California Renewable Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country, requiring electricity providers to increase the portion of energy from renewable sources to 20% by 2010 and by 33% by 2020. The California RPS is estimated to reduce statewide GHG emissions by approximately 12 million MtCO_{2e} by 2020.

Assembly Bill 1493 (Pavley) I and II

Assembly Bill 1493, signed into law in 2002, required the Air Resources Board to adopt regulations that require carmakers to reduce GHG emissions from 2009 and later models of new passenger cars and light-duty trucks by 30% below 2002 levels by the year 2016. It is expected that the Pavley regulations will reduce GHG emissions from California passenger vehicles by about 22% in 2012 and about 30% in 2016. This measure is estimated to reduce statewide GHG emissions by 26.1 million

Low-Carbon Fuel Standard

The Low Carbon Fuel Standard (LCFS) is a flexible performance standard designed to accelerate the availability and diversity of low-carbon fuels by requiring fuels that contain less carbon with consideration of their full life-cycle. As part of the AB 32 Scoping Plan, the LCFS is estimated to reduce GHG emissions by 15.8 million MtCO_{2e} by 2020.

Transportation Sector Goal

The transportation sector is the largest source of GHG emissions in the Chico area and is projected to account for 468,485 MtCO_{2e} (72%) of GHG emissions in the 2020 BAU scenario. Therefore, an aggressive sector goal is set to reduce transportation emissions by 224,556 MtCO_{2e}, or roughly 48% below the transportation related 2020 BAU projection. It is estimated that external actions will result in a 24% reduction in emissions from BAU, leaving the remaining 24% to be achieved through local actions.

To address this significant cause of GHG emissions and to meet the sector goal, **Chapters 3 and 4**

describe actions that relate to:

- expanding alternative fuel use;
- reducing vehicle miles traveled;
- improving vehicle fuel efficiency;
- participating in regional transportation planning; promoting local goods and businesses;
- developing a compact urban form; and promoting walking.



Sector Strategic Goal

Reduce **transportation** emissions by 48% from 2020 BAU

- Estimated External Impact 24%
- Local Reduction Goal 24%

Energy Sector Goals

Energy consumption is the second-largest source of GHG emissions for Chico, contributing 31.5% of the total 2005 base-year emissions, and projected to emit 201,584 MtCO_{2e} (26%) of the 2020 BAU emissions. This represents all energy consumption in the Chico area, including energy used to heat, deliver, and treat water and wastewater. In California, the greatest consumption of energy is from water conveyance. There are three sector goals related to reducing energy for residential, commercial, and industrial uses: a 35% reduction of emissions below the BAU scenario for residential energy, a 45% emissions reduction below BAU for commercial energy, and a 45% emissions reduction in industrial energy use, for a total reduction from BAU of 80,112 MtCO_{2e} in 2020.

External actions are estimated to account for 23% of energy-related emissions reductions, leaving local actions responsible for reducing energy-related emissions by 12% for residential, and 22% each for commercial and industrial sources to meet the energy sector goals. **Chapters 3 and 4** describe actions that will reduce GHG emissions from energy-related sources and help achieve the energy sector goals.



Sector Strategic Goals

Reduce **residential energy** emissions by 35% from 2020 BAU

Reduce **commercial energy** emissions by 45% from 2020 BAU

Reduce **industrial energy** emissions by 45% from 2020 BAU

- Estimated External Impact 23%
- Local Reduction Goal
 - Residential Energy 12%
 - Commercial Energy 22%
 - Industrial Energy 22%

Solid Waste Sector Goal

Solid waste generated in the Chico area and sent to the landfill accounts for 3.9% of total 2005 base-year emissions, and 25,435 MtCO_{2e} (2%) of the projected 2020 BAU emissions. While this represents a small percentage of the total emissions, it is important to control because decomposition of landfill waste releases methane gas into the atmosphere, which is 21 times more potent than CO₂. The sector goal for solid waste related emissions is a 20% reduction in GHG emissions from the 2020 BAU scenario. External actions are estimated to reduce 10% of emissions from solid waste with an additional 10% reduction needed to be achieved through local actions, for a total reduction from BAU of 5,087 MtCO_{2e} by 2020. The CAP includes Phase I and Phase II actions related to solid waste in **Chapter 3 and 4**.



Cost-Benefit Analysis

A cost-benefit analysis was conducted on 100 actions preliminarily suggested for the CAP by the Sustainability Task Force. This analysis was done, with assistance from CSU, Chico, to verify that the most cost-effective actions (in dollar savings and emissions reduced) were included in the CAP. Given the difficulties in estimating costs and benefits for certain actions, such as community outreach and solid waste, they were omitted from the cost-benefit analysis. In addition, new actions that were later identified by City staff and included in this CAP were not included in this cost-benefit analysis.

Methodology

Estimates of the costs and benefits for the transportation sector actions came primarily from ICLEI's Climate and Air Pollution Planning Assistant (CAPPA) software, which was developed in collaboration with the Environmental Protection Agency. The costs and benefits of potential energy sector actions were estimated using data from PG&E, and the U.S. Department of Energy (for fuel cost estimates).

CAPPA software helped generate estimates for the costs and cost savings over the lifetime of each action, including: equipment costs, annual fuel consumption decreases, and incremental initial and recurring annual costs. Incremental initial costs are those that exceed the costs of an action that would otherwise occur in the Business as Usual scenario. Hybrid vehicles, for example, have an initial cost in this analysis that reflects the cost of buying a hybrid over a conventional fuel vehicle. For each action, the following estimates were then determined:

- an average simple payback period;
- the reduction of GHG emissions per unit of implementation; and
- a net-cost per metric ton of CO₂ equivalent (MtCO_{2e}) emissions reduced.

Net cost per MtCO₂e reduced was calculated by establishing each action's net costs or savings over its lifetime and then dividing it by the total amount of emissions reduced. A negative value for net cost actually indicates a savings.

Sensitivity analyses were also conducted for all of the actions to determine if higher or lower fuel-costs and inflation would alter the cost-benefit results.

Analysis Results

The cost-benefit analysis concluded that for most actions there is an overall benefit that exceeds the initial cost, both in terms of financial benefit and the reduction of GHGs. The cost-benefit analysis results can be found in **Appendix C**, and are graphed in **Figures 2.3** and **2.4** below to show the relative ranking of many potential actions against each other, both in terms of their overall cost-effectiveness at reducing emissions and their initial costs and payback periods. The Y-axis measures Net Cost per MtCO₂e reduced, and shows that most of the actions used in the analysis have a negative net cost, or in other words a net savings.

Actions may also be weighed against the cost-effectiveness of carbon offsets, which currently cost from \$4 to \$40 per MtCO₂e per year. This is because savings over the lifetime of the project more than offset the initial and any recurring costs.

The cost-benefit analysis also included sensitivity analyses which concluded that the original results remain constant even when the input variables for fuel costs were changed.

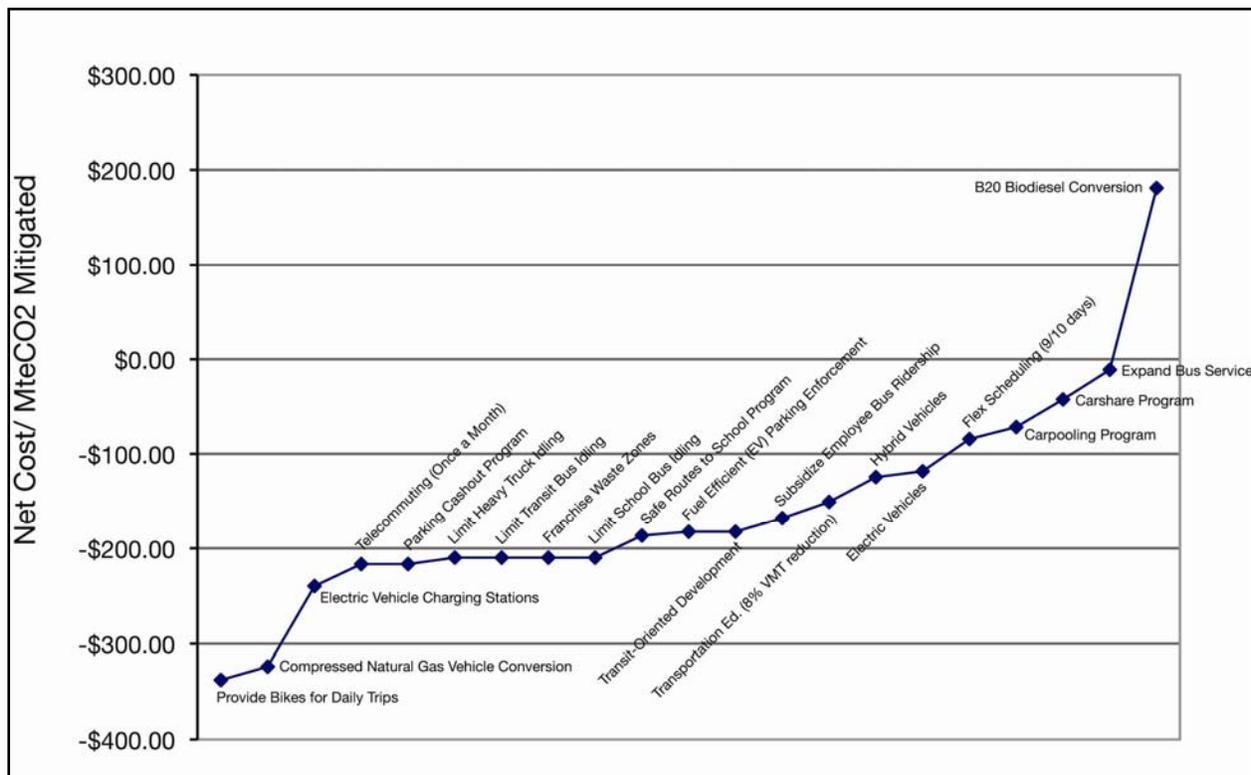


Figure 2.3

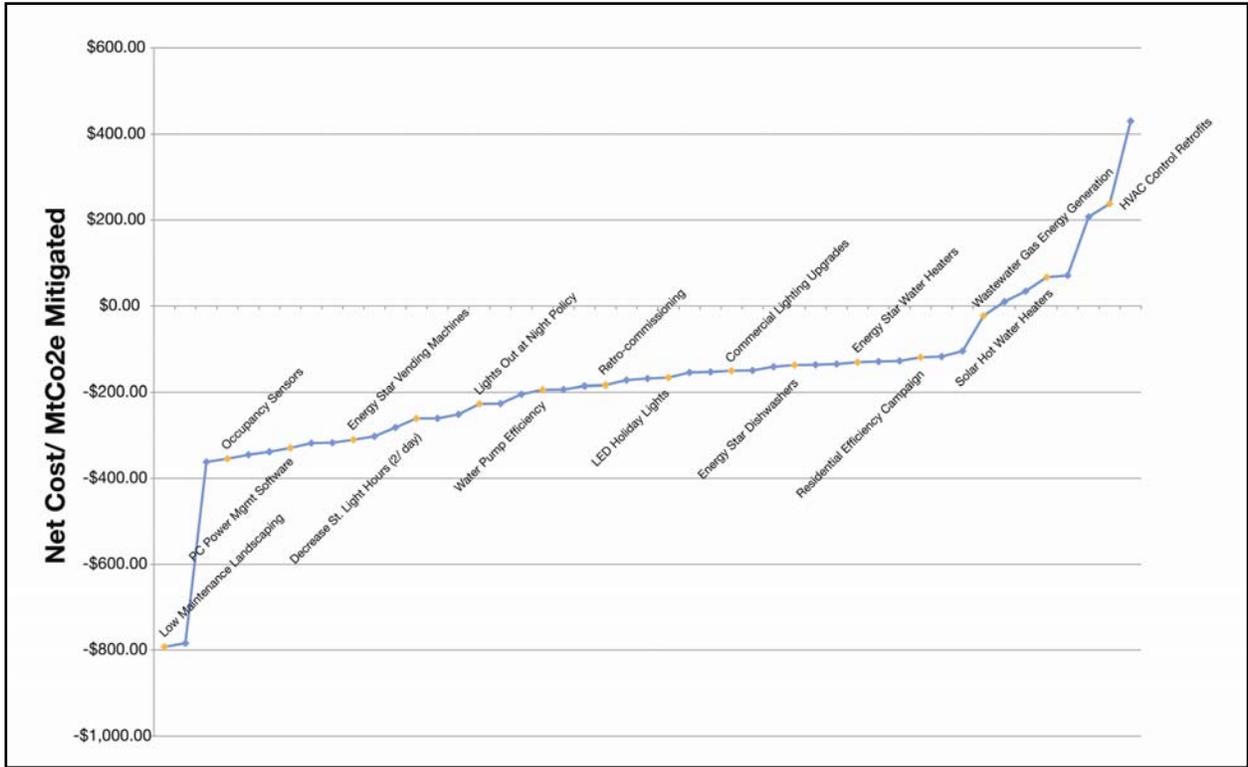


Figure 2.4

Chapter Three: Phase I

Phase I of the Climate Action Plan considers the emissions-reducing actions taken since the greenhouse gas (GHG) inventory 2005 baseline year, and it includes additional actions to be undertaken by the City and throughout the community before 2015.

Achieving the City's GHG reduction target will require considerable changes within the community over the next decade. Chico will need to reduce both energy and water use, reduce waste, and improve the appeal of alternative transportation modes. To ensure this transformation occurs, the CAP contains actions that are ambitious, yet attainable. A list of potential actions was developed by:

- 1) Evaluating existing community conditions.
- 2) Identifying GHG reduction opportunities within the City, including those identified by the City's Sustainability Task Force.
- 3) Considering suggestions from the local community.
- 4) Reviewing policy direction in the Chico 2030 General Plan.
- 5) Reviewing best practices from leading cities and organizations.
- 6) Incorporating State and regional laws, guidelines, and recommendations.

Many of the potential actions were evaluated for their cost-effectiveness in terms of real costs and potential for reducing GHG emissions, and those actions deemed infeasible or cost-prohibitive were removed from the list. Beyond cost effectiveness, Phase I actions were also included for being particularly applicable to local circumstances, already being implemented or easy to implement, and due to special circumstances surrounding an action, such as projects that are "shovel-ready" or where funding opportunities presented themselves. This chapter presents the Phase I actions and then explains the cost-benefit analysis that informed selection of the actions.

The goal for Phase I of the CAP is to reduce the GHG emissions generated in the Chico area to 10% below 2005 baseline levels by 2015, which means offsetting annual emissions below the business as usual (BAU) projection for 2015 by 165,820 MtCO_{2e}. The City of Chico and other members of the community are already undertaking significant efforts to reduce GHG emissions. These actions range from transforming fleets to run on renewable fuels to promoting walking and bicycling to installing solar panels throughout the community. With leadership from the Sustainability Task Force, the City has worked closely with local utility companies, the county, state agencies, and local businesses to identify a range of actions for implementation in Phase I.

Phase I Actions

Phase I of the CAP contains a total of 55 actions. The City recognizes that several factors, including technology maturity and implementation challenges, may cause actual reductions from individual actions to be higher or lower than estimated. The inclusion of many different actions in the CAP will help ensure that the 2020 target is achieved.

Quantified Actions and Non-quantified Actions

The CAP estimates the GHG emissions reduction potential for 40 of the Phase I actions, known as “quantified actions”. Documentation of how the GHG emission reduction estimates for the Phase I quantified actions were calculated is provided in **Appendix D** and the emissions factors used in the calculations are in **Appendix C**. The remaining “non-quantified actions” will also contribute to reaching the overall CAP reduction target, but their emissions reduction potential was not estimated for various reasons. Generally, either their GHG reduction potential could not be estimated at the time of Plan preparation or the action would reduce emissions for activities that were not measured by the baseline GHG Inventory. For those that could not be estimated for the CAP release, the omission was due to either: 1) insufficient data, such as unknown quantities of the units of measurements, to quantify GHG reduction potential, or 2) no reliable quantification methodology at present time to calculate these reductions. The City’s high standard for quantification methodologies may have resulted in the exclusion of some emissions reductions, but the standard reflects the City’s desire to not over estimate the reduction potential of the CAP actions. In the future, if reliable data or quantification methods are available, the City will include the reduction estimates.

As mentioned above, the emissions reduction potential of certain actions was also not quantified because those activities were not measured in the baseline GHG Inventory. These reductions, therefore, are not counted toward meeting the City's 2020 emissions reduction target, but remain in the CAP in recognition of their overall contribution to reducing GHG emissions and climate change.

As indicated in Chapter 2, the City also identified and estimated the potential GHG emission reductions that may be achieved within the Chico area as a result of the implementation of the AB32 Scoping Plan. The following actions were quantified and accounted for in this CAP because they most directly impact the Chico area, and have the potential to reduce emissions from activities that were measured in the baseline GHG Inventory:

- 1) Manufacture of more efficient vehicles (Pavley I and II and)
- 2) 33% renewable energy portfolio requirement for utilities by 2020 (RPS)
- 3) Low Carbon Fuel Standard

These external actions are estimated to reduce **84,874 MtCO₂e** from the Business as Usual emissions scenario by the end of Phase I with additional reductions expected during Phase II (see **Appendix E** for more details on how these actions were quantified).

Detailed Cost-Benefit Analysis of City-Implemented

The City conducted a subsequent, in-depth cost-benefit analysis on most the actions to be implemented by the City in Phase I, taking into account the exact costs and circumstances surrounding those actions. The results, further explained and summarized in **Appendix F**, show a net present value (costs and savings over the action lifetime, in current dollars) of over \$4.6 million in savings.

Tables 3.1 thru **3.5** throughout this chapter list and summarize the Phase I actions within each sector: Transportation, Energy, and Solid Waste. The total estimated GHG emissions reduction from the all of the Phase I actions, by sector, by implementer and collectively, is shown in **Table 3.1** below.

SECTOR	Total Identified Phase I Estimated Emissions Reductions (MtCO ₂ e)		
	City of Chico	Greater Community	Total
TRANSPORTATION ACTIONS	384	22,286	22,670
ENERGY ACTIONS	2,391	52,780	55,171
SOLID WASTE ACTIONS	63	203	266
COMMUNITY OUTREACH		542	542
TOTAL LOCAL ACTION REDUCTIONS:	2,838	75,811	78,649
TOTAL EXTERNAL ACTIONS REDUCTIONS:	84,874		84,874
TOTAL ESTIMATED PHASE I REDUCTIONS:			163,523
PHASE I TARGET REDUCTION GOAL			165,820

Table 3.1

Transportation Sector Actions

The baseline GHG Inventory identified transportation as the largest source of locally generated greenhouse gas emissions. It is also one of the most difficult sources of emissions to reduce because it can involve the installation of costly infrastructure as well as require a change in long established auto-related habits. If parking remains abundant and traffic is not congested, vehicle travel will continue to be a convenient option. Achieving the 2020 reduction target will, therefore, require significant changes to the transportation system in and around Chico. To reduce emissions in the transportation sector, changes need to occur in three areas: fewer vehicle miles traveled, improved vehicle efficiencies, and greater use of lower emission fuels. Phase I of the Climate Action Plan includes actions to capitalize on improvements in vehicle efficiency and public transportation, the use of alternative fuels, and strategies to decrease the amount of vehicle miles traveled.

Transportation Objective 1: Reduce Vehicle Miles Traveled

- 1.1 Car Share Programs:** Car sharing programs like “Zip Car” allow participants to reserve vehicles online for a low hourly rate. Although users are still using vehicles, it has been found that car sharing has a major impact on the travel behavior of its members by reducing the number and length of trips. Once members give up their personal cars, the car is no longer the default mode of travel and is therefore used less than a personally owned vehicle. Additionally, car share vehicles are often newer, more efficient models or hybrid vehicles. In 2009, CSU, Chico implemented the “Zip Car” program in which five fuel efficient cars are available to students, faculty and staff 24 hours a day, seven days a week. It is estimated that **1,856 MtCO_{2e}** of GHG emissions will be reduced from this effort by 2015.
- 1.2 Optimization of City Fleet:** In 2009, the City underwent a fleet optimization effort in which the City analyzed its fleet needs and removed unnecessary vehicles and equipment from its inventory. The City also revised its vehicle use policy to reduce the amount of take-home vehicles by City staff. Vehicles driven home are now limited to only those living within the Chico area and are only allowed upon approval of the City Manager on an annual basis. The number of take-home vehicles was reduced from over 35 vehicles down to approximately 12. The City’s new take home vehicle policy and its other fleet optimization efforts has resulted in an annual fuel savings of 32,731 gallons, which is estimated to reduce GHG emissions by **308 MtCO_{2e}** per year.
- 1.3 Subsidize Employee Bus Ridership:** The City and Butte County Association of Governments (BCAG), who administers the Butte Regional Transit System (B-Line), established a program 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 CSU, Chico staff and students. This action will continue this practice and will expand public education and promotion efforts to increase the use of the program by more downtown employers, employees, and students. An estimated **4,308 MtCO_{2e}** of GHG emissions will be reduced from this Phase I action.
- 1.4 Flexible Work Schedules:** In 2008, the City of Chico instituted a 9-80 flexible work schedule in which employees may choose to work nine 9-hour days with one day off over a two-week work period. This one day less of commuting by the current employees on a flex schedule results in an estimated GHG emissions reduction of **23 MtCO_{2e}** annually. This action will also include encouraging other Chico employers to consider establishing flex schedules within the work place.
- 1.5 City Travel Demand Management Plan:** Develop and implement a Travel Demand Management Plan that provides incentives for City employees to commute in modes other than single-occupant vehicles. An estimate of the GHG emissions that would be reduced by this action was not quantified because it is unknown at this time how many employees will participate (CIRC-9.1.1).
- 1.6 Carpooling Program:** A core component of this action will be to consider developing or subscribing to a web-based carpooling website, such as “RideShare” or “Zimride”, where people with similar commutes can find each other and create effective car pools. In addition to the ZipCar program, CSU, Chico also participates in the Zimride carpool program. The City will work with

BCAG and other relevant agencies to further facilitate ridesharing in the community. Additionally, the City will pursue options to provide shade, weather protection, seating, lighting, and bike racks at carpool pick up areas to facilitate resident participation in casual carpools. The City will also explore the need for additional ride share stations. It is estimated that **288 MtCO_{2e}** of GHG emissions will be reduced from this action.

1.7 Employer Vehicle Trip Reduction Programs: Through education and outreach, encourage existing employers to provide transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting and work-at-home programs, and preferential parking for carpools/vanpools to reduce vehicle miles traveled. Also, consistent with the General Plan, require new non-residential projects that employ more than 100 people to submit a Travel Demand Management Plan that identifies strategies, including, but not limited to transit subsidies, bicycle facilities, alternative work schedules, ridesharing, telecommuting and work-at-home programs, to reduce single-occupancy vehicle trips. The estimated GHG emissions reduction for this action was not quantified because this is primarily an educational campaign and it is unknown at this time how many employers and employees may participate in a trip reduction program (CIRC-9.1.2, CIRC-9.1.3) .

1.8 Expanded and Improved Bus Service: In 2009/10, the Butte County Association of Governments conducted a Market Based Transit Study of the Butte Regional Transit System (B-Line) to determine user needs and to improve transit productivity. Based on the study's recommendations, regional and Chico routes were adjusted to improve on-time performance and to establish an express bus route providing service to Chico from the south end of the town, through the major points of destination every 15 minutes. Changes in hours of route operations, and identification of additional transfer locations were also achieved. Comparing ridership in a calendar month before and after the improvements (November 2009 to November 2011) reveals that B-Line ridership in Chico has increased approximately 9% and that the increasing ridership trend is continuing. It was estimated that this increase bus ridership decreased annual GHG emissions by **4,846 MtCO_{2e}**.

1.9 Regional Transportation Planning: SB375 requires Metropolitan Planning Organizations like Butte County Association of Governments (BCAG) to create a Sustainable Communities Strategy (SCS) in their regional transportation plans to reduce greenhouse gas emissions from passenger vehicle trips. The SCS aims to more closely coordinate land use and transportation planning and includes strategies to reduce vehicle miles traveled and therefore greenhouse gas emissions. The City and the Transportation Ad-Hoc Committee of the Sustainability Task Force will work with local and regional planning organizations, such as BCAG, to develop and implement long-term community transportation strategies.

Although SB 375 is expected to reduce vehicle miles traveled (VMT) and transportation-related emissions, this action is not separately quantified due to the overlap with the current transportation, land use, and transit-oriented development actions already included in the CAP. For instance, Chico's recently adopted 2030 General Plan directs infill, mixed-use, and compact urban development, promotes thoughtful urban design, and details multi-modal circulation enhancements community-wide, making it a critical component of BCAG's SCS.

1.10 Sustainable Policy and Regulatory Framework: As mentioned in Chapter 1, the 2030 General Plan, adopted in April 2011, reinforces the City’s compact urban form. Future development projects must be consistent with the General Plan, which guides infill and mixed-use development to areas contiguous to existing development, so it may be efficiently served by the extension of infrastructure and municipal services. The Plan further emphasizes a balanced, multimodal circulation system that is efficient and safe, connecting neighborhoods to jobs, shopping, schools, services, local attractions, and open space. Implementation of the 2030 General Plan policy framework, and the supporting comprehensive update of development standards in the City’s Municipal Code, will result in increased densities and thoughtful mixed-use layouts that support the use of alternate modes of transportation, and therefore reduced VMT and GHG emissions.

As part of the General Plan EIR, a 4Ds (density, diversity, design, destination) analysis was performed comparing buildout of the 2030 General Plan Land Use Diagram to buildout of the 1994 General Plan Land Use Diagram (business as usual). The analysis showed that the 1994 General Plan Alternative had a VMT per household of 64 miles, while the 2030 General Plan Land Use Alternative had a VMT per household of 56 miles (11 percent reduction). The analysis concluded that this significant reduction is due to the 2030 General Plan Land Use Alternative being considerably denser, more diverse, having better pedestrian design, and having better access to regional destinations when compared to the 1994 General Plan. This action, which includes the following sub-actions, is estimated to reduce GHG emissions by **7,754 MtCO_{2e}** by 2015.

1.10.1 Tiered City Fee Structure: The City will update and adopt a tiered development fee program that varies fees by development type and location in recognition of the different impacts that various types of development have on City services and infrastructure costs. This will be another incentive for infill development for which GHG emissions reductions were quantified elsewhere. (LU-4.1.2)

1.10.2 Pedestrian Connections for New Development: The City will amend the Municipal Code to require new subdivisions and large-scale developments to include safe pedestrian walkways that provide direct links between streets and major adjacent destinations such as transit stops, schools, parks, shopping centers, and jobs.

1.11 Expand and Enhance Bicycling and Pedestrian Infrastructure: Bike racks are essential to encourage bicycle ridership for commuting and daily shopping and errands. The City will identify commercial and public areas that lack appropriate levels of bicycle parking and install the needed facilities, as funding is available. The City also requires the provision of adequate bicycle parking for tenants, employees, and customers in new residential and non-residential development. To avoid double counting of GHG emissions reductions, the GHG reductions that may be attributed to this action is included in Action 1.10- “Sustainable Policy and Regulatory Framework” above .

1.12 “Complete Streets” Policy: As indicated in the 2030 General Plan, the City has a “complete streets” policy to facilitate all modes of travel (public transit, cars, bicyclists, pedestrians) as safely as possible on new, and as funding allows on existing streets. This action will help improve pedestrian infrastructure, such as ensuring that sidewalks are continuous and complete, and improving the

Americans with Disabilities Act (ADA) access at intersections (CIRC-2.1.1). The GHG emissions reductions that could be attributed to this action are included in Action 1.10 above.

1.13 Corridor Management Measures and Traffic Calming: The City has an ongoing program of modifying major road corridors to enhance traffic flow and to reduce congestion and vehicle idling. Modifications include, but are not limited to, synchronization and optimization of signal timing, multi-modal roadway enhancements, intersection capacity improvements, and roundabouts. Since the 2005 base year, the following corridors have been enhanced:

- East Avenue/Manzanita/Bruce Road from Nord Avenue to SR 32,
- W. 8th Avenue between Nord and Esplanade,
- E. 5th Avenue between Esplanade and SR 99,
- Mangrove Avenue between SR 99 to E. 1st Avenue, and
- E. 1st Avenue between Esplanade and Downing Avenue.

As a result of the flow management enhancements, City Engineering staff estimates a reduction in vehicle emissions along these corridors of between 10 and 20 percent. In addition, the City continues to implement traffic calming measures such as landscape medians and street corner bulbouts to improve pedestrian safety and to reduce greenhouse gas emissions by lowering traffic speeds and improving the pedestrian and bicycle environment. Where practical and cost-effective, the City will continue to implement traffic calming and corridor flow management measures along existing roadways and in new development. The GHG emissions reductions for this action has not been quantified as it relates to other transportation related actions.

1.14 New Bike Paths: The City will continue to require new bike paths as part of conditions applied to new projects through the development review process, and will enhance the existing network as funding allows. Examples of new bike path opportunities are the recently constructed Hwy 99 Corridor Bikeway Project and the proposed 1st Street/2nd Street Couplet project (see side bars). The construction of these two projects alone is estimated to reduce GHG emissions by **1,455 MtCO₂e** annually.

Hwy 99 Corridor Bikeway Project

The City's award-winning Hwy 99 Bikeway Project consists of a 7-mile long contiguous bike path generally paralleling State Route 99. The project is being developed in two phases. Phase I was completed in 2011, and Phase II should be finished within three years. The bikeway commences at Eaton Road and traverses south to Southgate Avenue across a combination of Class I and Class II/III facilities, as well as bike bridges over creeks.

This action also includes the City updating its Bike Master Plan to include connections, crossings, and standards to support the new General Plan Land Use Diagram, enhance bicycle and pedestrian circulation community-wide, support safe routes to schools, and reduce reliance on the automobile

1.15 Pursue A Solid Waste Franchise System: Currently, the City has a solid waste permit system in which two waste haulers are allowed to provide waste service, curbside recycling, and yard waste recycling to Chico residents and businesses. Because the customer has a choice between either of these two haulers, six heavy diesel-powered solid waste vehicles can potentially traverse any given street in Chico every week. This action proposes to reduce vehicle miles traveled by establishing waste zones in which each hauler will be assigned a given area to serve, resulting in an estimated **683 MtCO₂e** of GHG emissions reduced each year.

1.16 Safe Routes to Schools: A large number of children are driven to school each day in private automobiles. The City will ensure that essential infrastructure improvements are made to enable safe routes to schools to promote students' walking and bicycling. The City will also work with schools to create trip reduction programs that encourage walking, bicycling, carpooling, and public transit use. Specific attention will be placed on expanding the walking school bus programs throughout the community, where children walk to school in adult supervised and school coordinated groups. An estimate of the GHG emissions that would be reduced by this action was not quantified because it is unknown at this time how many students are affected by the safe routes to schools projects. This action will be monitored and the GHG emissions will be quantified as each "safe routes to schools" project is implemented.

1.17 Comprehensive Update of City Parking Standards: Policies in the General Plan direct amendments to the City's parking standards. Through the Title 19 Municipal Code Update, the City will adopt new parking standards for parking areas that facilitate carpooling and alternative transportation. New standards may include:

- Providing reserved preferential parking spaces for car-share, carpool, and ultra-low or zero emission vehicles
- Minimum and maximum parking requirements that reduce surface parking area and ensure areas are not over-parked based on development intensity, proximity to transit, and availability of nearby on-street parking and parking facilities
- Promoting shared parking among different land uses, where feasible
- Requiring covered and uncovered bicycle parking at higher ratios
- Providing employee facilities to support alternative modes, including showers and lockers
- Providing convenient pedestrian pathways through parking areas.

An estimate of the GHG emissions that would be reduced by this action was not quantified, but will be monitored and determined during Phase I.

Transportation Objective 2: Expand the Use of Alternative Fuels

- 2.1 Community Use of Biodiesel (B20):** Biodiesel is alternative diesel fuel derived from biological sources (such as vegetable oils or tallow), which can be used in unmodified diesel-engine vehicles. Most commonly, these fuels are used in a blend with petroleum diesel. For example, B20 would be a mixture containing 20% biodiesel and 80% petroleum diesel. Some local residents and businesses are already using biodiesel fuel when it is available, and many others express interest. The GHG emissions that have been reduced by the local use of biodiesel is estimated at **11 MtCO_{2e}**.
- 2.2 Hybrid Vehicles:** Hybrids emit 80% fewer harmful pollutants and greenhouse gases than comparable gasoline cars.⁴⁵ This action would expand upon the City's current efforts to replace traditional gas and diesel vehicles with hybrid or electric vehicles when a fleet vehicle is due for replacement. This action sets the goal to replace City vehicles with alternative fuel or hybrid technology by 2015. The City also attempted to identify the number of hybrids purchased by members of the Chico community. Using the CAPP software, the City estimates that replacing vehicles with hybrids would decrease greenhouse gas emissions by **875 MtCO_{2e}** annually.
- 2.3 Electric Vehicles:** The City of Chico has several electric vehicles that it uses at its wastewater treatment plant and fleet maintenance yard. The City will be exploring the feasibility of using more electric vehicles for City operations, such as for Parks maintenance crews and as pool cars for employees. In addition during Phase I, the City will, to the best of its ability, quantify and account for GHG emission reductions achieved from the purchase of electric vehicles by local residents and businesses from 2005-2015. This action is estimated to reduce the GHG emissions by **74 MtCO_{2e}**.
- 2.4 Electric Vehicle Charging Stations:** In order for the City and the community to purchase more electric vehicles, it is imperative that electric charging stations be located in convenient and accessible locations throughout Chico. As called for by the 2030 General Plan and the update of Title 19 of the Municipal Code, the City will consider installing electric vehicle charging stations at City facilities and in municipal parking lots, and will encourage the installing of stations by businesses and large employers. This action is estimated to reduce the GHG emissions by **3 MtCO_{2e}**.
- 2.5 Compressed Natural Gas (CNG) Conversion:** Natural gas is a clean-burning alternative to gasoline or diesel for municipal and private fleet vehicles. While natural gas is a fossil fuel, it has lower carbon emissions per unit of energy than gasoline or diesel. Since the 2005 base year, the Butte Regional Transit System (B-Line) has been converting its regional and local buses to use CNG. The City will also consider the purchase of CNG vehicles and equipment where feasible. This action is estimated to reduce annual GHG emissions by **186 MtCO_{2e}**.

The following **Table 3.2** lists each Phase I Transportation Sector action, identifies the anticipated implementer (City of Chico or the greater community), and provides the estimated annual GHG emissions reduction (if available).

PHASE I TRANSPORTATION SECTOR ACTIONS		Implementor		Estimated Emissions Reductions (MtCO _{2e})		
		City of Chico	Greater Community	City of Chico	Greater Community	Total Reduction
Objective 1: Reduce Vehicle Miles Traveled						
1.1	Promote Car Share Programs		x		1,856	1,856
1.2	City Fleet Optimization	x		308		308
1.3	Subsidize Employee Bus Ridership	x	x		4,308	4,308
1.4	Flexible Work Schedules	x	x	23		23
1.5	City Travel Demand Mgmt Plan	x		TBD		TBD
1.6	Carpooling Program		x		288	288
1.7	Employer Trip Reduction Programs	x	x		TBD	TBD
1.8	Expand/Improved Bus Service		x		4,846	4,846
1.9	Regional Transportation Planning	x			TBD	0
1.10	Sust. Policy/Regulatory Framework including:	x			8,563	8,563
	1 Tiered City Fee Structure	x				incl. in 1.10
	2 Pedestrian Connections for New Development	x				incl. in 1.10
1.11	Expand Bicycling/Pedestrian Infrastructure	x	x			incl. in 1.10
1.12	Complete Streets Policy	x				incl. in 1.10
1.13	Corridor Management/Traffic Calming	x			TBD	TBD
1.14	New Bike Paths	x	x		1,455	1,455
1.15	Solid Waste Franchise System	x			683	683
1.16	Safe Routes to Schools	x	x		362	362
1.17	Update of City Parking Standards	x			TBD	TBD
Objective 2: Expand Use of Alternative Fuels						
2.1	Community Use of Biodiesel (B20)		x		11	11
2.2	Hybrid Vehicles	x	x	53	822	875
2.3	Electric Vehicles		x		74	74
2.3	Electric Vehicle Charging Stations	x	x		3	3
2.5	Compressed Natural Gas (CNG) Conversion:		x		186	186
TOTALS:				384	23,547	23,931

TBD: To be determined as part of the annual monitoring and evaluation of the implementation of the actions.

Table 3.2

Energy Sector Actions

The energy sector offers some of the most cost-effective opportunities to reduce GHG emissions, and Phase I capitalizes on these opportunities. Saving energy and saving money go hand in hand, and a significant number of community members have already reduced their energy consumption for one or both of these reasons. Three examples of these types of reductions include the installation of lighting occupancy sensors, large-scale commercial lighting upgrades, and building efficiency retrofits. The City has also taken significant steps to reduce energy consumption, including retrofitting over 1,200 streetlights with LED bulbs and installing a 1-megawatt solar panel array at the wastewater treatment facility.

Water conveyance is the highest use of energy in California. Conserving water, therefore, is a valuable way to save energy, and both the city and many community members have already taken water conservation steps such as installing low-maintenance landscaping and central irrigation control systems which irrigate based on weather and evapotranspiration (i.e. the amount of water that evaporates or transpires from the plant's leaves) rates of plants.

To achieve GHG reductions from the Energy sector, the CAP includes 22 actions for implementation during Phase I:

Energy Objective 1: Upgrade and Tune-up Equipment

- 1.1 Upgrade equipment and appliances to ENERGY STAR:** ENERGY STAR is a partnership between the U.S. Environmental Protection Agency and industry to voluntarily label products, such as appliances, office and other equipment, and lighting fixtures, which meet certain energy efficiency criteria. It is estimated that **5,184 MtCO_{2e}** emissions reduction has already been achieved from the purchase of Energy Star appliances and equipment by the City and the community. It is also assumed and calculated that GHG emissions will continue to be reduced by this action through 2020.
- 1.2 Personal Computer Recycling and Power Management:** The City seeks efficient information technology equipment and encourages sustainable practices throughout the equipment's life cycle. The City has been using power management programs for personal computers, strategically replacing inefficient equipment, and developing an internal reuse program for equipment that was once discarded. For example, since 2005, many of the City's personal computer monitors have been switched from cathode ray tube (CRT) to more energy efficient liquid crystal display (LCD) and old computers and equipment are recycled where possible. An estimate of **31 MtCO_{2e}** of emissions has been reduced from this program.
- 1.3 Heating Ventilation and Air Conditioning (HVAC) Retrofits:** HVAC systems, which includes boilers and chillers, are one of the largest energy users in commercial buildings. Energy used to heat, cool, and ventilate contributes to the majority of energy used in buildings. Replacing older units with appropriately sized and more efficient units can reduce energy use by up to 30%.

The City has replaced and intends to continue to replace older HVAC units in City buildings with energy efficient models as needed. HVAC units have also been replaced since the 2005 base year by other agencies and businesses. The City will also provide information to residents and businesses on

the energy use, GHG emissions reductions, and cost savings that can be achieved by retrofitting HVAC systems. This measure is estimated to reduce GHG emissions by **1,371 MtCO_{2e}**.

Energy Objective 2: Green Building and Energy Efficiencies

Buildings account for 40% of total energy use and about 35% of GHG emissions in the United States. Design and construction of new buildings, or major renovation of existing ones, is the easiest time to implement energy saving measures that reduce GHG emissions. "Green Building" is defined as a whole-systems approach to the design, construction, and operation of buildings that helps mitigate the environmental, economic, and health impacts of buildings. Green building practices recognize the relationship between natural and built environments and seek to minimize the use of energy, water, and other natural resources and provide a healthy productive indoor environment.

- 2.1 California Green Building Standards Code (CALGreen):** Under this GHG reduction measure, the City will enforce the mandatory actions required under and provide resources and information to encourage the building industry to implement the voluntary actions. The City will also continue to provide information and support to developers and contractors on LEED and GreenPoint standards. An estimated **329 MtCO_{2e}** of GHG emissions will be reduced from this Phase I action.
- 2.2 Installation of Reflective or "Cool Roofs":** A dark roof absorbs heat from the sun, creating higher urban temperatures and increasing the need for air conditioning. "Cool roofs" involve the installation of roofing materials with higher solar reflectivity to counter this heat island affect. California has required white colored material for flat roofs since 2005. The City will track "cool roof" installations and will implement a public information campaign to encourage residents and businesses to install "cool roofs" when replacing existing roofs on older buildings. The square footage of "cool roofs" installed within the community, such as at the Chico Mall, is used to estimate the GHG emission reductions of **99 MtCO_{2e}** from this action.
- 2.3 Low Income Weatherization Program:** While low-income earners may have smaller houses and fewer appliances than higher-income earners, their homes are often older and more poorly insulated. Low-income weatherization programs seal cracks around windows and doors, add insulation, and sometimes replace inefficient appliances, reducing energy use, related GHG emissions and lowering utility bills.

PG&E offers an Energy Savings Assistance Program to income-qualified renters and homeowners to make improvements to their dwellings. The improvements include compact fluorescent lights, caulking, showerheads, minor home repair, and other weatherization measures. Participants may also receive replacement of old refrigerators, furnaces, and/or water heaters. This program retrofits on average approximately 2,000 older homes in the Chico area each year. The City of Chico also offers low-income residents opportunity to improve the energy efficiency of their homes through its Low Income Housing Rehabilitation Program. An estimated **12,798 MtCO_{2e}** of GHG emissions will be reduced from this action.

2.4 Home Energy Requirements Upon Resale (RECO): In 2011, the City updated its existing Residential Energy Conservation Ordinance (RECO), which requires energy and water efficiency upgrades at the point-of-sale, prior to transfer of ownership. Upgrades include items such as attic insulation, programmable thermostats, water heater insulation, hot water pipe insulation, and draft elimination through caulking and sealing. An estimated **38 MtCO_{2e}** of GHG emissions will be reduced from this action.

2.5 PG&E Innovator Pilot Energy Efficiency Grant: Many homeowners are not aware of the energy and cost saving potential of relatively minor home improvements. The City received a grant from PG&E to implement the Innovators Pilot Program described later in the community outreach section. The program includes providing energy audits, weatherization retrofits, and personal energy efficiency consultations for 100 residents. This action includes continuing to seek funding to expand weatherization retrofits to older middle-income homes through the Energy Upgrade California program or other sources. It is estimated that **75 MtCO_{2e}** of GHG emissions will be reduced from the Innovators Pilot program.

2.6 Financial Incentives for Energy Efficient Improvements: AB 811, passed in July of 2008, allows local governments to assess property owners who install renewable energy and energy efficiency improvements on their properties and want to pay for the cost of the projects over time through their property tax bills. If the property is sold, the outstanding loan balance is taken over by the new owner. AB811 allows property owners to avoid up-front installation costs.

These types of programs are typically called Property Accessed Clean Energy, or PACE, programs. The City will pursue joining a PACE program to seek financing to fund these types of improvements for both residential and non-residential property owners. The amount of GHG emissions that potentially can be reduced from this action will be determined and calculated based on the projects funded through the PACE program

Energy Objective 3: Improve Lighting Efficiency

3.1 Light Emitting Diode (LED) Streetlights: Replacing conventional high-pressure sodium and metal halide lamps in streetlights with LED lamps is a proven and cost-effective way to reduce both energy consumption and GHG emissions. In 2011, the City used a large portion of its allotment of Energy Efficiency & Conservation Block Grant funds from the American Resource and Recovery Act to replace 1,210 of the over 4,100 (25%) City-owned streetlight lamps with LEDs.

The City will continue to replace streetlights with LED lamps as funding becomes available and will require LED streetlights in all new development. In addition, over 1,500 of the streetlights in Chico are owned by PG&E, and the City will work with them to encourage the conversion of these utility-owned streetlights to LED. The total estimated emissions reductions from this action are estimated to be **160 MtCO_{2e}**.

- 3.2 Commercial Lighting Upgrades:** Most commercial buildings use fluorescent lighting, which is relatively efficient, but many buildings still have older fixtures with magnetic ballasts and T-12 size fluorescent tubes. New electronic ballasts with T-8 size tubes use 30% less energy. The City and many local businesses and manufacturers, such as Smuckers Natural Foods, have upgraded their commercial lighting to T-8 or in some cases T-4 fluorescent lighting. The City will continue to upgrade the lighting in municipal facilities and will work with PG&E to encourage other businesses to install lighting upgrades. It was estimated that lighting upgrades installed by the City and the community will reduce annual GHG emissions by **12,830 MtCO_{2e}**.
- 3.3 Occupancy Sensors:** Occupancy sensors detect motion, and if no motion is detected after a set period, the sensor turns off or dims lights. Sensors are a low-cost way to save energy on lighting, with a typical payback time of less than two years. The City has installed sensors in many of the City facilities, but will complete the installation of sensors in remaining city-owned buildings. The City will also provide information regarding the energy and GHG savings associated with and encourage the installation of occupancy sensors in local businesses, schools and other institutions. An estimated **106 MtCO_{2e}** of GHG emissions will be reduced from this action.
- 3.4 LED Exit Signs:** Older exit signs are lit by incandescent bulbs which use 40 watts per sign, while LED exit signs use 5 watts or fewer per sign, a savings of 87%. One simple measure that the City can take to reduce their GHG emissions and achieve energy savings is to install light emitting diode (LED) exit signs in its municipal buildings. In this action, the City proposes to replace 74 existing incandescent exit signs with LED signs, thereby reducing GHG emissions by **8 MtCO_{2e}**.
- 3.5 Energy Fitness Commercial Lighting Upgrades:** This program, administered by Richard Heath and Associates (RHA), provides free lighting retrofits, air conditioning tune-ups, vending machine misers, occupancy sensors, and energy saving services to small and very small businesses in the Northern California area. The City will encourage PG&E and RHA to continue to provide funding for this program, and estimate that ultimately **4,224 MtCO_{2e}** emissions will be reduced with this action.

Energy Objective 4: Renewable Energy Generation

- 4.1 Installation of Solar Photovoltaic (PV) Systems:** This action includes the identification of the solar PV panels that have been installed by residents, businesses, the City, and other public agencies since the 2005 base year. These installations include a 1.1 megawatt PV array at the City's wastewater treatment plant, a nearly 2 megawatt PV solar system at the Sierra Nevada Brewing Company and PV arrays recently installed by the Chico Unified School District at the two high schools in Chico. This action also calls for the City to identify additional opportunities for solar panel installations on existing and new City facilities/properties. In addition, the City will continue to allow easier and quicker permit approval for the installation of solar panels by the private sector. An estimated **8,321 MtCO_{2e}** of GHG emissions will be reduced annually from this action.
- 4.2 California State University, Chico Switching to PG&E:** In 2005, CSU, Chico was obtaining its gas and electricity from an Arizona energy provider, whose primary source of energy was generated from coal. In 2009, the University switched to PG&E, which has a much greener energy

grid mix than their previous provider. This change in energy service providers resulted in a reduction of **8,730 MtCO_{2e}** of greenhouse gases emitted annually in the Chico area.

4.3 Methane Gas Recovery at the City's Wastewater Treatment Plant: It has been the past practice at the City's wastewater treatment plant to flare off the methane that is generated from the treatment of the wastewater produced from Chico residents and businesses. As part of recent expansion of the plant, a new co-generation system was installed to capture and convert the methane into reusable gas to replace a majority of the natural gas used to run the plant. It is estimated that the co-generation unit will reduce GHG emissions by **766 MtCO_{2e}** by 2015.

Energy Objective 5: Promote a Healthy Urban Forest

The City has a robust urban forest, which encompasses over 30,000 City street trees, and as many or more privately owned trees. Trees reduce greenhouse gas emissions by removing CO₂ from the atmosphere, and by shading our homes and office buildings thereby reducing air conditioning needs and the amount of fossil fuel burned to produce electricity.

5.1 Urban Forest Management Plan: The City will develop an Urban Forest Management Plan that will include the following:

- Maintain existing city trees through regular, scheduled service
- Planting new trees to replace those that require removal and enhance the street tree canopy, where needed
- Require street and parking lot tree planting in new development
- Work with commercial parking lot owners to improve the shade canopy
- Implement the Municipal Code's tree protection regulations
- Use volunteer groups and property owners to plant new trees, care for newly planted trees, maintain young trees, and provide information and instructions regarding such care and maintenance (OS-6.1.1)

Due to many variables and because this plan has not yet been prepared, the amount of GHG emissions reductions associated with this action have not been quantified at this time.

Energy Objective 6: Water Conservation

6.1 Weather Based Central Irrigation Control System: Weather-based or evapotranspiration (ET) irrigation controller systems analyze soil moisture content and irrigate only when plants need water. These systems optimize irrigation efficiency and avoid over watering. The City installed an ET controller for most of its parks and public landscaped areas, and it will continue to identify additional public land that will be irrigated by this controller. The City will also develop a program to encourage the use of ET controllers in private landscapes. An estimated **10 MtCO_{2e}** of GHG emissions has been reduced from the additional City's acreage irrigated by this controller since 2005. (SUS-4.2.1)

- 6.2 Water Efficient Public Landscaping:** AB 1881, the Water Conservation in Landscaping Act of 2006, mandated increased water efficiency for both new and existing development statewide. The law required the Department of Water Resources to update the Model Water Efficient Landscape Ordinance (MWELo) in 2009, to take effect in 2010. Since January 1, 2010, the City has been implementing MWELo for every new commercial, multi-family, industrial, or tract home project containing 2,500 sq. ft. or more of landscaping installed by the developer. New landscapes installed by an individual homeowner that are more than 5,000 sq.ft. are also subject to the MWELo. An estimate of the GHG emissions that will be reduced annually from this action has not been quantified but will be tracked annually.
- 6.3 Low Maintenance Landscaping:** As funding allows, the City will install drought tolerant landscaping in compliance with AB 1881 at City facilities, medians, and parkway strips to reduce water use and maintenance costs. (SUS-4.2.1). An estimated **93 MtCO_{2e}** of GHG emissions will be reduced annually from this action.
- 6.4 Free Water Audit Program:** Many of Chico's buildings are more than 30 years old, and water fixtures and appliances have improved considerably since that time. Replacing antiquated equipment will result in valuable water conservation. Leaking pipes and faucets account for approximately 8% of water consumption in older buildings. The local water purveyor, California Water Service, offers free water efficiency audits and the City will participate in promoting this opportunity to the community. This action is not quantified because it is unknown how many residents and businesses will request a free water audit and what water conservation measures, if any, will be installed as a result of the audit.

Table 3.3, below, lists each Phase I Energy Sector action, identifies the anticipated implementer (City of Chico or the greater community), and when available, provides the estimated annual GHG emissions reduction.

PHASE I ENERGY SECTOR ACTIONS		Implementor		Estimated Emissions Reductions (MtCO ₂ e)		
		City of Chico	Greater Community	City of Chico	Greater Community	Total Reduction
Objective 1: Upgrade and Tune-up Equipment						
1.1	Energy Star Appliances and Equipment		x		4,707	4,707
1.2	Computer Recycling/Power Mgmt.	x		31		31
1.3	HVAC Retrofits	x	x	127	707	834
Objective 2: Green Building and Energy Efficiencies						
2.1	CalGreen Building Standards		x		330	330
2.2	Reflective or Cool Roofs		x		98	98
2.3	Low Income Weatherization Program		x		11,384	11,384
2.4	Home Energy Requirement Upon Resale (RECO)	x			75	75
2.5	Innovator Pilot Energy Efficiency Program	x			153	153
2.6	Financial Incentives for Energy Efficiency (PACE)	x			TBD	TBD
Objective 3: Improve Lighting Efficiency						
3.1	LED Street Lights	x		160		160
3.2	Commercial Light Upgrades	x	x	43	12,790	12,833
3.3	Occupancy Sensors		x		106	106
3.4	LED Exit Signs	x		8		8
3.5	Energy Fitness Comm. Lighting Upgrades		x		3,885	3,885
Objective 4: Renewable Energy Generation						
4.1	Solar Photovoltaic Systems	x	x	640	6,766	7,406
4.2	CSU, Chico Switch in Energy Providers		x		9,881	9,881
4.3	Wastewater Treatment Methane Recovery	x		772		772
Objective 5: Promote a Healthy Urban Forest						
5.1	Urban Forest Management Plan	x			TBD	TBD
Objective 6: Water Conservation Strategies						
6.1	Weather Based Irrigation Controllers	x	x	6	4	10
6.2	Water Efficient Public Landscaping Ord.	x	x	TBD	TBD	TBD
6.3	Low Maintenance Landscaping		x		93	93
6.4	Free Water Audit Program	x	x	TBD	TBD	TBD
TOTALS:				1,787	50,979	52,766

TBD: To be determined as part of the annual monitoring and evaluation of the implementation of the actions.

Table 3.3

Solid Waste Sector Actions

Although waste-related emissions were a relatively small contributor (3.9%) to the overall baseline emissions generated in Chico, the solid waste sector remains a viable cost-effective option for reducing greenhouse gas emissions. Actions taken to reduce waste-related emissions can also produce coincidental environmental and economic benefits of keeping waste out of the landfill. Recycling and composting efforts have been established practices throughout the community for decades. Phase I of the Climate Action Plan includes actions to expand many of these existing efforts, as well as to develop a methane gas-to-energy generation facility at the Butte County Neal Road Waste and Recycling Facility.

Solid Waste Objective 1: Expand Recycling Efforts

- 1.1 Expand Residential and Multifamily Recycling:** Recycling at multifamily residences can be challenging, especially in a college town where many of the tenants are students who move often. There is a need for consistent outreach to tenants on what can be recycled, and to property managers and landlords about the cost-savings and environmental benefits of waste diversion. Expanded outreach to the multifamily residents in Chico is underway. The City will implement a multifamily public outreach and educational campaign to increase the amount of recycling from multifamily complexes by 5%. The campaign will include “move-in” information packets, a reusable tote bag for tenants to store and transport their recyclables, and modified recycling containers to reduce contamination and illegal disposal in the recycling bins. It is also assumed in this action that as the City’s residential and commercial base grows, that there will be additional materials recycled through the curbside recycling programs. An estimate of the GHG emissions to be reduced from this action is included in the “Commercial and Industrial Recycling” action 1.3 below.
- 1.2 Expand the City’s Municipal Recycling Program:** Increase the use of recycling bins at municipal facilities, public parks, and recreational spaces, and as necessary, increase the size, durability, and number of recycling bins as well as the range of materials accepted (*SUS-3.3.1*). The amount of GHG emissions that will be reduced from this action cannot be quantified at this time, but will be monitored and assessed at the end of Phase I.
- 1.3 Commercial and Industrial Recycling:** AB 341 (Chesbro), which was passed in October 2011, establishes a statewide mandatory commercial recycling mandate. The purpose of the program is to reduce greenhouse gas emissions by diverting recyclable materials generated by commercial and industrial businesses from the landfill. According the law, on or after July 1, 2012, a business that generates more than four cubic yards of commercial solid waste per week or a multifamily residential dwelling of five units or more shall arrange for recycling services. Because many of Chico’s businesses are already recycling, it is difficult at this time to determine the amount of additional GHG emissions that may be achieved through this new mandatory program. However, AB 341 requires the City to conduct a public outreach campaign, monitor the implementation of the mandate, and to report to the State on the progress each year. The estimated GHG emissions reductions achieved from this program is estimated at **12 MtCO_{2e}** per year by 2015 (*PPFS-8.1.7*).

1.4 Environmentally Preferable Purchasing Program: As called for by the General Plan (*SUS-3.1.1*), the City will develop and implement an Environmentally Preferable Purchasing Program that directs the purchase of products and services for municipal operations that are environmentally preferable (e.g., renewable, recyclable, non-toxic) and sold locally to the maximum extent economically and legally feasible. The amount of GHG emissions that will be reduced from this action cannot be quantified at this time, but will be monitored and assessed at the end of Phase I.

Solid Waste Objective 2: Expand Composting Efforts

2.1 Expand Yard Waste and Other Organic Composting: Curbside yard waste recycling is available to Chico residents and businesses. In addition, the City operates a compost facility that provides a convenient yard waste drop-off location for residents, landscapers, tree trimmers, and other businesses. As the population expands and the existing trees grow, it is assumed that more yard waste will be generated and composed within the Chico area. As part of its review of franchise waste zones, the City will also look to provide financial incentives to encourage more residents and businesses to participate in the yard waste recycling programs. An estimated **168 MtCO_{2e}** of GHG emissions will be reduced from this action.

Solid Waste Objective 3: Green Building

3.1 CALGreen Waste Diversion Requirement: The 2008 California Green Building Code (“CALGreen”) requires building contractors to recycle 50% of Construction and Demolition (C&D) debris from all 1) new construction projects, 2) full structure demolitions, and 3) alterations/tenant improvements with a contracted construction value of \$250,000 or more. Due to the economic downturn and the slow growth in new development, it is difficult to determine the potential GHG emissions from this action. However, contractors are required to submit waste management plans to the City for each project subject to the CALGreen standards. The City will track the tons of C&D waste recycled and annually calculate the associated GHG emission reductions resulting from this waste diversion mandate.

Solid Waste Objective 4: Renewable Energy Generation

4.1 Generate Energy from Landfill Methane Capture: During the 2005 base year, the methane that was produced at the Butte County Neal Road Landfill, which holds the majority of Chico's waste, was flared off rather than captured as energy. Starting in 2012, the County plans to capture and utilize the methane to generate up to 2.2 megawatts (enough power for approximately 1,383 homes). The amount of energy produced from Chico's proportionate share of waste at the landfill is estimated to reduce GHG emissions by **86 MtCO_{2e}** per year during Phase I.

The following **Table 3.4** lists each Phase I Solid Waste Sector action, identifies the anticipated implementer (City of Chico or the greater community), and provides the estimated annual GHG emissions reduction (if available).

PHASE I SOLID WASTE SECTOR ACTIONS		Implementor		Estimated Emissions Reductions (MtCO2e)		
		City of Chico	Greater Community	City of Chico	Greater Community	Total Reduction
Objective 1: Expand Recycling Efforts						
1.1	Residential/Multifamily Recycling		x		Incl. below	Incl. below
1.2	Commercial/Industrial Recycling	x	x		12	12
1.3	City Municipal Recycling Program			TBD		TBD
1.4	Environmentally Preferable Purchasing	x		TBD		TBD
Objective 2: Expand Composting						
2.1	Yard Waste/Other Organic Composting	x	x	63	105	168
Objective 3: Green Building						
3.1	CALGreen 50% C&D Diversion		x		TBD	TBD
Objective 4: Renewable Energy Generation						
4.1	Landfill Methane Gas Recovery	x	x		86	86
TOTALS:				63	203	266

Table 3.4

Community-Wide Education and Recognition Efforts

In addition to the specific actions described above, there are additional educational or collaborative efforts that can be taken by the City and the community to reduce GHG emissions. While it may not be possible to directly quantify these efforts, they are no less important in achieving the City's GHG reduction goal. These actions, described below, are intended to inform Chico residents about the need to reduce GHG emissions and foster a sense of involvement in and ownership of climate action in the community.

1) **School Outreach & Education Program:**

The City established an Education and Outreach Ad-Hoc Committee of the Sustainability Task Force to promote the CAP throughout the community and to develop and implement educational campaigns on climate action. The committee has already partnered with representatives from CSU, Chico, Chico Unified School District, and the Gateway Science Museum to develop a school educational outreach strategy. This strategy includes two main components: one targeted at 4th and 5th grade elementary school students, and the other at 9th and 10th grade high school students.

The aim of these educational outreach campaigns is to educate students about the science of climate change, focusing on causes and consequences, and to engage participants in climate action. For the younger students, outreach will include simple games and activities that teach how to reduce one's environmental impacts. For the older students, outreach will include service-learning projects, such as assisting directly in implementation of CAP actions. By educating and empowering students, Chico will develop a vital resource in the long-term effort to curb GHG emissions and climate change.

2) Sustainable Business Recognition Program:

The City will implement a sustainable business program to recognize and encourage businesses to voluntarily go beyond minimum requirements to run environmentally-friendly business operations. By implementing a combination of required and optional measures, businesses may receive recognition in one or more of the following sustainability categories; transportation, energy efficiency, water conservation, waste prevention, pollution prevention, and social equity. Although this is an public outreach program, the City did calculate that this program has the potential to reduce GHG emissions by **542 MtCO2e** per year. (SUS-1.5.3)

		Implementor		Estimated Emissions Reductions (MtCO2e)		
		City of Chico	Greater Community	City of Chico	Greater Community	Total Reduction
PHASE I SOLID WASTE SECTOR ACTIONS						
Objective 1: Community Outreach						
1.1	Sustainable Business Recognition	x			542	542

Table3.5

3) Sustainability Website:

The City will create a webpage that describes the City’s sustainability efforts, identifies partnerships, and provides educational resources and opportunities for community members. The site will also serve as a clearinghouse for information on Chico’s climate action program. (SUS-1.5.1)

4) Air Quality Mitigation:

The City is collaborating with the Butte County Air Quality District (BCAQMD) as they update their California Environmental Quality Act (CEQA) Air Quality Handbook to include recommendations and mitigation measures for projects to avoid having a significant impact through contributions to GHG emissions. The City and BCAQMD will employ locally appropriate environmental review guidelines to further help mitigate increases in GHG emissions.

PG& E Innovator’s Pilot Program

In 2010, the City of Chico was awarded the “Innovators’ Pilot Grant” from PG&E to work with local residents to reduce their home energy consumption. The Sustainability Task Force established an Innovators’ Pilot & Residential Outreach Ad-Hoc Committee to oversee the implementation of this program. Through this grant, the City will offer “whole house” Building Professional Institutes (BPI) energy assessments, basic weatherization measures as required by the City’s Residential Energy Conservation Ordinance (RECO), and personalized home energy consultations to 100 residents who own and reside in older homes. This program is estimated to reduce GHG emissions by **75 MtCO2e**.

Chapter Four: Phase II

By the end of Phase I in 2015, locally generated GHG emissions are projected to be reduced by 165,820 MtCO₂e from business as usual, to a level 10% below the 2005 base-year.

Achieving the CAP's overall 2020 goal will require Phase II emissions reductions that go significantly beyond Phase I levels. The Phase I actions will continue to reduce emissions during Phase II, and additional actions will be implemented to accelerate emissions reductions during this second Phase of the CAP. The Phase II reduction target is to further reduce emissions by an additional 20% or by **143,936 MtCO₂e** per year to achieve the overall CAP goal of reducing emissions to 385,749 MtCO₂e, which is 25% below baseline levels and 44.5% below BAU projections for 2020.

The CAP represents the City's best attempt to create an organized, community-wide response to the threat of climate change. The field of climate action planning is rapidly evolving. Over the next decade, new information about climate change science and risk is likely to emerge, new GHG reduction technologies and innovative municipal strategies will be developed, and State and federal legislation are likely to advance. In order to remain relevant and to be as effective as possible the CAP must evolve over time.

At the end of Phase I, the CAP will be reviewed and, if necessary, amended to include new actions to ensure the City meets its 2020 GHG reduction goal. The review will also consider advancements in climate science, new opportunities for GHG emissions reduction, and changes in climate policy. This chapter describes actions to be implemented in Phase II, but the list of actions to be implemented in Phase II may be revised in 2015 in response to:

- The results of the second comprehensive GHG Inventory;
- Reviewing the performance of Phase I actions;
- Changes to local circumstances surrounding emissions-generation;
- Updated reduction estimates for external and local actions.
- Any additional unanticipated local and external actions.

Second Comprehensive GHG Inventory

At the end of Phase I, the City will conduct a second comprehensive GHG emissions inventory, quantifying the emissions generated by City operations and those generated by the community, with a detailed breakdown of emissions generated by sector. The second inventory will measure the same sectors and geographic area used in the first GHG Inventory to accurately compare emissions levels and assess the impact of Phase I actions.

CAP Review and Amendment

Review of Phase I

A review and evaluation of Phase I will be conducted during 2015 so that, if necessary, a CAP amendment can be completed prior to the beginning of Phase II in 2016.

The CAP review will assess the successes and/or shortcomings of implementing Phase I actions. Using the results of the second GHG Inventory, the review will evaluate the degree to which external and local actions influenced emissions levels compared with the estimates originally made in the CAP. Any actions taken independently of the CAP by individuals and businesses during Phase I that were not accounted for in the CAP will also be identified and quantified if possible.

The review will also analyze the dynamic circumstances surrounding the CAP, and consider how they affected the implementation of Phase I. These circumstances may include: the condition of the local economy; input price levels (ranging from gasoline and kWh of energy to efficient technologies); relevant and available technologies; and funding sources for implementation. A careful evaluation of the Phase I results and the circumstances impacting them will help ensure that any adjustments made to the CAP for Phase II are most relevant and likely to steer the CAP toward meeting its 2020 goal.

Preparing for Phase II and CAP Amendment

After the Phase I review is complete, the emissions needed to achieve the 2020 goal may be recalculated. Depending upon the Phase I outcomes as shown by the second GHG Inventory and the CAP review, it may be necessary to adjust the amount of emissions reductions needed during Phase II to reach the targeted 2020 GHG emissions level of 385,749 MtCO_{2e}. If changes to the Phase II emissions reductions goals are needed for external and/or local actions, they will be established through the CAP amendment.

Estimation of Potential External Impacts in Phase II

To determine the level of local GHG reduction needed for the amendment, the City will first need to estimate the reductions from external actions in Phase II. Similar to Phase I, the reductions from external actions are anticipated to be primarily from changes in PG&E's grid mix, increases in automobile fuel efficiency, the diversion rates of locally generated waste, and other measures implemented through California's AB32 Scoping Plan.

Selection of Additional Actions

Many of the Phase I actions will continue to reduce GHG emissions during Phase II. It is projected that the continuation and/or expansion of all of the Phase I actions will collectively reduce GHG emissions by an estimated additional **18,672 MtCO₂e** per year by 2020. The following **Table 4.1** lists those Phase I actions for each sector that were projected to be expanded due to growth or other factors and the estimates of the additional projected annual GHG emissions reduction to be achieved between 2015 and 2020 .

Projection of Emissions Reductions from Applicable Phase I Actions by 2020		Projected 2020 Phase I Emissions Reductions
SECTOR		(MtCO₂e)
TRANSPORTATION		
Hybrid Vehicles		411
GP Sustainability Policy/Framework		7,872
ENERGY		
Energy Star Rebates		2,565
Low-Income Home Weatherization		7,069
Weatherization Retrofits Upon Resale (RECO)		38
Energy Fitness Lighting Efficiency Upgrades		1,847
CSU, Chico Energy Provider Switch		909
Solar PV Installations		4,597
WASTE		
Landfill Methane Gas Recovery		9
SUSTAINABLE BUSINESS PROGRAM		677
ESTIMATED TOTAL EXPANDED PHASE I REDUCTIONS:		25,994

Table 4.1

However, to meet the 2020 goal additional Phase II actions will be needed. Many are already included in this chapter, but others will likely be added through the CAP amendment process. New actions for Phase II may be selected by considering several of the following factors:

- Newly identified GHG reduction opportunities,
- Suggestions from the local community through public meetings,
- Policy direction in the Chico 2030 General Plan,
- Best practices from leading cities and organizations, and
- State and regional laws, guidelines, and recommendations.

The analysis of potential new Phase II actions will include determining the degree to which the action can be implemented, calculating an estimate of the potential emissions reduction, estimating the action's related costs and savings, and identifying the likely implementer or implementers.

CAP Amendment

The amendment should be presented to the City Council and ready to implement by the beginning of Phase II in 2016. The amendment may require additional environmental review and will be adopted by the City Council through a public process.

Phase II Actions

The CAP includes 27 Phase II actions described below and depicted in **Tables 4.2** through **4.5** for each sector: Transportation, Energy, and Solid Waste. There are fewer actions in Phase II than Phase I because many of the Phase I actions will still reduce emissions during Phase II and because the list of Phase II actions will be reviewed and likely expanded before Phase II begins. For many of the reasons stated above, the GHG emissions reductions for these potential actions have not been quantified at this time, but will be estimated if and when chosen for implementation during Phase II.

Transportation Sector Actions

Objective 1: Reduce Vehicle Miles Traveled

- 1.1 Require large employers to provide facilities that encourage bicycle commuting:** A large barrier to cycling as a means of commuting to work is a lack of facilities for changing into work clothes and protecting bicycles from the rain. Shower facilities encourage people who live further away to cycle to work. Covered and indoor bicycle parking increase security and prevent bikes from getting wet during the winter. The new requirement will establish a standard for when new development must provide showers and covered bicycle storage facilities.
- 1.2 Design Guidelines Manual Update:** With direction from the 2030 General Plan, the City will amend its Design Guidelines Manual to address residential infill conflicts, detail how to incorporate passive solar design into buildings, and include provisions for remaking older auto-centric transit corridors as pedestrian-friendly, multi-modal seems within the community. Renewed corridors support infill and redevelopment, and promote non-auto transportation modes. Passive solar design solutions support energy efficiency and renewable energy. The reductions from this action are not quantified to avoid possible double-counting with other quantified actions related to infill development and solar photovoltaic installations.
- 1.3 Residential Transportation Education and Challenge:** The City will partner with BCAG to expand its public education and outreach campaigns to encourage residents to use alternative transportation and reduce their individual annual vehicle miles traveled by 8%. The amount of GHG emissions reductions from this challenge will be determined in the future based on the number of participants who obtain this goal and the vehicle miles saved.

Objective 2: Expand the Use of Alternative Fuels

- 2.1 Preferential Street Parking for Alternative fueled vehicles:** The City will provide preferential parking spaces for car share, carpool, and ultra-low or zero emission vehicles such as electric vehicles that will encourage residents to carpool or purchase low or zero emission vehicles. Preferential street parking spaces for eligible vehicle types will be located throughout the community's commercial districts.
- 2.2 Use of Biodiesel (B20):** Biodiesel is alternative diesel fuel derived from biological sources, which can be used in unmodified diesel-engine vehicles. If readily available locally, the City will convert some of its fleet to use B20 biodiesel (80% diesel/20% biodiesel),
- 2.3 Expand Conversions to Compressed or Liquid Natural Gas (CNG or LNG) or Propane:** The City will continue to pursue converting the City's equipment and vehicles to those that use CNG, LNG or propane where possible. The City will also continue to encourage BCAG, the solid waste haulers, and other local diesel fleets to consider converting their vehicles to CNG or LNG where feasible.
- 2.4 Encourage Alternative Fuel Stations in Certain New Development:** The City will require master plans and planned developments in new growth areas to address site selection for alternative fueling stations and electrical vehicle charging stations.

The following **Table 4.2** lists potential Phase II Transportation Sector actions, identifies the anticipated implementer (City of Chico or the greater community), and provides the unit of measurement and emission factors that will be used to calculate the annual 2020 GHG emissions reductions for each action (if available).

PHASE II TRANSPORTATION SECTOR ACTIONS		Implementor		GHG Emissions Estimates	
		City of Chico	Greater Community	Unit of Measurement	Emission Reduction/ Unit (MtCO ₂ e)
Objective 1: Reduce Vehicle Miles Traveled					
1.1	Large Employer Bicycle Facility Requirement		x	TBD	TBD
1.2	Design Guidelines Manual Update	x		TBD	TBD
1.3	Residential Transportation Education/Challenge	x		# residents @ 8% VMT reduced	0.00941
Objective 3: Expand Use of Alternative Fuels					
2.1	Preferential Parking for Alternative Fuel Vehicles	x	x	TBD	TBD
2.2	Use of Biodiesel (B20)		x	# vehicles converted	1.36
2.3	Expand Vehicle Conversion to CNG/LNG/Propane	x	x	# vehicles converted	15.5
2.4	Encourage Alter. Fuel Station in New Development	x	x	# of stations installed	1.697

Table 4.2

Energy Sector Actions

Objective 1: Upgrade and Tune-Up Equipment

- 1.1 Building Commissioning and Retro-commissioning:** Before 2005, several City buildings received energy audits and lighting upgrades to improve their energy efficiency. Based on the results of further energy audits of City facilities, the City will continue to prioritize and complete energy efficiency upgrades on its municipal buildings, where feasible.
- 1.2 Require Solar Hot Water Heaters in New Development:** Solar hot water systems offer a simple and reliable way to harness the sun's energy to provide hot water. The City will work with PG&E and other agencies to promote financial incentives for the installation of solar hot water systems. In addition, the City can amend the Municipal Code to require certain new residential and commercial development projects to install solar hot water systems.
- 1.3 Variable Speed Pool Pumps and Solar Water Heating Systems for Swimming Pools:** Swimming pools can account for up to 20% of a residence's energy consumption. Through an education and outreach campaign, the City will encourage residents to install variable speed swimming pool pumps and solar water heating systems. In Phase II, the City will amend the Municipal Code to require variable speed pumps and solar water heating systems in most new swimming pools.
- 1.4 Solar Irrigation and Groundwater Pumps:** The City will work with Cal Water, the Chico Area Recreation District, and other public agencies to determine whether irrigation and groundwater pumps can be converted to use solar generated electricity or other alternative energy sources.

Objective 2: Green Building and Energy Efficiencies

- 2.1 Consider Adoption of Additional Building Standards for Energy Efficiency:** The City will consider amending the Chico Municipal Code to require all new construction to exceed the Title 24 energy efficiency requirements by 15% by 2020 (Tier 1 Standard).
- 2.2 City of Chico Green Facilities Commitment:** Consistent with the General Plan, new significant City facilities will be constructed to at least the baseline certification level of Leadership in Energy and Environmental Design (LEED), or its equivalent. Building facilities to LEED certification levels are estimated to reduce energy use by 25 percent.
- 2.3 Residential Energy Efficiency Challenge:** The City will partner with PG&E to expand its public education and outreach campaigns to promote energy efficiency improvements within the community, including information on rebates and incentives. An energy efficiency challenge is also an effective way to motivate people to save energy. The City will challenge residents to reduce their energy use by 10%. The amount of GHG emissions reductions from this challenge will be determined in the future based on the number of participants who obtain this goal.

Objective 3: Improve Lighting Efficiencies

3.1 Encourage/Require Bi-Level Parking Lot/Structure Lights: Many parking garage structures or parking lots in commercial and institutional facilities are currently illuminated with high pressure sodium and metal Halide ceiling mounted fixtures. Because it is common for parking lots and garages to have lights on all day or all night, regardless of the occupancy or lighting need, these facilities are excellent candidates for an upgrade to bi-level lighting. Bi-level fixtures, such as induction, ceramic metal halide, and LED, which are also controlled by motion sensors, present an opportunity to use 30-75% less energy by dimming light levels when parking areas are unoccupied. Bi-level lighting controls can also turn off perimeter light fixtures for much of the day in areas that receive sufficient daylight to meet lighting needs.

As funding allows, the City will convert its existing parking garage and parking lots to use these bi-level lights. Through the PACE program identified in Phase I, the City will also encourage the retrofit of lighting for existing large parking lots and garages, such as at the Chico Mall and Enloe Hospital, and may require the use of these fixtures in new large commercial and industrial developments.

Objective 4: Renewable Energy Generation

4.1 Building Fee Incentives for Alternative Energy Installations (Solar/Wind): When economic conditions are more favorable, the City will consider reducing or waiving building permit and/or plan review fees for photovoltaic solar or other renewable energy systems on existing residential and commercial buildings. This type of financial incentive encourages the proliferation of solar projects and is consistent with a number of initiatives at the local, State and Federal level.

4.2 Increase the City's Municipal Use of Renewable Energy: The City will investigate the potential to increase its purchase of renewable energy sources for its municipal buildings and facilities by 10%, which will exceed PG&E's 33% renewable grid mix required under the AB32 Scoping Plan.

4.3 Purchase Power Agreements: Renewable energy has become increasingly more accessible and cost-effective due to Power Purchase Agreements (PPAs). In a PPA, a private company or third party installs a renewable energy technology, often solar panels, at no cost to the consumer and maintains ownership of the installed panels, selling customers the power produced on a per kilowatt-hour basis at a contractually established rate. The rate is often lower than what customers pay to PG&E, and the rate increases at a fixed percentage annually. In addition to installing the panels, the third party owns, monitors, and maintains the systems to ensure that they keep working. These agreements are ideal for either projects implemented by the City, or for residents or businesses with interests in reducing the energy consumptions in their homes and businesses. The City will pursue the installation of renewable energy projects on City property at the Chico Municipal Airport Industrial Area and may offer this renewable energy source to commercial and industrial businesses located within this industrial area.

Objective 5: Carbon Reduction

- 5.1 Low Carbon Projects:** The City will develop a policy encouraging the implementation and construction of low carbon impact public works and infrastructure projects. This will include reducing transportation needs during construction, reducing waste, reusing asphalt and other materials, and other activities to reduce GHG emissions generated from projects constructed by the City directly, or through its contractors.
- 5.2 Purchase Carbon Offsets:** To help meet its 2030 overall greenhouse gas reduction goal, the City could explore investing in carbon offsets and retiring the associated credits. The City could also encourage residents, businesses, governments, schools, and institutions to invest in greenhouse gas-reducing projects to offset their personal or corporate greenhouse gas emissions. In addition, the City could explore ways to create offset programs which provide revenues for local climate change projects.

Objective 6: Water Conservation

- 6.1 Encourage the use of Grey Water and Rainwater Systems:** Grey water systems save water by reusing untreated household wastewater from bathtubs, showers, bathroom washbasins, and clothes washing machines. Rainwater may be collected from roofs and other impermeable surfaces and stored in cisterns or barrels for use in dry weather sub-surface or surface irrigation. Current California law permits use of grey water systems for subsurface irrigation if compliant with Title 24, Part 5 of the California Plumbing Code. In 2008, the adoption of Senate Bill 1258 made grey water systems more feasible in the California. The City will provide information to residents and businesses about the opportunities to construct such systems on their properties.
- 6.2 Require Weather-based Irrigation Controllers:** The City will require the use of weather-based, Evapotranspiration (ET) controllers for new development and landscape projects over 2,500 square feet. This action is estimated to achieve 0.2201 MtCO₂e of GHG emissions reductions for each acre irrigated by these controllers.
- 6.3 California 20 x 2020 Water Conservation Plan:** In February 2008, a comprehensive program was introduced to reduce statewide per capita urban water use by 20% by the year 2020. The 20 x 2020 Water Conservation Plan requires that Chico's local water purveyor, Cal Water, through a series of strategies, programs, incentives, and enforcement achieve the 20% per capita reduction. Benefits associated with this significant reduction in water use include a commensurate reduction in energy use for pumping, treating, and storage of water.

The following **Table 4.3** lists potential Phase II Energy Sector actions, identifies the anticipated implementer (City of Chico or the greater community), and provides the unit of measurement and emission factors that will be used to calculate the annual 2020 GHG emissions reductions for each action (if available).

PHASE II ENERGY SECTOR ACTIONS		Implementer		GHG Emissions Estimates	
		City of Chico	Greater Community	Unit of Measurement	Emission Reduction/ Unit (MtCO ₂ e)
Objective 1: Upgrade and Tune-up Equipment					
1.1	Building Retrocommissioning		x	sq ft commissioned	0.0004
1.2	Solar Hot Water Heater Requirement	x		# homes installed	0.6746
1.3	Variable Speed Pool Pumps/Solar Heaters	x	x	# of pump/heaters	TBD
1.4	Solar Irrigation/Groundwater pumps	x	x	# of pump installed	104
Objective 2: Green Building and Energy Efficiencies					
2.1	Additional CalGreen Building Standards	x		sq. ft. "green" buildings	0.00065
2.2	Green Facilities Commitment/Policy	x		sq. ft. "green" buildings	0.00065
2.3	Residential Energy Efficiency Challenge	x		# Kwh/therms saved	0.00029/ 0.0056
Objective 3: Improve Lighting Efficiencies					
3.1	Bi-level Parking Garage/Lot Lights	x	x	# Kwh saved	0.00029
Objective 4: Renewable Energy Generation					
4.1	Permit Fee Incentives for Alternative Energy Projects		x	# of kwh/therms generated	0.00029/ 0.0056
4.2	Increase City Use of Renewable Energy	x		# of kwh/therms generated	0.000.29/ 0.0056
4.3	Purchase Power Agreements (PPA's)	x	x	# of kwh/therms generated	0.00029
Objective 5: Carbon Reduction					
5.1	Low Carbon Infrastructure Projects	x		TBD	TBD
5.2	Purchase Carbon Offsets	x	x	MtCO ₂ e Offset	1.00
Objective 6: Water Conservation Strategies					
6.1	Encourage Grey Water/Rain Water Systems	x	x	# gallons (per 1,000 gal)	0.22013
6.2	Require Weather Based Irrigation Controllers	x		# acres irrigated	0.00350
6.3	CA 20 by 2020 Water Conservation Plan	x	x	# of gallons reduced	0.00350

Table 4.3

Solid Waste Sector Actions

Objective 1: Expand Recycling Efforts

1.1 City Waste Policy: The City will consider establishing a waste-reduction program for municipal operations by designing and managing goods and products to allow for the reduction, reuse, and recycling of waste, where feasible. Specifically, the City would establish a detailed recycling, composting, and Staff education program that would establish a goal that at 75% of materials are reused, recycled, or composted.

1.2 Increase Construction and Demolition (C&D) Recycling:

If feasible and if local recycling opportunities are available, the City will amend the Chico Municipal Code to require all new construction to exceed the CALGreen 50% C&D waste diversion requirement by 25% to achieve a 75% diversion rate by 2020.

Objective 2: Expand Composting Efforts

2.1 Composting of Food Waste: Currently, the City's compost facility does not have the capacity nor is it permitted to compost food waste. The City will work with the local waste haulers, Butte County, and other agencies to develop a facility or program to compost food waste from commercial and residential sectors.

Solid Waste Objective 3: Renewable Energy Generation

3.1 Expand Landfill Methane Capture: During Phase I, Butte County began capturing methane out of the landfill that was estimated to generate up to 2.2 megawatts. The County intends to expand the methane capture program, which is estimated to generate up to 4.3 megawatts per year.

The following **Table 4.4** lists potential Phase II Energy Sector actions, identifies the anticipated implementer (City of Chico or the greater community), and provides the unit of measurement and emission factors that will be used to calculate the annual 2020 GHG emissions reductions for each action (if available).

		Implementor		GHG Emissions Estimates	
		City of Chico	Greater Community	Unit of Measurement	Emission Reduction/ Unit (MtCO ₂ e)
PHASE II SOLID WASTE SECTOR ACTIONS					
Objective 1: Expand Recycling Efforts					
1.1	City Waste Reduction Policy	x		Tons Diverted	0.026
1.2	Construction/Demolition Recycling	x	x	Tons Diverted	0.011
Objective 2: Expand Composting Efforts					
2.1	Compost Food Waste	x	x	Tons Diverted	0.024
Objective 3: Renewable Energy Generation					
3.1	Expand Landfill Methane Gas Recovery		x	Additional Kw generated	0.6965

Table 4.4

Summary of CAP Emissions Reductions

Table 4.5 below demonstrates how the estimated GHG emissions reductions from all of the actions in Phase I and Phase II combined will reduce the 2020 emissions by **309,756 MtCO₂e** for the Chico area to an annual emissions level of **385,749 MtCO₂e**, which is 25% below baseline levels and 44.5% below BAU projections for 2020. The Chico CAP outlines a path to meet the City’s aggressive GHG emissions reduction goal. It provides an opportunity to evaluate the success of its implementation and make mid-course corrections if necessary to meet the goal. The City of Chico is committed to achieving the 2020 CAP goal, honoring the Mayor’s Climate Protection Agreement, supporting California’s Global Warming Solutions Act (AB 32), and being a regional leader in climate action.

Summary of 2020 Emissions Reductions Estimates	Total Estimated Emissions Reductions (MtCO ₂ e)		
	Phase I	Phase II	Total
SECTOR			
TOTAL ESTIMATED LOCAL ACTIONS REDUCTIONS:	78,649	25,994	104,643
TOTAL ESTIMATED EXTERNAL ACTIONS REDUCTIONS:	84,874	64,713	149,587
TARGETED REDUCTIONS FOR UNQUANTIFIED ACTIONS:	2,297	53,229	55,526
TOTAL 2020 EMISSION REDUCTIONS:	165,820	143,936	309,756

Table 4.5