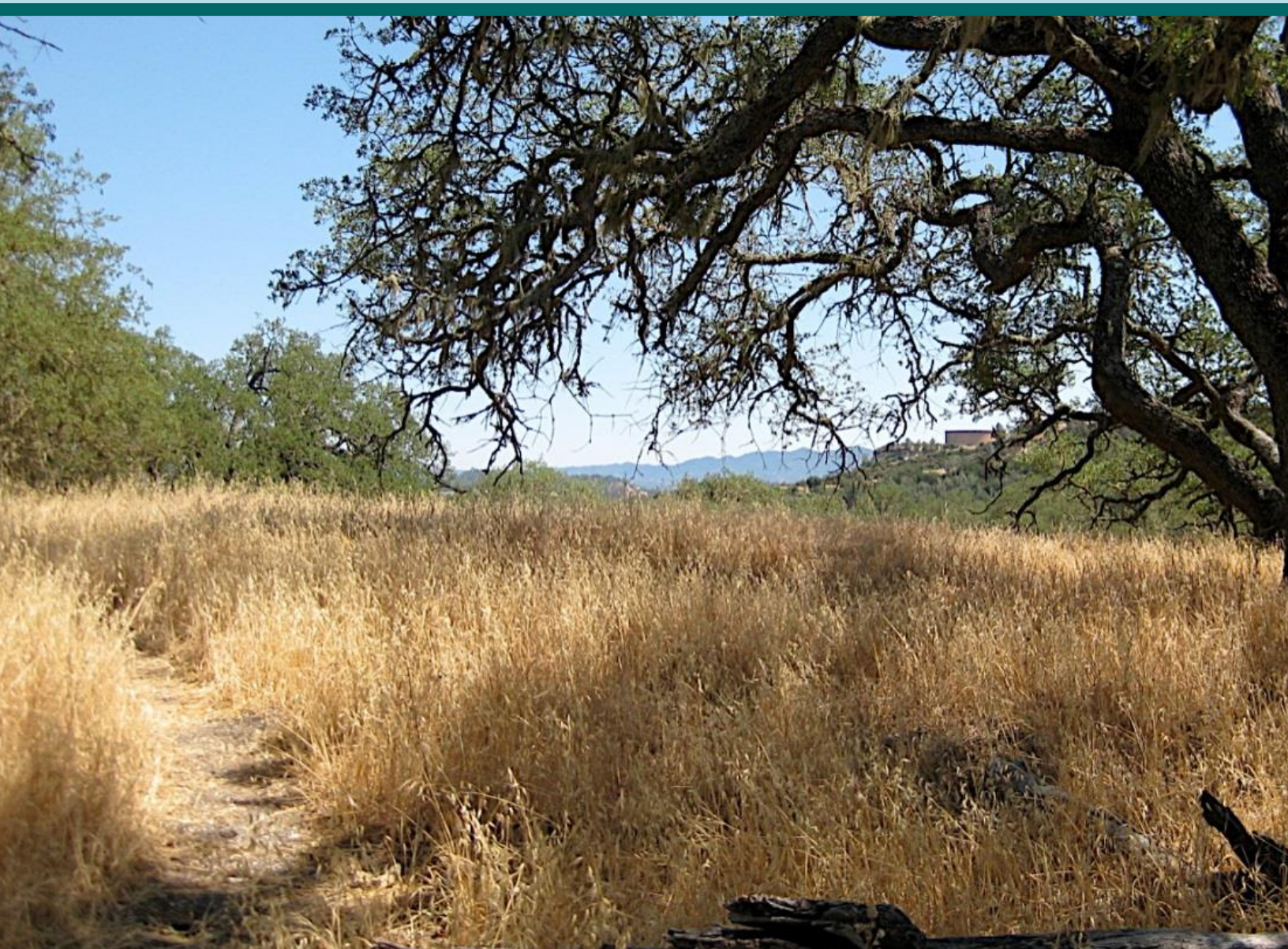
CITY OF ATASCADERO
CLIMATE ACTION PLAN

October 2013



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City of Atascadero Climate Action Plan

October 2013

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City of Atascadero

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Appendix A: GHG Emissions Inventory
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Acronyms

AB	Assembly Bill
APCD	San Luis Obispo County Air Pollution Control District
Cal/EPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAFE	Corporate Average Fuel Economy
CAP	Climate Action Plan
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
EPA	Environmental Protection Agency
GHG	Greenhouse gas
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilowatt hours
LCFS	Low Carbon Fuel Standard
LED	Light-Emitting Diode
MPO	Metropolitan Planning Organization
MT	Metric tons
N_2O	Nitrous oxide
O_3	Ozone
PFCs	Perfluorocarbons
PG&E	Pacific Gas and Electric
PV	Photovoltaic
RTA	Regional Transit Authority
SB	Senate Bill
SLOCOG	San Luis Obispo Council of Governments
TDM	Transportation demand management
VMT	Vehicle miles traveled

EXECUTIVE

SUMMARY

Executive Summary

The City of Atascadero Climate Action Plan (CAP) is a long-range policy document intended to cost-effectively reduce greenhouse gas (GHG) emissions from City government operations and community activities within Atascadero. The CAP will also help achieve multiple community goals such as lowering energy costs, reducing air pollution, supporting local economic development, and improving public health and quality of life. Specifically this CAP is designed to:

- Benchmark Atascadero's 2005 baseline GHG emissions and 2020 projected emissions relative to the statewide emissions target established under California Assembly Bill (AB) 32 of 15 percent below 2005 levels by the year 2020.
- Provide a roadmap for achieving the city's GHG emissions reduction target of 15 percent below 2005 levels by the year 2020 and help Atascadero prepare for anticipated climate change impacts.
- Serve as a qualified and comprehensive plan for addressing the cumulative impacts of GHG emissions within Atascadero (see California Environmental Quality Act [CEQA] Guidelines, Section15183.5, and the San Luis Obispo County Air Pollution Control District [APCD] CEQA Air Quality Handbook, Sections 3.3 and 4.6).
- Support tiering, and streamlining the analysis of GHG emissions for future projects within Atascadero pursuant to State CEQA Guidelines, Sections 15152 and 15183.5.

What is a Climate Action Plan?

"Climate Action Plans (CAP)" or "GHG Reduction Plans" are policy documents intended to reduce GHG emissions, improve energy efficiency and integrate sustainability into City government and community-wide planning and operations. In order to comply with California State Assembly Bill 32, the City must reduce GHG emissions to 1990 levels (an estimated 15 reduction from 2005 levels) by the year 2020. A CAP lays out how the City intends to reach that target.

Similar to a General Plan or a Downtown Revitalization Plan, a CAP is a policy document with goals and a work plan which are intended to be implemented over time. Most action measures identified in the CAP do not all go into effect immediately; programs take time to be implemented and may require adoption of ordinances or policies prior to seeing any actual changes take place.

For Atascadero, the City Council, Planning Commission, and the public have clearly expressed the importance of creating a document which is focused on cost-effectively reducing GHG emissions, with measures which improve the quality of life for residents while reducing costs for individuals, businesses and City operations.

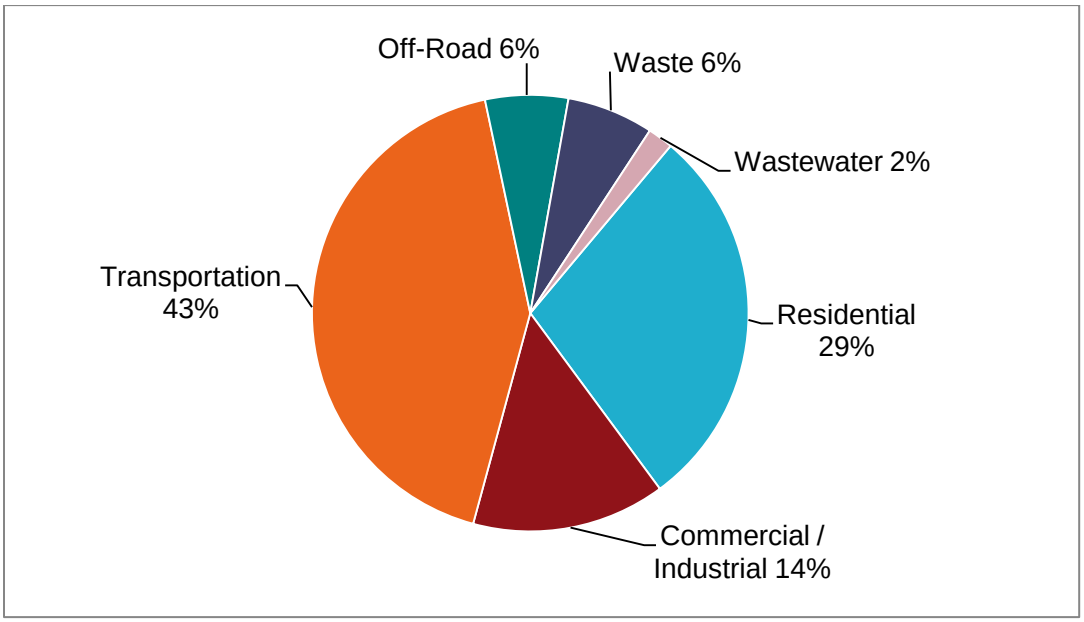
Atascadero's GHG Emissions

The *City of Atascadero 2005 Greenhouse Gas Emissions Inventory Update* (2012) (GHG Emissions Inventory) was prepared to identify the major sources and quantities of GHG emissions produced in Atascadero in 2005 and forecast how these emissions may change over time. The GHG Emissions Inventory provides information on the scale of emissions from various sources and where the

opportunities to reduce emissions lie. It also provides a baseline against which the City can measure its progress in reducing GHG emissions.

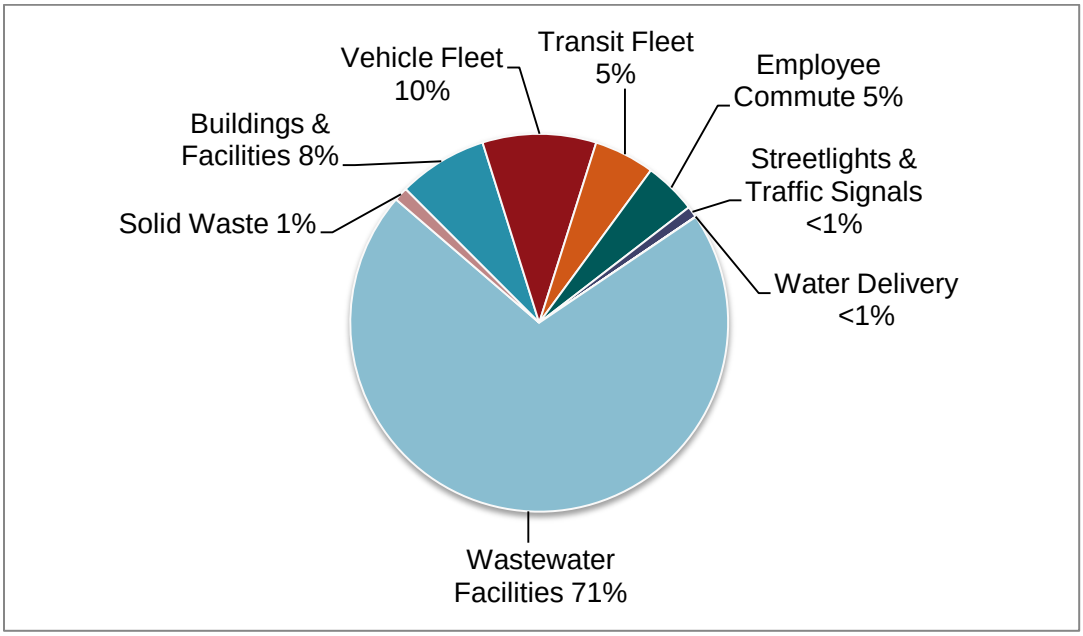
According to the GHG Emissions Inventory, in 2005, the Atascadero community emitted approximately 141,428 metric tons of carbon dioxide equivalent GHG emissions (MT CO_2e), as a result of activities that took place within the transportation, residential energy use, commercial and industrial energy use, off-road vehicles and equipment, solid waste, and wastewater sectors. As shown in **Figure ES-1**, the largest contributors of GHG emissions were the transportation (43 percent), residential energy use (29 percent) and commercial/industrial energy use (14 percent) sectors. The remainder of emissions resulted from the solid waste (six percent), off road vehicles and equipment (six percent) and wastewater (two percent) sectors.

Figure ES-1: Community-wide GHG Emissions by Sector (2005)



The GHG Emissions Inventory also analyzed emissions from City government operations and facilities. The City government operations inventory is a subset of the community-wide inventory, and is included within the community-wide inventory. In 2005, City government operations generated approximately 4,130 MT CO_2e. This quantity represents approximately three percent of Atascadero's total community-wide GHG emissions. As shown in **Figure ES-2**, the majority of these GHG emissions resulted from the City's wastewater facilities (71 percent), vehicle fleet (10 percent), and building and facility energy use (eight percent).

Figure ES-2: City Government Operations GHG Emissions by Sector (2005)



The GHG emissions forecast is a projection of how GHG emissions will change in the future with projected changes in population and jobs.[1] The "business-as-usual scenario" provides a forecast of how GHG emissions will change in the year 2020 if consumption trends and behavior continue as they did in 2005, absent any new federal, state, regional, or local policies or actions that would reduce emissions. The year 2020 was selected for the forecast in order to maintain consistency with AB 32.

Under the business-as-usual scenario, Atascadero's GHG emissions are projected to grow approximately 22 percent above 2005 GHG emissions levels by the year 2020, from 141,428 MT CO_2e to 172,488 MT CO_2e. Emissions associated with the transportation sector will experience the highest level of growth (39 percent). Emission increases for the other sectors will range from eight to 21 percent. **Table ES-1** shows the forecast results of the business-as-usual scenario.

Table ES-1: 2020 Business-As-Usual GHG Emissions Forecast

Sector	2005 (MT CO_2e)	2020 (MT CO_2e)	Percent Change from 2005 to 2020
Transportation	60,041	83,317	39%
Off-Road	8,686	10,521	21%
Commercial / Industrial	20,271	22,049	9%
Residential	40,690	43,926	8%
Solid Waste	9,083	9,805	8%
Wastewater	2,657	2,868	8%
Total	**141,428**	**172,488**	**22%**

[1] Population and job projections for the year 2020 were obtained from the San Luis Obispo Council of Governments (SLOCOG) 2040 Population, Housing & Employment Forecast (August 2011) (see Chapter 2).

The *AB 32 Climate Change Scoping Plan* (2008) (AB 32 Scoping Plan), prepared by the California Air Resources Board (CARB) pursuant to AB 32, identifies several State measures that are approved, programmed, and/or adopted and would reduce GHG emissions within Atascadero. These State measures require no additional local action. In addition to the State measures described above, the City of Atascadero has implemented, adopted, and/or programmed a number of local measures since the 2005 baseline inventory year that will reduce the community's GHG emissions. Therefore, these measures were incorporated into the forecast and reduction assessment to create an "adjusted forecast scenario," which provides a more accurate picture of future emissions growth and the responsibility of the City once State and local measures to reduce GHG emissions have been implemented.

Under the adjusted scenario, GHG emissions are projected to decrease to 138,951 MT CO_2e (approximately 19 percent below the business-as-usual scenario of 172,488 MT CO_2e). **Table ES-2** summarizes the reduction from state and local measures.

Table ES-2: Summary of Reductions from State and Local Measures and 2020 GHG Emissions

	GHG Reduction (MT CO_2e)
2020 Business-as-Usual Forecast	172,488
2020 Reduction from State Measures	-32,622
2020 Reduction from Local Measures	-915
Total Reduction from State and Local Measures	**-33,537**
2020 Adjusted Forecast	**138,951**

GHG Emissions Reduction Target

The City is committed to reducing its GHG emissions to 15 percent below 2005 levels by 2020, consistent with AB 32. As shown in **Table ES-3**, based on the 15 percent reduction target Atascadero would need to reduce its community-wide GHG emissions to 120,214 MT CO_2e by 2020. To meet this target, Atascadero will need to reduce its GHG emissions 13 percent below the adjusted forecast level (equivalent to 18,737 MT CO_2e) by 2020 through implementation of local measures and actions.

Table ES-3: Atascadero's GHG Emissions, Target, and Reduction Necessary to Meet Target

	GHG Emissions (MT CO_2e)
2005 Baseline Emissions	141,428
2020 Adjusted Forecast	138,951
Target (15 percent below 2005 levels by 2020)	120,214
Remaining Gap Necessary to Meet Target	**18,737**

Climate Action Measures

To achieve the State-recommended target of 15 percent below 2005 levels (120,214 MT CO_2e) by 2020 and prepare for the anticipated effects of climate change, the CAP identifies climate action measures. These measures are organized into the following focus areas: City government operations, energy, transportation and land use, off-road, water, solid waste, and trees and vegetation. The measures were selected based on careful consideration of the emission reductions needed to achieve the target, the distribution of emissions revealed in the GHG Emissions Inventory, goals and policies identified in the City's General Plan, existing priorities and resources, policies and strategies of neighboring jurisdictions and regional agencies, and the potential costs and benefits of each measure. Collectively, the measures identified in the CAP have the potential to reduce GHG emissions within Atascadero by 28,873 MT CO_2e (22 percent below the 2005 baseline) by 2020 and meet the reduction target. By identifying measures that create total reductions beyond the City's identified 15 percent reduction target of 18,737 MT CO_2e, the City will have some flexibility in reaching its goal and will not be required to implement every measure exactly as calculated in the CAP. Instead, the City will be able to meet its GHG reduction goal by implementing a combination of the identified measures, as feasible, in order to meet the 15 percent reduction target by 2020.

Implementation and Monitoring

Implementation and monitoring are essential processes to ensure that Atascadero reduces its GHG emissions and meets its target. To facilitate this, each climate action measure identifies implementation actions, departments responsible for implementation and monitoring, cost and savings estimates, the GHG reduction potential, a performance indicator to monitor progress, and an implementation time frame. Measure implementation is separated into three phases: near-term (by 2015), mid-term (2016-2017), and long-term (2018-2020).

In order to ensure that measures are implemented and their progress is monitored, upon adoption of the CAP, the City will establish a CAP Coordinator who will provide essential CAP oversight and coordination of a multi-departmental CAP Implementation Team comprised of key staff in each selected department. The CAP Implementation Team will meet at least one time per year to assess the status of CAP efforts. The City's CAP Coordinator will be responsible for developing an annual progress report to the City Council that identifies the implementation status of each measure, evaluates achievement of or progress toward performance indicators (where applicable), assesses the effectiveness of various measures and actions included in the CAP, and recommends adjustments to measures or actions, as needed. To evaluate the performance of the CAP as a whole, the City will update the community and City government GHG emissions inventories approximately every five years, as feasible, using the most up-to-date calculation methods, data, and tools. The GHG emissions inventory updates shall be coordinated with surrounding cities and regional bodies, with grant funding identified, in order to make this process cost efficient and feasible for the City to complete.

CHAPTER 1

INTRODUCTION

1.0 Introduction

Although climate change is a global issue, the State of California recognizes that it poses risks to the public health, environment, economic well-being, and natural resources of California, and has taken an active approach to address climate change through the adoption of legislation and policies. In 2005, the governor issued Executive Order S-3-05 to reduce statewide GHG emissions to 1990 levels by 2020 (approximately 15 percent below 2005 levels) and to 80 percent below 1990 levels by 2050. Enactment of several related pieces of climate action legislation followed, including AB 32 (the Global Warming Solutions Act of 2006), which codified the 2020 target, and SB 97 (the CEQA and GHG Emissions bill of 2007), which requires lead agencies to analyze GHG emissions and mitigate climate change impacts under CEQA. These laws together create a framework for GHG emissions reductions and identify local governments as having a vital role to play in assisting the State in meeting these mandates. The AB 32 Scoping Plan, prepared by CARB pursuant to AB 32, notes that local governments have broad influence and, in some cases, exclusive authority over activities that result in GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and City government operations. In recognition of the important role local governments will play in the successful implementation of AB 32, the AB 32 Scoping Plan recommends a GHG emission reduction target for local governments of 15 percent below 2005 levels by 2020 to match the statewide reduction target and to mitigate their impacts on climate change.

Recognizing the important role and responsibility that local governments have in reducing GHG emissions and mitigating their potential climate change impacts, the City has prepared this CAP. This chapter describes the purpose, scope, and content of Atascadero's CAP. This chapter also summarizes the scientific and regulatory framework under which this plan has been developed.

1.1 Purpose and Scope

The City's CAP is a long-range plan to reduce GHG emissions from community-wide activities and City government operations within Atascadero to support the State's efforts under AB 32 and to mitigate the community's contribution to global climate change. Specifically, the CAP does the following:

- Summarizes the results of the *City of Atascadero 2005 Greenhouse Gas Emissions Inventory Update* (2012), which identifies the major sources and quantities of GHG emissions produced within Atascadero and forecasts how these emissions may change over time.
- Identifies the quantity of GHG emissions that Atascadero will need to reduce to meet the State-recommended target of 15 percent below 2005 levels by the year 2020.
- Sets forth City government and community-wide GHG reduction measures, including performance standards which, if implemented, would collectively achieve the specified emission reduction target.

- Identifies proactive strategies that can be implemented to help Atascadero prepare for anticipated climate change impacts.
- Sets forth procedures to implement, monitor, and verify the effectiveness of the CAP measures and adapt efforts moving forward as necessary.

In addition to reducing Atascadero's GHG emissions consistent with AB 32 and mitigating the community's contribution to global climate change, implementation of the CAP will help achieve multiple community-wide goals, such as lowering energy costs, reducing air pollution, supporting local economic development, and improving public health and quality of life. The CAP may also be utilized to tier and streamline the analysis of GHG emissions of future development within Atascadero pursuant to State CEQA Guidelines Sections 15152 and 15183.5 (refer to Section 1.4, *Relationship to CEQA*).

1.2 Content

The CAP is organized into the following chapters:

1.0 Introduction – describes the purpose, scope, and content of Atascadero's CAP. It also summarizes the scientific and regulatory framework under which this plan has been developed.

2.0 GHG Emissions and Reduction Target – identifies the sources of GHG emissions in Atascadero, quantifies emissions for a baseline year (2005), and forecasts how emission levels would change through 2020. This chapter also quantifies the GHG emissions reduction target for the year 2020.

3.0 Climate Action Measures – organizes the CAP measures into the following focus areas: City government operations, energy, transportation and land use, off-road, water, solid waste, and trees and vegetation. Each GHG reduction measure is presented with implementation actions, estimated GHG reductions in 2020, and estimated cost and future savings.

4.0 Adaptation – includes a discussion of modeled climate change predictions, an urban system assessment, a vulnerability assessment, and adaptation measures to prepare for and minimize the risk associated with anticipated climate change impacts.

5.0 Implementation and Monitoring – sets forth procedures to implement and monitor the individual CAP measures, evaluate the CAP's performance, and amend the plan if it is not achieving targeted reduction levels. It also identifies potential sources of funding to implement the CAP.

1.3 Background and Planning Process

In 2007, the San Luis Obispo County Air Pollution Control District (APCD) convened a committee of agency stakeholders (Stakeholder Committee) from the cities of Atascadero, Arroyo Grande, Grover Beach, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo and the County of San Luis Obispo to initiate a discussion on climate change, including science,

policy, funding, mitigation, adaptation, and public engagement. The APCD also coordinated the preparation of GHG emissions inventories for each of the jurisdictions. Both the City and County of San Luis Obispo received federal stimulus funds to support the development of their CAPs. San Luis Obispo County approved its EnergyWise Plan in November 2011, and the City of San Luis Obispo adopted its Climate Action Plan in July 2012. The APCD worked with the remaining six cities to secure funds for individual CAPs, including the City of Atascadero CAP, through the Pacific Gas and Electric Company (PG&E) Green Communities Program, Southern California Gas Company (SoCalGas), and APCD's mitigation grant funding.

City staff and its consultants worked with members of the community and elected officials to develop the CAP. The public outreach program involved two regional community workshops hosted by the project consultant to introduce the project and gather input and ideas for the document and on potential GHG reduction measures. A virtual town hall also provided an opportunity for community members to evaluate a preliminary set of GHG reduction measures and suggest additional ideas. Public outreach also included posting project information and updates to the main project website (www.centralcoastghgplanning.com) and eNewsletter announcements. In order to facilitate detailed review and obtain input from local residents and decision makers in the City of Atascadero, the Atascadero City Council designated the City's Planning Commission as the "Climate Action Plan Steering Committee." The City Council stated that local public input and participation was a vital component of the CAP process, and was crucial to ensure that Atascadero's unique environment, local viewpoints and community goals were considered and incorporated into the document. As the Steering Committee, the Atascadero Planning Commission met several times to discuss the Climate Action Plan, including three meetings for extensive review and discussion of potential greenhouse gas reduction measures prior to drafting the CAP document. The City Council also held several public meetings to discuss the Climate Action Plan direction, and review the possible reduction measures at all stages of the CAP development. Public comment was encouraged at all of these meetings. The City maintained a local project website at Atascadero.org in order to make draft documents and staff reports easily accessible for review. Press releases, notices in the local newspaper, social media notifications, and televised public meetings were utilized to engage the public and create an open and collaborative CAP development process.

1.4 Relationship to CEQA

According to the California Natural Resources Agency (2009) and the State's Office of the Attorney General (2009), GHG emissions may be best analyzed and mitigated at the programmatic level (i.e., in a GHG reduction plan/CAP). In 2009, the California Natural Resources Agency amended the State CEQA Guidelines to add a new provision, Section 15183.5, which provides a framework for programmatic GHG emissions reduction plans (i.e., a CAP). Section 15183.5 states a plan for the reduction of GHG emissions should:

- Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area;
- Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;

- Identify and analyze the GHG emissions resulting from sources in the community;
- Identify a suite of specific, enforceable measures that, collectively, will achieve the emissions targets;
- Establish a mechanism to monitor the plan's progress and to require amendment if the plan is falling short; and
- Be adopted in a public process following environmental review.

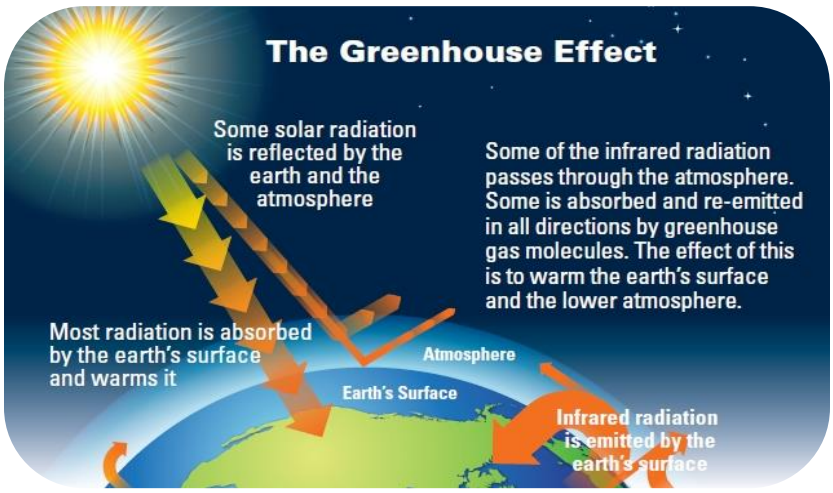
This CAP was developed to be consistent with State CEQA Guidelines Section 15183.5. Once the CAP is adopted following environmental review, a lead agency may determine that projects that are consistent with the CAP will not have significant GHG-related impacts, thereby shortening the CEQA process, which can save time and money for these projects. **Appendix C** contains a worksheet that project applicants may use to demonstrate project-level compliance. If a project is found to be inconsistent with the CAP, the APCD thresholds discussed in Section 1.8.3 should be applied.

1.5 Scientific Background

In order to make meaningful and effective decisions regarding the mitigation of GHG emissions and adaptation to anticipated changes in climate, it is important to understand the science under which this CAP has been developed. This section provides a brief introduction to the scientific research efforts to understand how climate change occurs and its implications.

Global climate change refers to changes in the average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation, and storms. Global warming, a related concept, is the observed increase in average temperature of the Earth's surface and atmosphere caused by increased GHG emissions, which can contribute to changes in global climate patterns. GHGs, such as water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and ozone (O_3), are gases in the Earth's atmosphere that play a critical role in determining the Earth's surface temperature. Specifically, GHGs allow high-frequency solar radiation to enter the Earth's atmosphere, but trap the low frequency, long wave energy which is radiated back from the Earth to space, resulting in a warming of the atmosphere. The trapping of heat at the Earth's surface is known as the "greenhouse effect" (refer to **Figure 1-1**).

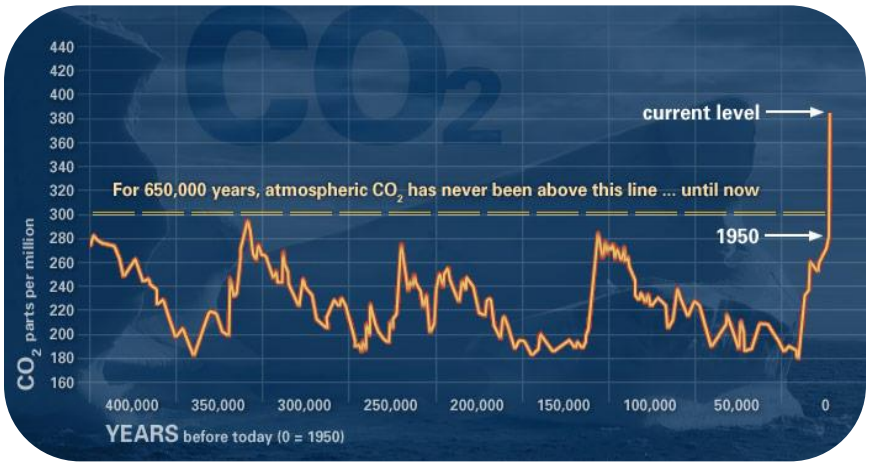
Figure 1-1: The Greenhouse Effect



Source: National Oceanic & Atmospheric Administration (NOAA), 2009

GHGs are the result of both natural and anthropogenic activities. The consumption of fossil fuels for power generation and transportation, forest fires, decomposition of organic waste, and industrial processes are the primary sources of GHG emissions. Without human intervention, the Earth maintains an approximate long-term balance between the emission of GHGs into the atmosphere and its storage in oceans and terrestrial ecosystems. Following the industrial revolution, however, increased combustion of fossil fuels (e.g., gasoline, diesel, coal, etc.) and other industrial processes have contributed to the rapid increase in atmospheric levels of GHGs (refer to **Figure 1-2**) (NOAA, 2009). This increase in GHGs correlates with the recent increase in global average temperature (which has risen approximately 1.4°F since the early 20th century) (IPCC, 2007; NOAA, 2009).

Figure 1-2: Historic Fluctuations and Recent Increases in Atmospheric Carbon Dioxide



This graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO_2 has increased since the Industrial Revolution (NASA, 2011).

The principal GHGs that enter the atmosphere as a result of human activities are discussed below.

- **Carbon dioxide (CO_2)** is released into the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., cement production) and deforestation. Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- **Methane (CH_4)** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from agricultural practices, such as the raising of livestock, and by the decomposition of organic waste in landfills.
- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities, as well as during the burning of fossil fuels and solid waste.
- **Fluorinated gases** (i.e., hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) are synthetic GHGs that are emitted from a variety of industrial processes (e.g., aluminum production) and used in commercial, industrial, and consumer products (e.g., automobile air conditioners and refrigerants). These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as "high global warming potential" gases.

Each GHG has a different potential for trapping heat in the atmosphere, called global warming potential. For example, one pound of methane has 21 times more heat capturing potential than one pound of carbon dioxide. To simplify reporting and analysis of GHGs, GHG emissions are typically reported in metric tons of carbon dioxide equivalent (MT CO_2e) units. When dealing with an array of emissions, the gases are converted to their carbon dioxide equivalents for comparison purposes. The global warming potentials for common GHGs are shown in **Table 1-1**.

Table 1-1: Global Warming Potential of GHGs

GHG	Global Warming Potential
Carbon Dioxide (CO_2)	1
Methane (CH_4)	21
Nitrous Oxide (N_2O)	310
Hydrofluorocarbons (HFCs)	140-11,700
Perfluorocarbons (PFCs)	6,500-9,200
Sulfur Hexafluoride (SF_6)	23,900

Notes: Each of the GHGs listed above differs in its ability to absorb heat in the atmosphere, or in its global warming potential. The values presented above are based on the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report and United Nations Framework Convention on Climate Change reporting guidelines (IPCC, 1996). Although the IPCC Fourth Assessment Report presents different estimates, the current inventory standard relies on the Second Assessment Report's intensity factors to comply with reporting standards and consistency with regional and national inventories (USEPA, 2010).

1.6 Climate Change Impacts

Increases in the globally averaged atmospheric concentration of GHGs will cause the lower atmosphere to warm, in turn inducing a myriad of changes to the global climate system. These large-scale changes will have unique and potentially severe impacts in the western United States, California, and the central coast region. Current research efforts coordinated through CARB, California Energy Commission, California Environmental Protection Agency (EPA), University of California system, and other entities are examining the specific changes to California's climate that will occur as the Earth's surface warms.

The best available climate models indicate that climate change could impact the natural environment in California in the following ways, among others (California Natural Resources Agency, 2009):

- Rising sea levels along the California coastline caused by ocean expansion and glacier melt
- Extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent
- An increase in heat-related human deaths, infectious diseases, and a higher risk of respiratory problems caused by deteriorating air quality
- Reduced snow pack and stream flow in the Sierra Nevada Mountains, affecting winter recreation and water supplies
- Potential increase in the severity and historical pattern of winter storms, affecting peak stream flows and flooding
- Changes in growing season conditions that could affect California agriculture, causing variations in crop quality and yield
- Changes in distribution of plant and wildlife species brought about by changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects

1.7 Implications for Atascadero

Rising temperatures affect local and global climate patterns, and these changes are forecasted to manifest themselves in a number of ways that may impact the central coast region. As further discussed in Chapter 4, *Adaptation*, according *ClimateWise: Integrated Climate Change Adaptation Planning in San Luis Obispo County in November 2010* (ClimateWise) potential climate changes that could occur in Atascadero by the end of this century include:

- Increased temperatures
- Changed precipitation
- Increased frequency and severity of storm events
- Increased burn area from wildfires

1.8 Regulatory Background

This section summarizes the federal, state, and regional legislation, regulations, policies, and plans that have guided the preparation and development of this CAP.

1.8.1 FEDERAL

Clean Air Act. The U.S. EPA is the federal agency responsible for implementing the Clean Air Act. The U.S. Supreme Court ruled in its decision in *Massachusetts et al. v. Environmental Protection Agency et al*., issued on April 2, 2007, that carbon dioxide is an air pollutant as defined under the Clean Air Act and that the U.S. EPA has the authority to regulate emissions of GHGs as pollutants. In 2011, the U.S. EPA began regulating GHG emissions from new power plants and refineries through a set of New Source Performance Standards. These regulations are found in 40 CFR Part 60 and apply to new, modified and reconstructed affected facilities in specific source categories such as manufacturers of glass, cement, rubber tires and wool fiberglass.

Energy Independence and Security Act. The Energy Independence and Security Act of 2007 includes several provisions that will increase energy efficiency and the availability of renewable energy, which in turn will reduce GHG emissions. First, the Act sets a Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel by 2022. Second, it increased Corporate Average Fuel Economy (CAFE) Standards to require a minimum average fuel economy of 35 miles per gallon for the combined fleet of cars and light trucks by 2020. Third, it includes a variety of new standards for lighting and for residential and commercial appliance equipment, including residential refrigerators, freezers, refrigerator-freezers, metal halide lamps, and commercial walk-in coolers and freezers.

1.8.2 STATE OF CALIFORNIA

The State of California has been proactive in working to reduce emissions and has a long history of leadership in addressing energy and climate issues spanning the last 40 years. In 1988, AB 4420 (Sher, Chapter 1506, Statutes of 1988) designated the California Energy Commission as the lead agency for climate change issues in California. Since that time, numerous initiatives in California have addressed climate change and energy efficiency, the majority of legislation passed since 2000. These initiatives have strengthened the ability of entities in California to engage in accurate data collection and have created targets and regulations that will directly lead to reductions in GHG emissions. These initiatives are described below.

Executive Order S-3-05. Executive Order S-3-05, issued in 2005, was the first comprehensive state policy to address climate change. It established ambitious GHG reduction targets for the State: reduce GHG emissions to 2000 levels by 2010, to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. This Executive Order is binding only for State agencies and has no force of law for local governments. However, S-3-05 is important for two reasons. First, it obligated State agencies to implement GHG emission reduction strategies. Second, the signing of the Order sent a clear signal to the Legislature about the framework and content for legislation to reduce GHG emissions as a necessary step toward climate stabilization.

Assembly Bill 32 (California Global Warming Solutions Act of 2006). AB 32 codified the State's 2020 GHG emissions target by directing CARB to reduce California's statewide emissions to 1990 levels by 2020. AB 32 also required CARB to develop a policy plan for reaching the 2020 emissions target and to adopt and enforce regulations to implement the plan. The resulting AB 32 Scoping Plan was adopted by CARB in December 2008. Key elements of the plan for achieving the 2020 target include:

- Adopting and implementing measures pursuant to existing state laws and policies, including California's goods movement measures and the Low Carbon Fuel Standard
- Expanding energy efficiency programs and green building practices
- Reducing methane emissions at landfills
- Developing a California cap-and-trade program
- Establishing and seeking to achieve reduction targets for transportation-related GHG emissions
- Increasing waste diversion, composting, and commercial recycling toward zero-waste
- Strengthening water efficiency programs
- Preserving forests that sequester carbon dioxide

Although the AB 32 Scoping Plan does not identify specific reductions for local governments, it identifies overall reductions from local government operations and land use decisions as a strategy to meet the 2020 target. The AB 32 Scoping Plan states that land use planning and urban growth decisions will play an important role in the State's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. It further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. However, the AB 32 Scoping Plan stopped short of identifying mandatory targets for local government compliance. Instead, it encourages local governments to adopt a target for City government and community-wide emissions that parallels the State's AB 32 target and reduces emissions by approximately 15 percent by 2020.

Senate Bill 97. SB 97 (2007) established that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis and required the Governor's Office of

Planning and Research to develop guidelines to analyze GHG impacts under CEQA. The guidelines were adopted on December 31, 2009, requiring lead agencies to analyze GHG emissions and the effects of GHG emissions during CEQA review.

Assembly Bill 1493 (Pavley Regulations). AB 1493 (referred to as Pavley I) (2002) directed CARB to develop and adopt standards for vehicle manufacturers to reduce GHG emissions coming from passenger vehicles and light-duty trucks at a "maximum feasible and cost effective reduction" by January 1, 2005. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction by 2012 and 30 percent by 2016.

Executive Order S-1-07 (Low Carbon Fuel Standard). This 2007 order requires fuel providers to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020.

Senate Bill 375. SB 375 (2008) supports implementation of AB 32 by aligning regional transportation planning efforts with land use and housing allocations in order to reduce transportation-related GHG emissions. Specifically, SB 375 directed CARB to set regional GHG emissions targets for passenger vehicles and light trucks for the years 2020 and 2035 for each Metropolitan Planning Organization (MPO) region, which were adopted in February 2011. The San Luis Obispo Council of Governments (SLOCOG), Atascadero's MPO, has adopted reduction targets for per capita emissions from passenger vehicles of 8 percent below baseline (2005) for the years 2020 and 2035 (CARB, 2011). These targets apply to the SLOCOG region as a whole, and not to individual cities or sub-regions. In 2008, GHG emissions from passenger vehicles in the San Luis Obispo region were approximately 16.5 pounds CO_2e per capita. Therefore, SLOCOG must reduce emissions to at least 15.18 pounds CO_2e per capita by 2020 and maintain or further reduce that level through 2035 to meet the target. SLOCOG's 2010 Regional Transportation Plan and Preliminary Sustainable Communities Strategy (RTP-PSCS), adopted in 2010, details how the region will meet the target (refer to the discussion of SLOCOG's 2010 RTP-PSCS in Section 1.8.3 below).

Senate Bill 1078, Senate Bill 107, and Senate Bill 2X (Renewables Portfolio Standard). Established in 2002 under SB 1078, and accelerated in 2006 under SB 107, California's Renewables Portfolio Standard required investor-owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources by at least 1 percent of their retail sales annually, until they achieved 20 percent by 2010. SB 2X raises the target from the current 20 percent, requiring private and public utilities to obtain 33 percent of their electricity from renewable energy sources by 2020.

Senate Bill 1368. SB 1368 (2006) directs the California Energy Commission and the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future electricity used in California, regardless of whether it is generated in-state or purchased from other states.

Assembly Bill 811. AB 811 (2008) authorizes California cities and counties to designate districts within which willing property owners may enter into contractual assessments to finance the installation of renewable energy generation and energy efficiency improvements that are

permanently fixed to the property. These financing arrangements would allow property owners to finance renewable energy generation and energy efficiency improvements through low-interest loans that would be repaid as an item on the property owner's property tax bill.

California Green Building Code. The California Green Building Code (2008) (the CALGreen Code) is the statewide green building code, which was developed to provide a consistent approach for green building within California. It lays out minimum requirements for newly constructed buildings in California, which will reduce GHG emissions through improved efficiency and process improvements. It requires builders to install plumbing that cuts indoor water use by as much as 20 percent, divert 50 percent of construction waste from landfills to recycling, and use low-pollutant paints, carpets, and floors.

California Code of Regulations Title 24, Part 6. Although it was not originally intended specifically to reduce GHG emissions, California Code of Regulations Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption, which in turn reduces fossil fuel consumption and associated GHG emissions. The standards are updated periodically to allow consideration and possible incorporation of new energy-efficient technologies and methods. The California Energy Commission estimates that the 2008 standards reduce consumption by 10 percent for residential buildings and 5 percent for commercial buildings, relative to the previous standards. For projects implemented after January 1, 2014, the California Energy Commission estimates that the 2013 Title 24 energy efficiency standards will reduce consumption by 25 percent for residential buildings and 30 percent for commercial buildings, relative to the 2008 standards. These percentage savings relate to heating, cooling, lighting, and water heating only and do not include other appliances, outdoor lighting that is not attached to buildings, plug loads, or other energy uses.

Assembly Bill 341. AB 341 (2011) establishes a new policy goal of the State of California to divert at least 75 percent of solid waste generated by the year 2020 in an effort to reduce GHG emissions. It also provides for mandatory commercial and multi-family residential recycling, and requires cities and counties to add a commercial and multi-family residential recycling element to their existing resource reduction plans.

1.8.3 REGIONAL

SAN LUIS OBISPO COUNTY AIR POLLUTION CONTROL DISTRICT

The APCD has primary responsibility for the development and implementation of rules and regulations designed to attain the National Ambient Air Quality Standards and California Ambient Air Quality Standards, as well as the permitting of new or modified sources, development of air quality management plans, and adoption and enforcement of air pollution regulations within San Luis Obispo County, which is located within the South Central Coast Air Basin. The APCD regulates most air pollutant sources, except for mobile sources, which are regulated by CARB or California EPA. State and local government projects, as well as projects proposed by the private sector, are subject to APCD requirements if the sources are regulated by the APCD.

The AB 32 Scoping Plan does not provide an explicit role for local air districts in implementing AB 32, but it does state that CARB will work actively with air districts in coordinating emissions reporting, encouraging and coordinating GHG reductions, and providing technical assistance in quantifying reductions. The ability of air districts to control emissions (both criteria pollutants and GHGs) is provided primarily through permitting as well as through their role as CEQA lead or commenting agency, the establishment of CEQA thresholds, and the development of analytical guidance for CEQA documents.

In March 2012, the APCD adopted GHG thresholds in order to help lead agencies meet the GHG reduction goals of AB 32. The APCD's approach to developing a threshold of significance for GHG emissions was to identify the GHG emissions level for which a project would not be expected to substantially conflict with existing California legislation adopted to reduce statewide GHG emissions. Different thresholds were developed to accommodate various development types and patterns and are summarized below in **Table 1-2**.

Table 1-2: APCD GHG Significance Thresholds

GHG Emission Source Category	Operational Emissions
Residential and Commercial Projects	Compliance with Qualified GHG Reduction Strategy OR Bright-Line Threshold of 1,150 MT CO_2e/yr OR Efficiency Threshold of 4.9 MT CO_2e/SP*/yr
(Industrial) Stationary Sources	10,000 MT of CO_2e/yr

*SP = Service Population (residents + employees). YR = Year

For projects other than stationary sources, compliance with either a Qualified GHG Reduction Strategy, or with the Bright-Line (1,150 CO_2e/yr) or Efficiency Threshold (4.9 MT CO2e/SP/yr) would result in an insignificant determination, and in compliance with the goals of AB 32. The construction emissions of projects will be amortized over the life of a project and added to the operational emissions. Emissions from construction-only projects (e.g. roadways, pipelines, etc.) will be amortized over the life of the project and compared to an adopted GHG Reduction Strategy or the Bright-Line Threshold only.

The APCD recommends that lead agencies within the county use the adopted GHG thresholds of significance when considering the significance of GHG impacts of new projects subject to CEQA. Further, projects with GHG emissions that exceed the thresholds will need to implement mitigation to reduce the impacts to a less than significant level, which can be accomplished through a Mitigated Negative Declaration or an Environmental Impact Report.

As identified in the APCD thresholds, if a project is consistent with an adopted Qualified GHG Reduction Strategy (e.g., CAP meeting criteria identified in Section 1.4 above) that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emission impacts. This approach is consistent with CEQA Guidelines Section 15183.5.
As discussed in Section 1.4 above, this CAP was developed to be consistent with State CEQA Guidelines Section 15183.5 to mitigate emissions and climate change impacts and will therefore serve as a Qualified GHG Reduction Strategy for the City of Atascadero.

SAN LUIS OBISPO COUNCIL OF GOVERNMENTS

SLOCOG is the local Council of Governments with responsibility for regional planning for San Luis Obispo County. SLOCOG's planning efforts address regional issues relating to transportation, land use and urban form, housing, environment, economic development, regional public facilities, and climate change. Plans that SLOCOG has adopted that support GHG emissions reductions in Atascadero are described below.

Rideshare Program. The Rideshare Program is a division of SLOCOG that focuses on outreach and events to promote bicycling, walking, carpooling, vanpooling, and riding the bus. Some of the major programs include:

- Bike month and Rideshare month.
- Transportation Choices Program – This is a free program in San Luis Obispo County offered to businesses and organizations that encourage their employees to use sustainable transportation. The goal of the Transportation Choices Program is to equip employers with the tools needed promote positive change in employee commuting habits.
- Mobility Management Program - The goal of the program is to bridge the communications gap between Public Transit Operators and Social Services Agencies.
- Safe Routes to School Program - Safe Routes to School is a national and international movement to enable and encourage students to walk and bicycle to school. Through the use of education, encouragement, enforcement, engineering and evaluation, programs and projects are being developed to create a safe, healthy and fun environment for walking and biking to school.
- Senior Transportation Choices Program - Rideshare works hand-in-hand with seniors throughout the county, providing tools and education on how to use public transportation and community transportation services. Through our Senior Transportation Choices Program, we provide transportation information, Transit Field Trips and personalized trip planning.

Planning for Alternative Modes. SLOCOG focuses planning efforts to support the use of the following alternative modes of transportation:

- **Bikes –** SLOCOG supports and promotes bicycling as a viable transportation choice. SLOCOG staff attend Bicycle Advisory Committees in the City of San Luis Obispo and San Luis Obispo County. SLOCOG staff also review and advise jurisdictions on approval of BTA eligible Bicycle Plans.
- **Pedestrians –** SLOCOG is in the process of developing the Northern San Luis Obispo County Salinas River Corridor Anza Trail Master Plan.
- **Bus –** SLOCOG works with all transit providers to coordinate services. The Transit Operators Group is an Ad Hoc committee of transit operators, contractors, and SLOCOG staff. Coordinating projects include the Coordinated Human Services Public

Transportation Plan, the Region Wide Fare Improvement Study, and the Long Range Transit Plan.

- **Rail –** SLOCOG coordinates and prepares agendas for the Coast Rail Coordinating Council (CRCC). The purpose of the CRCC is to improve the frequency and speed of passenger trains on the coast route between San Francisco and Los Angeles.

Community 2050 Regional Blueprint. Community 2050 is a collaborative planning effort that utilizes scenario planning to study long-range regional growth. Community 2050 outlines a program to improve multimodal mobility through a combination of strategies and investments to accommodate growth in transportation demand and reduce congestion that will contribute to a strong economy.

2010 Regional Transportation Plan – Preliminary Sustainable Communities Strategy (RTP-PSCS). The RTP-PSCS, most recently updated in 2010, is a comprehensive plan guiding transportation policy for the region and makes recommendations concerning improvements to the existing transportation network of highways, transit, air, water, rail, and bicycling. The plan helps position the region to achieve smarter, more sustainable growth that meets the transportation needs of the growing population and changing region. The primary purpose of the RTP-SCS is to integrate sustainable communities strategies developed under the Community 2050 Regional Blueprint and continue progress in accomplishing the intermodal mix of policies, programs and projects in the adopted RTP, Vision 2025, adopted in 2005. The 2010 RTP-PSCS contains a "Preliminary" Sustainable Communities Strategy consistent with the purpose and intent of state bills related to GHG emissions GHGs and climate change, including AB 32 and the SB 375.

2012 SCS-compliant RTP Update. SLOCOG is currently working to prepare a 2012 SCS-complaint RTP. This update will build upon and further refine the efforts of the 2010 RTP-PSCS to adjust alternatives to satisfy State requirements of SB 375. SLOCOG must reduce per capita GHG emissions from passenger vehicles by 8 percent relative to 2005 levels in 2020 and 2030.

1.8.4 LOCAL GOVERNMENT ROLES AND RESPONSIBILITIES

The AB 32 Scoping Plan establishes a framework for achieving statewide GHG reductions required by AB 32. Specifically, the AB 32 Scoping Plan describes a list of measures that the State will undertake, and the anticipated GHG reductions associated by these measures, by 2020. Because the State does not have jurisdictional control over all of the activities that produce GHG emissions in California, the AB 32 Scoping Plan articulates a unique role for local governments in helping to achieve the statewide GHG reduction target, noting their broad influence and, in some cases, exclusive authority over activities that contribute to significant direct and indirect GHG emissions through their planning and permitting processes, local ordinances, outreach and education efforts, and City government operations. As such the AB 32 Scoping Plan recommends that local governments reduce GHG emissions from both their City government operations and community at large.

CHAPTER 2

GHG EMISSIONS AND REDUCTION TARGET

2.0 GHG Emissions and Reduction Target

A GHG emissions inventory identifies the major sources and quantities of GHG emissions produced by community-wide activities and City government facilities and operations within a jurisdiction's boundaries for a given year. Estimating GHG emissions enables local governments to establish an emissions baseline, track emissions trends, identify the greatest sources of GHG emissions within their jurisdiction, set targets for future reductions, and create an informed mitigation strategy based on this information.

This chapter summarizes the results of the GHG Emissions Inventory (2012). The Inventory includes a 2005 baseline inventory of GHG emissions resulting from community-wide activities and City government facilities and operations within Atascadero. It also includes a 2020 business-as-usual forecast of how emissions would change over time as a result of population and job growth if consumption trends and efficiencies remained at their 2005 levels, absent of any new policies or actions that would reduce emissions. Since 2005, there have been several State regulations and local initiatives that have been implemented that will reduce Atascadero's GHG emissions. Therefore, this chapter also presents a 2020 adjusted forecast to account for the impact of these measures to provide a more accurate picture of future emissions growth in 2020. In addition, this chapter identifies the City's GHG emissions reduction target for the year 2020 consistent with AB 32. **Appendix A** contains the complete GHG Emissions Inventory and supporting documentation.

2.1 2005 Baseline GHG Emissions

This section summarizes the methodology used to complete the 2005 baseline inventory of community-wide activities and City government facilities and operations, and the results.

2.1.1 METHODOLOGY

The 2005 baseline inventory quantifies the amount of GHG emissions that occurred within the City's jurisdictional boundary in the year 2005. It includes a community-wide inventory that details the sources and quantities of GHG emissions resulting from activities from the Atascadero community as a whole, and a City government operations inventory that identifies the sources and quantities of emissions resulting from the City of Atascadero's operations and facilities. The City government operations inventory is a subset of the community-wide inventory, such that the City government's emissions are included within the community-wide inventory.

The community-wide inventory is divided into the following sectors, or categories of emissions sources: residential energy use, commercial and industrial energy use, transportation, off-road vehicles and equipment, solid waste, and wastewater. The City government operations inventory provides a more detailed analysis of emissions resulting from City-owned or -operated buildings and facilities, fleet vehicles, transit vehicles, and streetlights and traffic signals; employee commute travel; water delivery; wastewater facilities; and solid waste.

The City government operations inventory follows the *Local Government Operations Protocol* (version 1.1), which was adopted in 2010 by CARB and serves as the national standard for quantifying and reporting GHG emissions from local government operations. The community-wide inventory follows the *Association of Environmental Professionals (AEP) California Community-wide GHG Baseline Inventory Protocol (AEP Protocol)* (June 2011) and *ICLEI International Local Government GHG Emissions Analysis Protocol (IEAP)* (October 2009). These protocols provide standard accounting principles, boundaries, quantification methods, and procedures for reporting GHG emissions. Like all emissions inventories, this inventory must rely on the best-available data and calculation methodologies, and therefore, represents a best estimate of GHG emissions following standard methodologies at the time of preparation. As protocols are updated, as better data and calculation methodologies become available, the inventory can be updated and improved. Nevertheless, the findings of this analysis provide a solid basis upon which Atascadero is planning and taking action to reduce its GHG emissions.

2.1.2 COMMUNITY-WIDE GHG EMISSIONS

In 2005, the Atascadero community emitted approximately 141,428 MT CO_2e as a result of activities that took place within the residential energy use, commercial and industrial energy use, transportation, off-road, solid waste, and wastewater sectors. As shown in **Figure 2-1** and **Table 2-1**, the transportation sector was the largest contributor of GHG emissions, generating approximately 60,041 MT CO_2e, or 43 percent of total 2005 emissions. Transportation sector emissions are the result of diesel and gasoline fuel used in on-road vehicles traveling to and/or from locations within Atascadero.[1] Electricity and natural gas consumption within the residential sector was the second largest contributor, generating 40,690 MT CO_2e, or 29 percent of the total emissions. Electricity and natural gas consumption in Atascadero's commercial and industrial sector produced 20,271 MT CO_2e, or 14 percent of total community-wide emissions. Emissions from solid waste sent to landfills (9,083 MT CO_2e, or six percent), off-road vehicles and equipment (8,686 MT CO_2e, or six percent), and wastewater treatment (2,657 MT CO_2e, or two percent) accounted for the remainder of community-wide emissions.

[1] Excludes pass-through trips that do not have an origin or destination within the city. Emissions take into account the regional mix of vehicle classes and model years, as well as ambient conditions and travel speeds that determine fuel efficiency. Types of emissions accounted for include: running exhaust, idle exhaust, starting exhaust, diurnal, resting loss, running loss, and hot soak. Refer to **Appendix A** for further information.

Figure 2-1: Community-wide GHG Emissions by Sector (2005)

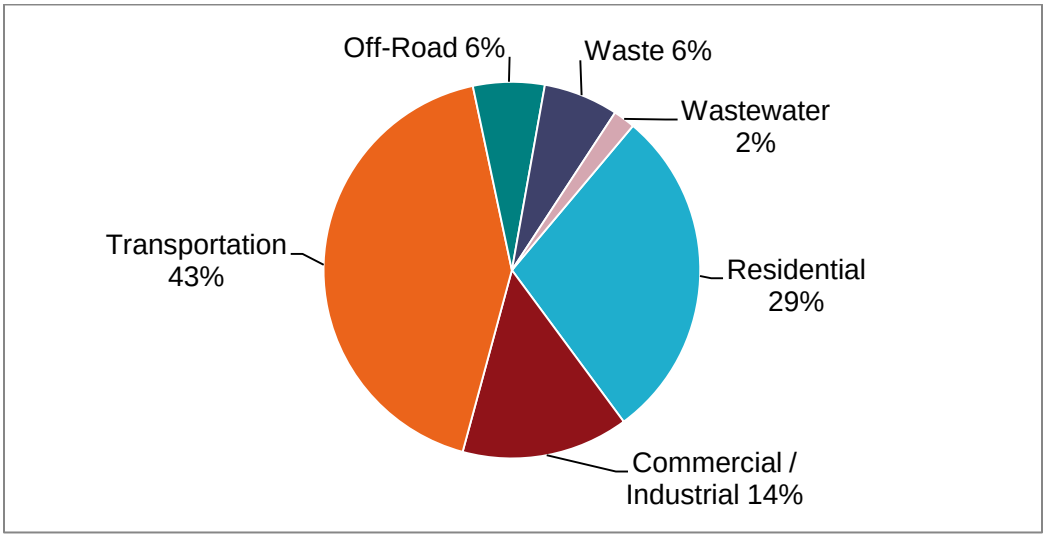


Table 2-1: Community-wide GHG Emissions by Sector (2005)

Sector	Description	GHG Emissions (MT CO_2e)	Percent of Total
Residential	Electricity and natural gas used in homes	40,690	29%
Commercial/Industrial	Electricity and natural gas used in commercial and industrial buildings	20,271	14%
Transportation	Gasoline and diesel used in on-road vehicles	60,041	43%
Off-Road Vehicles and Equipment	Gasoline, diesel, and compressed natural gas used in off-road vehicles and equipment	8,686	6%
Solid Waste	Methane from the decomposition of landfilled solid waste	9,083	6%
Wastewater	Methane and nitrous oxide released in the wastewater treatment process	2,657	2%
Total		**141,428**	**100%**

2.1.3 CITY GOVERNMENT OPERATIONS GHG EMISSIONS

In 2005, City government operations generated approximately 4,130 MT CO_2e. This quantity represents approximately three percent of Atascadero's total community-wide GHG emissions. As shown in **Figure 2-2** and **Table 2-2**, the City's wastewater facility was the largest contributor to the City's emissions (generating approximately 71 percent of the total emissions). Fuel consumption from the City's fleet vehicles (10 percent) and from electricity and natural gas used at City buildings (eight percent) were also a large source of emissions. Emissions from the transit fleet (five percent), employee commute (five percent), solid waste (one percent), streetlights and traffic signals (less than one percent), and water delivery (less than one percent) accounted for the remainder of the City's emissions.

Figure 2-2: City Government GHG Emissions by Sector (2005)

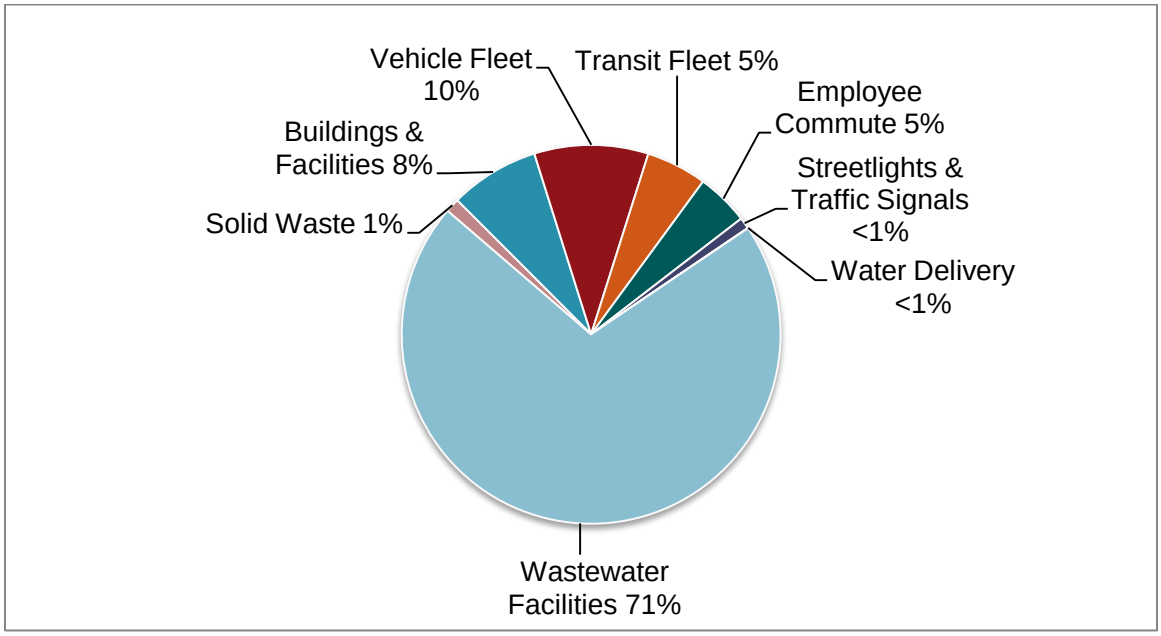


Table 2-2: City Government GHG Emissions by Sector (2005)

Sector	Description	GHG Emissions (MT CO_2e)	Percent of Total
Vehicle Fleet	Diesel and gasoline consumption and vehicle type	402	10%
Transit Fleet	Diesel and gasoline consumption	214	5%
Employee Commute	Annual vehicle miles traveled (VMT) from sample of employee commuting patterns	185	5%
Buildings and Facilities	Electricity and natural gas consumption in City-owned or –operated buildings and facilities	316	8%
Streetlights &Traffic Signals	Electricity used to power streetlights, traffic signal lights, and other public outdoor lighting	40	<1%
Solid Waste	Annual waste tonnage sent to landfill	49	1%
Water Delivery	Electricity used for water transport resulting from City operations	1	<1%
Wastewater Facilities	Electricity consumption from wastewater facilities	2,923	71%
Total		**4,130**	**100%**

2.2 2020 GHG Emissions Forecast

2.2.1 METHODOLOGY

The GHG emissions forecast provides a "business-as-usual estimate," or scenario, of how emissions will change in the year 2020 if consumption trends and behavior continue as they did in 2005, absent any new federal, state, regional, or local policies or actions that would reduce emissions. The year 2020 was selected for the forecast in order to maintain consistency with AB 32.

The GHG emissions forecast is based on projected growth trends in population, jobs, and VMT and the assumption that the emissions per sector will change over time in proportion to population, jobs, and VMT. The forecast relies on *SLOCOG's San Luis Obispo County 2040 Population, Housing & Employment Forecast* (August 2011) for year 2020 population and job projections and VMT estimates from SLOCOG's regional travel demand model for the year 2020 provided by Fehr & Peers. The "mid-range" values for population and job growth were used for this forecast.

2.2.2 2020 BUSINESS-AS-USUAL FORECAST

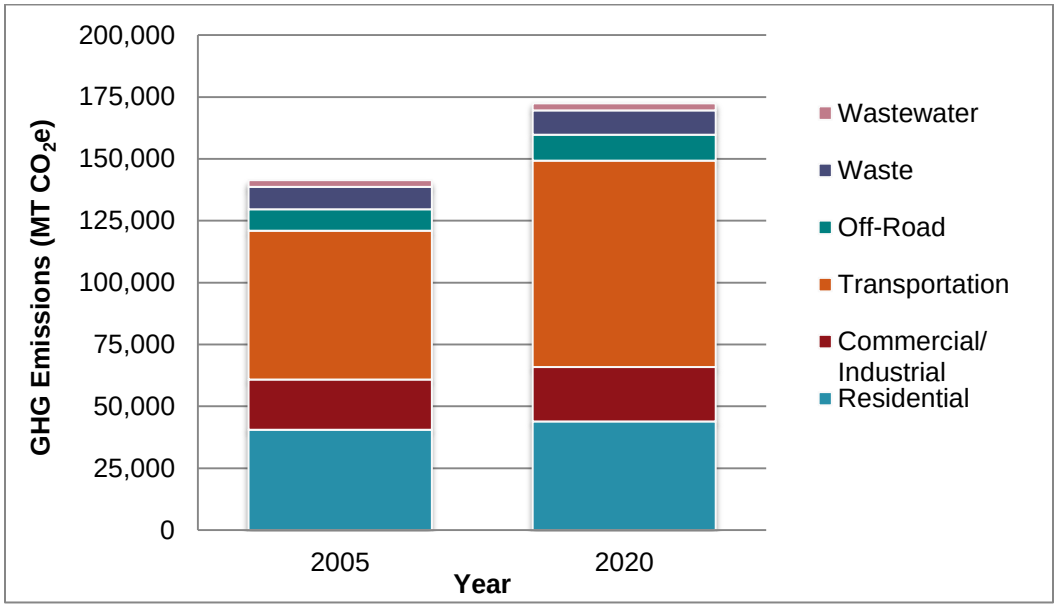
Under a business-as-usual scenario, Atascadero's GHG emissions are projected to grow by approximately 22 percent by the year 2020, from 141,428 MT CO_2e to 172,488 MT CO_2e. Emissions associated with the transportation sector are projected to experience the highest level of growth (39 percent). **Table 2-3** and **Figure 2-3** show the results of the forecast.

Table 2-3: 2020 Business-As-Usual GHG Emissions Forecast

Sector	2005 (MT CO_2e)	2020 (MT CO_2e)	Percent Change from 2005 to 2020
Residential	40,690	43,926	8%
Commercial / Industrial	20,271	22,049	9%
Transportation	60,041	83,317	39%
Off-Road	8,686	10,521	21%
Solid Waste	9,083	9,805	8%
Wastewater	2,657	2,868	8%
TOTAL	**141,428**	**172,488**	**22%**

*Refer to **Appendix A** for details

Figure 2-3: 2020 Business-As-Usual GHG Emissions Forecast



2.2.3 2020 ADJUSTED FORECAST

A. INCORPORATION OF STATE REDUCTIONS INTO FORECAST

The AB 32 Scoping Plan identifies several State measures that are approved, programmed, and/or adopted and will reduce GHG emissions within Atascadero. These State measures require no additional local action. Therefore, these measures were incorporated into the forecast and reduction assessment to create an "adjusted forecast," which provides a more accurate picture of future emissions growth and the responsibility of the City once State measures to reduce GHG emissions have been implemented. A brief description of each of these measures is provided below and the calculation details are located in **Appendix B**, of this document. **Table 2-4** summarizes the reduction in local emissions that would result.

Table 2-4: Summary of State Reductions

State Measure	2020 Reduction (MT CO_2e)*
Clean Car Standards, AB 1493 (Pavley I)	-11,064
Low-Carbon Fuel Standard (on-road transportation)	-7,226
Low-Carbon Fuel Standard (off-road vehicles)	-1,052
Title 24	-592
Renewable Portfolio Standard	-12,688
Total State Reduction	**-32,622**

*Refer to **Appendix B** for calculation details

Clean Car Standards, AB 1493 (Pavley I)

Signed into law in 2002, AB 1493 (Pavley I standard) requires vehicle manufacturers to reduce GHG emissions from new passenger vehicles and light trucks from 2009 through 2016. The CARB anticipates that the Pavley I standard will reduce GHG emissions from new California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016. The Pavley I standard is expected to reduce transportation sector emissions in Atascadero by approximately 11,064 MT CO_2e, or 13 percent, in 2020 compared to business-as-usual levels.

Low Carbon Fuel Standard

The Low Carbon Fuel Standard requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. Measured on a lifecycle basis, the carbon intensity represents the CO_2e emitted from each stage of producing, transporting, and using the fuel in a motor vehicle. This translates to an approximately nine percent (or 7,226 MT CO_2e) reduction in Atascadero's on-road transportation sector GHG emissions and a 10 percent reduction (1,052 MT CO_2e) in its off-road sector GHG emissions in 2020 compared to business-as-usual levels.

Title 24

Although it was not originally intended specifically to reduce GHG emissions, California Code of Regulations Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption, which in turn reduces fossil fuel consumption and associated GHG emissions. The standards are updated periodically to allow consideration and possible incorporation of new energy-efficient technologies and methods. The updates that have occurred since the 2005 baseline year and, therefore, were not included in the business-as-usual forecast, include the 2008 and 2013 Title 24 Energy Efficiency Standards. The California Energy Commission estimates that the 2008 standards reduce consumption by 10 percent for new residential buildings and five percent for new commercial buildings, relative to the 2005 standards. For projects implemented after January 1, 2014, the California Energy Commission estimates that the 2013 Title 24 Energy Efficiency Standards will reduce consumption by 25 percent for new residential buildings and 30 percent for new commercial buildings, relative to the 2008 standards. The 2008 and 2013 Title 24 requirements would reduce emissions in Atascadero by approximately 592 MT CO_2e in 2020.[2]

Renewable Portfolio Standard

The State of California Renewable Portfolio Standard requires investor-owned utilities, electric service providers, and community choice aggregators to increase the portion of energy that comes from renewable sources to 20 percent by 2010 and 33 percent by 2020. PG&E is the electricity provider in Atascadero. In order to calculate future emissions that take into account the Renewable Portfolio Standard, PG&E's 2020 emissions factor was applied (PG&E, 2011).

[2] The AB 32 Scoping Plan calls for the continuation of ongoing triennial updates to Title 24 that will yield regular increases in the mandatory energy and water savings for new construction. Future updates to Title 24 standards for residential and non-residential alterations are not taken into consideration due to lack of data and certainty about the magnitude of energy savings that will be realized with each subsequent update.

As show in **Table 2-5**, the Renewable Portfolio Standard would reduce Atascadero's GHG emissions by approximately by 12,688 MT CO_2e, or 40 percent, in 2020.

Sustainable Communities and Climate Protection Act – Senate Bill 375

SB 375, the Sustainable Communities and Climate Protection Action of 2008, enhances California's ability to reach its AB 32 target by aligning regional transportation planning efforts with land use and housing allocations in order to reduce transportation-related GHG emissions. As mentioned in Chapter 1, *Introduction*, SLOCOG must reduce per capita GHG emissions from passenger vehicles by eight percent relative to 2005 levels in 2020 and 2030.

While the outcome of SB 375 in terms of a reduction in VMT per capita is specified by the State, achievement of the target is dependent on regional and local actions and activities that are not regulated by the State. Many of these actions and activities will be inextricably linked to local actions which rely on implementation assumptions that will need to be monitored to ensure effectiveness. Therefore, GHG reductions resulting from implementation of SB 375 have not been included as a State measure that would reduce GHG emissions within Atascadero.

B. INCORPORATION OF LOCAL REDUCTIONS INTO FORECAST

In addition to the State measures described above, the City of Atascadero has implemented a number of local measures since the 2005 baseline inventory year that will reduce the community's GHG emissions. It is important to note that local measures which rely on future implementation actions and assumptions are included in Chapter 3, *Climate Action Measures*, as they will need to be monitored to ensure effectiveness. A brief description of each of these local measures is provided below by topic area and the local reduction in GHG emissions in 2020 is summarized in **Table 2-5** (see **Appendix B** for supporting details).

Table 2-5: Summary of Local Reductions

Local Measure	2020 Reduction (MT CO_2e)
Energy	
Solar Energy Installation (Residential, Commercial, and City Government)	-213
City Government Building/Facility Energy Efficiency Improvements	-35
Energy Efficiency and Conservation Education and Outreach	Included in Chapter 3 as a CAP measure*
Transportation and Land Use	
Increase Density and Diversity of Land Uses	Included in Chapter 3 as a CAP measure*
Transit Improvements	-26
Park and Ride Facilities	Included in Chapter 3 as a CAP measure*
Bicycle Network Improvements	-17
Electric Vehicle Charging Station	Included in Chapter 3 as a CAP measure*
Waste	
Construction and Demolition Debris Diversion	-569
Water	
Water Conservation Programs	-19
Trees	
Tree Planting	-36
Streetscape Improvements	Not quantified
Total Reduction from Local Measures	**-915**

* The reductions associated with this measure are quantified and included as part of the CAP measures identified in Chapter 3.
** The SLOCOG 2010 travel demand model used to estimate 2005 baseline and 2020 vehicle miles traveled (VMT) uses a 2010 base year and its VMT are calculated and calibrated to 2009-2011 traffic counts. As such, results for alternative transportation modes and transportation demand management are inherent to the model results.

Energy Measures

Between 2006 and 2012, approximately 834 kilowatts (kW) of solar photovoltaic systems and hot water heaters were installed on or in homes, affordable housing (through the Single-family Affordable Solar Homes [SASH] program), businesses, and City property in Atascadero, which will reduce emissions by 215 MT CO_2e in 2020.

In addition, between 2005 and 2012, the City has implemented energy efficiency improvements, such as lighting retrofits, HVAC upgrades, and the installation of programmable thermostats and occupancy censors. These improvements are estimated to reduce electricity use by approximately 239 kW and would reduce GHG emissions by 33 MT CO_2e in 2020.

Transportation and Land Use Measures

New bicycle routes and bicycle parking and transit improvements installed between 2006 and 2012 are projected to reduce emissions by approximately 43 MT CO_2e in 2020.

Solid Waste Measures

As of 2010, the California Green Building Code requires all local jurisdictions to ensure that 50 percent of all non-hazardous construction and demolition solid waste is diverted from landfills. Within Atascadero, this would reduce emissions by an estimated 569 MT CO_2e in 2020.

Water Measures

Together, the City of Atascadero and the Atascadero Mutual Water Company have implemented a number of measures to reduce water consumption, including a water efficient landscape and irrigation ordinance, toilet and washing machine rebate program, and landscape rebate program. In addition, the City has implemented several water conservation measures at City facilities. These improvements and programs are estimated to reduce GHG emissions by approximately 19 MT CO_2e in 2020.

Urban Greening

Between 2006 and 2011, approximately 3,000 trees were planted throughout Atascadero, which are estimated to sequester 36 MT CO_2e in 2020.

C. ADJUSTED FORECAST

As shown in **Table 2-6**, State and local measures will reduce GHG emissions in Atascadero by an estimated 33,537 MT CO_2e in 2020. Under the adjusted scenario GHG emissions are projected to decrease to 138,951 MT CO_2e (approximately 19 percent below the business-as-usual scenario of 172,488 MT CO_2e).

Table 2-6: Summary of Reductions from State and Local Measures and 2020 GHG Emissions

	GHG Emissions (MT CO_2e)
2020 Business-as-Usual Forecast	172,488
2020 Reduction from State Measures	-32,622
2020 Reduction from Local Measures	-915
Total Reduction from State and Local Measures	**-33,537**
2020 Adjusted Forecast	**138,951**

2.3 GHG Emissions Reduction Target

The City is committed to reducing its share of GHG emissions consistent with AB 32. The AB 32 Scoping Plan encourages local governments to establish a reduction target that "parallels the State's commitment to reduce GHG emissions by approximately 15 percent from current levels by 2020." Therefore, this CAP establishes a reduction target of 15 percent below 2005 levels by 2020 in conformance with the State's recommended reduction target. The 2005 baseline GHG emissions inventory and 2020 GHG emissions forecast under the adjusted scenario provide the

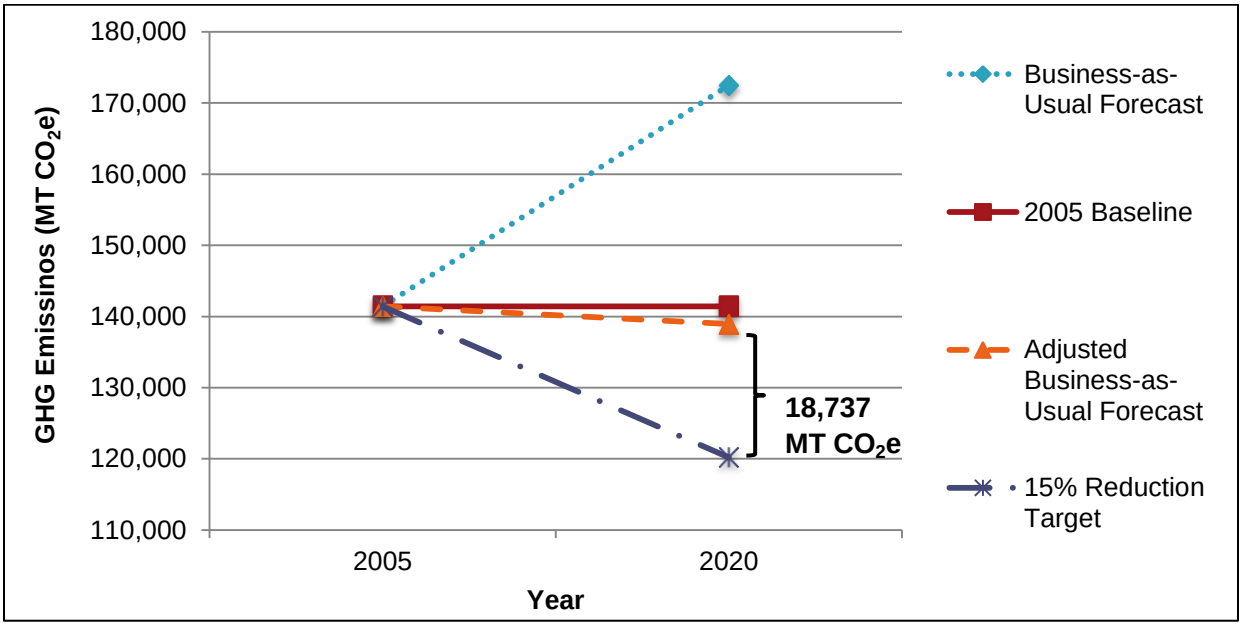
necessary background for the City to identify the reduction in emissions needed from local measures to meet this target.

As shown in **Table 2-7** and **Figure 2-4**, based on the 15 percent reduction target, Atascadero would need to reduce its community-wide emissions to 120,214 MT CO_2e by 2020. To meet this target, Atascadero will need to reduce its GHG emissions 13 percent below the adjusted forecast levels[3] (equivalent to 18,737 MT CO_2e) by 2020 through implementation of local measures and actions.

Table 2-7: Atascadero's GHG Emissions, Target, and Reduction Necessary to Meet Target

	GHG Emissions (MT CO_2e)
2005 Baseline Emissions	141,428
2020 Adjusted Forecast	138,951
Target (15 percent below 2005 levels by 2020)	120,214
Remaining Gap Necessary to Meet Target	**18,737**

Figure 2-4: GHG Emissions in Relation to State-Recommended Target



[3] As described in Section 2.3, the adjusted 2020 forecast accounts for approved, programmed, and/or adopted State- and local-level measures that will reduce local GHG emissions. Therefore, it is used to determine the necessary reductions to meet the City's reduction target as it provides a more accurate picture of future emissions growth and the proportionate share of emissions the City must reduce once State measures to reduce GHG emissions have been implemented.

CHAPTER 3

CLIMATE ACTION MEASURES

3.0 Climate Action Measures

This chapter identifies the measures that the City will implement to achieve its GHG emissions reduction target of 15 percent below 2005 levels by 2020. The City has identified a set of measures based on careful consideration of the reductions in GHGs needed to achieve the target, the sources and distribution of emissions identified in the GHG emissions inventory, existing priorities and resources, and the potential costs and benefits of each measure. Many of the CAP measures are also consistent with the measures of neighboring jurisdictions and regional agencies which is important for feasible and effective implementation of GHG reduction measures. Detailed analyses of the GHG reduction potential and estimated costs and savings for each measure are located in **Appendix B**.

3.1 Chapter Organization

The climate action measures, which represent ways to reduce GHG emissions are organized into the following focus areas: City government, energy, transportation and land use, off-road, water, solid waste, and tree planting. The discussion of each focus area begins with an introduction, followed by a summary table listing the measures within the focus area and the associated GHG reduction potential, where applicable. Following the introduction to each focus area, each measure is presented with the following information:

- **Existing or Completed Efforts:** a list of efforts the City has implemented or is in the process of implementing since the baseline year (2005) to accomplish the measure.
- **Implementation Actions:** the specific steps the City will take to achieve the GHG emission reduction and outcome of the measure.
- **GHG Reduction Potential:** the estimated reduction in GHG emissions anticipated in 2020.
- **Costs and Savings:** for each measure, potential costs and savings to the City or community (private) are categorized as none, very low, low, medium, and high. **Table 3-1** summarizes these category definitions. Costs account for the expense that would occur beyond conducting business-as-usual (i.e., without implementation of the CAP).

Table 3-1: Measure Cost and Savings

Aggregated City Government Costs/Savings	Per Unit Community Cost/Savings
Very Low: $1 - $10,000 Low: $10,001 - $50,000 Medium: $50,001 - $100,000 High: $100,001 or greater	Very Low: $1 - $500 Low: $501 - $1,000 Medium: $1,001 - $5,000 High: $5,001 or greater

Details related to measure implementation and monitoring, including responsible parties, performance criteria, implementation time frames, and potential funding sources are located in Chapter 5, *Implementation and Monitoring*.

3.2 City Government Operations Measures

The City has already taken a number of steps that have resulted in GHG emissions reductions, as identified in Chapter 2, *GHG Emissions and Reduction Target*, and is committed to building on those efforts. This focus area identifies measures and actions the City can implement to further reduce GHG emissions from City government operations and facilities. Although the GHG emissions that result from City government operations and facilities account for only three percent of Atascadero's community emissions, as an employer, property-owner, and regulatory entity, the City can set an example of GHG emissions reduction practices for the community and demonstrate additional benefits of the measures beyond reducing GHG emissions, such as cost savings in buildings and operations and improved operational efficiency. As shown in **Table 3-2**, the City government operations measures have the potential to reduce Atascadero's GHG emissions by 333 MT CO_2e by 2020.

In addition to reducing GHG emissions, the City government measures described in this section have the potential to provide other important benefits to the community. These benefits include:

- City leadership
- Reduced operating and maintenance costs
- Improved public health
- Improved air and water quality
- Resource conservation
- City beautification
- Lower maintenance costs and extended equipment lives

Table 3-2: City Government Operations GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
C-1	City Government Energy Efficiency Retrofits and Upgrades	59
C-2	City Government Energy Efficient Public Realm Lighting	23
C-3	Renewable Energy Systems on City Property	172
C-4	Zero and Low Emission City Fleet Vehicles	48
C-5	City Government Solid Waste Reduction	7
C-6	City Government Tree Planting Program	24
C-7	Wastewater Treatment Methane Capture	Unknown
City Government Operations Total		**333**

C-1: City Government Energy Efficiency Retrofits and Upgrades

GHG Reduction Potential:
59 MT CO_2e
City Cost:
Varies
City Savings:
Medium
Private Cost:
None
Private Savings:
None

Establish a target to reduce City government energy use by 20 percent from 2005 baseline levels by 2020 and implement cost-effective improvements and upgrades to achieve that target.

Existing and/or Completed Efforts in Support of Measure:

- The City has completed energy audits and benchmarking of all City-owned or -operated facilities. Monthly energy usage data within individual buildings and across entire building portfolio is automatically measured and tracked through a Portfolio Manager.
- The City maintains a regular maintenance schedule for heating and cooling, ventilation and other building functions.
- The Historic City Hall restoration includes: new high efficiency HVAC units with individual temperature controls, energy efficient light fixtures with occupancy sensors, energy efficient appliances, low flush water closets and urinals, additional windows for natural light and ventilation, on-demand water heaters, and added insulation.
- The City has a policy for the purchase of energy efficient equipment and appliances.
- In 2008, the City Manager issued a directive outlining citywide energy conservation measures. City staff completed a Building Operator Certification Course and were trained to evaluate and improve operational efficiencies in municipal facilities and cut down on energy usage.
- As a result of these initiatives and staff focus on reducing energy consumption, the City achieved an overall 10 percent reduction in energy usage across all City buildings and facilities between 2009 and 2011.

Implementation Actions:

- **C-1.1:** Adopt a 20 percent City government energy use reduction target, based on a per square footage analysis of energy usage.
- **C-1.2:** Establish a prioritized list of cost-effective energy efficiency upgrade projects and implement them as funding becomes available.
- **C-1.3:** Look into the feasibility of installing an energy management system that monitors energy use and controls heating, cooling, and ventilation to increase efficiency. Conduct a cost benefit analysis and identify funding sources for installation of this system, or other tools for monitoring and encouraging energy efficiency.

- **C-1.4:** Continue to measure and track building energy usage and maintain a regular maintenance schedule for heating and cooling, ventilation and other building functions.

C-2: City Government Energy Efficient Public Realm Lighting

GHG Reduction Potential:
23 MT CO_2e
City Cost:
Medium
City Savings:
Low
Private Cost:
None
Private Savings:
None

Continue to replace City-owned or -operated street, traffic signal, park, and parking lot lights with higher efficiency lamp technologies.

Implementation Actions:

- **C-2.1:** Conduct an inventory of existing outdoor public light fixtures.
- **C-2.2:** Identify and secure funding to replace additional inefficient City-owned or -operated public lighting.

C-3: Renewable Energy Systems on City Property

GHG Reduction Potential:
172 MT CO_2e
City Cost:
High
City Savings:
High
Private Cost:
None
Private Savings:
None

Pursue on-site small-scale renewable energy generation at City government facilities.

Existing and/or Completed Efforts in Support of Measure:

The City completed a feasibility study on the installation of renewable energy projects at select City facilities.

Implementation Actions:

- **C-3.1:** Identify funding sources and opportunities for City government renewable energy generation. Specifically, installation of a solar photovoltaic (PV) system at the wastewater treatment plant property which could be used to supply power to wastewater plant and other City facilities.
- **C-3.2:** Install small-scale solar PV systems or other renewable energy projects at select City government facilities.

C-4: Zero- and Low-Emission City Fleet Vehicles

GHG Reduction Potential:
48 MT CO_2e
City Cost:
Low
City Savings:
Very Low
Private Cost:
None
Private Savings:
None

Continue to replace official City vehicles with more efficient and/or alternatively fueled vehicles.

Existing and/or Completed Efforts in Support of Measure:

- The City has retired old diesel vehicles from the vehicle fleet.
- The Fire Department tests all engines and command vehicles for emissions; two new engines exceed the 2007 EPA specs for trucks and heavy equipment.

Implementation Actions:

- **C-4.1:** Develop and adopt a low- and zero- emissions replacement/purchasing policy for official City vehicles and equipment. This would not apply to vehicles with special performance requirements.
- **C-4.2:** Work with the Central Coast Clean Cities Coalition to obtain funding to purchase low-emission and zero-emission fleet vehicles.
- **C-4.3:** Identify fleet vehicles near replacement and options for lower emission vehicles.

C-5: City Government Solid Waste Reduction

GHG Reduction Potential:
7 MT CO_2e
City Cost:
Low
City Savings:
None
Private Cost:
None
Savings:
None

Establish a solid waste diversion rate of 15 percent over 2005 baseline levels and identify steps to meet that rate by 2020.

Implementation Actions:

- **C-5.1:** Continue to install recycling receptacles at City-owned or -operated buildings and facilities.
- **C-5.2:** Investigate feasibility of installation of solar powered trash/recycle compactors at City facilities in order to reduce trips to City parks for trash pickup and encourage public awareness of recycling.

C-6: City Government Tree Planting Program

Establish a tree planting program to increase the number of native, drought-tolerant trees on City-owned property, parks and streetscapes.

Existing and/or Completed Efforts in Support of Measure:

- The City has developed and adopted a formal tree planting policy or program and has planted trees in collaboration with the Atascadero Native Tree Association.

Implementation Actions:

- **C-6.1:** Plant at least 2,000 trees on City-property by 2020.
- **C-6.2:** Identify and secure grant funding to plant trees on City properties.

GHG Reduction Potential:
24 MT CO_2e
City Cost:
High
City Savings:
None
Private Cost:
None
Savings:
None

C-7: Wastewater Treatment Plant Methane Capture

Implement methane capture at the wastewater treatment facility.

Implementation Actions:

- **C-7.1:** Investigate the installation of a methane capture system at the wastewater treatment plant. Look for funding sources to conduct a complete feasibility study and supplement construction costs for installation of this type of system.

GHG Reduction Potential:
Unknown
City Cost:
Unknown
City Savings:
Unknown
Private Cost:
None
Savings:
None

3.3 Community-wide Measures

3.3.1 ENERGY MEASURES

Energy use accounted for 43 percent of Atascadero's total GHG emissions in 2005. These emissions result from the combustion of fossil fuel, primarily coal, oil, and natural gas, which is used to heat, cool, and provide power to residential, commercial, and industrial buildings and other facilities. Factors affecting energy-related emissions in buildings include building design and the efficiency of technology and electronics in buildings. GHG emissions reductions can be achieved both by changes to the energy demand (e.g., improving energy efficiency and reducing consumption) and energy supply (e.g., switching from a high-carbon to a low- or zero-carbon technology or fuel). The energy measures listed in **Table 3-3** focus on these strategies and have the potential to reduce Atascadero's GHG emissions by 3,098 MT CO_2e by 2020.

In addition to reducing GHG emissions, the energy measures described in this section have the potential to provide other important benefits to the community, including:

- Reduced energy and operating costs
- Lower maintenance costs and extended equipment lives
- Increased building re-sale value
- Strengthened local economy
- Resource conservation
- Increased electricity reliability
- Improved air quality

Table 3-3: Energy GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
E-1	Energy Efficiency Outreach and Incentive Programs	778
E-2	Energy Audit and Retrofit Program	1,099
E-3	Income-Qualified Energy Efficient Weatherization Programs	126
E-4	Incentives for Exceeding Title 24 Building Energy Efficiency Standards	227
E-5	Small-Scale On-Site Solar Photovoltaic (PV) Incentive Program	781
E-6	Income-Qualified Solar PV Program	87
Energy Total		**3,098**

Measure E-1: Energy Efficiency Outreach and Incentive Programs

GHG Reduction Potential:
778 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Varies
Private Savings:
Very Low to Low

Expand participation in and the promotion of existing energy efficiency programs, such as Energy Upgrade California and San Luis Obispo County Energy Watch, to increase community awareness of existing energy efficiency rebates and financial incentives, and no- and low-cost actions community members can take to increase energy efficiency.

Existing and/or Completed Efforts in Support of Measure:

- The City currently partners with San Luis Obispo County Energy Watch and directs community members to existing program websites. This partnership has provided extensive training, outreach, and energy-saving opportunities for the City as well as for local businesses and property owners.
- The City works with SLO Green Build to host community workshops and seminars for homeowners, builders, and the general public. A SLO Green Build public information kiosk is located at the City Hall front counter.

Implementation Actions:

- **E-1.1:** Continue to collaborate with San Luis Obispo County Energy Watch, SLO Green Build, and other local groups to conduct additional outreach and promotional activities targeting specific groups or sectors within the community (e.g., homeowners, renters, businesses, etc.). Direct community members to existing program websites, such as Energy Upgrade California and San Luis Obispo County Energy Watch.
- **E-1.2:** Designate one week per year to conduct an energy efficiency outreach campaign targeting a specific group. The campaign week can also be used to recognize and encourage programs and educational outreach conducted by industry organizations, non-governmental entities, government agencies, and other community groups.

Measure E-2: Energy Audit and Retrofit Program

GHG Reduction Potential:
1,099 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Low to Medium
Private Savings:
Very Low to Medium

Facilitate voluntary energy assessments, retrofits, and retrocommissioning of residential and commercial buildings within Atascadero.

Implementation Actions:

- **E-2.1:** Develop and promote a residential and commercial energy audit program, either individually or in collaboration with San Luis Obispo County Energy

Watch, local utilities, and/or local jurisdictions within the region.

- **E-2.2:** Conduct outreach and promotional activities targeting specific groups (e.g., owners of buildings built prior to Title 24 [1980]) in order to promote the audit and retrofit program.
- **E-2.3:** As part of the business licensing and renewal process, encourage businesses to participate in the program and receive an energy audit.
- **E-2.4:** Participate in and promote a residential and commercial energy efficiency financing program to encourage investment in energy efficiency upgrades.
- **E-2.5:** Work with Energy Upgrade California, local utilities, and/or community businesses and organizations, to annually conduct a "do-it-yourself" workshop for building energy retrofits.
- **E-2.6:** Highlight the effectiveness of energy audits and retrofits by showcasing the success of retrofit projects (e.g., on the City's website or in its newsletter).

Measure E-3: Income-Qualified Energy Efficient Weatherization Programs

GHG Reduction Potential:
126 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Low

Facilitate energy efficient weatherization of low- and middle-income housing through promotion of existing programs.

Existing and/or Completed Efforts in Support of Measure:

- The City partners with Community Action Partnership of San Luis Obispo County (CAPSLO) to promote income-qualified weatherization programs.

Implementation Actions:

- **E-3.1:** Continue to promote income-qualified weatherization programs, either individually, or in collaboration with an existing organization, to income-qualified households using sources of data available to the City, (e.g., water bills, housing records, etc.).

Measure E-4: Incentives for Exceeding Title 24 Energy Efficiency Building Standards

GHG Reduction Potential:
227 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Medium to High
Private Savings:
Very Low to Medium

Encourage new development to voluntarily exceed State energy efficiency standards.

Existing and/or Completed Efforts in Support of Measure:

- The City collaborates with community organizations and businesses, local utilities, and other local jurisdictions in the region to develop and promote a technical assistance and best practices program that

aids developers in selecting and implementing energy efficiency measures that exceed State standards.

- City staff meets quarterly with SLO Green Build to discuss how City can encourage sustainable design.
- The City works with SLO Green Build to host community workshops and seminars for homeowners, builders, and the general public. A SLO Green Build public information kiosk is located at City Hall.

Implementation Actions:

- **E-4.1:** Identify, provide, and promote incentives (e.g., streamlined permitting, public recognition, etc.) for applicants whose project exceeds State requirements by a specified percent.
- **E-4.2:** Launch an educational campaign for builders, permit applicants, and the general public to promote best practices and incentive programs; continue to provide information and assistance about energy efficiency options online and at permit counter.
- **E-4.3:** Continue to work with SLO Green Build and community organizations and businesses to promote and encourage implementation of energy efficiency measures that exceed State standards.

Measure E-5: Small-Scale On-Site Solar PV Incentive Program

GHG Reduction Potential:
781 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
High
Private Savings:
Medium to High

Facilitate the voluntary installation of 2,704 kW commercial small-scale on-site solar PV systems and 1,932 kW residential small-scale on-site solar PV systems in the community through expanded promotion of existing financial incentives, rebates, and financing programs, and by helping residents and business owners overcome common regulatory barriers and upfront capital costs.

Implementation Actions:

- **E-5.1:** Conduct a comprehensive review of the City's solar permitting process based on the Governor's Office of Planning and Research's (OPR) *California Solar Permitting Guidebook* (June 2012), identifying any existing barriers to facility implementation.
- **E-5.2:** Improve the permit review and approval process for small solar PV systems by implementing recommendations for streamlined permitting identified in the *California Solar Permitting Guidebook* (e.g., use standardized forms, provide clear written instructions on the permitting process and a checklist of required application materials, make information available on the City's website and at the permit counter, etc.).

- **E-5.3:** Collaborate with other local jurisdictions in the region to standardize requirements across jurisdiction, by using common promotion and permit materials, such as checklists and standard plans, to reduce permit submittal errors among contractors working throughout a region.
- **E-5.4:** Participate in and promote a residential and commercial/industrial renewable energy financing program (e.g., through CaliforniaFIRST, a joint powers authority with neighboring jurisdictions, or other mechanisms) facilitating voluntary investment in renewable energy upgrades by residential and commercial/industrial property owners for their buildings.
- **E-5.5:** Expand education on and promotion of existing incentive, rebate, and financing programs for small-scale on-site solar PV systems targeting specific groups or sectors within the community.
- **E-5.6:** Designate one week per year to conduct a renewable energy outreach campaign targeting a specific group. The campaign week can also be used to recognize community members that have implemented noteworthy or unique renewable energy projects.

Measure E-6: Income-Qualified Solar PV Program

GHG Reduction Potential:
87 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Medium

Facilitate the installation of small-scale on-site solar PV systems on income-qualified housing units by promoting existing programs offered through the California Solar Initiative and New Solar Homes Partnership and by collaborating with organizations, such as GRID Alternatives, on outreach and eligibility.

Existing and/or Completed Efforts in Support of Measure:

- The Single Family Affordable Solar Homes (SASH) Program will be installing solar PV systems on 24 new affordable housing units which are currently under construction by People's Self Help Housing.[1]
- The City collaborates with Grid Alternatives on outreach and eligibility.

Implementation Actions:

- **E-6.1:** Continue to collaborate with GRID Alternatives and/or other community organizations to provide targeted education and outreach to developers and homeowners about incentives offered through the SASH Program and the Multifamily Affordable Solar Homes (MASH) Program.
- **E-6.2:** Provide targeted outreach regarding solar incentives offered through the California Solar Initiative, including the SASH and MASH Programs.

[1] The California Solar Initiative's SASH Program provides fully subsidized systems to very low-income households, and highly subsidized systems to other low-income households. GRID Alternatives, a non-profit solar organization, manages the $108 million SASH Program on the California Public Utility Commission's behalf.

3.3.2 TRANSPORTATION AND LAND USE MEASURES

Transportation-related emissions made up the 43 percent of Atascadero's 2005 GHG emissions inventory. Factors affecting GHG emissions from transportation include the number of VMT, fuel economy, and the type of fuel used. The number of VMT is directly influenced by the geographic distribution of people and places, especially the density of development and zoning. Therefore, land use measures are included as reduction policies in this section. The transportation and land use measures listed in **Table 3-4** focus on these strategies and have the potential to reduce Atascadero's GHG emissions by 21,961 MT CO_2e by 2020.

The transportation and land use measures in this section will not only help reduce GHG emissions, but also provide multiple other benefits to the community. These include:

- Reduced transportation costs
- Reduced traffic congestion
- Improved public health
- Strengthened local economy
- Improved infrastructure
- Increased equity
- Increased housing and travel options
- Resource conservation
- Reduced noise, air, and water pollution

Table 3-4: Transportation and Land Use GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
TL-1	Bicycle Network	691
TL-2	Pedestrian Network	317
TL-3	Expand Transit Network	86
TL-4	Increase Transit Service Frequency/Speed	23
TL-5	Transportation Demand Management Incentives	110
TL-6	Parking Supply Management	543
TL-7	Electric Vehicle Network and Alternative Fueling Stations	1,984
TL-8	Smart Growth	3,251
TL-9	Halt Retail Leakage	14,956
Transportation and Land Use Total		**21,961**

Measure TL-1: Bicycle Network

GHG Reduction Potential:
691 MT CO_2e
City Cost:
Low
City Savings:
None
Private Cost:
None
Private Savings:
Very Low

Continue to improve and expand the city's bicycle network and infrastructure.

Existing and/or Completed Efforts in Support of Measure:

- In 2010, the City adopted the Atascadero Bicycle Transportation Plan which provides a blueprint for the development of a comprehensive bicycling system to facilitate bicycle transportation and encourage recreational cycling. If all near term projects are implemented, approximately 34 miles of Class I-III bikeways will be added to the City's bicycle network.
- The City annually identifies and schedules street improvement and maintenance projects to preserve and enhance the bicycle network.
- The City incorporates bicycle facility improvements into pavement resurfacing, restriping, and signalization operations where the safety and convenience of users can be improved within the scope of work.
- The City currently requires new subdivisions and large developments to incorporate bicycle lanes, routes, and/or shared-use paths into street systems to provide a continuous network of routes, facilitated with markings, signage, and bicycle parking.
- The City has installed bike racks at all existing parks, City facilities, and schools and requires bike rack installation with all new retail and public development projects.

Implementation Actions:

- **TL-1.1:** Continue to pursue public and private funding to expand and link the city's bicycle network in accordance with the General Plan and Bicycle Plan.
- **TL-1.2:** Continue to coordinate with and support SLOCOG in the implementation of bicycle plans to facilitate non-auto travel within and between communities.
- **TL-1.3:** Continue to collaborate with the San Luis Obispo Bicycle Coalition to assist with event promotions and publications to increase awareness and ridership during Bike Month.
- **TL-1.4:** Continue to enforce mandatory California Green Building Standards Code bicycle parking standards for non-residential development.

Measure TL-2: Pedestrian Network

GHG Reduction Potential:
317 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Varies

Continue to improve and expand the City's pedestrian network.

Existing and/or Completed Efforts in Support of Measure:

- The City annually identifies and schedules sidewalk improvement and maintenance projects to preserve and enhance the pedestrian circulation network.
- The City incorporates pedestrian facilities improvements into pavement resurfacing, restriping, and signalization operations where the safety and convenience of users can be improved within the scope of work.
- The City has constructed "Safe Routes to School" bike lanes, striping, signage and sidewalks near Atascadero High school, San Gabriel & Santa Rosa Schools.
- The City requires that new development projects provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site. The City also requires that new development projects minimize barriers to pedestrian access and interconnectivity.
- The City requires new development to implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.) through conditions of approval.
- The City is currently working on design of pedestrian bridge which will connect the new movie theater to the Sunken Gardens to create a walkable downtown district.
- The City is currently working with SLOCOG on the North County Regional De Anza Trail Master Plan, and with Atascadero Land Preservation Society to establish trails throughout the City.
- The City is working to complete construction on several pedestrian and multimodal trail system enhancements, including the Atascadero Creek Trail along Highway 41 to El Camino Real, Colony Park Community Center and Stadium Park, portions of Salinas River Anza Trail, and other trail networks throughout the City to provide safe off road pedestrian pathways.
- Since 2006, the City has completed several pedestrian and operational improvements including bulb outs, landscaped medians, street trees, street furniture and lighting for the downtown.

Implementation Actions:

- **TL-2.1:** Continue to pursue public and private funding to expand and link the City's pedestrian network.

- **TL-2.2:** Continue to expand and promote the Safe Routes to School program.

Measure TL-3: Expand Transit Network

GHG Reduction Potential:
86 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Low
Private Savings:
Medium

Work with the Regional Transit Authority (RTA) and transit service providers to expand the local transit network (i.e., additional routes or stops, and/or expanded hours of operation) based on the greatest demand for service.

Existing and/or Completed Efforts in Support of Measure:

- The City coordinates with RTA and transit service providers to implement the Short Range Transit Plan.
- The City works with RTA and local transit agency to identify and map existing and future bus lines (routes) and transit
- Through the development review process, the City requires new development to provide safe and convenient access to alternative and public transportation within the project area as feasible.
- In 2013, the City completed construction of a new downtown transit center on Capistrano Avenue to provide a centralized location for transit, thereby increasing convenience, visual appearance, comfort and safety for the City's transit system.

Implementation Actions:

- **TL-3.1:** Continue to support the addition of transit routes that provide intercity express services.
- **TL-3.2:** Continue to research federal and local funding for transit service upgrade projects.

Measure TL-4: Increase Transit Service Frequency/Speed

GHG Reduction Potential:
23 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Low
Private Savings:
Medium

Work with the RTA and transit services providers to increase transit service frequency (i.e., reducing headways) by identifying routes where increased bus frequency would improve service.

Existing and/or Completed Efforts in Support of Measure:

- The City works with RTA and transit service providers to implement the Short Range Transit Plan.

Implementation Actions:

- **TL-4.1:** Work with RTA and transit service providers to shorten regional service headways (e.g., by purchasing additional buses, re-routing existing buses, etc.) to 30 minutes or shorter at commute peaks subject to passenger load demand.

- **TL-4.2:** Continue to support streamlined transit services and infrastructure that create a bus rapid transit network on main commute corridors.
- **TL-4.3:** Consolidate regional transportation and local transportation routes to eliminate duplicate services and create a more efficient and effective transportation system.

Measure TL-5: TDM Incentives

GHG Reduction Potential:
110 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Very Low

Work with San Luis Obispo Regional Ride Share and Ride-On to conduct additional outreach and marketing of existing TDM programs and incentives to discourage single-occupancy vehicle trips and encourage alternative modes of transportation, such as carpooling, taking transit, walking, and biking.

Existing and/or Completed Efforts in Support of Measure:

- The City collaborates with San Luis Obispo Ride Share and Ride-On.
- The City directs community members to existing program websites (e.g., Ride Share, Ride-On) by providing links on the City's website.
- The City has collaborated on construction of five Park and Ride lots in Atascadero, totaling 183 spaces. Atascadero currently provides 30 percent of the county's park and ride lots, with these lots are being utilized to full capacity by residents. Bike lockers are also installed at many of the City's Park and Ride lots.
- The City partners with San Luis Obispo Bicycle Coalition to sponsor events to increase awareness and ridership during Bike Month each May, with community participation in these events continuing to increase each year.

Implementation Actions:

- **TL-5.1:** Conduct additional outreach through event promotions and publications, targeting specific groups or sectors within the community (e.g., large employers, employees, students, seniors, etc.).
- **TL-5.2:** Provide information on and promote existing employer based TDM programs as part of the business licensing and renewal process, with key focus on large employers with over 50 employees in Atascadero.
- **TL-5.3:** Continue to collaborate with San Luis Obispo Ride Share and the San Luis Obispo Bicycle Coalition to assist with event promotions and publications to increase awareness and ridership during Bike Month and Rideshare month.
- **TL-5.4:** Continue to work with SLOCOG to identify locations for installation and facilitate construction of Park and Ride lots.

Measure TL-6: Parking Supply Management

GHG Reduction Potential:
543 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Low

Amend the Municipal Code to reduce parking requirements in areas such as the downtown where a variety of uses and services are planned in close proximity to each other and to transit.

Existing and/or Completed Efforts in Support of Measure:

- The City has amended the Municipal Code to reduce parking requirements in the downtown zoning districts (e.g., eliminate or reduce minimum parking requirements and allow shared parking).

Implementation Actions:

- **TL-6.1:** Implement existing ordinances and parking policies as infill development continues throughout the downtown.

Measure TL-7: Electric Vehicle Network and Alternative Fueling Stations

GHG Reduction Potential:
1,984 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
None

Continue to work with the APCD, Central Coast Clean Cities Coalition, and neighboring jurisdictions to create and implement the electric vehicle readiness plan.

Existing and/or Completed Efforts in Support of Measure:

- The City is currently working with the APCD, Central Coast Clean Cities Coalition, and neighboring jurisdictions to develop the electric vehicle readiness plan and obtain grant funding to install more charging systems in the city.
- The City provides streamlined installation and permitting procedures for vehicle charging facilities.
- In 2013, eight supercharge electric vehicle charging stations were installed by Tesla at the Rabobank in downtown Atascadero. The Atascadero charging stations are free and open to the public, and were installed to create a fast-charge electric car charging corridor between San Francisco and Los Angeles.
- New City parking lots, such as the low impact design demonstration lot at the Atascadero Zoo on Highway 41, are being designed and constructed with electric power sources and conduit so that electric vehicle charging stations can be provided as funding for the equipment becomes available.

Implementation Actions:

- **TL-7.1:** Continue to create and implement the electric vehicle readiness plan through expanding the use of alternative fuel vehicles and fueling stations in the community (e.g., through identifying and zoning locations for fueling stations, offering incentives for alternative fuel vehicles, etc.).
- **TL-7.2:** Continue to pursue funding for plug-in electric vehicle charging stations on both public and private property.

Measure TL-8: Smart Growth

GHG Reduction Potential:
3,251 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
High

Facilitate mixed-use, higher density, and infill development near transit stops, in existing community centers/downtown, and in other designated areas.

Existing and/or Completed Efforts in Support of Measure:

- The City created the Office of Economic Development created to encourage retail, job development, and infill in the downtown & urban core.
- In 2011, the City upzoned High Density Residential areas to increase density in the urban core (upzoned from a maximum of 16 dwelling units per acre to a minimum of 20 dwelling units per acre).
- The City recently simplified its permit process and modified its Zoning Ordinance to encourage mixed use development. City staff also provides support to facilitate these projects.
- The City, in collaboration with SLOCOG, is working to develop the South El Camino Real Corridor Visioning Study which will be used to illustrate the integration of a mix of land uses and densities, alternative forms of transportation, and complete streets.

Implementation Actions:

- **TL-8.1:** Continue to facilitate construction of high quality mixed-use and medium- and high-density land uses located close to transit nodes, existing bus routes, or park and ride facilities with regularly scheduled, daily service.
- **TL-8.2:** Develop and adopt incentives to help facilitate live/work developments. Live/work developments allow residents to live at their place of work and thereby reduce vehicle miles traveled and associated GHG emissions.

Measure TL-9: Halt Retail Leakage

GHG Reduction Potential:
14,956 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
High

Work with private developers to identify incentives for and encourage the development of convenient commercial, office, and shopping opportunities near existing employment and/or residential areas, as a means of shortening the distance between origins and destinations, and increasing the potential for walking or biking within the city to obtain services.

Existing and/or Completed Efforts in Support of Measure:

- In 2007, the ADE Economic Study was prepared, which provides key information regarding retail sales leakage going outside the city.

Implementation Actions:

- **TL-9.1:** Conduct a study of key underserved areas of demand for retail, offices, and services.
- **TL-9.2:** Implement the findings of the study with a goal of capturing 60 percent of current retail leakage.

3.3.3 OFF-ROAD MEASURE

Emissions in the off-road sector result from the combustion of fuel, primarily diesel, gasoline, and compressed natural gas, which is used to power off-road equipment and vehicles. Off-road equipment and vehicles include those used in construction, agriculture, commercial, industrial, and landscaping operations as well as recreational vehicles. Factors affecting off-road emissions include the age, type, and usage of the vehicle or equipment.

GHG emissions reductions can be achieved by reducing off-road equipment and vehicle usage and idling or by using equipment that runs on electricity or alternative fuels. The off-road equipment measure listed in **Table 3-5** has the potential to reduce Atascadero's GHG emissions by 754 MT CO_2e by 2020.

The off-road measure in this section will not only help reduce GHG emissions, but will also provide multiple other benefits to the community. These include:

- Improved air and water quality
- Reduced noise pollution
- Improved public health

Table 3-5: Off-Road GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
O-1	Off-Road Vehicle and Equipment Upgrades, Retrofits, and Replacements	754
Off-Road Total		**754**

Measure O-1: Off-Road Vehicle and Equipment Upgrades, Retrofits, and Replacements

GHG Reduction Potential:
754 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
Varies

Continue to work with the APCD and promote existing programs that fund off-road vehicle and equipment upgrades, retrofits, and replacement through the Carl Moyer heavy-duty vehicle and equipment program or other funding mechanisms.

Existing and/or Completed Efforts in Support of Measure:

- The City currently directs community members to existing program websites (e.g., APCD, Carl Moyer Grant page).

Implementation Actions:

- **O-1.1:** Conduct additional outreach and promotional activities targeting specific groups (e.g., agricultural operations, construction companies, homeowners, etc.).

3.3.4 WATER MEASURE

The conveyance, treatment, and distribution of water can result in significant GHG emissions depending on the water source, distances and topography traversed in conveyance, and the treatment processes that occur before and after the end-use phase.

Emissions from water use can decrease by reducing overall water consumption, and therefore the energy used to convey, treat and distribute water. The water measure listed in **Table 3-6** has the potential to reduce Atascadero's GHG emissions by 22 MT CO_2e by 2020.

The water measure in this section will not only help reduce GHG emissions, but also provide multiple other benefits to the community. These include:

- Reduced costs
- Improved air quality
- Reduced water consumption
- Reduced energy consumption
- Improved public health

Table 3-6: Water GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
W-1	Exceed SB X7-7 Water Conservation Target	22
Water Total		**22**

Measure W-1: Exceed SB X7-7 Water Conservation Target

Work with the Atascadero Mutual Water Company to adopt a water conservation target that exceeds the SB X7-7[2] (Water Conservation Act of 2009) target and identify and implement additional water efficiency and conservation measures to meet that target by 2020.

GHG Reduction Potential:
22 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
Varies
Private Savings:
Varies

Existing and/or Completed Efforts in Support of Measure:

- Together, the City of Atascadero and the Atascadero Mutual Water Company have implemented a number of measures to reduce water consumption, including a water efficient landscape and irrigation ordinance, toilet and washing machine rebate program, and landscape rebate program.
- The City has implemented several water conservation measures at City facilities.

Implementation Actions:

- **W-1.1:** Work with the Atascadero Mutual Water Company to adopt a water conservation target to exceed SB X7-7 by 10 percent and develop and/or help implement additional water conservation and efficiency programs (e.g. water efficiency audits, replacement/retrofit programs, etc.) to meet that target.
- **W-1.2:** Continue to enhance retrofit programs for existing residences and commercial buildings by providing additional resources, assistance, and incentives to home and business owners.
- **W-1.3:** Expand the use of grey water or recycled water by working with the City's water purveyors and educating the community on dual plumbing, and state-of-the-art irrigation systems, including the use of grey water systems and rainwater catchment.

[2] The Water Conservation Act of 2009 (SB X7-7) requires all water suppliers to increase water use efficiency. The legislation sets an overall goal of reducing per capita urban water use by 20 percent by 2020, with an interim target of 10 percent reduction by 2015. By July 2011, urban water retailers were required to determine baseline and target daily per capita water use. Urban water retail suppliers who do not meet the water conservation requirements will not be eligible for state water grants or loans (California Department of Water Resources, 2013).

3.3.5 SOLID WASTE MEASURE

As solid waste decomposes in landfills, it releases methane, a GHG 21 times more potent than carbon dioxide (USEPA, 2012). In 2005, the Atascadero sent approximately 31,122.52 tons of waste to landfill.

Waste management is an important action that the community can take to reduce GHG emissions. Waste management can be achieved by reducing the amount of trash and other waste that is discarded; reusing containers, products, and building materials; and recycling as many materials as possible, including green waste and construction materials. The solid waste measure listed in **Table 3-7** has the potential to reduce Atascadero's GHG emissions by 924 MT CO_2e by 2020.

In addition to reducing GHG emissions, the solid waste measure described in this section have the potential to provide other important benefits to the community. These include:

- Improved air quality
- Resource conservation

Table 3-7: Solid Waste GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
S-1	Solid Waste Diversion	924
Solid Waste Total		**924**

Measure S-1: Solid Waste Diversion

GHG Reduction Potential:
924 MT CO_2e
City Cost:
Low
City Savings:
None
Private Cost:
None
Private Savings:
None

Adopt a specified solid waste diversion rate that exceeds the state-mandated rate of 50 percent and identify programs to meet the identified rate by 2020.

Existing and/or Completed Efforts in Support of Measure:

- The City has been utilizing a "Cold In-Place Recycling" program for road rehabilitation which eliminates truck trips and road material waste which would traditionally be produced during road repair and reconstruction.
- The City collaborates with Atascadero Waste Alternatives regarding programs for increased solid waste diversion.
- The City hosts semiannual "citywide clean-up days" for residents to recycle household waste at no cost.
- The City maintains a free curbside co-mingled recycling program and "green waste" recycling program.

Implementation Actions:

- **S-1.1:** Adopt a solid waste diversion rate goal of 60 percent (10 percent above the state-mandated rate of 50 percent).
- **S-1.2:** Work with Atascadero Waste Alternatives to identify the current city-wide diversion rate, and options for increased recycling, waste diversion, and education and outreach to meet the City's goal.
- **S-1.3:** Adopt an ordinance requiring that 70 percent of debris from demolition projects be diverted from landfills.
- **S-1.4:** Develop and adopt an ordinance requiring the provision of recycling receptacles at all events requiring a permit or held on City-owned or -operated property.

3.3.6 TREES AND VEGETATION MEASURES

Trees and other vegetation absorb and capture the GHG carbon dioxide from the atmosphere in a process called carbon sequestration. By maintaining a healthy urban forest, prolonging the life of trees, and continually increasing the number of trees, Atascadero can increase its net carbon storage over the long term (CAPCOA, 2012). Trees and other vegetation also reduce local air and surface temperatures by shading buildings, streets, and sidewalks.

The trees and vegetation measures listed in **Table 3-8** have the potential to reduce Atascadero's GHG emissions by 1,781 MT CO_2e by 2020.

In addition to reducing GHG emissions, the trees and vegetation measures described in this section have the potential to provide other important benefits to the community. These include:

- City beautification
- Increased property values
- Improved air quality
- Improved water quality
- Improved public health
- Reduced surface and air temperatures
- Reduced noise pollution

Table 3-8: Trees and Vegetation GHG Reductions by Measures

Measure Number	Measure	2020 GHG Reductions (MT CO_2e)
T-1	Tree Planting Program	36
T-2	Native Forest Regeneration	1,745
Trees and Vegetation Total		**1,781**

Measure T-1: Tree Planting Program

GHG Reduction Potential:
36 MT CO_2e
City Cost:
Medium
City Savings:
None
Private Cost:
Very Low
Private Savings:
None

Facilitate voluntary tree planting within the community, working with local non-profit organizations and community partners.

Existing and/or Completed Efforts in Support of Measure:

- The City has developed a tree planting assistance program, which provides resources, labor, and subsidies to participating community members.
- The City has developed and adopted tree planting guidelines that address tree and site selection.
- The City tracks the number of trees planted annually and has completed a tree and habitat survey to study Atascadero's oak forest and success of tree replanting sites.
- The City has been recognized as a Tree City member since 1988.
- The Atascadero Native Tree Association creates tree planting areas and conducts educational programs and outreach which focus on the care and renewal of native trees.
- The City has adopted landscape standards for multifamily and commercial development and parking lots to establish minimum requirements for landscape coverage, decorative planting and shade trees.

Implementation Actions:

- **T-1.1:** Facilitate voluntary tree planting within the community, working with local non-profit organizations and community partners.
- **T-1.2**: Continue to provide tree planting assistance to facilitate tree planting within the community.

Measure T-2: Native Forest Regeneration

GHG Reduction Potential:
1,745 MT CO_2e
City Cost:
Very Low
City Savings:
None
Private Cost:
None
Private Savings:
None

Increase the amount of vegetated open space within the City to permanently increase carbon storage.

Existing and/or Completed Efforts in Support of Measure:

- The City has a number of ongoing efforts for permanent preservation of open space and native forest regeneration. For example, the City works with developers to cluster development and rezone existing residential property to open space with preservation easements to guarantee these areas remain as undisturbed oak woodlands in the future.

- The City estimates that approximately 1,400 acres of commercial and/or residential zoned land would be rezoned into open space conservation between 2006 and 2020, which will naturally facilitate native forest regeneration.[3]

Implementation Actions:

- **T-2.1:** Continue to work with developers and landowners to permanently preserve open space and regenerate native forest within Atascadero.[4]

[3] This measure can only account for projects that re-vegetate or create vegetated land from previously settled land that will sequester carbon dioxide from the atmosphere which would not have been captured had there been no land-type change. In other words, it can only account for net new or "additional" vegetation. This is because trees are only net carbon sinks when they are actively growing (a 20 year period). As such, there is no reduction in GHG emissions associated with preservation of land where re-vegetation will not occur (CAPCOA, 2010, p. 402-409).

[4] The CARB-approved Urban Forest Project Protocol (2010) provides guidance for municipalities to quantify and verify GHG reductions from a planned set of tree and vegetation planting and maintenance activities implemented to permanently increase carbon storage through trees and vegetation. The Protocol is available at: http://www.climateactionreserve.org/how/protocols/urban-forest/

3.4 GHG Reduction Summary

As discussed in Chapter 2, *GHG Emissions and Reduction Target*, Atascadero will need to reduce its GHG emissions by 18,737 MT CO_2e by 2020 to meet its 15 percent reduction target. The GHG reduction measures in this CAP are estimated to reduce Atascadero's GHG emissions by 28,873 MT CO_2e by 2020, as summarized in **Table 3-9**. Therefore, the implementation of the measures identified in this chapter would enable Atascadero meets its 15 percent reduction target by 2020. By identifying measures that create total reductions beyond the City's identified 15 percent reduction target of 18,737 MT CO_2e, the City will have some flexibility in reaching its goal and will not be required to implement every measure exactly as calculated in the CAP. Instead, the City will be able to meet its GHG reduction goal by implementing a combination of the identified measures, as feasible, in order to meet the 15 percent reduction target by 2020.

Table 3-9: Summary of GHG Reductions by Measure

Measure Number	Measure	2020 GHG Reduction (MT CO_2e)
City Government Operations		
C-1	City Government Energy Efficiency Retrofits and Upgrades	59
C-2	City Government Energy Efficient Public Realm Lighting	23
C-3	Renewable Energy Systems on City Property	172
C-4	Zero- and Low-Emission City Fleet Vehicles	48
C-5	City Government Solid Waste Reduction	7
C-6	City Government Tree Planting Program	24
C-7	Wastewater Treatment Methane Capture	Unknown
	City Government Operations Subtotal	*333*
Energy		
E-1	Energy Efficiency Outreach and Incentive Programs	778
E-2	Energy Audit and Retrofit Program	1,099
E-3	Income-Qualified Energy Efficient Weatherization Programs	126
E-4	Incentives for Exceeding Title 24 Building Energy Efficiency Standards	227
E-5	Small-Scale On-Site Solar PV Incentive Program	781
E-6	Income-Qualified Solar PV Program	87
	Energy Subtotal	*3,098*
Transportation and Land Use		
TL-1	Bicycle Network	691
TL-2	Pedestrian Network	317
TL-3	Expand Transit Network	86
TL-4	Increase Transit Service Frequency/Speed	23
TL-5	TDM Incentives	110
TL-6	Parking Supply Management	543
TL-7	Electric Vehicle Network and Alternative Fueling Stations	1,984
TL-8	Smart Growth	3,251
TL-9	Halt Retail Leakage	14,956
	Transportation and Land Use Subtotal	*21,961*
Off-Road		
O-1	Off-Road Vehicle and Equipment Upgrades, Retrofits, and Replacements	754
	Off-Road Subtotal	*754*
Water		
W-1	Exceed SB X7-7 Water Conservation Target	22
	Water Subtotal	*22*
Solid Waste		
S-1	Solid Waste Diversion	924
	Solid Waste Subtotal	*924*
Trees and Vegetation		
T-1	Tree Planting Program	36
T-2	Native Forest Regeneration	1,745
	Trees and Vegetation Subtotal	*1,781*
TOTAL REDUCTION		**28,873**

CHAPTER 4

ADAPTATION

4.0 Adaptation

There are two responses to climate change available to local governments: mitigation and adaptation. The previous chapter addressed climate change mitigation, by identifying measures to reduce GHG emissions. This chapter identifies measures to prepare for and minimize the risks associated with anticipated climate change impacts and increase resiliency to those changes. Drawing on a recent climate adaptation planning process that took place in San Luis Obispo County, this chapter identifies climate change predictions for the region and specific to Atascadero. This chapter also provides an assessment of populations and infrastructure within Atascadero that are particularly vulnerable to the identified impacts and identifies measures to increase community resilience to those effects.

> *"Adaptation planning at the local, state, and national levels can limit the damage caused by climate change, as well as reduce the long-term costs of responding to the climate related impacts that are expected to grow in number and intensity in the decades to come"* (PEW Center on Global Climate Change, 2011).

4.1 Climate Change Predictions and Vulnerability

Climate change is a global phenomenon that has the potential to impact local health, agriculture, natural resources, infrastructure, emergency response, tourism, and many other facets of society. As climate change continues to progress, increased stress to vulnerable populations and sectors of society are expected. In 2010, key stakeholders, elected officials, city and county planners, land managers, public health officials, concerned citizens, scientists, and the Local Government Commission initiated a process to address climate change adaptation in San Luis Obispo County. As part of this process, scientists from Geos Institute identified anticipated climate change impacts in the region and threats to socioeconomic and natural systems. The range of potential impacts presented in the document *ClimateWise: Integrated Climate Change Adaptation Planning in San Luis Obispo County in November 2010* (ClimateWise) are based on projections of climate change in the San Luis Obispo region using three of the best-available models (MIROC, HadCM, and CSIRO) and an emissions scenario drawn from those used by the Intergovernmental Panel on Climate Change (IPCC).

According to ClimateWise, climate change could lead to the following potential changes in the San Luis Obispo County region and the City of Atascadero:

- Increased temperatures
- Changed precipitation
- Increased frequency and severity of storm events
- Increased burn area from wildfires

Based on these climate changes, a vulnerability assessment was completed to determine the degree to which physical, socioeconomic, and natural factors are susceptible to, or unable to

accommodate, the anticipated effects of climate change. The assessment was comprised of three primary components:

- Exposure – the nature and degree to which a system experiences a stress or hazard, sensitivity and adaptive capacity
- Sensitivity – the degree to which the system is impacted by a given stressor, change or disturbance
- Adaptive Capacity – the ability to cope with extreme events, to make adaptive changes, or to transform to a greater extent, including the ability to moderate potential damages and to take advantage of opportunities

Each of these components contributes to understanding the overall vulnerability of a functional system (Snover, 2007). Climate change will most impact those individuals and systems that have both the greatest exposure and sensitivity to climate change impacts, in addition to the lowest adaptive capacity (see **Table 4-1**). For each climatic hazard, the population and economic sector most vulnerable depends on the unique combination of these three factors (ClimateWise, 2010).

Table 4-1: Climate Change Vulnerability

Components of Vulnerability	Climatic Risks	Populations or Infrastructure Particularly at Risk
Exposure	Floods Heat Drought Wildfire	Floodplain residents Outdoor workers Farmers, all water users Homes at the wildland-urban interface
Sensitivity	Heat Air pollution Drought	Infants, elderly Asthma sufferers, children Farmers
Adaptive Capacity	Floods Heat	Institutionalized populations, low-income households Low-income residents

Source: ClimateWise, 2010

4.1.1 INCREASED TEMPERATURES

Average temperatures in San Luis Obispo County are expected to become 2 to 4 degrees warmer by mid-century and possibly 4 to 8 degrees warmer by late century, depending on emission levels (ClimateWise, 2010). Greater warming is expected to occur in the summer months compared to winter. Atascadero should also anticipate more extreme-heat conditions (i.e., heat waves, which are defined as five or more consecutive days over 99 degrees to 101 degrees Fahrenheit), which could last longer and become three to four times more frequent by 2050.

Public health may be negatively impacted by a changing climate as a result of changing environmental conditions (e.g., extreme weather events, changes in temperature and rainfall that decrease water supply, worsening air quality, and increases in allergens and air pollutants).

ClimateWise states that "*in the case of extreme heat, some of the most vulnerable populations include: the elderly, infants, and outdoor workers* [especially in the hotter inland areas such as Atascadero]." This vulnerability assessment is consistent with California's Adaptation Strategy in the identification of population segments that will be the most at risk from climate change impacts.[1] In addition, California's Adaptation Strategy also identifies "individuals suffering from chronic heart or lung disease, persons with mental disabilities, the socially and/or economically disadvantaged as being vulnerable populations" (California Natural Resources Agency, 2009).

Almost 9 percent of all Atascadero residents live below the poverty line (U.S. Census 2010). With anticipated increases in temperature, these economically disadvantaged persons may find it more difficult to afford the additional costs of cooling their homes. Consequently, many low-income households, especially those of seniors and the disabled may become physically vulnerable to the effects of extreme heat events.

4.1.2 CHANGED PRECIPITATION

Precipitation, except during winter months, is anticipated to change little in the near future. However, climate models forecast drier conditions throughout San Luis Obispo County by 2075. As a result, droughts may become more frequent, longer and more severe. It is also projected that when rainfall does occur, it may be more likely to come in the form of intense downpours.

Wells owned by the Atascadero Mutual Water Company supply the water for urban use, and a limited number of private wells serve agricultural and residential uses within the city limits. While climate models predict little change in rainfall patterns for the near future, they do forecast a drier climate during the last half of this century. This may result in longer and more severe periods of drought, therefore impacting the livestock industry, which relies on annual precipitation for reliable grazing and pasturing.

4.1.3 INCREASED FREQUENCY AND SEVERITY OF STORM EVENTS

As mentioned above, the severity of storm events could increase, even if precipitation levels do not. This is an important differentiation to recognize. More rain falling in a shorter time frame increases the risk of flooding. The prevalence of impermeable paving materials and drainage systems that prevent quick absorption back into the ground water will serve to exacerbate the problem.

Businesses, residents, and infrastructure located within floodplains (e.g., adjacent to the Salinas River) would be more susceptible to damage or disruption by larger than average precipitation events. The region may see more severe (but not necessarily more frequent) rainfall events, leading to quick pulses of runoff. Currently, there is insufficient infrastructure to accommodate that momentary surplus of water, and large amounts of impervious pavement prevent much of

[1] California's Adaptation Strategy was developed in 2009 by the California Natural Resources Agency (CNRA), working through the Climate Action Team (CAT). Seven sector-specific working groups led by 12 state agencies, boards and commissions, and numerous stakeholders were convened for this effort. The strategy proposes a comprehensive set of recommendations designed to inform and guide California decision makers as they begin to develop policies that will protect the state, its residents and its resources from a range of climate change impacts.

the rain from infiltrating into the ground. There is also a possibility of septic systems and sewage treatment plants being unable to handle increases in intense rainfall events and associated runoff. This could impede the proper functioning of onsite septic systems or overwhelm sewers and centralized sewage treatment plants. As a result, untreated water, with a full load of toxics and organic waste, could enter streams and coastal waters (Koopman et al., 2010).

4.1.4 Increased Burn Area from Wildfires

Rural areas within and surrounding Atascadero may become more prone to wildfires due to higher temperatures and stress to vegetation. By the end of the century, San Luis Obispo County could experience two to three times larger area burned annually by wildfires (ClimateWise, 2010).

As the population and urban areas of the state continue to grow, much of California is experiencing an exponential increase in its vulnerability to wildfire damages and loss. This increase is especially true in outlying (rural) suburbs that are situated in forested or brush covered areas seen as more desirable than higher density developments. Because rural properties are more likely to be more than 1,000 feet from a hydrant, firefighting capabilities are not as effective for such properties.

4.2 Adaptation Measures

The following measures focus on items the City of Atascadero can implement in adapting to climate change. The goal of these measures is to reduce impacts to the community, the economy, and local natural resources. Recognizing the link between public health and climate adaptation, this chapter recommends adaptation measures that are designed to reduce the negative impacts of climate change on sensitive populations and communities. Measures were developed from those identified in the ClimateWise program, the World Bank Primer on Reducing Vulnerabilities to Disaster, International Council for Local Environmental Initiatives (ICLEI), and the California Natural Resources Agency's Climate Adaptation Strategy.

Measure A-1: Climate Change Vulnerability

Periodically reassess regional climate change vulnerabilities.

Implementation Actions:

- **A-1.1:** Participate in inter-agency and or inter-jurisdictional meeting and planning activities to periodically reassess regional climate change vulnerabilities.
- **A-1.2:** Incorporate newly identified adaptation measures into planning documents as appropriate.

Measure A-2: Public Health and Emergency Preparedness

Prepare for anticipated climate change effects on public health, the local economy, and populations that may bear a disproportionate burden of the climate change effects.

Implementation Actions:

- **A-2.1:** Collaborate with community-based organizations (such as health care providers, public health advocates, fire prevention organizations, etc.) to disseminate public preparedness and emergency response information related to climate change.
- **A-2.2:** Conduct training exercises at public forums as well as distribute publicly available information on emergency exit routes and methods.
- **A-2.3:** Identify and focus planning and outreach programs on vulnerable populations including neighborhoods that currently experience social or environmental injustice or bear a disproportionate burden of potential public health impacts.
- **A-2.4:** Prepare a heat wave response plan that focuses on responding to the increased propensity for heat-related death and illness.
- **A-2.5:** Coordinate and promote cooling centers for residents who may require refuge from hot days, particularly low-income households and senior citizens.[2]
- **A-2.6:** Coordinate with the City's Fire and Police Departments to bolster wildfire preparedness and defensiveness for residents and businesses through providing information on the City's website and conducting trainings promoting mechanical fuel management and increasing the area of defensible space around structures.

Measure A-3: Water Management

Implement new policies and programs to limit community exposure to threats such as flooding, and support those that encourage water use conservation and efficiency.

Implementation Actions:

- **A-3.1:** Collaborate with other jurisdictions to address water supply threats, flooding, and wastewater management.
- **A-3.2:** Continue to seek grants and other sources of funding, including the State Integrated Regional Water Management Grant Program and mitigation opportunities, to enhance flood control and improve water quality.
- **A-3.3:** Implement the CAP measure that facilitates water conservation and the use of recycled water.

[2] A cooling center is a place where residents can go to cool off on high heat days. Cooling centers are often located in local government-run facilities such as senior centers or neighborhood parks and recreation sites and are open to all. Typical locations include community centers, fairgrounds, libraries, and other public facilities (California Adaptation Planning Guide, 2012).

Measure A-4: Infrastructure

Work to improve the resilience of systems that provide the resources and services critical to community function.

Implementation Actions:

- **A-4.1:** Assess the potential impact of climate change as part of the update of plans that manage community infrastructure systems.
- **A-4.2:** Complete an assessment, including economic impacts and threats to public health and safety, for projected climate change impacts on local transportation, water, wastewater, stormwater, energy, and communication systems.
- **A-4.3:** Develop mitigation plans, as necessary, for protection of the wastewater treatment facility, the high school, and the relocation or elevation of vulnerable infrastructure.

CHAPTER 5

IMPLEMENTATION AND MONITORING

5.0 Implementation and Monitoring

Implementation and monitoring are essential components of the CAP to ensure that Atascadero reduces its GHG emissions and meets its target. This chapter identifies key steps that the City will take to implement the CAP and monitor the progress in reducing Atascadero's GHG emissions consistent with AB 32. It also describes potential funding sources and mechanisms available to implement the CAP.

5.1 Implementation Matrix

Ensuring that the CAP measures translate into measurable reductions in GHG emissions is critical to the success of the CAP. To facilitate this, each measure and its corresponding implementation actions identified in Chapter 3, *Climate Action Measures*, and Chapter 4, *Adaptation*, is listed in the implementation matrix in **Table 5-1** along with the following items:

- **Responsible Department(s):** The City department that will be primarily responsible for implementing, monitoring, and reporting on the progress of the selected measure and corresponding actions.
- **Implementation Time Frame:** The phase in which measure implementation should begin. Please note that measures already underway with existing or recently completed efforts in support of the measure are categorized as near-term. Time frames include:
    - Near-Term – By 2015
    - Mid-Term – 2016-2017
    - Long-Term – 2018-2020
- **City Cost and Savings Estimates:** For each measure, potential costs and savings to the City are categorized as none ($0), very low ($1-$10,000), low ($10,001-$50,000), medium ($50,001-$100,000), and high ($100,001 or greater). Supporting information on costs and savings is provided in **Appendix B**.
- **GHG Reduction Potential:** The GHG reduction potential value identifies the estimated annual emission reductions anticipated in 2020, measured in MT CO_2e. Supporting information pertaining to the GHG reduction calculations is provided in **Appendix B**.
- **Performance Indicator:** Performance indicators enable the City to generally monitor measure progress.

Table 5-1: Implementation Matrix

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
City Government Operations							
C-1: City Government Energy Efficiency Retrofits and Upgrades. Establish a target to reduce City government energy use by 20 percent by 2020 and implement cost-effective improvements and upgrades to achieve that target.	**C-1.1:** Adopt a 20 percent City government energy use reduction target, based on a per square footage analysis of energy usage. **C-1.2:** Establish a prioritized list of cost-effective energy efficiency upgrade projects and implement them as funding becomes available. **C-1.3:** Look into the feasibility of installing an energy management system that monitors energy use and controls heating, cooling, and ventilation to increase efficiency. Conduct a cost benefit analysis and identify funding sources for installation of this system, or other tools for monitoring and encouraging energy efficiency. **C-1.4:** Continue to measure and track building energy usage and maintain a regular maintenance schedule for heating and cooling, ventilation and other building functions.	Public Works, Finance	Varies	Medium	59	20 percent energy savings from City government operations by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
C-2: City Government Energy Efficient Public Realm Lighting. Continue to replace City-owned or -operated street, traffic signal, park, and parking lot lights with higher efficiency lamp technologies.	**C-2.1:** Conduct an inventory of existing outdoor public light fixtures. **C-2.2:** Continue to identify and secure funding to replace additional inefficient City-owned or -operated public lighting.	Public Works, Finance	Medium	Low	23	50 LED street lights, 50 LED traffic signals, and 150 LED or CFL outdoor lights installed by 2020	Mid-Term
C-3: Renewable Energy Systems on City Property. Pursue on-site small-scale renewable energy generation at City government facilities.	**C-3.1:** Identify funding sources and opportunities for City government renewable energy generation. Specifically, installation of a solar photovoltaic (PV) system at the wastewater treatment plant property which could be used to supply power to wasterwater plant and other City facilities. **C-3.2:** Install small-scale solar PV systems or other renewable energy projects at select City government facilities.	Public Works, City Manager's Office, Finance	High	High	172	1,650 kW solar PVs and 2 solar hot water systems installed by 2020	Long-Term
C-4: Zero- and Low-Emission City Fleet Vehicles. Continue to replace official City vehicles with more	**C-4.1**: Develop and adopt a low- and zero- emissions replacement/purchasing policy for official City vehicles and equipment. This would not apply	Finance	Low	Very Low	48	5 municipal vehicles replaced by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
efficient and/or alternatively fueled vehicles.	to vehicles with special performance requirements. **C-4.2:** Work with the Central Coast Clean Cities Coalition to obtain funding to purchase low-emission and zero-emission fleet vehicles. **C-4.3:** Identify fleet vehicles near replacement and replace with lower emission vehicles.						
C-5: City Government Solid Waste Reduction. Establish a 15 percent solid waste diversion rate over 2005 baseline levels and identify steps to meet that rate by 2020.	**C-5.1:** Continue to install recycling receptacles at City-owned or -operated buildings and facilities. **C-5.2:** Investigate feasibility of installation of solar powered trash/recycle compactors at City facilities in order to reduce trips to City parks for trash pickup and encourage public awareness of recycling.	Public Works, Finance, City Manager's Office	Low	None	7	20 percent diversion above 2005 baseline in City solid waste, and 20 new recycling receptacles by 2020	Near-Term
C-6: City Government Tree Planting Program. Establish a tree planting program to increase the number of native, drought-tolerant trees on City-owned property, parks and	**C-6.1:** Develop and adopt a formal tree planting policy or program and plant at least 2,000 trees on City property by 2020. **C-6.2:** Identify and secure grant funding to plant trees on City properties.	Public Works, Planning	High	None	24	2,000 net new trees planted on City-owned property by 2020	Near-Term,

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
streetscapes.							
C-7: Wastewater Treatment Plant Methane Capture. Implement methane capture at the wastewater treatment facility.	**C-7.1:** Investigate the installation of a methane capture system at the wastewater treatment plant. Look for funding sources to conduct a complete feasibility study and supplement construction costs for installation of this type of system.	Public Works	Unknown	Unknown	Unknown	36 percent methane capture by 2020	Long-Term
Energy							
E-1: Energy Efficiency Outreach and Incentive Programs. Expand participation in and the promotion of existing energy efficiency programs, such as Energy Upgrade California and San Luis Obispo County Energy Watch, to increase community awareness of existing energy efficiency rebates and financial incentives, and no- and low-cost actions	**E-1.1:** Continue to collaborate with San Luis Obispo County Energy Watch, SLO Green Build, and other local groups to conduct additional outreach and promotional activities, either individually or in collaboration with San Luis Obispo County Energy Watch, targeting specific groups or sectors within the community (e.g., homeowners, renters, businesses, etc.). Direct community members to existing program websites, such as Energy Upgrade California and San Luis Obispo County Energy Watch. **E-1.2:** Designate one week per year to conduct an energy	Community Development, Public Works	Very Low	None	778	40 percent of households participating with 10 percent energy savings and 40 percent of businesses participating with 10 percent energy savings by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
community members can take to increase energy efficiency.	efficiency outreach campaign targeting a specific group. The campaign week can also be used to recognize and encourage programs and educational outreach conducted by industry organizations, non-governmental entities, government agencies, and other community groups.						
E-2: Energy Audit and Retrofit Program. Facilitate voluntary energy assessments, retrofits, and retrocommissioning of local businesses and organizations within Atascadero.	**E-2.1:** Collaborate with San Luis Obispo County Energy Watch, local utilities, and local jurisdictions to develop and promote a residential and commercial energy audit program. **E-2.2:** Conduct outreach and promotional activities targeting specific groups (e.g., owners of buildings built prior to Title 24 [1980]) in order promote the audit and retrofit program. **E-2.3:** As part of the business licensing and renewal process, encourage businesses to participate in the program and receive an energy audit. **E-2.4:** Participate in and promote a residential and commercial energy efficiency	Building Services, Community Development, Planning, Public Works	Very Low	None	1,099	700 households and 525 businesses audited by 2020, with 40 percent of those completing building upgrades with an average energy savings of 25 percent	Mid-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	financing program to encourage investment in energy efficiency upgrades. **E-2.5:** Work with Energy Upgrade California, local utilities, and/or community businesses and organizations, to annually conduct a "do-it-yourself" workshop for building energy retrofits. **E-2.6:** Highlight the effectiveness of energy audits and retrofits by showcasing the success of retrofit projects (e.g., on the City's website or in its newsletter).						
E-3: Income-Qualified Energy Efficient Weatherization Programs. Facilitate energy efficient weatherization of low- and middle-income housing through promotion of existing programs.	**E-3.1:** Continue to promote income-qualified weatherization programs, either individually, or in collaboration with an existing organization, to income-qualified households using sources of data available to the City, (e.g., water bills, housing records, etc.).	Community Development, Finance	Very Low	None	126	100 residential units upgraded by 2020	Near-Term
E-4: Incentives for Exceeding Title 24 Energy Efficiency Building Standards.	**E-4.1:** Identify, provide and promote incentives (e.g., streamlined permitting, public recognition, etc.) for applicants	Building Services, Planning	Very Low	None	227	400 new or remodeled residences and 150 new	Mid-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
Encourage new development to voluntarily exceed State energy efficiency standards.	whose project exceeds State requirements by 20 percent. **E-4.2:** Launch an educational campaign for builders, permit applicants, and the general public to promote best practices and incentive programs; continue to provide information and assistance about energy efficiency options online and at permit counter. **E-4.3:** Continue to work with SLO Green Build and community organizations and businesses to promote and encourage implementation of energy efficiency measures that exceed State standards.					non-residential buildings exceeding State standards by 20 percent by 2020	
E-5: Small-Scale On-Site Solar PV Incentive Program. Facilitate the voluntary installation of 2,704 kW commercial small-scale on-site solar PV systems and 1,932 kW residential small-scale on-site solar PV systems in the community through	**E-5.1:** Conduct a comprehensive review of the City's solar permitting process based on the Governor's Office of Planning and Research's (OPR) *California Solar Permitting Guidebook* (June 2012), identifying any existing barriers to facility implementation. **E-5.2:** Improve the permit review and approval process for small solar PV systems by	Public Works, Building Services, Planning	Very Low	None	781	80 commercial solar PV systems installed (total of 2,704 kW) and 420 residential solar PV systems installed (total of 1,932 kW) by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
expanded promotion of existing financial incentives, rebates, and financing programs, and by helping residents and business owners overcome common regulatory barriers.	implementing recommendations for streamlined permitting identified in the *California Solar Permitting Guidebook* (e.g., use standardized forms, provide clear written instructions on the permitting process and a checklist of required application materials, make information available on the City's website and at the permit counter, etc.). **E-5.3:** Collaborate with other local jurisdictions in the region to standardize requirements across jurisdiction, by using common promotion and permit materials, such as checklists and standard plans, to reduce permit submittal errors among contractors working throughout a region. **E-5.4:** Participate in and promote a residential and commercial/industrial renewable energy financing program (e.g., through CaliforniaFIRST, a joint powers authority with neighboring jurisdictions, or other mechanisms) facilitating voluntary investment in renewable energy upgrades by						

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	residential and commercial/industrial property owners for their buildings. **E-5.5:** Expand education on and promotion of existing incentive, rebate, and financing programs for solar PV systems targeting specific groups or sectors within the community. **E-5.6:** Designate one week per year to conduct a renewable energy outreach campaign targeting a specific group. The campaign week can also be used to recognize community members that have implemented noteworthy or unique renewable energy projects.						
E-6: Income-Qualified Solar PV Program. Facilitate the installation of small-scale on-site solar PV systems on income-qualified housing units by promoting existing programs offered through the California Solar Initiative and	**E-6.1:** Continue to collaborate with GRID Alternatives and/or other community organizations to provide targeted education and outreach to developers and homeowners about incentives offered through the SASH and MASH Programs. **E-6.2:** Provide targeted outreach regarding solar water heating incentives offered through the California Solar	Building Services, Planning	Very Low	None	87	60 low-income residential solar PV systems installed and 25 low-income residential solar water heaters installed by	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
New Solar Homes Partnership and by collaborating with organizations, such as GRID Alternatives, on outreach and eligibility.	Initiative, including the SASH and MASH Programs.					2020	
Transportation and Land Use							
TL-1: Bicycle Network. Continue to improve and expand the city's bicycle network and infrastructure.	**TL-1.1:** Continue to pursue public and private funding to expand and link the city's bicycle network in accordance with the General Plan and Bicycle Plan. **TL-1.2:** Continue to coordinate with and support SLOCOG in the implementation of bicycle plans to facilitate non-auto travel within and between communities. **TL-1.3:** Continue to collaborate with the San Luis Obispo Bicycle Coalition to assist with event promotions and publications to increase awareness and ridership during Bike Month. **TL-1.4:** Continue to enforce mandatory California Green Building Standards Code bicycle parking standards for non-	Planning, Building, Public Works	Low	None	691	30 miles of bikeways added by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	residential development.						
TL-2: Pedestrian Network. Continue to improve and expand the City's pedestrian network.	**TL-2.1:** Continue to pursue public and private funding to expand and link the City's pedestrian network. **TL-2.2:** Continue to expand and promote the Safe Routes to School program.	Planning, Public Works	Very Low	None	317	25 miles of sidewalk added by 2020	Near-Term
TL-3: Expand Transit Network. Work with the Regional Transit Authority (RTA) and transit service providers to expand the local transit network (i.e., additional routes or stops, and/or expanded hours of operation) based on the greatest demand for service.	**TL-3.1:** Continue to support the addition of transit routes that provide intercity express services. **TL-3.2:** Continue to research federal and local funding for transit service upgrade projects.	Public Works, Planning	Very Low	None	86	15 percent increase in transit service by 2020	Mid-Term
TL-4: Increase Transit Service Frequency/ Speed. Work with the RTA and transit services providers to increase transit service frequency	**TL-4.1:** Work with RTA and transit service providers to shorten regional service headways (e.g., by purchasing additional buses, re-routing existing buses, etc.) to 30 minutes or shorter at commute peaks subject to passenger load	Public Works	Very Low	None	23	10 percent reduction in headways (increase in frequency) by 2020	Mid-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
(i.e., reducing headways) by identifying routes where increased bus frequency would improve service.	demand. **TL-4.2:** Continue to support streamlined transit services and infrastructure that create a bus rapid transit network on main commute corridors. **TL-4.3:** Consolidate regional transportation and local transportation routes to eliminate duplicate services and create a more efficient and effective transportation system.						
TL-5: TDM Incentives. Work with San Luis Obispo Regional Ride Share and Ride-On to conduct additional outreach and marketing of existing TDM programs and incentives to discourage single-occupancy vehicle trips and encourage alternative modes of transportation, such as carpooling, taking transit, walking, and biking.	**TL-5.1:** Conduct additional outreach through event promotions and publications, targeting specific groups or sectors within the community (e.g., large employers, employees, students, seniors, etc.). **TL-5.2:** Provide information on and promote existing employer based TDM programs as part of the business licensing and renewal process, with key focus on large employers with over 50 employees in Atascadero. **TL-5.3:** Continue to collaborate with San Luis Obispo Ride Share and the San Luis Obispo	Planning, Public Works	Very Low	None	110	25 percent of employees participating in TDM programs, reducing their VMT by 4 percent	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	Bicycle Coalition to assist with event promotions and publications to increase awareness and ridership during Bike Month and Rideshare month. **TL-5.4:** Continue to work with SLOCOG to identify locations for installation and facilitate construction of Park and Ride lots.						
TL-6: Parking Supply Management. Reduce parking requirements in areas such as the downtown where a variety of uses and services are planned in close proximity to each other and to transit.	**TL-6.1:** Implement existing ordinances and parking policies as infill development continues throughout the downtown.	Planning	Very Low	None	543	Net reduction of 1,000 parking spaces by 2020	Long-Term
TL-7: Electric Vehicle Network and Alternative Fueling Stations. Continue to work with the APCD, Central Coast Clean Cities Coalition, and	**TL-7.1:** Continue to create and implement the electric vehicle readiness plan through expanding the use of alternative fuel vehicles and fueling stations in the community (e.g., through identifying and zoning locations for fueling stations, offering	Public Works, Planning, Building	Very Low	None	1,984	5 percent increase in electric vehicles by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
neighboring jurisdictions to create and implement the electric vehicle readiness plan.	incentives for alternative fuel vehicles, etc.). **TL-7.2:** Continue to pursue funding for plug-in electric vehicle charging stations on both public and private property.						
TL-8: Smart Growth. Facilitate mixed-use, higher density, and infill development near existing or planned transit stops, in existing community centers/downtown, and in other designated areas.	**TL-8.1:** Continue to facilitate construction of high quality mixed-use and medium- and high-density land uses located close to transit nodes, existing bus routes, or park and ride facilities with regularly scheduled, daily service. **TL-8.2:** Develop and adopt incentives to help facilitate live/work developments. Live/work developments allow residents to live at their place of work and thereby reduce vehicle miles traveled and associated GHG emissions.	Planning	Very Low	None	3,251	5 percent reduction in VMT by 2020	Near-Term
TL-9: Halt Retail Leakage. Work with private developers to identify incentives for and encourage the development of convenient commercial, office, and shopping	**TL-9.1:** Conduct a study of key underserved areas of demand for retail, offices, and services. **TL-9.2:** Implement the findings of the study with a goal of capturing 60 percent of current retail leakage.	Planning, City Manager's Office, Office of Economic Development	Very Low	None	14,956	23 percent reduction in VMT by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
opportunities near existing employment and/or residential areas, as a means of shortening the distance between origins and destinations, and increasing the potential for walking or biking within the city to obtain services.							
Off-Road							
O-1: Off-Road Vehicle and Equipment Upgrades, Retrofits, and Replacements. Continue to work with the APCD and promote existing programs that fund off-road vehicle and equipment upgrades, retrofits, and replacement through the Carl Moyer heavy-duty vehicle and equipment program or other funding	**O-1.1:** Conduct additional outreach and promotional activities targeting specific groups (e.g., agricultural operations, construction companies, homeowners, etc.).	Public Works, Building, Planning	Very Low	None	754	10 percent of off-road vehicles/ equipment replaced with electric-powered vehicles/ equipment and 10 percent replaced with alternatively fueled vehicles/ equipment by 2020	Mid-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
mechanisms.							
Water							
W-1: Exceed SB X7-7 Water Conservation Target. Work with the Atascadero Mutual Water Company to adopt a water conservation target that exceeds the SB X7-7 (Water Conservation Act of 2009) target and identify and implement additional water efficiency and conservation measures to meet that target by 2020.	**W-1.1:** Work with the Atascadero Mutual Water Company to adopt a water conservation target to exceed SB X7-7 by 10 percent and develop and/or help implement additional water conservation and efficiency programs (e.g. water efficiency audits, replacement/retrofit programs, etc.) to meet that target. **W-1.2:** Continue to enhance retrofit programs for existing residences and commercial buildings by providing additional resources, assistance, and incentives to home and business owners. **W-1.3:** Expand the use of grey water or recycled water by working with the City's water purveyors and educating the community on dual plumbing, and state-of-the-art irrigation systems, including the use of grey water systems and rainwater catchment.	Planning, Building, Atascadero Mutual Water Company	Very Low	None	22	Exceed SB X7-7 water conservation target by 10 percent by 2020	Mid-term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
Solid Waste							
S-1: Solid Waste Diversion. Adopt a specified solid waste diversion rate that exceeds the state-mandated rate of 50 percent and identify programs to meet the identified rate by 2020.	**S-1.1:** Adopt a solid waste diversion goal of 60 percent (10 percent above the state-mandated rate of 50 percent). **S-1.2:** Work with Atascadero Waste Alternatives to identify the current city-wide diversion rate, and options for increased recycling, waste diversion, and education and outreach to meet the City's goal. **S-1.3:** Adopt an ordinance requiring that 70 percent of debris from demolition projects be diverted from landfills. **S-1.4:** Develop and adopt an ordinance requiring the provision of recycling receptacles at all events requiring a permit or held on City-owned or -operated property.	Public Works	Low	None	924	60 percent of solid waste diverted by 2020	Mid-Term
Trees and Vegetation							
T-1: Tree Planting Program. Facilitate voluntary tree planting within the community, working with local non-profit organizations and	**T-1.1:** Facilitate voluntary tree planting within the community, working with local non-profit organizations and community partners. **T-1.2:** Continue to provide tree planting assistance to facilitate	Planning, Public Works	Medium	None	36	3,000 net new trees planted by 2020	Near-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
community partners.	tree planting within the community.						
T-2: Native Forest Regeneration. Increase the amount of vegetated open space within the City to permanently increase carbon storage.	**T-2.1:** Continue to work with developers and landowners to permanently preserve open space and regenerate native forest within Atascadero.	Planning, Public Works	Very Low	None	1,745	1,400 net new acres re-vegetated	Near-Term
Adaptation							
A-1: Climate Change Vulnerability. Periodically reassess regional climate change vulnerabilities.	**A-1.1:** Participate in inter-agency and or inter-jurisdictional meeting and planning activities to periodically reassess regional climate change vulnerabilities. **A-1.2:** Incorporate newly identified adaptation measures into planning documents as appropriate.	Community Development, Planning	Very Low	None	NA	NA	Mid-Term
A-2: Public Health and Emergency Preparedness. Prepare for anticipated climate change effects on public health, the local economy, and populations that may bear a disproportionate	**A-2.1:** Collaborate with community-based organizations (such as health care providers, public health advocates, fire prevention organizations, etc.) to disseminate public preparedness and emergency response information related to climate change. **A-2.2:** Conduct training exercises at public forums as	Community Development, Public Works, Planning, Human Services	Very Low	None	NA	NA	Long-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
burden of the climate change effects.	well as distribute publicly available information on emergency exit routes and methods. **A-2.3:** Identify and focus planning and outreach programs on vulnerable populations including neighborhoods that currently experience social or environmental injustice or bear a disproportionate burden of potential public health impacts. **A-2.4:** Prepare a heat wave response plan that focuses on responding to the increased propensity for heat-related death and illness. **A-2.5:** Coordinate and promote cooling centers for residents who may require refuge from hot days, particularly low-income households and senior citizens. **A-2.6:** Coordinate with the City's Fire and Police Departments to bolster wildfire preparedness and defensiveness for residents and businesses through providing information on the City's website and conducting trainings promoting mechanical						

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	fuel management and increasing the area of defensible space around structures.						
A-3: Water Management. Implement new policies and programs to limit community exposure to threats such as flooding, and support those that encourage water use conservation and efficiency.	**A-3.1:** Collaborate with other jurisdictions to address water supply threats, flooding, and wastewater management. **A-3.2:** Continue to seek grants and other sources of funding, including the State Integrated Regional Water Management Grant Program and mitigation opportunities, to enhance flood control and improve water quality. **A-3.3:** Implement the CAP measure that facilitates water conservation and the use of recycled water.	Community Development, Public Works	Very Low	None	NA	NA	Long-Term
A-4: Infrastructure. Work to improve the resilience of systems that provide the resources and services critical to community function.	**A-4.1:** Assess the potential impact of climate change as part of the update of plans that manage community infrastructure systems. **A-4.2:** Complete an assessment, including economic impacts and threats to public health and safety, for projected climate change impacts on local transportation, water,	Community Development, Public Works	Very Low	None	NA	NA	Long-Term

Measure	Actions	Responsible Department	City Cost	City Savings	2020 GHG Reduction (MT CO_2e)	Performance Indicator	Implementation Time Frame*
	wastewater, stormwater, energy, and communication systems. **A-4.3:** Develop mitigation plans for protection of the wastewater treatment facility, the high school, and the relocation or elevation of vulnerable infrastructure.						

* The phase in which implementation of the measure began or should begin. Please note that measures already underway with existing or recently completed efforts in support of the measure are categorized as near-term.

5.2 Implementation and Monitoring Policies

CAP implementation and monitoring will require City leadership to execute CAP measures and actions, report on the progress of implementation and performance, and if necessary, alter or amend the CAP in the future to ensure that the plan remains effective and on track toward meeting its target. The following policies and actions were developed to guide CAP implementation and monitoring.

I-1: CAP Implementation Team

Establish a CAP Coordinator and multi-departmental CAP Implementation Team to implement, monitor, and report on the status of measures and actions identified in the CAP. The CAP Implementation Team will meet at least one time per year to assess the status of City efforts.

Implementation Actions:

- **I-1.1:** Form a multi-departmental CAP Implementation Team that meets annually to implement, monitor, and report on the status of measures and actions identified in the CAP.
- **I-1.2:** Designate a City staff member on the CAP Implementation Team to have lead responsibilities for overseeing CAP implementation and monitoring. Duties of this position include coordinating the CAP Implementation Team meetings, preparing the annual CAP progress report to City Council, and coordinating the GHG emissions inventory and CAP updates, as specified in this chapter.
- **I-1.3:** Provide CAP implementation and GHG reduction training to staff.

I-2: CAP Measure Evaluation

Annually monitor and report on the implementation and performance of the CAP measures and actions.[1]

Implementation Actions:

- **I-2.1:** Prepare an annual progress report for City Council review and consideration. The progress report should:
    - Identify the implementation status of each measure (including how new development projects have been implementing CAP measures);

[1] While a full GHG emissions inventory is necessary to assess community-wide and local government progress toward the 2020 goal, the City can track progress between inventories and provide insight on the effectiveness of specific actions. By evaluating whether the implementation of a measure is on track to achieve its performance criteria, the City can identify successful measures, and re-evaluate or replace under-performing measures.

- Evaluate achievement of or progress toward performance criteria;[2]
- Assess the effectiveness of measures included in the CAP;
- Report on the State's implementation of state-level measures included in the CAP; and
- Recommend adjustments to actions or tactics, as needed.

I-3: GHG Emissions Inventory and CAP Updates

Re-inventory GHG Emissions approximately every five years, as feasible, to evaluate the performance of the CAP as a whole, and if necessary, alter or amend the CAP to ensure that the plan remains on track.[3]

Implementation Actions:

- **I-3.1:** Conduct a GHG inventory update every five years, as feasible, and evaluate CAP performance.
- **I-3.2:** Update the CAP as necessary based on the results of the inventory, and to reflect new programs or policies to reduce GHG emissions.

At this time, the State has not created a mandate for further reductions beyond the 2020 target. It has identified a long-term goal for State agencies of reducing emissions to 80 percent below 1990 emissions levels by 2050 (in Executive Order S-3-05), but has not adopted the target and does not plan for meeting this goal. As such, this CAP does not identify a target beyond 2020. As the year 2020 approaches, the State is likely to adopt a target for later years and, at that time Atascadero will adopt a reduction target for a later year, considering the State's longer-term target. However, if the State has not adopted a reduction target by 2020, the City will set a reduction target.

5.3 Funding Sources

One of the main barriers to an implementation and monitoring plan is lack of available funds. There are multiple grant and loan programs through state, federal, and regional sources to reduce GHG emissions. This section identifies potential funding sources that Atascadero could pursue to offset the financial cost of implementing the CAP measures.

The spectrum of public and private funding options for the measures outlined in this CAP is ever evolving. The programs listed below represent the current (2013) status of those options that are most relevant to the CAP. These funding sources could quickly become out-of-date; therefore, it is important to evaluate the status of a given program before seeking funding, as availability and application processes are updated periodically. In addition, there are general

[2] The performance indicators, provided for each quantified measure, identify the level of participation or performance required to achieve the estimated level of GHG emissions reductions by 2020.

[3] Inventory updates provide the best indication of CAP effectiveness as they will allow for comparison to the 2005 baseline. If an update reveals that the plan is not making progress toward meeting the GHG reduction target, the City will adjust the measures as necessary.

sources of funding that provide the most up-to-date information and should be reviewed on a regular basis, including:

- U. S. Department of Energy
- U.S. Environmental Protection Agency
- U.S. Department of Housing and Urban Development
- California Energy Commission
- California Strategic Growth Council
- California Public Utilities Commission
- Caltrans
- CAL FIRE
- California Statewide Communities Development Authority
- Foundation for Renewable Energy and Environment
- SLOCOG
- SoCalGas
- PG&E

To reduce costs and improve the CAP's effectiveness, actions should be pursued concurrently whenever possible. Which funding sources the City decides to pursue will be addressed as implementation occurs.

The City can, in part, provide funding for various measures outlined in this CAP. This can be accomplished through the City's annual budgeting and Capital Improvement Program process which provides an opportunity for citizen input and guides decision-makers while helping them set priorities. The City can also partner with SLOCOG, local jurisdictions within San Luis Obispo County, community-based organizations, and private companies for joint programs.

5.3.1 ENERGY-RELATED FUNDING SOURCES

Many of the financing and incentive programs relevant to the CAP concern energy infrastructure and conservation. Some of these programs are tied to the American Recovery Reinvestment Act economic stimulus package enacted by Congress in February 2009. Access to these funds will be available for a limited period. The City should seek the most up-to-date information regarding the programs listed below.

Energy Efficiency and Conservation Block Grant Program

U.S. Department of Energy

The Energy Efficiency and Conservation Block Grant program, funded by the American Recovery and Reinvestment Act of 2009, provides local government grants to reduce fossil-fuel emissions, reduce total energy use, and improve energy efficiency and conservation in the transportation and building sectors. Grants originate from U.S. Department of Energy and are released from both the U.S. Department of Energy and California Energy Commission.

Strategic Growth Council Sustainable Communities Planning Grant Program

California Strategic Growth Council

On behalf of the Strategic Growth Council, the Department of Conservation manages competitive grants to cities, counties, and designated regional agencies to promote sustainable community planning and natural resource conservation. The grant program supports

development, adoption, and implementation of various planning elements. The Sustainable Communities Planning Grant Program offers a unique opportunity to improve and sustain the wise use of infrastructure and natural resources through a coordinated and collaborative approach.

Urban Greening for Sustainable Communities Grant Program

California Strategic Growth Council

Because of the built-out nature of California's urban areas, the Urban Greening for Sustainable Communities Program provides funds to preserve, enhance, increase, or establish community green areas such as urban forests, open spaces, wetlands, and community spaces (e.g., community gardens). The goal is for these greening projects to incrementally create more viable and sustainable communities throughout the state. This program has both an Urban Greening Planning Program, which provides funds to assist entities in developing a master urban greening plan, and an Urban Greening Project Program, which provides funds for projects that preserve, enhance, increase or establish community green areas.

Urban and Community Forestry Grant Program

CAL FIRE

The CAL FIRE Urban and Community Forestry Program works to expand and improve the management of trees and related vegetation in communities throughout California. This program offers funding through a variety of grants. The Urban Forest Management Plan Grant funds the development and implementation of a management plan to be used by a jurisdiction to manage its urban forest. Such plans will be holistic and long-term, must include the entire jurisdiction and take an ecosystem management approach, and may include a minimum level of a training or educational component. Local jurisdictions may request between $30,000 and $100,000 and matching contributions totaling 25 percent of the total project cost is required. The Green Trees for the Golden State Grant provides funding for urban tree planting projects and up to two years of initial maintenance. Local jurisdictions may request between $30,000 and $100,000. Matching contributions totaling 25 percent of the total project cost is required.

California Investor Owned Utilities (IOUs) Programs

PG&E

California IOUs, such as PG&E, are required by the CPUC to offer energy efficiency programs to their customers. Each IOU program is unique; generally the programs offer rebates, financing assistance, design assistance, educational seminars, and other forms of assistance. PG&E's rebates may be calculated based on the amount of energy savings or, alternatively, may be fixed rate financial assistance for specific energy efficiency technology.

In conjunction with its rebates and incentives programs, PG&E offers an Energy-Efficiency Retrofit Loan Program, also known as On-Bill Financing. The program for public agencies includes: zero-percent financing on qualifying measures for up to ten years; offsets to energy-efficient upgrade costs after rebates and incentives through PG&E; loans ranging from a minimum of $5,000 up to $250,000 per meter; and loan installments added to monthly PG&E bills.

PG&E also offers the Green Communities and Innovator Pilots energy efficiency programs, which are administrated by PG&E, using funds from the Public Goods Charge (PGC) authorized by the California Public Utility Commission (CPUC). Customers of California's three largest investor-owned utility companies pay the PGC through their electric utility bills. Customers pay the surcharge per unit of consumption (kilowatt-hours). Money raised by the PGC is spent on services and programs deemed to be in the public interest, including energy efficiency initiatives such as Green Communities and Innovator Pilots.

SoCalGas

Southern California Gas Company offers On-Bill Financing with rebates for energy efficient natural gas equipment. For institutional customers, such as the City of Atascadero, zero-percent financing is available from $5,000 to $250,000 per meter, with a maximum payback period of 10 years. Monthly loan payments are added directly to the customer's energy bill.

Energy Conservation Assistance Account Program (ECAA) Energy Efficiency Financing

California Energy Commission

The California Energy Commission offers low-interest loans (1-3 percent) to help local jurisdictions and other public agencies finance energy-efficient projects as part of the ECAA Program. Projects with proven energy and/or capacity savings are eligible, provided they meet the eligibility requirements. Examples of projects include: lighting systems, pumps and motors, energy efficient streetlights and traffic signals, automated energy management systems/controls, building insulation, renewable energy generation and combined heat and power projects, heating and air conditioning modifications, and wastewater treatment equipment. The maximum loan amount is $3 million per application for 15 years. There is no minimum loan amount.

California Solar Initiative State Rebate Program

California Energy Commission & California Public Utilities Commission

California Solar Initiative will provide over $2 billion in statewide incentives over the next decade for solar photovoltaic systems, as well as other solar thermal generating technologies, such as water heaters, on existing residential homes, and existing and new commercial, industrial, and agricultural properties. Photovoltaic incentives are available for systems up to one megawatt in size for homeowners, commercial/industrial, government and non-profit customers. The program pays solar consumers an incentive based on system performance.

California Feed-In Tariff

The California feed-in tariff allows eligible customer-generators to enter into 10-, 15- or 20-year standard contracts with their utilities to sell the electricity produced by small renewable energy systems -- up to three megawatts -- at time-differentiated market-based prices. Time-of-use adjustments will be applied by each utility and will reflect the increased value of the electricity to the utility during peak periods and its lesser value during off-peak periods. These tariffs are not available for facilities that have participated in the California Solar Initiative, Self-Generation Incentive Program, Renewables Portfolio Standard, or other ratepayer funded generation incentive programs, including net-metering tariffs. For customers generating renewable energy not covered by the California Solar Initiative or Self-Generation Incentive Program (e.g.,

biomass or geothermal) the feed-in tariff is applicable. If customers prefer a long-term contract at a fixed price over a financial incentive paid in the short term, feed-in tariffs may be a beneficial financing tool.

5.3.2 TRANSPORTATION-RELATED FUNDING SOURCES

Many federal, state, and regional grant programs are available to fund transportation and infrastructure improvements. The programs listed below represent the current status of the most relevant of these programs.

Livability Grant Programs

Federal Transportation Authority

The Federal Transportation Authority provides resources on sustainable communities and transit oriented development. This includes access to transit oriented development resources and training free of charge to local government employees. The Federal Transportation Authority's Livable and Sustainable Communities program supports initiatives that demonstrate ways to improve the link between public transit and communities. The Federal Transportation Authority offers a broad selection of Livability Grant Programs that fund projects for accessible, livable, and sustainable communities. In particular, the Bus and Bus Facilities Discretionary Program provides capital assistance for new buses and intermodal transit centers. The New Starts and Small Starts Program supports transit "guideway" capital investments, such as rapid rail, light rail, commuter rail, automated guideway transit, people movers, bus rapid transit, and other high occupancy vehicles. Additionally, the Intercity Bus Program supports transit access to residents in non-urbanized areas.

Alternative and Renewable Fuel and Vehicle Technology Program

California Energy Commission

Assembly Bill 118 created the Alternative and Renewable Fuel and Vehicle Technology Program, within the California Energy Commission. The statute authorizes the Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's GHG reduction goals and reduce our dependence on foreign oil. The statute allows the Energy Commission to use grants, loans, loan guarantees, revolving loans, and other appropriate measures. Eligible recipients include: public agencies, private businesses, public-private partnerships, vehicle and technology consortia, workforce training partnerships and collaboratives, fleet owners, consumers, recreational boaters, and academic institutions. The Energy Commission must prepare and adopt an Investment Plan and convene an Advisory Committee to assist in preparing the Investment Plan. The Energy Commission has an annual program budget of approximately $100 million.

Community-Based Transportation Planning Grant Program

Caltrans

The Community-Based Transportation Planning Grant Program is primarily used to seed planning activities that encourage livable communities. Grants assist local agencies to better integrate land use and transportation planning, to develop alternatives for addressing growth, and to assess efficient infrastructure investments that meet community needs. These planning

activities are expected to help leverage projects that foster sustainable economies, increase available affordable housing, improve housing/jobs balance, encourage transit oriented and mixed use development, expand transportation choices, reflect community values, and include non-traditional participation in transportation decision making.

Local Assistance Program

Caltrans

Caltrans' Local Assistance Program oversees more than one billion dollars in federal and state funds annually available to over 600 cities, counties, and regional agencies for the purpose of improving their transportation infrastructure or providing transportation services.

Safe Routes to School Programs

Caltrans

Caltrans administers two separate Safe Routes to School Programs—one state program and one federal program. Both programs are intended to achieve the same basic goal of increasing the number of children walking and bicycling to school by making it safer for them to do so. Both programs fund qualifying infrastructure projects.

Bicycle Transportation Account

Caltrans

The Bicycle Transportation Account is an annual program providing state funds for city and county projects that improve safety and convenience for bicycle commuters. Caltrans expects to appropriate $7.2 million annually for projects, on a matching basis with local jurisdictions. A wide variety of projects are eligible, including but not limited to new bikeways serving major transportation corridors, new bikeways removing travel barriers, and secure bicycle parking.

Environmental Enhancement and Mitigation Program

Caltrans

The Environmental Enhancement and Mitigation Program offers a total of $10 million each year for grants to local, state, and federal government agencies and to nonprofit organizations for projects to mitigate the environmental impacts caused by new or modified public transportation facilities. Eligible projects must be directly or indirectly related to the environmental impact of the modification of an existing transportation facility or construction of a new transportation facility. Two of the grant categories include Highway Landscaping and Urban Forestry Projects, which are designed to offset vehicular emissions of carbon dioxide through the planting of trees and other suitable plants, and Roadside Recreation Projects, which provide for the acquisition and/or development of roadside recreational opportunities.

Highway Safety Improvement Program

Caltrans

The Highway Safety Improvement Program provides federal funding for work on any public road or publicly owned bicycle/pedestrian pathway or trail that corrects or improves the safety for its users. The program is intended to reduce traffic fatalities and serious injuries on all public roads. Local jurisdictions, such as counties and cities, may apply to Caltrans for funding ranging from

$100,000 to $900,000 per project. Federal reimbursements cover up to 90 percent of total project costs. Eligible projects include, but are not limited to, improvements for pedestrian or bicyclist safety, intersection safety improvements, and shoulder widening.

Community Development Block Grant

California Department of Housing and Community Development

The Community Development Block Grant (CDBG) program funds projects and programs that develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for persons of low and moderate income. Federal CDBG Grantees may use funds for activities that include, but are not limited to, acquiring real property; building public facilities and improvements, such as streets, sidewalks, and recreational facilities; and planning and administrative expenses, such as costs related to developing a consolidated plan and managing CDBG funds. The State makes funds available to eligible agencies (cities and counties) through a variety of different grant programs.

Infill Infrastructure Grant Program

California Department of Housing and Community Development

The Infill Infrastructure Grant Program assists in the new construction and rehabilitation of infrastructure that supports higher-density affordable housing and mixed-income housing in locations designated as infill. Eligible applicants include, but are not limited to, localities and public housing authorities.

National Recreational Trails Program

California Department of Parks and Recreation

In California, the National Recreational Trails Program is administered by Department of Parks and Recreation to provide funding to develop recreational trails and related facilities for uses such as bicycling and hiking**.**

Federal Transportation Improvement Program for the San Luis Obispo County Region

SLOCOG

The Federal Transportation Improvement Program (FTIP) is a comprehensive listing of federally funded surface transportation projects in San Luis Obispo County. SLOCOG prepares and adopts the FTIP every two years in close cooperation with stakeholders such as cities and counties. As part of the FTIP, SLOCOG plans for the spending of flexible funding from the federal Surface Transportation Program, which applies to the following types of projects: enhanced transit services, expanding technology, freeway express bus stops, ridesharing, vanpooling, parallel routes along major transportation corridors, and Park-n-Ride lots. SLOCOG selects projects that promote the strategies and policies of the Regional Transportation Plan.

The FTIP also includes the allocation of funding under the state Transportation Development Act (TDA). Each year, SLOCOG disburses approximately $10 million in funding from the TDA toward bicycle and pedestrian infrastructure, traffic calming, and other planning and capital improvement projects in the region.

Infrastructure State Revolving Fund Program

California Infrastructure and Economic Development Bank

The Infrastructure State Revolving Fund Program provides low-cost financing to public agencies for a wide variety of infrastructure projects. Program funding is available in amounts ranging from $250,000 to $10 million, with loan terms of up to 30 years. Interest rates are set on a monthly basis. Eligible project categories include city streets, county highways, state highways, drainage, water supply and flood control, educational facilities, environmental mitigation measures, parks and recreational facilities, port facilities, public transit, sewage collection and treatment, solid waste collection and disposal, water treatment and distribution, defense conversion, public safety facilities, and power and communications facilities.

5.3.3 SOLID WASTE-RELATED FUNDING SOURCES

Beverage Container Recycling Grant and Payment Programs

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle administers funding programs to assist organizations with establishing convenient beverage container recycling and litter abatement projects, and to encourage market development and expansion activities for beverage container materials. The Beverage Container Recycling Grant provides funding to local governments, businesses, individuals, and non-profit organizations for projects that implement new programs or enhance existing programs to provide convenient beverage container recycling opportunities in various locations statewide. Eligible projects include, but are not limited to, the following locations: parks and recreational areas, sporting complexes, community events, office buildings, multifamily dwellings, entertainment/hospitality venues, curbside, restaurants, and schools and colleges. CalRecycle issues up to $1.5 million annually for this program. The City/County Payment Program provides a total of $10.5 million in grant funds annually to eligible cities and counties for beverage container recycling and litter abatement activities. Each city is eligible to receive a minimum of $5,000 or an amount calculated by the Department based on per capita, whichever is greater.

5.3.4 OTHER FUNDING SOURCES

Community Assistance Grant

Bureau of Land Management

Funds are available to assist with hazardous fuels treatments, community wildfire protection planning, and education addressing wildfire safety and hazard risk reduction within the wildland-urban interface. Treatments may be focused on both Federal (with prior approval from local Bureau of Land Management field staff) and non-federal lands and aimed toward protecting communities at risk and resource values identified within a Community Wildfire Protection Plan and/or Community Fire Plans with an interdisciplinary and interagency collaborative process.

Wildland Urban Interface Grant

Fish and Wildlife Service

Wildland Urban Interface funds are available for hazard mitigation projects that protect communities at risk of wildfire by reducing hazardous fuels (non-federal lands), developing Community Wildfire Protection Plans (includes associated planning and compliance documents), and implementing wildfire education and outreach initiatives.

Partnerships with Other Jurisdictions and Community Organizations

Partnering with neighboring jurisdictions and community organizations is a key implementation strategy supporting the CAP. Various jurisdictions and organizations within the County could serve as potential partners in implementing the CAP strategies. The City should seek to partner with appropriate local governments, as identified within CAP measures.

CHAPTER 6

REFERENCES AND PREPARERS

6.0 References and Preparers

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6.2 List of Preparers

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GLOSSARY

OF TERMS

Glossary of Terms

Actions: The steps that will be taken to implement the Climate Action Plan measures.

Adaptation: The ability to adjust to, or minimize, the potential impacts of climate change or other environmental disturbances.

Baseline Emissions: The amount of GHG emissions released in a designated year against which future changes in emissions levels are measured.

Business-as-Usual: A scenario used for the projection of GHG emissions at a future date based on current technologies and regulatory requirements in absence of other reductions.

California Environmental Quality Act (CEQA): A statute that requires state and local agencies to evaluate the environmental impacts of private or public proposed projects they undertake or permit and to avoid or mitigate potentially impacts, if feasible. If a proposed action has the potential for a significant environmental impact, an environmental impact report (EIR) must be prepared and certified before action can be taken.

Carbon Dioxide (CO_2): A naturally occurring gas, and also a by-product of burning fossil fuels and biomass, as well as land-use changes and other industrial processes. It is the principal anthropogenic GHG that affects the Earth's radiative balance. It is the reference gas against which other GHGs are measured and therefore has a Global Warming Potential of 1.

Carbon Dioxide Equivalent (CO_2e): A metric used to compare the emissions from various greenhouse gases based upon their global warming potential, or potency. Carbon dioxide equivalents are commonly expressed as "metric tons of carbon dioxide equivalents" (MT CO_2e). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated global warming potential. For example, the global warming potential for methane is 21. This means that one metric ton of methane is equivalent to 21 metric tons of carbon dioxide.

Carbon Sequestration: The process through which agricultural and forestry practices remove carbon dioxide from the atmosphere. The term “carbon sinks” is also used to describe agricultural and forestry lands that absorb carbon dioxide.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere, they drift into the upper atmosphere, where their chlorine components destroy ozone.

Climate: Climate in a narrow sense is usually defined as the "average weather," or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands of years. The classical period is three decades, as defined by the World Meteorological Organization. These quantities

are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.

Climate Action Plan: A description of the measures and actions that a local government will take to reduce GHG emissions and achieve an emissions reduction target. Most plans include a description of existing and future year emissions; a reduction target; a set of measures, including performance standards, that will collectively achieve the target; and a mechanism to monitor the plan and require amendment if it is not achieving specified levels. Interchangeable with GHG Reduction Plan.

Climate Change: Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from: natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun; natural processes within the climate system (e.g. changes in ocean circulation); human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.).

Co-Benefit: Additional benefits that occur as a result of GHG reduction measures. These include financial savings, improved air quality, increased health or safety, natural resource conservation, reduced energy use, etc.

Connectivity: A well connected circulation system with minimal physical barriers that provides continuous, safe, and convenient travel for all users of streets, roads, and highways.

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

Emissions Factor: A set of coefficients used to convert data provided on energy use and energy use reductions to emissions. These emission factors are the ratio of emissions of a particular pollutant (e.g., carbon dioxide) to the quantity of the fuel used (e.g., kilograms of coal). For example, when burned, 1 ton of coal = 2.071 tons of CO_2.

Emissions Forecast: The projected emissions that would occur in a future year based on growth multipliers applied to the baseline year.

Energy Conservation: Reducing energy consumption. Energy conservation can be achieved through energy efficiency (getting the most productivity from each unit of energy) or by reduced use of energy such as turning off appliances when not in use.

Energy Efficiency: Using less energy to provide the same level of service or complete the same task. For example, a more efficient light will use less electricity to provide the same amount of illumination.

Fossil Fuel: A general term for combustible geologic deposits of carbon, including coal, oil, natural gas, oil shale, and tar sands. These fuels emit carbon dioxide into the atmosphere when burned, thus significantly contributing to the enhanced greenhouse effect.

Fuel Efficiency: The distance a vehicle can travel on an amount of fuel. This is most often measured in miles traveled per gallon of fuel. A higher-efficiency vehicle travels farther on a gallon of fuel than similar vehicles.

Global Warming: Global warming is an average increase in the temperature of the atmosphere near the Earth's surface and in the troposphere, which can contribute to changes in global climate patterns. Global warming can occur from a variety of causes, both natural and human induced. In common usage, "global warming" often refers to the warming that can occur as a result of increased emissions of GHGs.

Green Building: Green, or sustainable, building is the practice of creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance and demolition.

Greenhouse Effect: Trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. Some of the heat flowing back toward space from the Earth's surface is absorbed by water vapor, carbon dioxide, ozone, and several other gases in the atmosphere and then reradiated back toward the Earth's surface. If the atmospheric concentrations of these GHGs rise, the average temperature of the lower atmosphere will gradually increase.

Greenhouse Gas (GHG): Any gas that absorbs infrared radiation in the atmosphere. GHGs include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Greenhouse Gas Emissions Inventory: A GHG emissions inventory provides estimates of the amount of GHGs emitted to and removed from the atmosphere by human activities. A city or county that conducts an inventory looks at both community emission sources as well as emissions from government operations. A base year is chosen and used to gather all data from that year. Inventories include data collection from such things as vehicle miles traveled (VMTs), energy usage from electricity and gas, and waste. Inventories include estimates for carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydroflourocarbons (HFCs), and perflourocarbons (PFCs), which are referred to as the "six Kyoto gases."

Hydrofluorocarbons (HFCs): Man-made compounds containing hydrogen, fluorine, and carbon, many of which have been developed as alternatives to ozone-depleting substances for industrial, commercial, and consumer products, that have a range of global warming potentials. HFCs do not have the potential to destroy stratospheric ozone, but they are still powerful GHGs.

Infill Site: A site in an urbanized area that meets criteria defined in Public Resources Code Section 21061.3.

Intergovernmental Panel on Climate Change (IPCC): The IPCC was established jointly by the United Nations Environment Program and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national GHG emission inventories.

Kilowatt (kW): One thousand watts.

Kilowatt-hour (kWh): an amount of electricity equivalent to the use of one kilowatt for one hour. A hundred watt light bulb that is on for 10 hours uses one kilowatt-hour of electricity (100 watts x 10 hours = 1,000 watt-hours = 1 kilowatt-hour). Electricity production or consumption is often expressed as kilowatt- or megawatt-hours produced or consumed during a period of time.

Methane (CH_4): A hydrocarbon that is a GHG with a global warming potential estimated at 21 times that of carbon dioxide (CO_2). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Measure: A way to reduce GHG emissions.

Metric Ton (MT): Common international measurement for the quantity of GHG emissions. A metric ton is equal to 2,205 pounds or 1.1 short tons.

Mitigation: An action to either reduce the amount of GHGs being emitted into the atmosphere or remove previously emitted gases from the atmosphere.

Mixed-Use: Mixed Use development means combining a variety of compatible land uses in a single development, and can be creatively used to create vibrant centers for living, working, and shopping. The primary purpose of the Mixed-Use land use designations is to implement the principals of smart growth by applying the designation to certain areas along the City's main transportation corridors that could successfully support a combination of uses (multi-family residential, retail, office uses, etc.) within a single development plan.

Natural Gas: Underground deposits of gases consisting of 50 to 90 percent methane and small amounts of heavier gaseous hydrocarbon compounds such as propane and butane.

Perfluorocarbons (PFCs): Potent GHGs that accumulate in the atmosphere and remain there for thousands of years. Aluminum production and semiconductor manufacture are the largest known man-made sources of perfluorocarbons.

Recycling: Collecting and reprocessing a resource so it can be used again. An example is collecting aluminum cans, melting them down, and using the aluminum to make new cans or other aluminum products.

Renewable Energy: Energy generated from sources that are naturally replenished or not used up in the course of providing power (e.g., wind, solar, biomass, and geothermal).

Retrofit: The addition of new technology or features to older systems. For example, adding new energy-efficient lamps to existing lighting fixtures.

Sector: A term used to describe GHG emission inventory source categories for GHGs based on broad economic sectors.

Smart Growth: A compact, efficient, and environmentally sensitive pattern of development that provides people with additional travel, housing, and employment choices by focusing future growth closer to existing and planned job centers and public facilities, while preserving open space and natural resources.

Solar Photovoltaic (PV): A system that converts sunlight directly into electricity using cells made of silicon or other conductive materials. When sunlight hits the cells, a chemical reaction occurs, resulting in the release of electricity.

Source: Any process or activity that releases a GHG into the atmosphere.

Target Year: The year by which the GHG emissions reduction target should be achieved.

Transportation Demand Management (TDM): A general term for strategies that increase overall system efficiency by encouraging a shift from single-occupant vehicle trips to non-single-occupant vehicle modes, or shifting auto trips out of peak periods. TDM seeks to facilitate this shift by increasing travel options, by providing incentives and information, or by reducing the physical need to travel through transportation-efficient land uses.

Vehicle-Miles Traveled (VMT): One vehicle traveling the distance of one mile. Total vehicle miles is the aggregate mileage traveled by all vehicles. VMT is a key measure of overall street and highway use. Reducing VMT is often a major objective in efforts to reduce vehicular congestion and achieve air quality goals.

APPENDIX A

GHG EMISSIONS INVENTORY

CITY OF ATASCADERO

Community-Wide and Government Operations 2005 Baseline Greenhouse Gas Emissions Inventory Update

Prepared for:

SAN LUIS OBISPO AIR POLLUTION CONTROL DISTRICT
ON BEHALF OF THE CITY OF ATASCADERO

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Appendices

Appendix A: CACP2009 Detailed Report for Community-Wide Emissions, 2005

Appendix B: CACP2009 Detailed Report for City Government Operations Emissions, 2005

Appendix C: Detailed Methodology for Community-Wide Inventory

Appendix D: Detailed Methodology for City Government Operations Inventory

Appendix E: City Employee Commute Survey, 2009

Executive Summary

A greenhouse gas (GHG) emissions inventory identifies the major sources and quantities of GHG emissions produced by community activities and City government facilities and operations within a jurisdiction's boundaries for a given year. Estimating GHG emissions enables local governments to establish an emissions baseline, track emissions trends, identify the greatest sources of GHG emissions within their jurisdiction, set targets for future reductions, and create an informed mitigation strategy based on this information.

This Inventory includes a 2005 baseline inventory of GHG emissions from community activities and City government facilities and operations within the city[1], and a 2020 business-as-usual forecast of how emissions in Atascadero would change if no further actions are implemented to reduce those emissions. It is important to note that the City government operations inventory is a subset of the community inventory, meaning that the city government's emissions are included within the community inventory.

The community inventory is divided into six sectors, or sources of emissions: transportation, residential energy use, commercial and industrial energy use, solid waste, off-road vehicles and equipment, and wastewater. The City government inventory provides a more detailed analysis of emissions resulting from City-owned or -operated buildings, fleet vehicles, and lighting; water and sewage transport; City-generated solid waste; and employee commute travel.

What are Greenhouse Gas Emissions (GHGs)?

Gases that trap heat in the Earth's atmosphere are called greenhouse gases, or GHGs. GHGs include carbon dioxide, methane, nitrous oxide, and fluorinated gases. While many of these gases occur naturally in the atmosphere, modern human activity has led to a steep increase in the amount of GHGs released into the atmosphere over the last 100 years. Collectively, these gases intensify the natural greenhouse effect, thus causing global average surface temperatures to rise, which in turn affects global climate patterns. GHGs are often quantified in terms of CO_2 equivalent, or CO_2e, a unit of measurement that equalizes the potency of GHGs.

Source: Intergovernmental Panel on Climate Change (IPCC), 2007

INVENTORY UPDATE PURPOSE

In 2010, PMC prepared an inventory of Atascadero's 2005 community-wide and City government emissions. Changes to GHG accounting protocols have prompted an update to the

[1] In this report, the term "city" refers to the area inside the jurisdictional boundary of the City of Atascadero, whereas "City government" refers to those activities which are under the operational control of City agencies.

emissions inventory and in 2012 Rincon Consultants conducted a peer-review and update to the Inventory. This Inventory is the updated assessment of GHG emissions in Atascadero.

Rincon updated the Inventory methodology, emissions coefficients, and data for consistency with current protocols, including the Local Government Operations Protocol (LGOP) version 1.1 (May 2010), for the city government inventory, and the Association of Environmental Professionals (AEP) California Community-wide GHG Baseline Inventory Protocol (AEP Protocol) (June 2011) and ICLEI International Local Government GHG Emissions Analysis Protocol (IEAP) (October 2009), for the community-wide inventory. Rincon also updated the Inventory to include all emissions sectors within the discretionary action authority of the City. The primary additions and revisions to the updated Inventory include the following:

- Calculation of emissions from additional off-road vehicle and equipment categories (lawn and garden equipment, construction equipment, industrial equipment, and light commercial equipment) for the community-wide inventory.
- Incorporation of improved emissions factors from the LGOP version 1.1.
- Incorporation of a refined methodology for on-road transportation emissions. The 2012 methodology estimates vehicle miles traveled (VMT) based on an origin-destination approach using the regional travel demand model and excludes vehicle trips that pass through the city. Transportation-related GHG emissions were then calculated using the California Air Resources Board Emissions Factor 2011 (EMFAC2011) software.
- Corrections to baseline electricity and natural gas consumption data, and waste stream profile data.
- Inclusion of updated population and employment projections using the San Luis Obispo Council of Governments' (SLOCOG) 2040 Population, Housing & Employment Forecast (August 2011).[2]

As a result of this Inventory update, Atascadero's community-wide 2005 baseline emissions decreased by 34,806 metric tons CO_2e and 2020 forecast decreased by 55,159 metric tons CO_2e compared to the April 2010 inventory.

[2] SLOCOG's 2040 Population, Housing & Employment Forecast includes population, housing, and employment projections developed based on an analysis of historic growth and economic trends. See *San Luis Obispo County 2040 Population, Housing & Employment Forecast* (August 2011) for details.

COMMUNITY-WIDE GHG INVENTORY RESULTS

The community of Atascadero emitted approximately 141,428 metric tons of carbon dioxide equivalent (CO_2e) emissions in the baseline year 2005. As shown in **Figure ES-1 and Table ES-1**, the transportation sector was by far the largest contributor to emissions (42.5%), producing approximately 60,041 metric tons of CO_2e in 2005. Transportation sector emissions are the result of diesel and gasoline fuel used in vehicles traveling on local roads and state highways within the jurisdictional boundaries of Atascadero. Emissions from electricity and natural gas consumed in the residential sector were the next largest contributor (28.8%), producing approximately 40,690 metric tons of CO_2e. Electricity and natural gas consumed in the commercial and industrial sector accounted for a combined 14.3% of the total. Emissions from solid waste comprised 6.4% of the total, emissions from off-road vehicles and equipment comprised 6.1% of the total, and emissions from wastewater facilities comprised 1.9% of the total.

FIGURE ES-1: COMMUNITY GHG EMISSIONS BY SECTOR, 2005

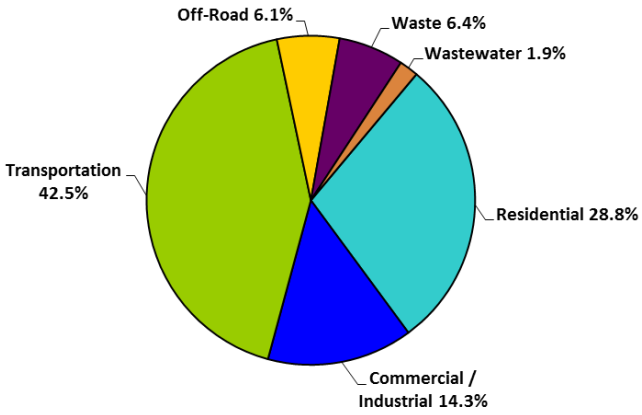


TABLE ES-1: COMMUNITY GHG EMISSIONS BY SECTOR, 2005

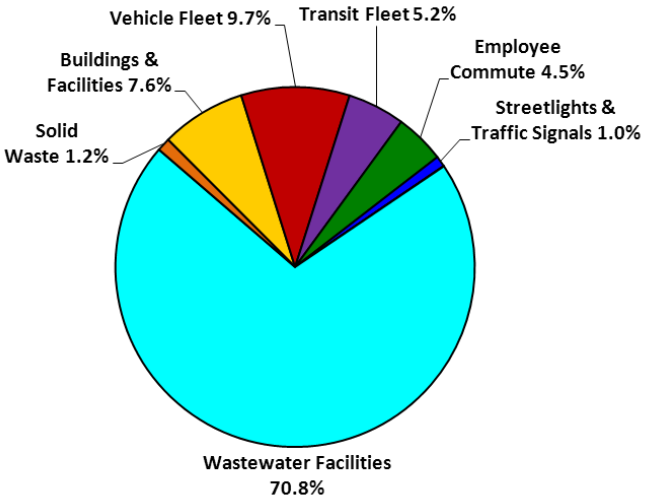
2005 Community Emissions by Sector	Residential	Commercial/ Industrial	Transportation	Off-Road	Waste	Waste water	TOTAL
CO_2e (metric tons)	40,690	20,271	60,041	8,686	9,083	2,657	141,428
Percentage of Total CO_2e	28.8%	14.3%	42.5%	6.1%	6.4%	1.9%	100.0%

CITY GOVERNMENT OPERATIONS GHG INVENTORY RESULTS

City government operations and facilities produced approximately 4,130 metric tons of CO_2e in 2005. As displayed in **Table ES-2** and **Figure ES-2**, this represents approximately 2.9% of total community-wide emissions in the city. City government emissions result from waste, energy consumption from water and wastewater facilities, buildings, streetlights and other facilities, fuel consumption by the vehicle and transit fleet and employee commutes, and miscellaneous equipment. The largest contributor to the City's emissions (70.8%) was from the wastewater facilities producing 2,923 metric tons of CO_2e. The vehicle fleet was the second largest contributor to the City's emissions (9.7%), producing 402 metric tons of CO_2e (refer to **Figure ES-3** and **Table ES-2**).

FIGURE ES-2: CITY GOVERNMENT PORTION OF COMMUNITY-WIDE GHG EMISSIONS

FIGURE ES-3: CITY GOVERNMENT GHG EMISSIONS BY SECTOR, 2005



City government operations emissions are a subset of the total community-wide emissions as outlined above. However, similar to the way in which businesses and factories perform their own facility-scale GHG Inventories, this Inventory analyzes City emissions separately to identify opportunities for cost-savings and emissions-reductions in the future. The methodology for estimating emissions from local government operations is guided specifically by the LGOP version 1.1 developed by the California Air Resources Board, ICLEI – Local Governments for Sustainability, and the California Climate Registry.

TABLE ES-2: CITY GOVERNMENT GHG EMISSIONS BY SECTOR, 2005

2005 Emissions by Sector	Buildings & Facilities	Vehicle Fleet	Transit Fleet	Employee Commute	Street Lights & Traffic Signals	Water Delivery	Waste-water Facilities	Solid Waste	TOTAL
CO_2e (metric tons)	316	402	214	185	40	1	2,923	49	4,130
Percentage of CO_2e	7.6%	9.7%	5.2%	4.5%	1.0%	<0.0%	70.8%	1.2%	100.0%

DATA LIMITATIONS

This Inventory captures the major sources of GHGs caused by activities within the city per standard practice. However, it is important to note that some likely emission sources were not included in the Inventory, either because of privacy laws, lack of data, or a lack of reasonable methodology for calculating emissions. It is estimated that the sources not included in the inventory comprise less than 5.0% of total emissions in the city. It is likely that as GHG inventories become more common, methodology and accessibility to data will improve.

The sources that could not be included due to privacy laws, lack of data availability, and/or a reasonable methodology include the following:

- Refrigerants from City government operations, facilities, and vehicles, and the community-at-large
- Freight and passenger trains;
- Propane, wind or solar energy consumed by the community-at-large; and
- Residential septic tanks systems.

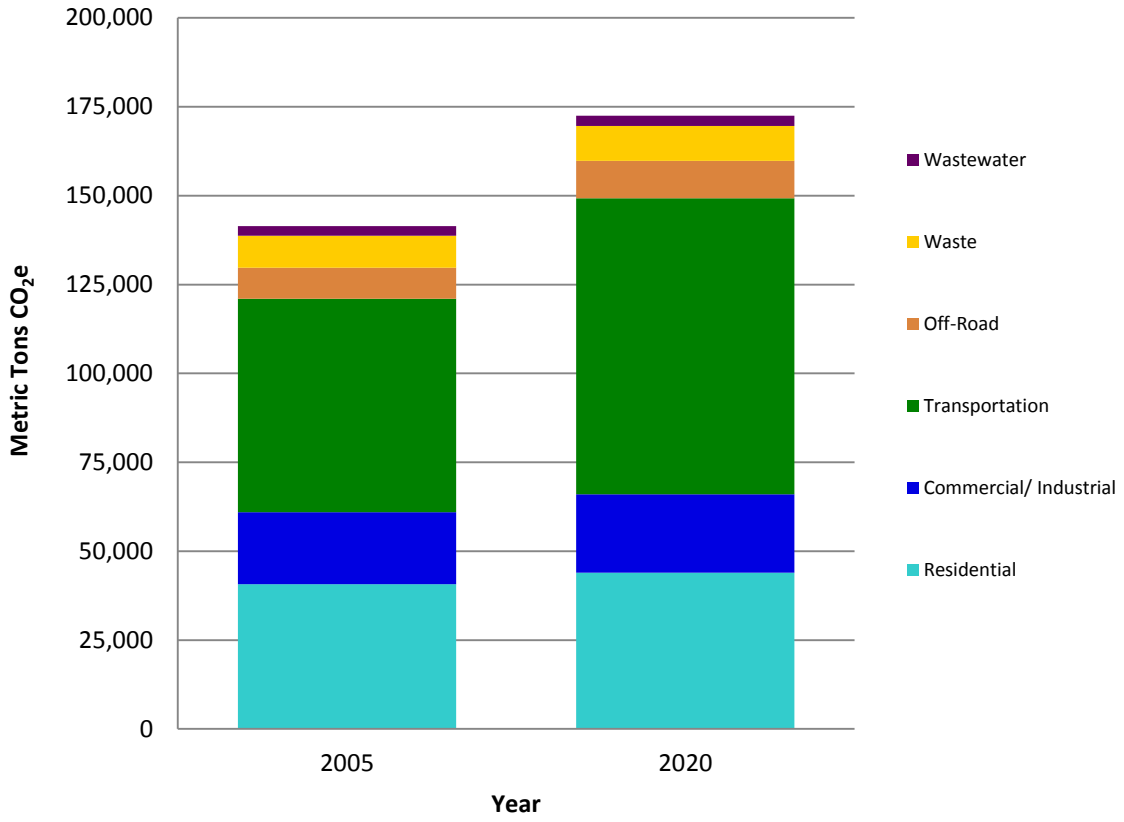
These limitations are explained further in this document.

BUSINESS-AS-USUAL FORECAST

The GHG emissions forecast provides a “business-as-usual estimate,” or scenario, of how emissions will change in the year 2020 if consumption trends and behavior continue as they did in 2005, absent any new federal, state, regional, or local policies or actions that would reduce emissions. The year 2020 was selected for the forecast in order to maintain consistency with AB 32. As shown in **Figure ES-4** and **Figure ES-5**, if consumption trends continue the pattern observed in 2005 emissions (i.e., under business-as-usual conditions) will reach 172,488 metric

tons of CO_2e by 2020, or a 22.0% increase over 2005 baseline levels (projections based on population and employment growth).

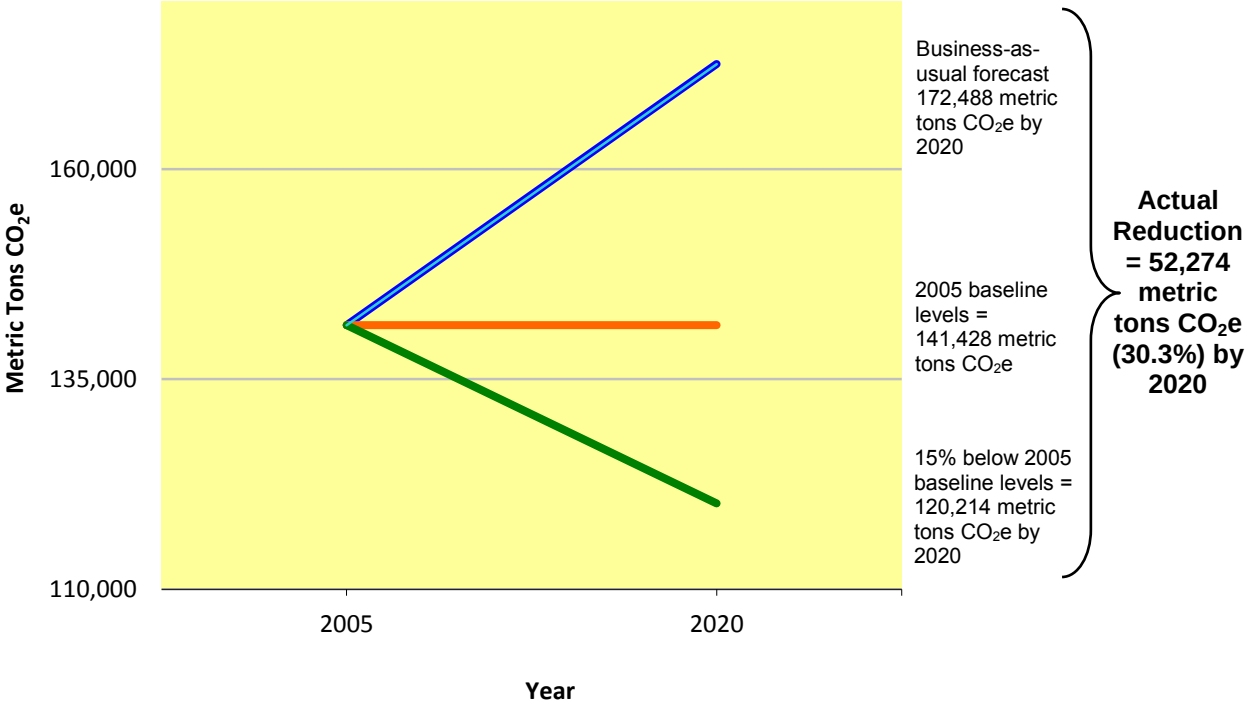
FIGURE ES-4: 2020 CITY OF ATASCADERO BUSINESS-AS-USUAL GHG EMISSIONS FORECAST



With this information, the City can make an informed determination regarding a reduction target. Conformance with the State of California's recommended reduction of 15% below present levels by 2020 would require a 30.3% reduction below the City's business-as-usual emissions (refer to **Figure ES-5**).[3]

[3] AB 32 Scoping Plan, page 27 states that the California Air Resources Board encourages local governments to "move toward establishing similar goals for community emissions that parallel the State commitment to reduce GHG emissions by approximately 15 percent from current levels by 2020." http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm

FIGURE ES-5: BUSINESS-AS-USUAL FORECAST IN RELATION TO STATE-RECOMMENDED REDUCTION TARGET



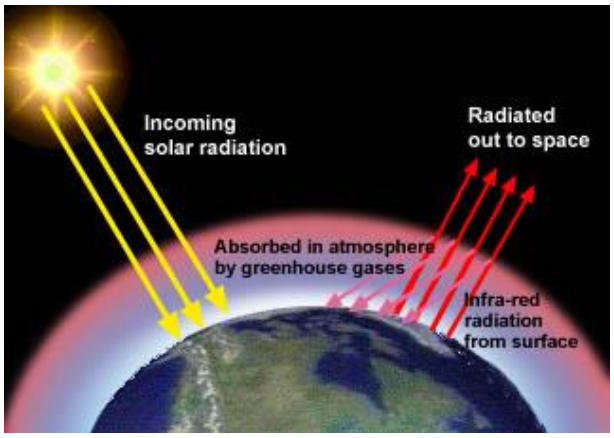
1. Introduction

This section introduces the Inventory, defines key terms used throughout the Inventory, and provides an overview of climate change science and regulation in California.

1.1 PURPOSE OF A GHG INVENTORY

This Inventory represents completion of the first step in the City's climate protection process. Quantifying recent-year emissions is essential to establish: (1) a baseline against which to measure future emission levels, and (2) an understanding of where the highest percentages of emissions are coming from, and, therefore, the greatest opportunities for emissions reductions. This Inventory presents estimates of GHG emissions in 2005 resulting from the community as a whole.

FIGURE 1-1: THE GREENHOUSE EFFECT



Source: Tufts University

Climate Change Background

Scientific consensus holds that the world's population is releasing GHGs faster than the earth's natural systems can absorb them. These gases are released as byproducts of fossil fuel combustion, waste disposal, energy use, land-use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), creates a blanket around the earth that allows light to pass through but traps heat at the surface preventing its escape into space (**Figure 1-1**). Known as the greenhouse effect, models show that this phenomenon could lead to a 2°F to 10°F temperature increase over the next 100 years. The Intergovernmental Panel on Climate Change (IPCC) warns that most of the warming observed over the last 50 years is attributable to human activities.[4]

Although used interchangeably, there is a difference between the terms "climate change" and "global warming." According to the State, climate change refers to "any long-term change in

[4] Intergovernmental Panel on Climate Change. Fourth Assessment Report, Working Group I. 2007. Climate Change 2007: The Physical Science Basis, Summary for Policy Makers.

average climate conditions in a place or region, whether due to natural causes or as a result of human activities.[5] The use of the term "climate change" is becoming more prevalent because it encompasses all changes to the climate, not just temperature. Additionally, the term "climate change" conveys temporality, implying that climate change can be slowed with the efforts of local, regional, state, national, and world entities.

Changes in the earth's temperature will have impacts for residents and businesses in the City of Atascadero. Some of the major impacts to the Central Coast expected to occur include the following, separated by sector.[6] [7]

- Coastline: The San Luis Obispo County coastline could face inundation as a result of sea level rise and global warming. As temperatures rise, the ocean waters rise as well due to thermal expansion and the melting of glaciers and snowpack. The state's 2009 Climate Change Impacts Assessment (the 2009 Scenarios Project) estimates that sea levels will rise by 12 to 18 inches by 2050 and 21 to 55 inches by 2100. This level of sea rise has the potential to negatively affect groundwater salination as well as the size and attractiveness of local beaches, which could affect property values and the tourism industry in the county;

- Reduced Water Supply: The 2009 Scenarios Project estimates a decrease in precipitation of 12 to 35% by 2050. In addition, more precipitation will fall as rain rather than snow, which will cause snow to melt earlier in the year and not in the warmer, drier months when water is in higher demand;

- Agriculture: Climate change could cause a shift in the type and location of agriculture in the area. As saltwater intrudes into coastal aquifers and groundwater resources decrease, it is possible that some crops will be forced out of the area, which affects the local economy and food supply. Water supplies to agriculture may be 20 to 23% below demand targets between 2020 and 2050;

- Public Health: Climate change could potentially threaten the health of residents of Atascadero. Heat waves may have a major impact on public health, as will decreasing

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[5] California Natural Resources Agency. 2009 California Climate Adaptation Strategy Discussion Draft. August 2009.

[6] California Climate Change Center. Our Changing Climate: Assessing the Risks to California (2006), www.climatechange.ca.gov

[7] Governor's Office of Planning and Research. Proposed CEQA Guideline Amendments for Greenhouse Gas Emissions. April 2009.

air quality and an increase in mosquito breeding and mosquito-borne diseases. There is also expected to be an increase in allergenic plant pollen and an increase in the frequency of wildfires.

Although climate change is a global issue, local governments can make a positive impact through cumulative local action. Cities and counties have the ability to reduce GHG emissions through effective land use and transportation planning, wise waste management, and the efficient use of energy. The City can achieve multiple benefits including lower energy bills, improved air quality, economic development, reduced emissions, and better quality of life through:

- Energy efficiency in City facilities and vehicle fleet;
- Sustainable purchasing and waste reduction efforts;
- Land use and transportation planning; and
- Efficient management of water resources.

This Inventory serves as a baseline measurement for implementing and tracking the effectiveness of these efforts.

1.2 LEGISLATIVE BACKGROUND

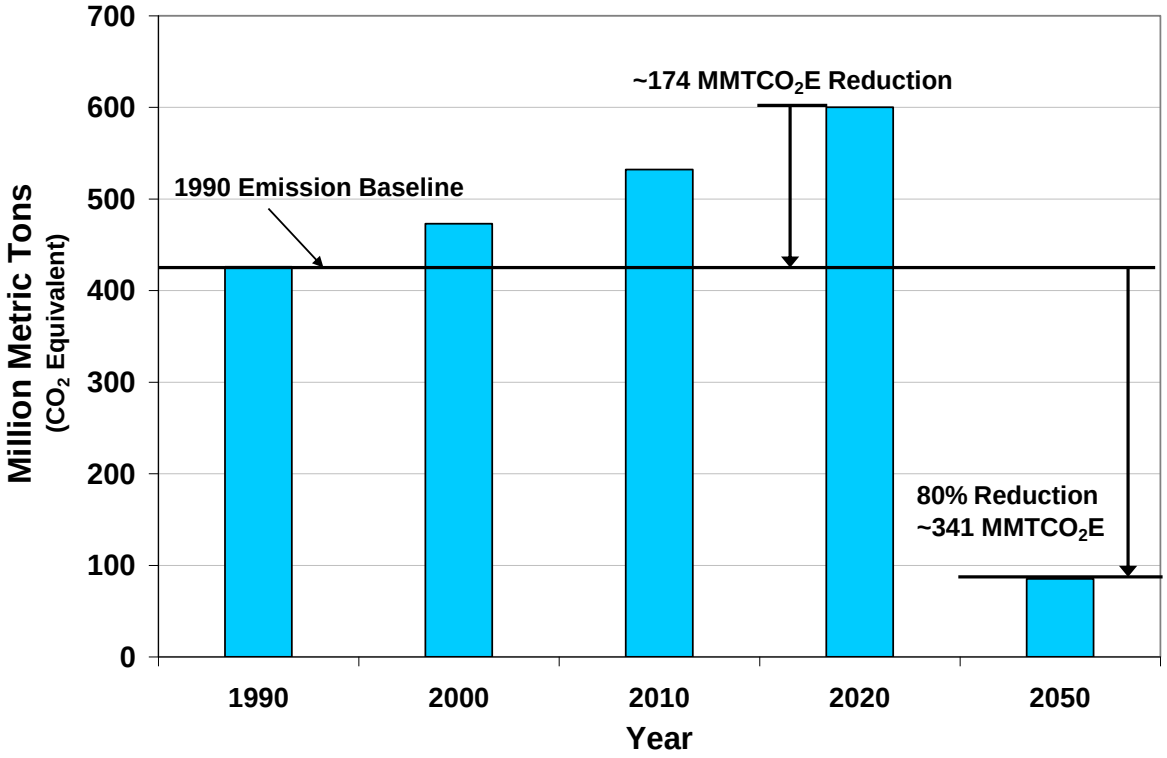
California continues to be a leader in addressing climate change in the United States and in the world. In June of 2005, Governor Schwarzenegger issued a landmark Executive Order establishing progressive GHG emissions targets for the entire state. Executive Order (EO) S-3-05 makes the following goals:

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

To support these reduction targets, the California legislature adopted Assembly Bill (AB) 32 (the California Global Warming Solutions Act of 2006). The law requires the California Air Resources Board to develop regulatory and market mechanisms that will reduce GHG emissions to 1990 levels by 2020 as shown in **Figure 1-2** below. To achieve this goal, the California Air Resources Board developed a set of early action measures in 2007 for priority implementation in 2010. These early action measures became part of the AB 32 implementation plan, or Scoping Plan,

approved in December 2008. The Scoping Plan identifies a variety of GHG reduction activities including direct regulations, monetary and non-monetary incentives, voluntary actions, market-based mechanisms such as a cap-and-trade, and an implementation fee regulation to fund the program. The Scoping Plan also identifies local governments as "essential partners" and calls for cities and counties to adopt GHG reduction targets consistent with AB 32.

FIGURE 1-2: CALIFORNIA CLIMATE CHANGE EMISSIONS AND TARGETS



In support of the AB 32 reduction targets, California adopted Senate Bill (SB) 97 in August 2007, which formally acknowledges that climate change is an important environmental issue that requires analysis under the California Environmental Quality Act (CEQA). In response to SB 97, the Governor's Office of Planning and Research submitted their proposed amendments to the CEQA Guidelines for GHG emissions in April 2009. The amendments provide guidance to public agencies regarding the analysis of mitigation and the effects of GHG emissions in CEQA

documents. The Natural Resources Agency certified and adopted the amendments in December 2009.[8]

At the same time, the State is working to form regional approaches to reducing GHG emissions in response to the passage of SB 375. SB 375 aims to reduce GHG emissions by linking transportation funding to land use planning. It also requires Metropolitan Planning Organizations, including the San Luis Obispo Council of Governments, to include a Sustainable Communities Strategy (SCS) in their Regional Transportation Plans (RTPs) for reducing VMT. The bill also creates incentives for implementation of SCSs and sustainable transportation plans.

Additional efforts are underway for the overall transportation sector by mandating fewer emissions from vehicles, including Assembly Bill 1493, signed into law in 2002, which will require carmakers to reduce emissions from new passenger cars and light trucks beginning in 2009. The U.S. Environmental Protection Agency (EPA) approved the new emissions standards in June 2009.

The State is also preparing for climate change resiliency in order to adapt to the inevitable effects of climate change. In November 2008, Governor Schwarzenegger signed Executive Order S-13-08 which asked the Natural Resources Agency to identify how state agencies can respond to rising temperature, changing precipitation patterns, sea level rise, and extreme natural events. The order requires the Natural Resources Agency to develop a Climate Adaptation Strategy to analyze climate change impacts to the state and recommend strategies to manage those threats. The Natural Resources Agency released the Climate Adaptation Strategy in 2009.

1.3 PLANNING PROCESS

The California Air Resources Board (ARB) provides a framework for local communities to identify and reduce GHG emissions, organized along six steps as represented in **Figure 1-3** below. [9]

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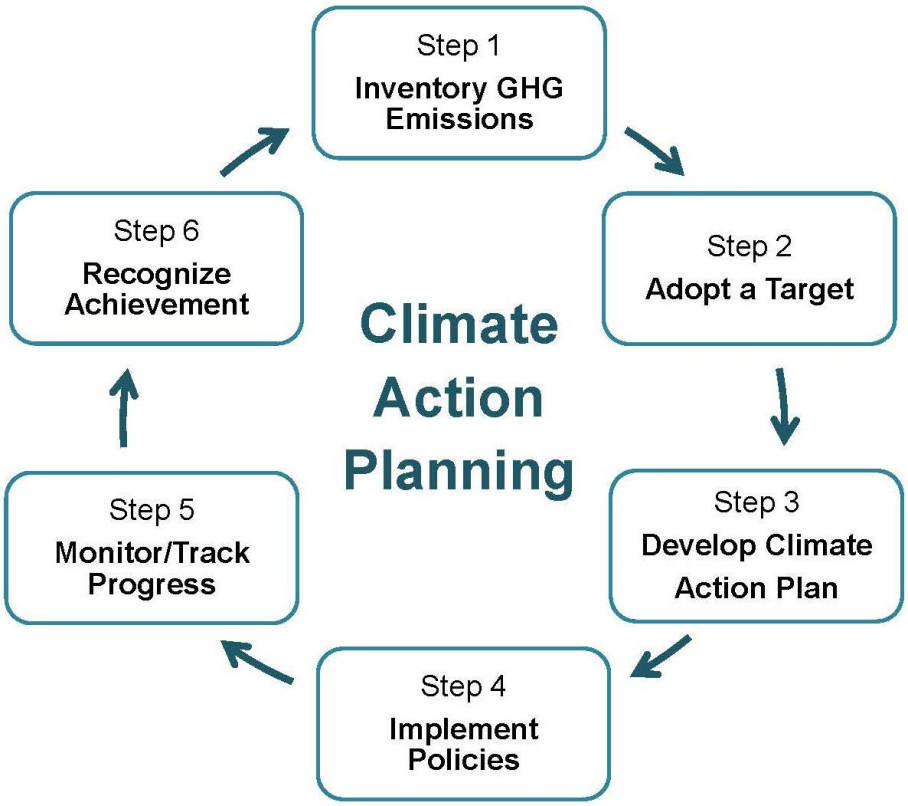
[8] Governor's Office of Planning and Research. Proposed CEQA Guideline Amendments for Greenhouse Gas Emissions. April 2009.

[9] California Air Resources Board. Local Government Toolkit, http://www.coolcalifornia.org/local-government

FIGURE 1-3: PLANNING PROCESS



This report represents the completion of the first step, and provides a foundation for future work to reduce GHG emissions in the City of Atascadero.

1.4 LOCAL CLIMATE CHANGE MITIGATION ACTIVITIES

Many of the air pollution programs already in place throughout San Luis Obispo County reduce ozone forming pollutants and toxic emissions, but they also have ancillary benefits and reduce GHG emissions. The County, cities, and the Air Pollution Control District (APCD) implement rules and regulations, clean fuels programs, CEQA mitigation measures, grants, the Transportation Choices Program, pollution prevention activities, energy efficiency and conservation measures, water conservation programs, partnerships, and general public outreach that directly or indirectly address climate change and reduce GHG emissions.

The APCD Board approved the first report or plan to address climate change in the county. The plan, (Options for Addressing Climate Change in San Luis Obispo County (2005)) identifies the following seven actions that could be implemented to specifically address GHGs at the local level:

1) Prepare a countywide inventory of GHG emissions;

2) Target a percentage of mitigation grant funds for GHG emission reductions;

3) Evaluate and quantify the GHG reduction benefits from existing district programs;

4) Develop public education and outreach campaigns on climate change;

5) Encourage and provide support for local governments to join the Cities for Climate Protection program;

6) Develop partnership with Cal Poly for addressing climate change; and

7) Join the California Climate Registry and encourage local industry participation.

As of November 2008, the APCD has initiated, promoted, or supported all of the implementation actions to address climate change and reduction of GHG emissions in the county. The APCD joined the California Climate Registry and conducted its GHG emissions inventory in the fall of 2008. The APCD facilitates regular meetings of Climate Change Stakeholders, a local group of city and county representatives that shares resources to address climate change. To encourage and support local GHG emissions inventories, the APCD is providing technical assistance to all of the incorporated cities to assist or perform GHG government operations and community-wide emissions inventories, similar to this Inventory, for all of the incorporated cities in San Luis Obispo County.

The APCD also coordinates the Central Coast Clean Cities Coalition (C5). C5 is a partnership of public/private entities whose goal is to promote the use of alternative fuels vehicles (AFV) on the Central Coast. By working with area fleet operators, C5 sponsors training seminars, public events, and grant funding workshops related to use of alternative fuels.

The City of Atascadero has been pursuing energy efficiencies through measures such as:

- Construction of new and improvement of existing bike lanes and sidewalks through the Safe Routes to School Program to encourage walking and biking to schools (ongoing);

- The construction of bicycle lanes, sidewalks, and multi-use trails throughout the City

- Adoption of Native Tree Ordinance (1998);
- Native tree reforestation projects at various sites throughout the City;
- Partnership with SLO Green Build to promote energy efficiency in new development;
- Joined PG&E's Climate Smart Program to purchase carbon credits to offset emissions from City Hall;
- Replacement of high pressure sodium light bulbs with energy efficient light emitting diodes (LED) bulbs in street and traffic lights;
- Development of a solar financing district through AB 811 to encourage the installation of solar panels and reduce dependence on traditional energy sources (ongoing); and
- Development of a Water Conservation Landscape Ordinance (2009).

1.5 INVENTORY UPDATE

In 2010, PMC prepared an inventory of Atascadero's 2005 community-wide and City government emissions. Changes to GHG accounting protocols have prompted an update to the emissions inventory and in 2012 Rincon Consultants conducted a peer-review and update to the Inventory. This Inventory is the updated assessment of GHG emissions in Atascadero.

Rincon updated the Inventory methodology, emissions coefficients, and data for consistency with current protocols, including the Local Government Operations Protocol (LGOP) version 1.1 (May 2010), for the city government inventory, and the Association of Environmental Professionals (AEP) California Community-wide GHG Baseline Inventory Protocol (AEP Protocol) (June 2011) and ICLEI International Local Government GHG Emissions Analysis Protocol (IEAP) (October 2009), for the community-wide inventory. Rincon also updated the Inventory to include all emissions sectors within the discretionary action authority of the City. The primary additions and revisions to the updated Inventory include the following:

- Calculation of emissions from additional off-road vehicle and equipment categories (lawn and garden equipment, construction equipment, industrial equipment, and light commercial equipment) for the community-wide inventory.
- Incorporation of improved emissions factors from the LGOP version 1.1.
- Incorporation of a refined methodology for on-road transportation emissions. The 2012 methodology estimates VMT based on an origin-destination approach using the regional

travel demand model and excludes vehicle trips that pass through the city. Transportation-related GHG emissions were then calculated using the California Air Resources Board Emissions Factor 2011 (EMFAC2011) software.

- Corrections to baseline electricity and natural gas consumption data, and waste stream profile data.
- Inclusion of updated population and employment projections using the San Luis Obispo Council of Governments' (SLOCOG) 2040 Population, Housing & Employment Forecast (August 2011).

As a result of the Inventory update, Atascadero's community-wide 2005 baseline emissions decreased by 34,806 metric tons CO2e and 2020 forecast decreased by 55,159 metric tons CO2e compared to the April 2010 inventory. This decrease was a result of the refined methodology for calculating on-road VMT and transportation emissions.

2. Community and Government Operations Inventory Methodology

The first step toward reducing GHG emissions is to identify baseline levels and sources of emissions in the city. This information can later inform the selection of a reduction target and possible reduction measures to be included in a climate action plan.

This section outlines the methodology used to calculate the community and City government operations[10] inventories, including the difference between the two inventories, and the data collection process, data sources, GHG emission scopes, data limitations, and means of calculation.

2.1 BASELINE AND FORECAST YEARS

The year 2005 was selected as the baseline year for the Inventory due to the availability of reliable data and consistency with other cities in San Luis Obispo County. The State of California uses 1990 as a reference year to remain consistent with the Kyoto Protocol, and also because it has well-kept records of transportation trends and energy consumption in that year. However, cities and counties throughout California typically elect to use 2005 or 2006 as a

[10] In this report, the term "city" refers to the incorporated area (the jurisdictional boundary of the City of Atascadero), whereas "City" refers to those activities that are under the operational control of City agencies. "Community-wide" or "community" refers to all activities within the city (as defined above), including those from businesses, industrial processes, residents, vehicles, and City government operations.

baseline year because of the more reliable recordkeeping from those years and because of the large amount of growth that has occurred since 1990.

This Inventory uses a forecast year of 2020 to be consistent with the State of California GHG Inventory[11] forecast year and AB 32 target, both of which reference 2020. In addition, it is likely that any forecast considerably beyond 2020 would have a significant margin of error because of unknown population growth rates and new technology.

2.2 THE TWO INVENTORIES: COMMUNITY-WIDE AND CITY GOVERNMENT OPERATIONS

This Inventory is separated into two sections, community-wide and City government operations. It is important to note that the City government operations inventory is a subset of the community inventory, meaning that all City government operations are included in the commercial/industrial, transportation, waste, or "other" categories of the community-wide inventory. The City's government operations inventory should not be added to the community analysis; rather it should be looked at as a slice of the complete picture as illustrated in **Figure 2-1**. Although City operations are a small contributor to the community's overall emissions levels, an inventory allows the City to track its individual facilities and vehicles and to evaluate the effectiveness of its emissions reduction efforts at a more detailed level.

[11] California Greenhouse Gas Inventory, http://www.arb.ca.gov/cc/inventory/inventory.htm

FIGURE 2-1: THE RELATIONSHIP BETWEEN COMMUNITY-WIDE AND CITY GOVERNMENT INVENTORIES

Once completed, these inventories provide the basis for policy development, the quantification of emissions reductions associated with proposed measures, the creation of an emissions forecast, and the establishment of an informed emissions reduction target.

2.3 DATA COLLECTION AND METHODOLOGY

Creating the community and City government operations emissions inventories required the collection of information from a variety of sources. Sources for community data included the Pacific Gas and Electric Company (PG&E), the Southern California Gas Company, Caltrans, the California Air Resources Board, Cal-Recycle, and the County of San Luis Obispo. City government operations data sources included PG&E, the Southern California Gas Company, Atascadero Waste Alternatives, and documentation from multiple City departments including Planning, Public Works, Finance, Police, Fire, and more. Data from the year 2005 were used in both inventories, with the following exceptions:

- A subset of waste data by type was not available for 2005, therefore this study utilizes a California statewide waste characterization study conducted in 2003-2004;
- City employee commuting trips were calculated using an employee survey conducted in 2009; and

- Propane, wind and solar power used in both the community-wide and City government inventories.

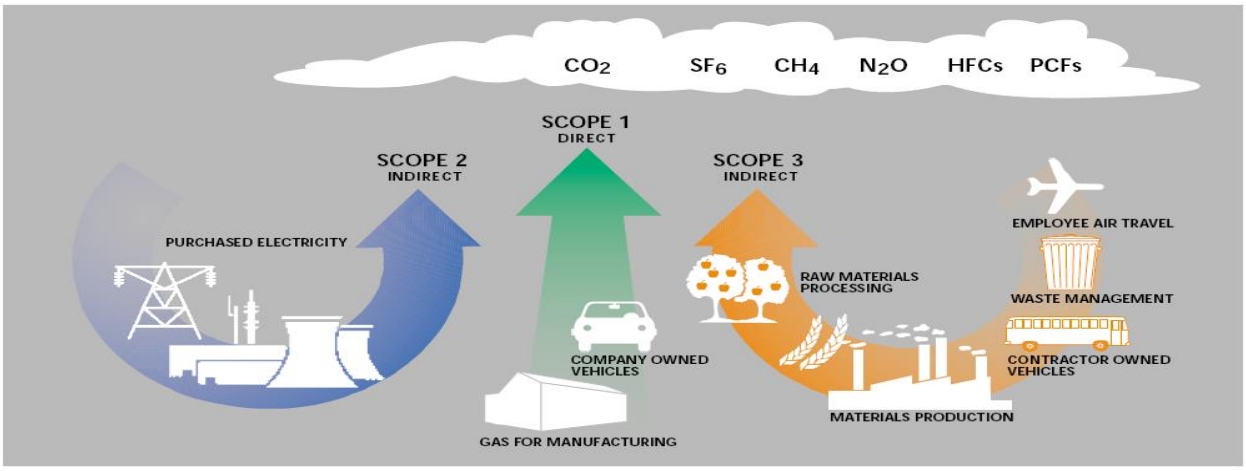
For community activities and City operations, emissions sources are categorized by scope. Scopes help us identify where emissions originate from and what entity retains regulatory control and the ability to implement efficiency measures. The scopes are illustrated in **Figure 2-2** and defined as follows:

- **Scope 1.** Direct emissions sources located within the community, mostly from the combustion of fuels. Examples of Scope 1 sources include use of fuels such as gasoline and natural gas.

- **Scope 2.** Indirect emissions that result because of activities within the community, limited to electricity, district heating, steam and cooling consumption. An example of a Scope 2 source is purchased electricity used within the community. These emissions should be included in the community-wide analysis, as they are the result of the community's electricity consumption.

- **Scope 3.** All other indirect emissions that occur as a result of activity within the community. Examples of Scope 3 emissions include methane emissions from solid waste generated within the community which decomposes at landfills either inside or outside of the community.

FIGURE 2-2: GHG EMISSIONS SCOPES



Source: NZBCSD (2002), The Challenge of GHG Emissions: the "why" and "how" of accounting and reporting for GHG emissions: An Industry Guide, New Zealand Business Council for Sustainable Development, Auckland.

Appendices A and **B** of this report separate the community and City government operations emissions by scope. Each sector is labeled with a 1, 2, or 3 that corresponds to the scopes above.

2.4 DATA SOURCES

The data used to complete this Inventory came from multiple sources, as summarized in **Tables 2-1** and **2-2**. Utility providers supplied electricity and natural gas consumption data associated with commercial, industrial, residential, and City government buildings in 2005. Vehicle miles traveled (VMT) was provided by Fehr and Peers and calculated using SLOCOG's Regional Travel Demand model. These data sources are further explained in the sector-specific discussions of this document.

TABLE 2-1: DATA SOURCES FOR COMMUNITY ANALYSIS, 2005

Sector	Information	Unit of Measurement	Data Source
Residential	Electricity consumption	kWh	PG&E
	Natural gas consumption	Therms	Southern California Gas Company
Commercial/Industrial	Electricity consumption	kWh	PG&E
	Natural gas consumption	Therms	Southern California Gas Company
Transportation	VMT excluding pass through trips	Average Weekday Daily VMT	Fehr & Peers
Off-Road Vehicles and Equipment	Emissions from off-road equipment	Tons/year of N_2O, CO_2, and CH_4	California Air Resources Board OFFROAD2007 model
Solid Waste	Solid waste tonnage sent to landfill from activities in City of Atascadero	Short tons	San Luis Obispo Integrated Waste Management Board
Wastewater Treatment	Methane and nitrous oxide released in the wastewater treatment process	Tonnes	Public Works Department Data Records

TABLE 2-2: DATA SOURCES FOR CITY GOVERNMENT ANALYSIS, 2005

Sector	Information	Unit of Measurement	Data Source
Buildings & Facilities	Electricity consumption	kWh	PG&E
	Natural gas consumption	Therms	Southern California Gas Company
Vehicle Fleet	Diesel consumption and corresponding vehicle type	Gallons	Billing Records
	Gasoline consumption and corresponding vehicle type	Gallons	Billing Records
Employee Commute	Sample of employee commuting patterns	Annual VMT	Commuter Survey (June 2009)
Streetlights	Electricity consumption	kWh	PG&E
Water/Sewage	Electricity consumption	kWh	PG&E
	Methane and nitrous oxide released in the wastewater treatment process	Tonnes	Public Works Department Data Records
Waste	Annual waste tonnage sent to landfill	Short Tons	Atascadero Waste Alternatives

2.5 DATA LIMITATIONS

It is important to note that calculating community-wide GHG emissions with precision is a complicated task. The ICLEI Clean Air and Climate Protection (CACP2009) software relies on numerous assumptions and is limited by the quantity and quality of available data. Because of these limitations it is useful to think of any specific number generated by the model as an approximation of reality, rather than an exact value. The city's actual 2005 GHG emissions are likely to be *slightly* greater than what are reported in this document due to three main factors: (1) data limitations, (2) privacy laws, and (3) a lack of a reasonable methodology to collect or model emissions data. The following paragraphs highlight emissions that cannot be included in a GHG Inventory under current science and policy direction, or due to lack of reliable data.

Data Limitations

Lack of available data prevented the calculation of emissions from community-wide freight and passenger trains, off-road vehicles and equipment, propane use, and City government operations refrigerants. For rail and port, as well as equipment emissions, the California Air Resources Board OFFROAD 2007 software provides emissions data; however, these numbers are aggregated for the entire San Luis Obispo County area, including incorporated, unincorporated, and state or federally owned land.

Lack of data availability also prevents the calculation of emissions from propane (liquefied petroleum gas, or LPG) created within the city's boundaries. Propane is basically an unregulated fuel in California (except for storage and safety issues which are regulated). Because it is an unregulated commodity, no data is collected by the state on propane sales or usage. Another sector that was excluded from the inventory is City government operations refrigerants.

The City of Atascadero made a best effort to gather data on the amount of refrigerants consumed by fleet vehicles, HVAC systems, and City government operations facilities; however City records were not suited to this purpose. It is recommended that the City look into amending its record keeping so that the amount of refrigerants purchased and consumed within a year is recorded.

Privacy Laws

This Inventory does not separately analyze site-level emissions from specific sources such as refineries or large industrial emitters. The emissions from industrial energy consumption and related transportation are included under the commercial/industrial category, but will not be analyzed independently as part of this Inventory for two reasons:

1) State privacy laws prevent us from obtaining site-level energy consumption data from utility providers. Notably the California Public Utilities Commission 15/15 rule[12] prevents us from analyzing industrial emissions separately from commercial emissions.

2) It is the responsibility of the emitter, whether it is a large refinery or household, to perform its own energy audit and subsequent reduction process. Efforts to require site-level energy audits and GHG emissions reporting are being continually expanded and

[12] Commercial and Industrial Electricity and Natural Gas were combined into one section due to the California 15/15 rule. The 15/15 rule was adopted by the California Public Utilities Commission in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality.

required by the California Climate Action Registry, U.S. Environmental Protection Agency, and California Air Resources Board.

Lack of a Reasonable Methodology

There is a lack of reasonable methodology for estimating life cycle emissions for the community and, therefore, emissions associated with the production and disposal of items consumed by a community are not included in the Inventory. For instance, a life cycle assessment would estimate the emissions associated with the planning, production, delivery, and disposal of each car currently in the city. In contrast, this analysis only captures how much that car drives within the city.

Despite these limitations, the CACP2009 software[13] and ICLEI methodology provide the best-available snapshot of the city's GHG emissions. Additionally, the CACP2009 tool is utilized to promote consistency among municipalities throughout the country and the world. Sector-specific data limitations or methodological issues are explained thoroughly in **Appendices C** and **D.**

However, it is important to note that the emissions identified in this report are primarily GHGs that the community has directly caused and has the ability to reduce through implementation of conservation actions, a Climate Action Plan, or corresponding efforts.

2.6 CLEAN AIR AND CLIMATE PROTECTION SOFTWARE 2009

The City government operations and community-wide inventories use the CACP2009 software package developed by ICLEI in partnership with the National Association of Clean Air Agencies (NACAA) and Torrie Smith Associates. This software calculates emissions resulting from energy consumption, vehicle miles traveled, and waste generation. The CACP2009 software calculates emissions using specific factors (or coefficients) according to the type of fuel used.

CACP2009 aggregates and reports the three main GHG emissions (CO_2, CH_4, and N_2O) and converts them to equivalent carbon dioxide units, or CO_2e. Equalizing the three main GHG emissions as CO_2e allows for the consideration of different GHGs in comparable terms. For example, methane (CH_4) is 21 times more powerful than carbon dioxide on a per weight basis in

[13] The CACP2009 software 2009 was developed by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (SAPPA/ALAPCO), the International Council for Local Environmental Issues (ICLEI), and Torrie Smith Associates.

its capacity to trap heat, so the CACP2009 software converts one metric ton of methane emissions to 21 metric tons of carbon dioxide equivalents.[14]

The emissions coefficients and quantification method employed by the CACP2009 software are consistent with national and international inventory standards established by the Intergovernmental Panel on Climate Change (1996 Revised IPCC Guidelines for the Preparation of National Inventories) and the U.S. Voluntary GHG Reporting Guidelines (EIA form1605).

[14] The potency of a given gas in heating the atmosphere is defined as its Global Warming Potential, or GWP. For more information on GWP see: IPCC Fourth Assessment Report, Working Group I, Chapter 2, Section 2.10.

3. Community GHG Inventory Results

The City of Atascadero contains primarily residential and commercial land uses. In the 2005 baseline year, there were approximately 25,940 people, 8,550 jobs, and 10,505 households in the city.[15] The following section provides an overview of the emissions caused by activities within the jurisdictional boundary of the city and analyzes the emissions in terms of scope, sector, source, and population.

3.1 COMMUNITY-WIDE EMISSIONS BY SCOPE

Although there are countless items that can be included in a community-wide emissions inventory, as discussed in Chapter 2, this Inventory includes Scope 1, Scope 2, and Scope 3 sources from the following sectors, consistent with the ICLEI protocol:

- Residential
- Commercial / Industrial
- Transportation
- Waste
- Wastewater
- Off-Road Vehicles and Equipment Emissions.

Table 3-1 summarizes the scopes of each sector in this analysis.

What are Scopes?

The key principles to remember are that Scope 1 emissions are caused by activities within the city and emitted within the city (fuel combustion), while Scope 2 emissions are caused by activities within the city, but most likely are emitted outside of the city (electricity). Scope 3 emissions are indirect emissions, such as waste decomposition.

[15] Baseline population, household, and job data for the year 2005 was obtained from SLOCOG's Long Range Socio-Economic Projections (Year 2030), prepared by Economics Research Associates (July 2006 Revision).

TABLE 3-1: COMMUNITY-WIDE GHG EMISSIONS SOURCES BY SCOPE AND SECTOR

Sector	Scope 1	Scope 2	Scope 3
Residential	Natural Gas	Electricity	---
Commercial/Industrial	Natural Gas	Electricity	---
Transportation	Gasoline & Diesel	---	---
Off-Road Vehicles and Equipment	Gasoline, Diesel & Compressed Natural Gas		
Waste	---	---	Methane from Decomposition
Wastewater	Methane from Water Treatment Processes		

Including all sectors and scopes, the community emitted approximately 141,428 metric tons of CO_2e in 2005. As shown in **Figure 3-1** and **Table 3-2,** the majority of community GHG emissions were Scope 1 (73.0%), with Scope 2 (20.6%) and Scope 3 (6.4%) constituting the remainder.

The largest portion of Scope 1 emissions came from the transportation sector (refer to **Table 3-2** and **Figure 3-1**). These emissions qualify as Scope 1 because they involve the direct combustion of fuel within the jurisdictional boundary of the city. The second largest source of Scope 1 emissions was residential natural gas use. Residential uses also generated the largest percentage of Scope 2 emissions. Emissions from waste operations account for the whole of Scope 3 emissions.

FIGURE 3-1: COMMUNITY GHG EMISSIONS BY SCOPE, 2005

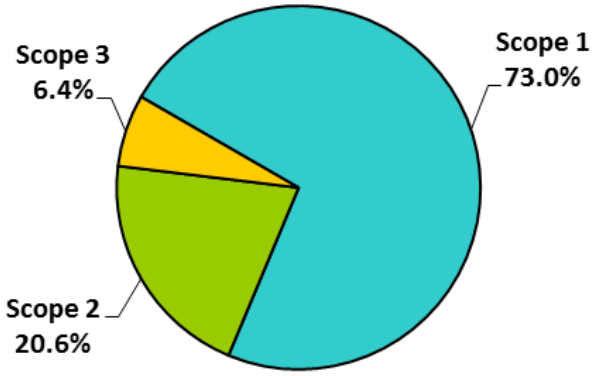


TABLE 3-2: COMMUNITY GHG EMISSIONS BY SECTOR AND SCOPE, 2005 (METRIC TONS OF CO_2E)

Sector	Scope 1	Scope 2	Scope 3	Total
Residential	24,778	15,912	---	40,690
Commercial/Industrial	7,030	13,241	---	20,271
Transportation	60,041	---	---	60,041
Off-Road	8,686	---	---	8,686
Waste	---	---	9,083	9,083
Wastewater	2,657	---		2,657
TOTAL	103,192	29,153	9,083	141,428
Percentage of Total CO_2e	73.0%	20.6%	6.4%	100.0%

3.2 ALL SCOPE EMISSIONS BY SECTOR

As noted above, the community emitted approximately 141,428 metric tons of CO_2e in calendar year 2005. In addition to analyzing the data by scope, it can also be aggregated by sector. As depicted in **Figure 3-2** and **Table 3-3** below, the transportation sector was the largest emitter (42.5%) in 2005. Emissions from the residential sector were the next largest contributor (28.8%), while the commercial and industrial sectors accounted for a combined 14.3% of the total. Emissions from solid waste comprised 6.4% of the total, emissions from off-road vehicles and equipment comprised 6.1% of the total and emissions from wastewater facilities comprised 1.9% of the total.

FIGURE 3-2: COMMUNITY GHG EMISSIONS BY SECTOR, 2005

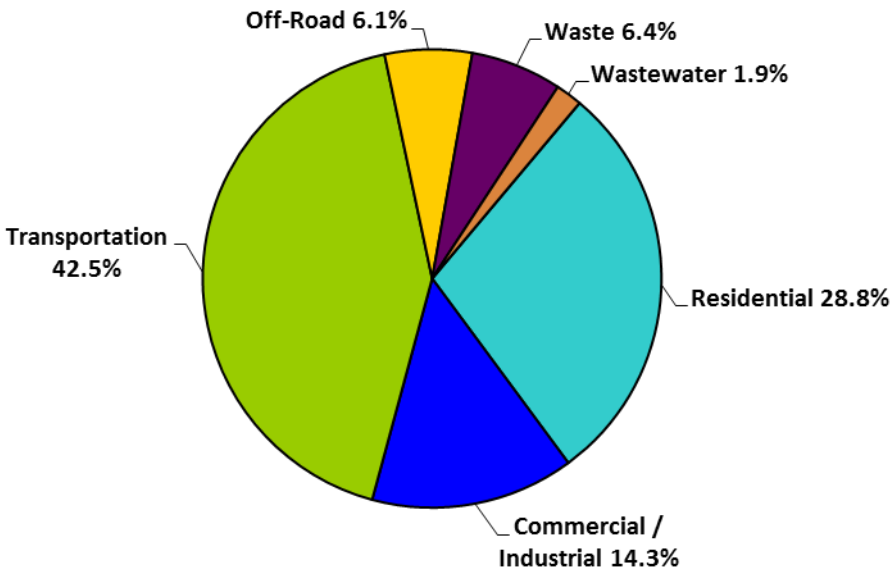


TABLE 3-3: COMMUNITY GHG EMISSIONS BY SECTOR, 2005

2005 Community Emissions by Sector	Residential	Commercial/ Industrial	Transportation	Off-Road	Waste	Waste water	TOTAL
CO_2e (metric tons)	40,690	20,271	60,041	8,686	9,083	2,657	141,428
Percentage of Total CO_2e	28.8%	14.3%	42.5%	6.1%	6.4%	1.9%	100.0%

3.3 TRANSPORTATION

Transportation accounted for 42.5% of the City's emissions in 2005. Emissions from traffic resulted in 60,041 metric tons of CO_2e. Of the total emissions in the transportation sector, an estimated 93.2% was due to gasoline consumption, with the remaining 6.8% coming from diesel use (see **Figure 3-3** and **Table 3-4**).

FIGURE 3-3: COMMUNITY GHG EMISSIONS BY FUEL SOURCE

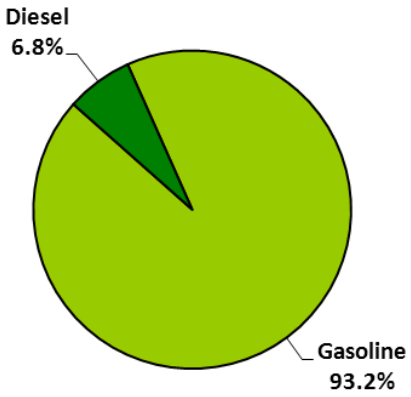


TABLE 3-4: TRANSPORTATION GHG EMISSIONS BY FUEL SOURCE

Transportation Fuel Emissions Sources 2005	Gasoline	Diesel	TOTAL
CO_2e (metric tons)	55,970	4,071	60,041
Percentage of Total CO_2e	93.2%	6.8%	100%

Using origin-destination analysis and the SLOCOG Regional Travel Demand Model, three types of vehicle trips were tracked in the city:

1. Internal-Internal: Vehicle trips that remained inside the city
2. Internal-External and External-Internal: Vehicle trips that have an ending or a beginning in the city
3. External-External: Vehicle trips that pass through the city without originating or ending in the city

Fehr & Peers calculated VMT for each of the three types of vehicle trips using the recommendation of the Regional Target Advisory Committee (RTAC), the body responsible for Senate Bill 375 target setting. VMT from trips of type 1, 2, and 3 (see above) were counted

100%, 50%, and 0% respectively toward jurisdiction-generated VMT.[16] The VMT results are summarized in **Appendix A and C.** Annual VMT was then analyzed to determine GHG emissions from vehicle travel using the EMFAC2011 software developed by the California Air Resources Board. EMFAC2011 uses emissions rates for different types of vehicles in conjunction with travel activity statistics to calculate vehicle based emissions in metric tons per day. For a detailed description of the methodology used to estimate transportation-related emissions, please see **Appendix C**.

Emissions that resulted from the air and rail travel of city residents were not included in the transportation sector analysis. As science and data collection methodology develop it is likely that the GHG emissions from air, rail and boat travel could be estimated as a Scope 3 items. Please see **Appendix C** for more detail on methods and emissions factors used in calculating emissions from the transportation sector.

3.4 OFF-ROAD VEHICLES AND EQUIPMENT

Gasoline, diesel, and compressed natural gas fuel are used to power off-road equipment in the City of Atascadero. Off-road equipment incorporated in this inventory includes agriculture, lawn and garden, construction and mining, light commercial equipment, and industrial equipment. Off-road vehicles and equipment accounted for 6.1% of the City's emissions in 2005. The California Air Resources Board's OFFROAD 2007 software provides emissions data for off-road equipment by county. The countywide data was attributed to city based on the indicators presented in **Table 3-5.**

TABLE 3-5: COUNTY-WIDE EQUIPMENT TYPE INDICATORS

Equipment Type	Allocation Indicator
Agricultural Equipment	Acres of cropland
Construction and Mining Equipment	Construction and mining jobs
Industrial Equipment	Industrial jobs
Lawn and Garden Equipment	Households
Light Commercial Equipment	Service and commercial jobs

[16] Since external-external VMT is the result of vehicle trips that pass through the city without originating or ending in the city, they are excluded from the inventory as the City is unable to directly impact these VMT.

Approximately 80.0% of off-road equipment emissions in 2005 came from construction and mining equipment, while 8.7% were the result of light and commercial equipment. The remaining off-road equipment activities included in this Inventory include lawn and garden equipment, agricultural equipment, and industrial equipment, making up the remaining 11.3% of emissions collectively (see **Table 3-6** and **Figure 3-4**). Total emissions from off-road equipment for 2005 are estimated to be approximately 8,686 MT CO2e. Of the total emissions in the off-road sector, an estimated 84.1% was due to diesel consumption, with the remaining 15.9% coming from gasoline and compressed natural gas use (see **Table 3-7** and **Figure 3-5**).

FIGURE 3-4: OFF-ROAD GHG EMISSIONS BY EQUIPMENT TYPE

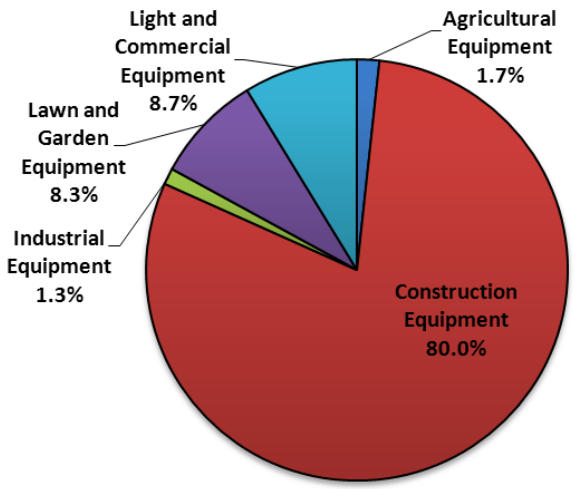


FIGURE 3-5: OFF-ROAD GHG EMISSIONS BY FUEL TYPE

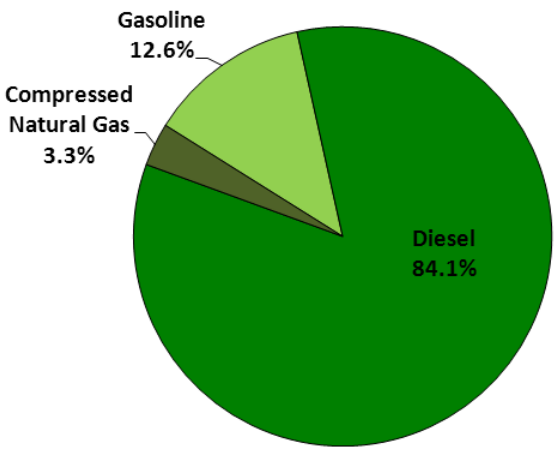


TABLE 3-6: OFF-ROAD GHG EMISSIONS BY EQUIPMENT TYPE

Equipment Type Emissions Sources 2005	Agricultural Equipment	Construction Equipment	Industrial Equipment	Lawn and Garden Equipment	Light and Commercial Equipment	TOTAL
CO_2e (metric tons)	148	6,950	108	722	758	8,686
Percentage of Total CO_2e	1.7%	80.0%	1.3%	8.3%	8.7%	100%

TABLE 3-7: OFF-ROAD GHG EMISSIONS BY FUEL TYPE

Off-Road Fuel Emissions Sources 2005	Gasoline	Diesel	Compressed Natural Gas	TOTAL
CO_2e (metric tons)	1,095	7,303	288	8,686
Percentage of Total CO_2e	12.6%	84.1%	3.3%	100%

3.5 THE BUILT ENVIRONMENT (RESIDENTIAL, COMMERCIAL, INDUSTRIAL)

With all scopes aggregated, 43.1% of total community-wide emissions in the year 2005 came from the "built environment." The built environment is comprised of the residential, commercial, and industrial natural gas and electricity consumption. This analysis does not include emissions from other types of energy such as propane, solar, and wind due to lack of reliable sales, construction, or consumption data. The commercial and industrial sectors are combined in this Inventory due to the mandatory aggregating of commercial and industrial data by PG&E previously referenced.

In 2005, emissions from the built environment were split roughly 66.7-33.3% between the residential sector and the commercial/industrial sector (see **Figure 3-6**). All of the emissions calculated from the built environment were the result of local natural gas consumption (Scope 1) and local consumption of electricity generated outside of the city (Scope 2). Overall, natural gas consumption (52.2%) was slightly higher than electricity consumption (47.8%) as the cause of emissions from the built environment in 2005 as shown in **Figure 3-7**.

FIGURE 3-6: BUILT ENVIRONMENT GHG EMISSIONS BY SECTOR

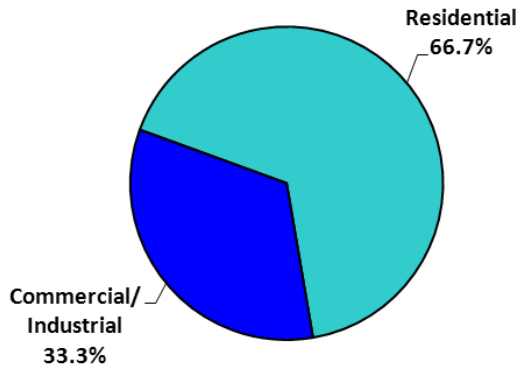
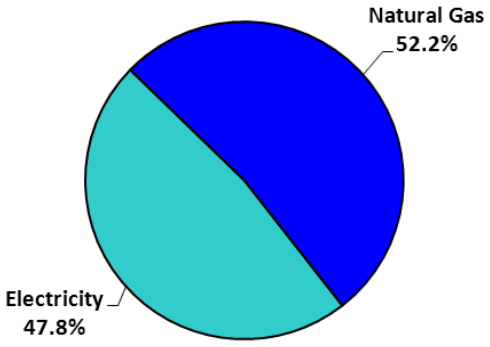


FIGURE 3-7: BUILT ENVIRONMENT GHG EMISSIONS BY SOURCE



Approximately 60.9% of emissions in the residential sector resulted from combustion of natural gas for heating and cooking (see **Figure 3-8** and **Table 3-8**), while 34.7% of emissions in the commercial/industrial sector came from natural gas usage (see **Figure 3-9** and **Table 3-9**).

FIGURE 3-8: RESIDENTIAL GHG EMISSIONS BY SOURCE

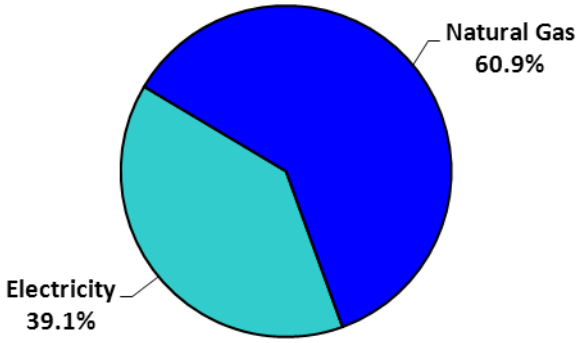


FIGURE 3-9: COMMERICAL/INDUSTRIAL GHG EMISSIONS BY SOURCE

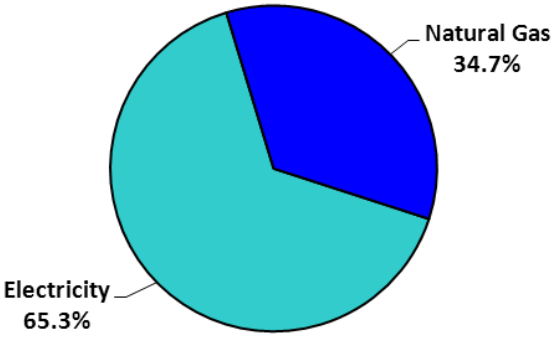


TABLE 3-8: RESIDENTIAL GHG EMISSIONS BY SOURCE

Residential Emission Sources 2005	Electricity	Natural Gas	TOTAL
CO2e (metric tons)	15,912	24,778	40,690
Percentage of Total CO2e	39.1%	60.9%	100%
Energy Use (MMBtu)	242,839	465,783	708,622

TABLE 3-9: COMMERCIAL/INDUSTRIAL GHG EMISSIONS SOURCES

Commercial / Industrial Emission Sources 2005	Electricity	Natural Gas	TOTAL
CO2e (metric tons)	13,241	7,030	20,271
Percentage of Total CO2e	65.3%	34.7%	100%
Energy Use (MMBtu)	202,065	132,159	334,224

3.6 SOLID WASTE

Solid waste disposed of at managed landfills was responsible for 6.4% of total emissions for the community. The CACP2009 software calculates methane generation from waste sent to landfill in 2005, and accounts for the reported methane recovery factors among the two utilized landfills (Cold Canyon and Chicago Grade), which have a 60% weighted average. The Chicago Grade Landfill accepted approximately 99% of the community's solid waste, while less than 1% went to Cold Canyon. The methane recovery factors of the landfills are well documented by the San Luis Obispo County APCD based on the system operations at that time. For more information, please see detailed methodology in **Appendix C**.

Waste emissions are considered Scope 3 emissions because they are not generated in the base year, but will result from the decomposition of waste generated in 2005 over the full 100-year+ cycle of its decomposition. In 2005, the community sent approximately 31,122.52 tons of waste to landfill. The 2004 California Statewide Waste Characterization Study provides standard waste composition for the State of California. Identifying the different types of waste in the general mix is necessary because during decomposition various materials generate methane within the anaerobic environment of landfills at differing rates. Carbonaceous materials such as paper and wood would actually sequester the methane released in managed landfills, thereby offsetting some or all of the emissions from food and plant waste. However, GHG sequestration at the landfills has been set to zero, based on guidance in the LGOP version 1.1, which recommends eliminating the effect of landfill sequestration for both government operations inventories and community inventories, to be consistent with the principle that local government operations and community inventories should not account for emissions sinks. **Figure 3-10** and **Table 3-10** show the estimated percentage of emissions coming from the various types of organic, methanogenic waste.

FIGURE 3-10: WASTE GHG EMISSIONS BY TYPE

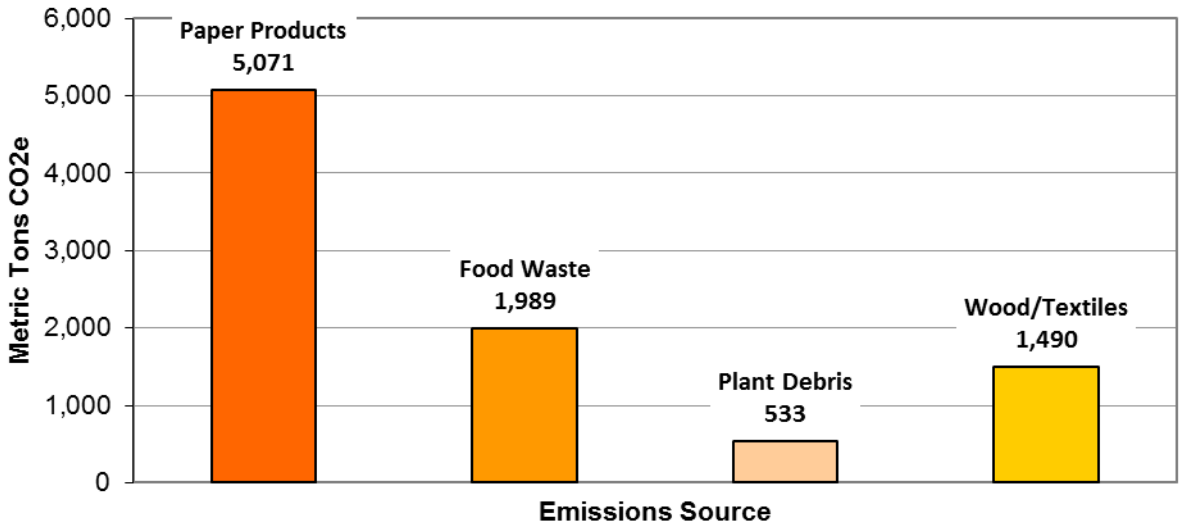


TABLE 3-10: WASTE GHG EMISSIONS BY TYPE

Waste Emissions Sources 2005	Paper Products	Food Waste	Plant Debris	Wood / Textiles	All Other Waste	TOTAL
CO_2e (metric tons)	5,071	1,989	533	1,490	0	9,083
Percentage of Total CO_2e	55.8%	21.9%	5.9%	16.4%	0.0%	100%

3.7 WASTEWATER

The wastewater treatment plant consists of four aerated lagoons and provides a cost effective way to treat water. However, aside from the aeration of these lagoons, the City does not use additional processes to treat the influent. As organic matter is broken down through the process of lagoons, methane is released into the atmosphere. Methane emissions released during wastewater treatment processes were responsible for 1.9% of total emissions for the community. Natural gas and electricity emissions associated with wastewater treatment facilities operations are accounted for within the commercial/industrial sector.

3.7 COMMUNITY EMISSIONS BY SOURCE

In addition to viewing emissions by sector and by scope, policy and programs development can benefit from an analysis of emissions according to their raw fuel or waste source. **Figure 3-11** and **Table 3-11** below demonstrates that 40.3% of all community emissions come from the consumption of gasoline on local roads and highways. Natural gas (22.7%) and electricity (20.6%) consumption are the next most significant figures, with the remainder coming from diesel, methane from wastewater treatment processes, and various waste products.

FIGURE 3-11: COMMUNITY GHG EMISSIONS BY SOURCE, 2005

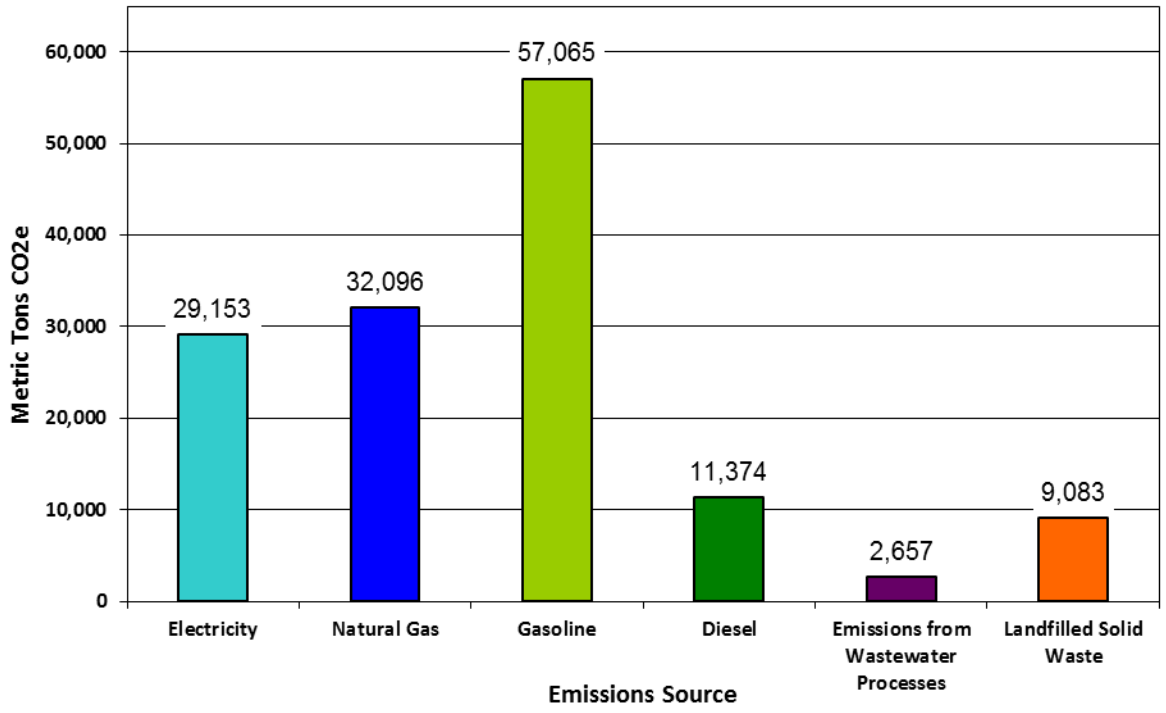


TABLE 3-11: COMMUNITY GHG EMISSIONS BY SOURCE, 2005

Community GHG Emissions 2005 by Source	CO_2e (metric tons)	CO_2e (percent of total)
Electricity	29,153	20.6%
Natural Gas	32,096	22.7%
Gasoline	57,065	40.3%
Diesel	11,374	8.0%
Methane from Wastewater Treatment Processes	2,657	1.9%
Landfilled Solid Waste	9,083	6.4%
TOTAL	141,428	100.0%

3.8 PER CAPITA EMISSIONS

Per capita emissions can be a useful metric for measuring progress in reducing GHGs and for comparing one community's emissions with neighboring cities and against regional and national averages. Currently it is difficult to make meaningful comparisons between local inventories because of variations in the scope of inventories conducted. For instance, this Inventory takes in to account emissions from agricultural off-road vehicles, which many inventories like the Sonoma County GHG Inventory do not. Only when ICLEI, the California Air Resources Board, and other organizations adopt universal reporting standards will local inventories be prepared in a consistent manner and therefore be comparable.

Simply dividing total community GHG emissions (141,428 metric tons of CO_2e) by city population in 2005 (25,940) yields a result of 5.45 metric tons CO_2e per capita.[17] It is important to understand that this number is not the same as the carbon footprint of the average individual living in the City of Atascadero, which reflects a wider scope of emissions. It is also important to note that the per capita emissions number for the city is not directly comparable to every per capita number produced by other emissions studies because of differences in emission inventory methods.

[17] Baseline population data for the year 2005 was obtained from SLOCOG's Long Range Socio-Economic Projections (Year 2030), prepared by Economics Research Associates (July 2006 Revision).

4. City Government Operations GHG Emissions Inventory Results

In 2005, the City of Atascadero government employed 128 people and was comprised of seven departments: City Manager, Administrative Services, Police and Fire Services, Community Development, Community Services, and Public Works. This chapter reviews the results of the City government operations inventory by sector, including employee commuting emissions.

4.1 CITY GOVERNMENT OPERATIONS INVENTORY RESULTS

City government operations and facilities produced approximately 4,130 metric tons of GHG emissions in 2005. As displayed in **Figure 4-1**, government operations emissions would equate to approximately 2.9% of total community-wide emissions. City government emissions result from waste, energy consumption from wastewater facilities, buildings, streetlights and other facilities, fuel consumption by the vehicle and transit fleet and employee commutes, wastewater treatment processes, and miscellaneous equipment. The wastewater facilities and processes were the largest contributor to the City's emissions (70.8%) with 2,923 metric tons of carbon dioxide equivalent. The vehicle fleet (9.7%) was the second largest contributor to the City's emissions with 4,023 metric tons of carbon dioxide equivalent. (Refer to **Figure 4-2** and **Table 4-1** below)

FIGURE 4-1: CITY GOVERNMENT OPERATIONS CONTRIBUTION TO COMMUNITY-WIDE GHG EMISSIONS

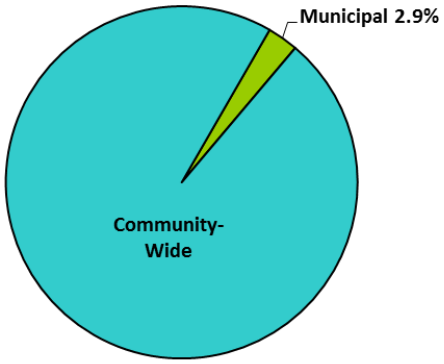
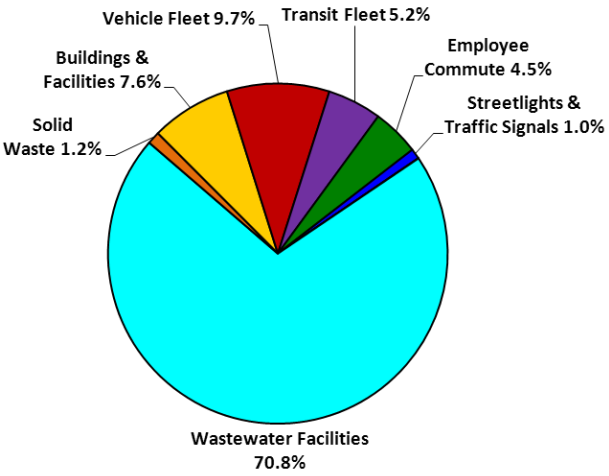


FIGURE 4-2: CITY GOVERNMENT GHG EMISSIONS BY SECTOR, 2005



As mentioned in the Introduction, these emissions are a subset of the community emissions inventory discussed in **Chapter 3**. The City's government operations emissions are separately analyzed in this section in a manner that is similar to how an industry or business would produce a facility-scale GHG audit. The LGOP, version 1.1 developed by the California Air Resources Board, The Climate Registry, the California Climate Action Registry, and ICLEI guides the methodology for estimating emissions from local government operations.

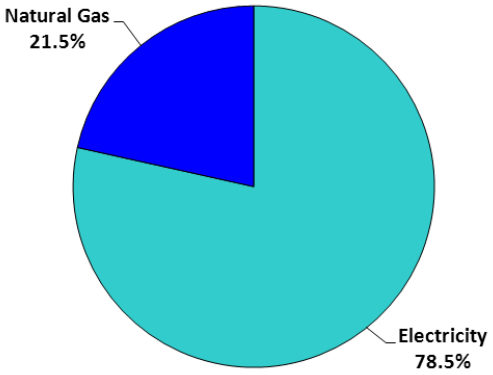
TABLE 4-1: CITY GOVERNMENT GHG EMISSIONS BY SECTOR, 2005

2005 Emissions by Sector	Buildings & Facilities	Vehicle Fleet	Transit Fleet	Employee Commute	Street Lights & Traffic Signals	Water Delivery	Wastewater Facilities	Solid Waste	TOTAL
CO_2e (metric tons)	316	402	214	185	40	1	2,923	49	4,130
Percentage of CO_2e	7.6%	9.7%	5.2%	4.5%	1.0%	<0.0%	70.8%	1.2%	100.0%

4.2 BUILDING SECTOR

The building sector includes GHG emissions from energy consumption in facilities owned and operated by a municipality but does not included facilities located at the wastewater treatment plant. Electricity consumption in facilities located at the wastewater treatment plant is included in the Wastewater Facilities Sector. The facilities included in this analysis include City Hall, fire and police Stations, recreation facilities, Charles Paddock Zoo, parks, and numerous other facilities. As depicted in **Figure 4-3** and **Table 4-2**, the majority of emissions resulted from electricity consumption (78.5%).

FIGURE 4-3: BUILDING GHG EMISSIONS BY SOURCE



It should be noted that the historic Administration Building has been unoccupied since 2004. In 2004, an earthquake damaged the historic building and forced the City to move its government offices to another building in downtown. Subsequently, this Inventory does not include energy consumption in the historic Administration Building. Estimated emissions for City Hall are from a more energy efficient building where government offices were located in 2005.

The City has been working with the Federal Emergency Management Administration (FEMA) to obtain the necessary funding to restore the building to pre-earthquake condition. Once the building has been repaired to pre-earthquake condition, the City plans to upgrade the building. These upgrades will likely increase the efficiency of the Administration Building; however, baseline emissions were not calculated for this building as part of this inventory and; therefore, the amount of increase in efficiency is unknown. The City plans to move its government offices back to the Administration building within the next couple of years. The relocation is likely to affect the business-as-usual forecast.

TABLE 4-2: BUILDING SECTOR GHG EMISSIONS BY SOURCE

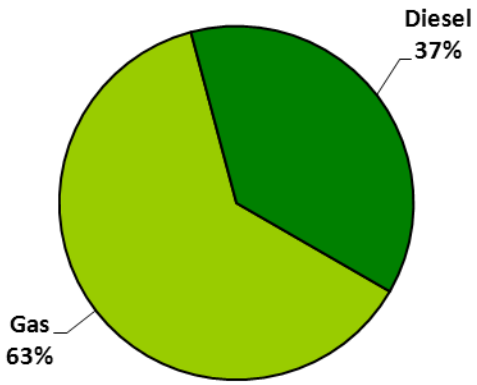
2005 City Government Operations Emissions by Sector	Electricity	Natural Gas	Total
CO_2e (metric tons)	248	68	316
Percentage of Total CO_2e	78.5%	21.5%	100%
Energy Use (MMBtu)	3,780	1,283	5,063

These emissions and associated consumption data will be useful in designating priority facilities for energy efficiency retrofits and conservation outreach.

4.3 VEHICLE AND TRANSIT FLEET

City-owned and -operated vehicles emitted approximately 616 metric tons of CO_2e, or 15.0% of total City government emissions. This sector includes gasoline and diesel consumption from all departments in the City operating vehicles, including the Fire and Police Departments, Community Services, Public Works, and Community Development. This sector also includes the transit fleet operated by the City. This estimate is based on 2005 fuel billing record data provided by the Finance Department for most departments. The Police Department provided their own fuel consumption data as their records are were more complete than the fuel billing records.

FIGURE 4-4: VEHICLE FLEET FUEL CONSUMPTION PER YEAR BY TYPE



The majority of fuel used by the City – vehicle and transit fleets combined – is gasoline (63%), with the remainder diesel (37%) (see **Figure 4-4**). When compared to the total emissions per fuel type, diesel emissions actually produce less CO_2e for the vehicle types used by the City. However, there are other, non-CO_2e emissions from diesel-like particulate matter that make such a comparison misleading to the reader. The trend for diesel to emit less CO_2e in this case does not necessarily mean that the City should aim to convert more vehicles to conventional diesel. There are multiple clean and alternative fuel options available, including biodiesel conversion, electric vehicles, hybrid vehicles, smaller vehicles, and shared vehicles.

4.4 EMPLOYEE COMMUTE

This sector estimates GHG emissions from City employees traveling to and from work in 2005. The estimate is based on a June 2009 online survey conducted by the City, a blank version of which is included as **Appendix F**. Approximately 69 employees responded to the survey with usable information, meaning that all essential questions were answered. This results in approximately a 58% response rate, the results of which were applied to the City employment total for 2005.

The online survey found that most City employees travel to and from work by car. Employees were asked how many days of the week they travel by each commute mode, including driving alone (which includes motorcycles), carpooling, vanpooling, public transit, bicycling, walking, telecommuting, and other. The results show that employees get to and from 77.4% of their workdays by personal vehicle. The second most popular mode of transportation was bicycling (10.7%), followed by walking and other means such as skateboarding with a combined 7.2% of the total.

TABLE 4-3: DAYS OF CITY EMPLOYEE TRAVEL BY COMMUTE MODE

Mode of Travel	Days traveled by Commute mode	% of Total
Drive Alone	12,792	77.4%
Carpool	468	2.8%
Vanpool	52	0.3%
Public transit	260	1.6%
Bicycle	1,768	10.7%
Walk	520	3.1%
Other	676	4.1%
Total	16,536	100%

These figures for commute mode were combined with each respondent's travel distance to work, car model (if any), and fuel type (if any). The results show VMT annually per vehicle type and fuel type (see **Table 4-4**). These VMT numbers were then adjusted for the total employee population in 2005 and entered into the CACP2009 software to obtain CO_2e.

Driving patterns were assumed to be constant for the purposes of this study; therefore, the 2009 sample was applied directly to the 2005 employee population. Only one modification to the sample data was made in order to account for the large increase in hybrid car sales between 2005 and 2009. The proportion of hybrid to traditional vehicles was roughly two-thirds less in 2005 than in 2009, according to State sales data.[18]

The 2009 survey results, adjusted for 2005 employee totals, resulted in an estimate of 185 metric tons CO_2e in 2005 from commuter travel to and from work. This figure comprises 4.5% of total GHG emissions released from City government operations. The calculation does not include employee business travel or travel during lunchtime hours.

[18] www.hybridcars.com

TABLE 4-4: EMPLOYEE COMMUTE VMT BY VEHICLE AND FUEL TYPE

Vehicle Group	2009 Survey results		Adjusted for 2005	
	Annual VMT	Fuel Type	Annual VMT	Fuel Type
Light Truck/SUV/Pickup	56,197.86	Gasoline	120,997.07	Gasoline
	313.08	Diesel	544.76	Diesel
Large Truck	22,620.03	Gasoline	39,358.85	Gasoline
	16,843.70	Diesel	29,308.04	Diesel
Passenger Vehicle	138,885.77	Gasoline	183,403.96	Gasoline
Motorcycle	208.72	Gasoline	363.17	Gasoline
Total	235,069.16		373,975.86	

Employee business travel is usually included in a City government GHG Inventory per protocol; however, we could not include it in this baseline analysis due to data limitations. The City maintains financial records of when employees travel by air or vehicle to conferences and other events; however, it does not keep records of business travel destinations. As such, this Inventory could not accurately account for GHG emissions from employee business travel. A minor adjustment to City recordkeeping would allow the data to be included in the next City government operations GHG inventory.

4.5 STREETLIGHTS AND TRAFFIC SIGNALS

The electricity consumed by City streetlights and traffic signals in calendar year 2005 resulted in approximately 40 metric tons of CO_2e, or approximately 1.0% of total City government emissions. This Inventory accounts for approximately 289 streetlights and 9 traffic signals.

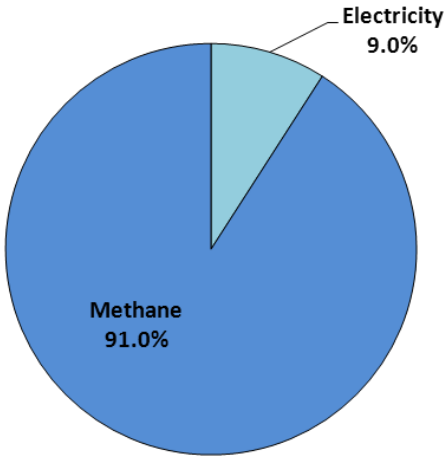
4.6 WATER AND WASTEWATER

The City of Atascadero does not provide potable water to its residents. The Atascadero Mutual Water Company provides residents with drinking water and; therefore, the City does not have regulatory control over the distribution of potable water within the City. Emissions associated with the pumping and distribution of potable water are included in the commercial/industrial portion of the energy sector of the community-wide section of the Inventory.

The City is responsible for the collection, treatment, and disposal of wastewater. Approximately half (50%) of the community is served by sewer and the other 50 percent on septic. Due to a lack of methodology for calculating emissions resulting from septic systems, these emissions are not included in the Inventory. In 2005, electricity consumption from wastewater facilities in

the City emitted approximately 266 metric tons of CO_2e, or 9.0% of total emissions related to wastewater (see **Figure 4-5**). This category includes energy use at the Wastewater Treatment Plant and the numerous lift stations and pumps necessary to convey effluent to the treatment plant. Point-source emissions that arise from the wastewater treatment system due to fermentation of discarded biomass in the lagoons resulted in an additional 2,657 metric tons of CO_2e, increasing the percentage of total emissions attributed to wastewater facilities to 70.8% of government operations emissions.

FIGURE 4-5: GHG EMISSIONS FROM WASTEWATER TREATMENT PLANT



The wastewater treatment plant consists of four aerated lagoons and provides a cost effective way to treat wastewater. However, aside from the aeration of these lagoons, the City does not use additional processes to treat the influent. As organic matter is broken down through the process of lagoons, methane is released into the atmosphere. While this Inventory identifies methane from the wastewater treatment plant as the major contributor to the government operations emissions, emissions from other sectors and sources within government operations should not be overlooked entirely. This Inventory is meant to identify the sources of emissions from the City's operations. It does not recommend or mandate improvements or upgrades to the wastewater treatment plant. Upgrading the wastewater treatment plant to reduce GHG emissions would likely require a complete redesign of the wastewater treatment plant and be very costly. Emissions associated with government operations are broken down further in **Section 4.9**.

4.7 SOLID WASTE

Similar to the Community-Wide analysis, waste produced by City facilities was calculated using the methane commitment method. The CACP2009 calculates the methane expected to be released from this landfilled waste over the course of its lifetime. Unlike other sectors analyzed, the emissions from waste disposed of in 2005 will occur over multiple years as the waste breaks down over time. Atascadero Waste Alternatives estimates that in 2005, City facilities sent a total of 168.65 tons of waste to landfill, producing 49 metric tons of CO_2e, or 1.2% of total emissions. This category includes only those emissions generated by waste produced at City facilities and does not include the total emissions released from the landfill.

4.8 CITY EMISSIONS BY SOURCE

It can also be helpful to view overall City government emissions by source. As shown in **Table 4.5** and **Figure 4.6**, the majority of emissions are from methane produced at the wastewater treatment plant during the treatment of wastewater (66.5%). Gasoline (12.9%) consumption by the vehicle and transit fleets is the second largest source of emissions. Electricity consumption in City-owned buildings, streetlights, and water and wastewater facilities account for 12.6% of government operations emissions and natural gas, miscellaneous equipment, diesel and solid waste contributed in decreasing amounts to the remaining 8.0% of the overall City GHG emissions.

Since the majority of GHG emissions are associated with the wastewater treatment plant and water treatment processes and strategies to reduce emissions at the treatment plant would require an expensive redesign of the plant, **Table 4.5** also breaks down emissions by source with emissions from the wastewater treatment plant and water treatment processes excluded. Viewing emissions without the wastewater treatment plant (see **Figure 4.7**) will aid the City in identifying other sources of emissions within their operations that are equally as important in reducing the City's overall GHG emissions.

TABLE 4-5: CITY GOVERNMENT GHG EMISSIONS BY SOURCE, 2005

City Emissions 2005 by Source	All Sectors		Emissions from the Wastewater Treatment Plant Processes Removed	
	CO_2e (metric tons)	CO_2e (percent of total)	CO_2e (metric tons)	CO_2e (percent of total)
Electricity	555	13.4%	555	37.7%
Natural Gas	68	1.6%	68	4.6%
Gasoline	567	13.7%	567	38.5%
Diesel	234	5.7%	234	15.9%
Solid Waste Decomposition (Methane)	49	1.2%	49	3.3%
Wastewater Treatment Processes (Methane)	2,657	64.3%	n/a	n/a
TOTAL	4,130	100%	1,473	100%

FIGURE 4-6: CITY GOVERNMENT GHG EMISSIONS BY SOURCE, 2005

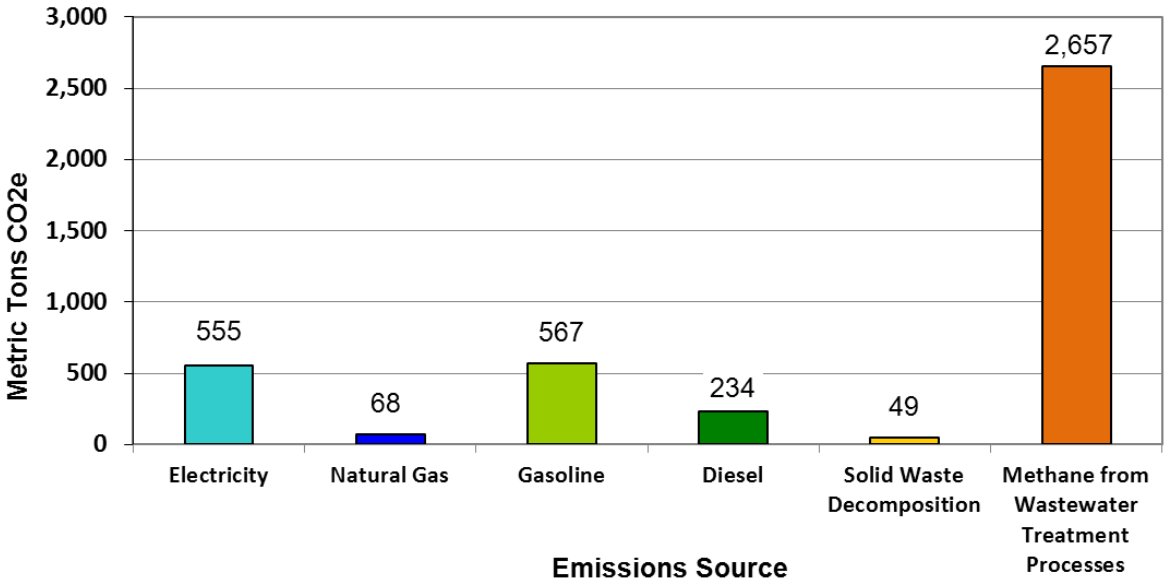
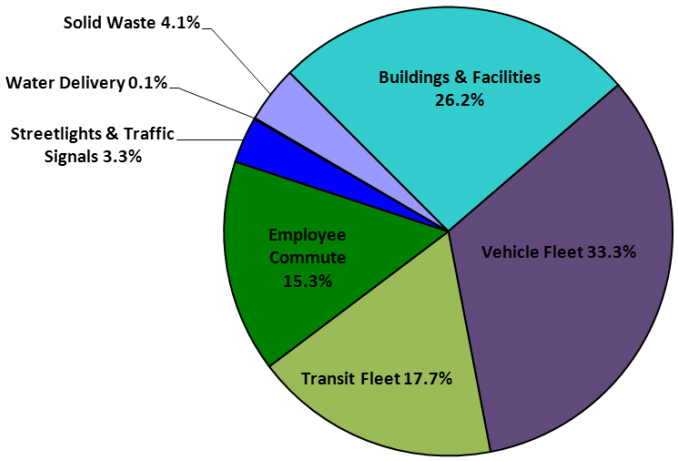


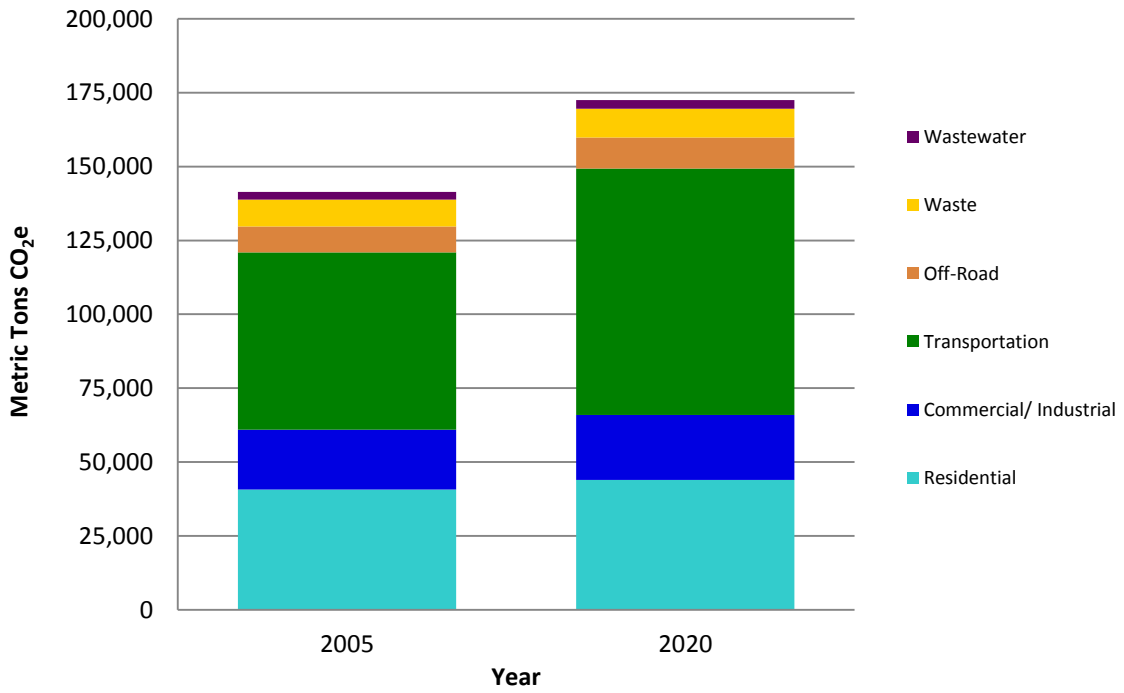
FIGURE 4-7: CITY GOVERNMENT GHG EMISSIONS BY SECTOR WITH WASTEWATER TREATMENT PLANT REMOVED



5. Forecast

The emissions forecast for the City of Atascadero represents a business-as-usual prediction of how community-wide GHG levels will change over time if consumption trends and behavior continue as they did in 2005. These predictions are based on the community inventory results included in this report and statistics on job and population growth from the SLOCOG 2040 Population, Housing & Employment Forecast (August 2011). The analysis shows that if behavior and consumption trends continue as business-as-usual, emissions will reach 172,488 metric tons of CO_2e by 2020, or a 22.0% increase over 2005 baseline levels (see **Figure 5-1**).

FIGURE 5-1: 2020 BUSINESS-AS-USUAL PROJECTED GROWTH IN COMMUNITY-WIDE GHG EMISSIONS



The forecast does not quantify emissions reductions from State or federal activities including AB 32, the renewable portfolio standard, and SB 375. Additionally, it does not take into account reduction activities already underway or completed since 2005, the results of which likely put the community's emissions on a track well below the business-as-usual linear projection.

Forecasts were performed by applying job and population growth rates to 2005 community-wide GHG emissions levels. Baseline data and estimated growth were obtained from the San Luis

Obispo Council of Governments report, "San Luis Obispo County 2040 Population, Housing & Employment Forecast" prepared by AECOM in August 2011. The “mid-range” cases for population and job growth were used in this forecast estimation. Baseline data from this report is consistent with the San Luis Obispo County APCD’s GHG thresholds.

City government operations emissions are not separately analyzed as part of this forecast due to a lack of reasonable growth indicators for the City government sector. However, a significant increase in emissions is not expected for existing facilities and operations in the City government operations sector.

6. Conclusion and Next Steps

The City of Atascadero has made a formal commitment to reduce its GHG emissions. This report lays the groundwork for those efforts by estimating baseline emission levels against which future progress can be demonstrated.

This analysis found that the community was responsible for emitting 141,428 metric tons of CO_2e in the base year 2005, with the transportation sector contributing the most (42.5%) to this total. As a component of the community-wide analysis, City government operations produced 4,130 metric tons of CO_2e, or 2.9% of the total. In addition to establishing the baseline for tracking progress over time, this report serves to identify the major sources of City emissions, and therefore the greatest opportunities for emission reductions. In this regard, the emissions inventory will inform the focus of the City's Climate Action Plan. If no action is taken, this report found that business-as-usual (worst case scenario) emissions will likely rise by 22.0% by 2020.

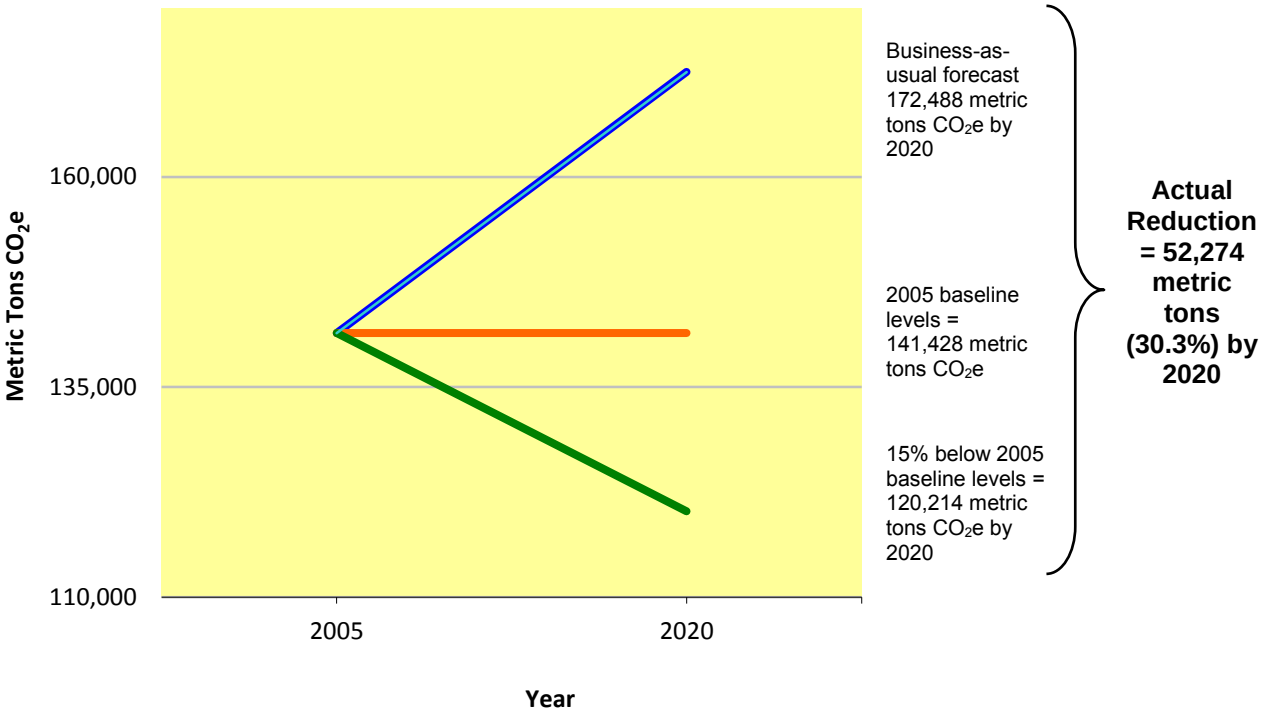
It is important to note that in order to remain consistent with GHG reduction methodology, all future quantifications of reduction activities must be subtracted from this 'business-as-usual' line. Not doing so would be assuming that emissions remain at constant 2005 levels while reduction activities are underway. In reality, the City's climate action efforts will be working against a rising emissions level due to job, population, and household growth. **Figure 6-1** below shows the business-as-usual emissions forecast in relation to 2005 baseline levels and the 15% reduction below 2005 levels recommended by the State Attorney General and Air Resources Board. [19]

The difference between the business-as-usual forecast and the reduction targets is actually 30.3% in 2020.

As the City moves forward to the next milestones in the process, including designation of emission reduction targets and development of a Climate Action Plan, the City should identify and quantify the emission reduction benefits of projects that have already been implemented since 2005, as well as the emissions reduction benefits of existing General Plan policies. The benefits of existing strategies can be tallied against the baseline established in this report to determine the appropriate set of strategies that will deliver the City to its chosen emissions reduction goal.

[19] The AB 32 Climate Change Scoping Plan Document prepared by the Air Resources Board calls for reducing GHG emissions to 1990 levels by cutting approximately 30 percent from business-as-usual emission levels projected for 2020, or about 15 percent from today's levels.

FIGURE 6-1: GHG FORECAST IN RELATION TO REDUCTION TARGET



APPENDIX A:
CACP DETAILED REPORT FOR COMMUNITY-WIDE EMISSIONS, 2005

Community Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Residential						
San Luis Obsipo APCD, CA						
1 SoCal Gas Company Residential Natural Gas						
Natural Gas	24,714	47	2,329	24,778	17.9	465,783
Subtotal 1 SoCal Gas Compan	24,714	47	2,329	24,778	17.9	465,783

Natural gas data provided by Paulo Morais, Customer Programs Environmental Affairs, Southern California Gas Co. (213) 244-3246, pmorais@semprautilities.com <mailto:pmorais@semprautilities.com>, May 2012.

CEC Emission Factor for Natural Gas - RCI Average Set from Local Government Operations Protocol version 1.1 (LGOP v1.1). Fuel CO2 set provided by Southern California Gas Co for San Luis Obispo area.

2 PG&E Residential Electricity						
Electricity	15,782	355	968	15,912	11.5	242,839
Subtotal 2 PG&E Residential E	15,782	355	968	15,912	11.5	242,839

Electricity data provided by Jillian Rich, jillian.rich@pge.com <mailto:jillian.rich@pge.com> and John Joseph, ghgdatarequests@pge.com <mailto:ghgdatarequests@pge.com>, PG&E.

The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009). Criteria air pollutant emission factors for electricity were obtained from the LGOP v1.1 for California.

Subtotal Residential	40,496	402	3,297	40,690	29.3	708,622
Commercial						
San Luis Obsipo APCD, CA						
1 SoCal Gas Company Commercial Natural Gas						
Natural Gas	7,012	13	661	7,030	5.1	132,159
Subtotal 1 SoCal Gas Compan	7,012	13	661	7,030	5.1	132,159

Natural gas data provided by Paulo Morais, Customer Programs Environmental Affairs, Southern California Gas Co. (213) 244-3246, pmorais@semprautilities.com <mailto:pmorais@semprautilities.com>, May 2012.

CEC Emission Factor for Natural Gas - RCI Average Set from Local Government Operations Protocol version 1.1 (LGOP v1.1). Fuel CO2 set provided by Southern California Gas Co for San Luis Obispo area.

Community Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
2 PG&E Commercial + Industrial Electricity						
Electricity	13,132	295	806	13,241	9.5	202,065
Subtotal 2 PG&E Commercial	13,132	295	806	13,241	9.5	202,065

Electricity data provided by Jillian Rich, jillian.rich@pge.com <mailto:jillian.rich@pge.com> and John Joseph, ghgdatarequests@pge.com <mailto:ghgdatarequests@pge.com>, PG&E.

The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009). Criteria air pollutant emission factors for electricity were obtained from the LGOP v1.1 for California.

Subtotal Commercial	20,144	309	1,466	20,271	14.6	334,223

Waste

San Luis Obsipo APCD, CA

3 Community Solid Waste - Chicago Grade						*Disposal Method - Managed Landfill*
Paper Products	0	0	241,287	5,067	3.7	
Food Waste	0	0	94,629	1,987	1.4	
Plant Debris	0	0	25,393	533	0.4	
Wood or Textiles	0	0	70,890	1,489	1.1	
Subtotal 3 Community Solid W	0	0	432,198	9,076	6.5	

1. Total waste tonnage for the City in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.

2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study. http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

3. Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 157.47 mmcf/yr. Total gas transferred = 94.48 mmcf/yr.

4. Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 700 mmcf/yr. Total gas transferred = 420 mmcf/yr.

Notes:
1. Waste Type data not collected by landfill. State average waste characterization data is used for residential, commercial, and self haul waste.
2. Emissions Factors from LGOP v1.1

3 Community Solid Waste - Cold Canyon						*Disposal Method - Managed Landfill*
Paper Products	0	0	199	4	0.0	
Food Waste	0	0	78	2	0.0	

Community Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
Plant Debris	0	0	21	0	0.0	
Wood or Textiles	0	0	59	1	0.0	
Subtotal 3 Community Solid W	0	0	357	7	0.0	

Source(s):

1. Total waste tonnage for the City in 2005 provided by the 2005 Disposal Quarterly Reports prepared by San Luis Obispo County Integrated Waste Management Authority on 6/17/05, 9/27/05, 12/27/05 and 3/6/06, provided by Peter Cron, pcron@iwma.com.
2. Percentages of waste share by type for landfill tonnage provided by CIWMB 2004 Statewide Waste Characterization Study. http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097

3. Chicago Grade landfill reports a methane recovery factor of 60%. Chicago Grade total gas generated = 157.47 mmcf/yr. Total gas transferred = 94.48 mmcf/yr.

4. Cold Canyon landfill reports a methane recovery factor of 60%. Cold Canyon total gas generated = 700 mmcf/yr. Total gas transferred = 420 mmcf/yr.

Notes:

1. Waste Type data not collected by landfill. State average waste characterization data is used for residential, commercial, and self haul waste.

Subtotal Waste	0	0	432,555	9,084	6.5	

Other

San Luis Obsipo APCD, CA

1 - On-Road Transportation

Carbon Dioxide	60,041	0	0	60,041	43.3	
Subtotal 1 - On-Road Transpo	60,041	0	0	60,041	43.3	

Sources:

- Average weekday vehicle miles traveled (VMT) were provided by Fehr & Peers, July 2012, using the San Luis Obispo Regional Travel Demand model.
- Transportation-related GHG emissions (carbon dioxide, methane, and nitrous oxide) were calculated using California Air Resources Board's Emissions Factor (EMFAC2011) software and converted to CO2e.

Notes:

- Using origin-destination analysis, three types of vehicle trips were tracked separately for AM and PM peak periods in the City:
  1. Internal-Internal: Vehicle trips that remained inside the city
  2. Internal-External and External-Internal: Vehicle trips that have an ending or a beginning in the city
  3. External-External: Vehicle trips that pass through the city without originating or ending in the city
- Using the recommendation of the Regional Target Advisory Committee (RTAC), the body responsible for Senate Bill 375 target setting, vehicle miles traveled (VMT) from trips of type 1, 2, and 3 were counted 100%, 50%, and 0% respectively toward jurisdiction-generated VMT.
- Transportation-related greenhouse gas emissions were calculated using the EMFAC2011 software. EMFAC2011 provides carbon dioxide, methane, and nitrous oxide emissions according to the unique vehicle composition of each county in California. Of the total on-road transportation emissions 93.2% are the result of gasoline consumption and 6.8% are the result of diesel fuel consumption.

Community Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)
1 - Off-Road and Agricultural Equipment						
Carbon Dioxide	8,686	0	0	8,686	6.3	
Subtotal 1 - Off-Road and Agri	8,686	0	0	8,686	6.3	

Off-road vehicle and equipment emissions obtained from the California Air Resources Boards' OFFROAD2007 software. Emissions were calculated for construction equipment based on the city's share of countywide construction jobs, lawn & garden equipment based on the city's share of countywide households, industrial equipment based on the city's share of countywide industrial sector jobs, light commercial equipment based on the city's share of countywide commercial sector jobs, and agricultural equipment based on the city's share of countywide agricultural land. Household and job data obtained from the U.S. Census Bureau and agricultural data obtained from County GIS files.

Subtotal Other	68,727	0	0	68,727	49.5	
Total	129,368	710	437,318	138,772	100.0	1,042,846

APPENDIX B:
CACP DETAILED REPORT FOR CITY GOVERNMENT OPERATIONS EMISSIONS, 2005

Government Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Buildings and Facilities							
San Luis Obsipo APCD, CA							
All Buildings and Facilities							
Electricity	246	6	15	248	16.8	3,780	0
Natural Gas	68	0	6	68	4.6	1,283	0
Subtotal All Buildings and Faci	314	6	21	316	21.5	5,063	0

Revised Inventory Notes:

Updated natural gas data provided by Paulo Morais, Customer Programs Environmental Affairs (213) 244-3246, pmorais@semprautilities.com, May 2012.

Update electricity data provided by Jillian Rich, jillian.rich@pge.com and John Joseph, ghgdatarequests@pge.com, PG&E, May 2012.

1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E CO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009). N2O and CH4 emissions factors from LGOP v1.1

Original Inventory Notes:
Electricity data recieved from PG&E (ghgdatarequests@pge.com). Natural gas data retrieved from The Gas Company billing statements. Billing statements were provided by the Finance Department Richelle Rickard (805-470-3428).

Subtotal Buildings and Facilities	314	6	21	316	21.5	5,063	0
Streetlights & Traffic Signals							
San Luis Obsipo APCD, CA							
All Streelights and Traffic Signals							
Electricity	40	1	2	40	2.7	613	435
Subtotal All Streelights and Tra	40	1	2	40	2.7	613	435

Source: Jillian Rich, jillian.rich@pge.com and John Joseph, ghgdatarequests@pge.com, PG&E.
1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009).

Original Inventory Notes:

Data recieved from PG&E (ghgdatarequests@pge.com).

Subtotal Streetlights & Traffic Si	40	1	2	40	2.7	613	435

This report has been generated for San Luis Obsipo APCD, CA using ICLEI's Clean Air and Climate Protection 2009 Software.

Government Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Water Delivery Facilities							
San Luis Obsipo APCD, CA							
Water Delivery Facilities							
Electricity	0	0	0	0	0.0	2	0
Subtotal Water Delivery Faciliti	0	0	0	0	0.0	2	0

Source: Jillian Rich, jillian.rich@pge.com and John Joseph, ghgdatarequests@pge.com, PG&E.
1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009).

Original Inventory Notes:

Data recieved from PG&E (ghgdatarequests@pge.com).

Subtotal Water Delivery Facilities	0	0	0	0	0.0	2	0
Wastewater Facilities							
San Luis Obsipo APCD, CA							
Wastewater Facilities							
Electricity	264	6	16	266	18.1	4,059	0
Natural Gas	0	0	0	0	0.0	5	0
Subtotal Wastewater Facilities	264	6	16	266	18.1	4,064	0

Source: Jillian Rich, jillian.rich@pge.com and John Joseph, ghgdatarequests@pge.com, PG&E.
1. The "PG&E California" electricity coefficient set is based on the 2005 PG&E eCO2 emission factor of 0.489 lbs/kWh of delivered electricity as update on June 27, 2011 and provided by PG&E. PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)6 (2003-2008) or The Climate Registry (TCR) (2009).
2. Natural gas data provided by Paulo Morias at SoCalGas.

Original Inventory Notes:

Data recieved from PG&E (ghgdatarequests@pge.com). Service ID# 4949700205

Subtotal Wastewater Facilities	264	6	16	266	18.1	4,064	0
Solid Waste Facilities							
San Luis Obsipo APCD, CA							
3 - All Facilities							
Carbon Dioxide	49	0	0	49	3.3	0	0
Subtotal 3 - All Facilities	49	0	0	49	3.3	0	0

Data provided by Mike LaBarbera (805.466.3636) at Atascadero Waste Alternatives.

This report has been generated for San Luis Obsipo APCD, CA using ICLEI's Clean Air and Climate Protection 2009 Software.

Government Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
Subtotal Solid Waste Facilities	49	0	0	49	3.3	0	0
Vehicle Fleet							
San Luis Obsipo APCD, CA							
1 ComDev							
Gasoline	14	1	1	14	1.0	207	4,250
Subtotal 1 ComDev	14	1	1	14	1.0	207	4,250

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Community Development assigned gas cards to specific vehicles. This information was provided by Annette Manier, Community Development Department, (805-470-3470). Light Trucks MY 1999 includes 2 - Ford Rangers. Light Trucks MY 2004 includes 1 - Ford Explorer.

1 Fire Dept.							
Diesel	60	0	0	60	4.1	829	14,537
Gasoline	12	1	1	12	0.8	172	2,298
Subtotal 1 Fire Dept.	72	1	1	72	4.9	1,001	16,835

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Fire Department assigned gas cards to specific vehicles; however, the fleet has changed since 2005 and it was difficult to match present card information with specific vehicles in 2005. It was assumed all diesel consumption was by firetrucks and unleaded gasoline by the remaining fleet vehicles. Unleaded gasoline was distributed evenly between the six vehicles. Gas card information was provided by Ellen Perkins, Fire Department, (805-470-3300). Diesel Heavy-Duty Vehicles (All MY) includes - Vehicle Numbers 501, 502, 503, 507, and 574. Light Trucks MY 19987 to 1993 includes 2 - Chevy Blazers. Light Trucks MY 2001 includes 2 - Ford F250. Light Trucks MY 2004 includes 1 - Chevy Tahoe Fire Command Vehicle.

1 Parks							
Gasoline	23	3	2	24	1.6	342	0
Subtotal 1 Parks	23	3	2	24	1.6	342	0

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Light Trucks MY 1987 to 1993 includes 1- 1980 Cushman Scooter, 1- 1986 Ford Ranger, 1- 1980 Chevy Truck, 1- 1990 GMC Truck. Heavy Duty Vihicles MY 2002 includes 1- 2002 Dodge Truck 3/4 Ton dump bed.

1 Police Department							
Diesel	1	0	0	1	0.1	11	0
Gasoline	130	7	6	132	9.0	1,910	0
Subtotal 1 Police Department	131	7	6	133	9.0	1,922	0

All vehicle gas consumption data provided by Terry Buckley, Police Department (ext. 3258). The Police Department tracks vehicle fuel consumption. Police Department personnel use government credit cards in addition to assigned gas cards to purchase fuel. These purchases do not show up in the gas card billing statements provided by the Finance Department. Unleaded gasoline was distributed evenly between the 23 vehicles. Passenger Cars MY 2005 includes 3 - Ford Crown Victoria and 1 - BMW Motorcycle. Passenger Cars MY 2004 includes 1 - Ford Crown Victoria. Passenger Cars MY 2003 includes 1 - Ford Crown Victoria and 1 - Dodge Intrepid. Passenger Cars MY 1999 includes 2 - Ford Crown Victoria and 1 - Ford Taurus. Passenger Cars MY 2001 includes 3 - Ford Crown Victoria. Passenger Cars MY 2000 includes 2 - Ford Crown Victoria. Passenger Cars MY 1998 includes 1 - Ford Taurus. Passenger Cars MY 1997 includes 2 - Dodge Intrepid. Passenger Cars MY 1995 includes 2 - Ford Crown Victoria.

Government Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)

Passenger Cars MY 1984 to 1993 includes 1 - 1955 Chevy. Light Trucks MY 2004 includes 1 - Ford Expedition. Light Trucks MY 1987-1993 includes 1 - 1989 Jeep. Diesel Heavy-Duty Vehicles includes 1 - 1981 Chevy Bus.

1 PW Building Maintenance

Gasoline	6	1	0	7	0.4	94	1,827
Subtotal 1 PW Building Mainte	6	1	0	7	0.4	94	1,827

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Unleaded gasoline was distributed evenly between the three vehicles. Light Trucks MY 2002 includes 1 - Ford F150. Light Trucks MY 1987 to 1993 includes 1 - Chevrolet (C-11).

1 PW Operations

Gasoline	1	0	0	1	0.1	11	319
Subtotal 1 PW Operations	1	0	0	1	0.1	11	319

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Light Trucks MY 2005 includes 1 - Ford Explorer.

1 PW Streets

Gasoline	6	0	1	6	0.4	88	1,922
Subtotal 1 PW Streets	6	0	1	6	0.4	88	1,922

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Unleaded gasoline is evenly distributed between the nine vehicles within the fleet. Heavy Duty Vehicles MY 1985 to 1986 includes 1 - 1980 3/4 Ton Chevy Utility Truck, 1 - 1981 5 YD Ford Dump Truck, 1 - 1982 5 YD Ford Dump Truck, and 1 - 1984 1 Ton Chevy Service Truck. Heavy Duty Vehicles MY 1990 to 1995 includes 1 - 1990 GMC 1 Ton Service Truck. Light Trucks MY 1987 to 1993 includes 1 - 1973 Chevy 1/2 Ton, 1 - 1989 1/2 Ton Chevy Pick-up, and 1 - 1990 1/2 Ton GMC Pick-up. Light Trucks MY 2002 includes 1 - 1/2 Ton Dodge Pick-up.

1 Wastewater

Diesel	125	0	0	125	8.5	1,717	0
Gasoline	12	1	1	12	0.8	178	0
Subtotal 1 Wastewater	137	1	1	138	9.3	1,894	0

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Diesel fuel was distrubeted evenly between the Front End Case Loader and Aquatech Sewer Jet Truck. Unleaded gasoline was distributed evenly between the remainder of the fleet. Diesel Heavy Duty Trucks All MY includes 1- Front End Case Loader and 1- Aquatech Sewer Jet Truck. Light Trucks MY 1987 to 1993 includes 1 - 1984 Chevy truck and 1 - 1992 GMC medium duty with crane. Light Trucks MY 1999 includes 1 - Ford F250. Heavy Duty Vehicles MY 2003 includes 1 - Ford F550 Super Duty. Light Trucks MY 2003 includes 1 - Dodge Ram.

1 Zoo

Gasoline	8	1	1	8	0.5	113	2,302
Subtotal 1 Zoo	8	1	1	8	0.5	113	2,302

All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are

Government Greenhouse Gas Emissions in 2005
Detailed Report

	CO_2 (tonnes)	N_2O (kg)	CH_4 (kg)	Equiv CO_2 (tonnes)	Equiv CO_2 (%)	Energy (MMBtu)	Cost ($)
maintained by individual Departments. Unleaded gasoline was distributed evenly between the four vehicles.Light Trucks MY 1987 to 1993 includes 1 - 1979 Chevy Luv 4x4, 1 - 1985 Dodge Sedan, 1 - 1990 Chevy S-10, and 1 - Isuzu Trooper.							
Subtotal Vehicle Fleet	398	15	13	403	27.4	5,672	27,456
Employee Commute							
San Luis Obsipo APCD, CA							
1 Employee Commute							
Diesel	48	0	1	48	3.2	652	0
Gasoline	134	10	15	137	9.3	1,969	0
Subtotal 1 Employee Commute	181	10	16	185	12.6	2,621	0
Passenger Cars Alt. Method includes motorcycles.							
Subtotal Employee Commute	181	10	16	185	12.6	2,621	0
Transit Fleet							
San Luis Obsipo APCD, CA							
1 Dail-A-Ride							
Gasoline	116	8	3	119	8.1	1,712	26,725
Subtotal 1 Dail-A-Ride	116	8	3	119	8.1	1,712	26,725
All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Transit Fleet information was provided by Amanda Muether, Dispatch, (805) XXX-XXXX. Heavy Duty Vehicles MY 2002 includes 1 - Chapion Type III Bus. Heavy Duty Vehicles MY 2005 includes 1 - Eldorado Aerotech Bus. Heavy Duty Vehicles MY 2003 includes 2 - Ford Type III Bus. Heavy Duty Vehicles MY 2000 includes 1 - Eldorado Champion Bus							
1 North County Shuttle (Fixed Route)							
Gasoline	92	7	3	95	6.4	1,361	26,950
Subtotal 1 North County Shuttle	92	7	3	95	6.4	1,361	26,950
All vehicle fuel consumption records provided by the Finance Department. Records consisted of gas card billing statements. Gas cards are maintained by individual Departments. Transit Fleet information was provided by Amanda Muether, Dispatch, (805) 461-5000. Heavy Duty Vehicles MY 2003 includes 1 - Ford Type III Bus with Graphics.							
Subtotal Transit Fleet	209	14	6	213	14.5	3,073	53,675
Total	1,455	53	75	1,473	100.0	21,107	81,566

APPENDIX C: DETAILED METHODOLOGY FOR COMMUNITY-WIDE INVENTORY

APPENDIX C: DETAILED METHODOLOGY FOR COMMUNITY-WIDE INVENTORY

Detailed Methodology for Community-Wide Inventory

This appendix provides the detailed methodology and data sources used for calculating GHG emissions in each sector of the community-wide inventory.

OVERVIEW OF INVENTORY CONTENTS AND APPROACH

The community inventory methodology is based on guidance from ICLEI International Local Government GHG Emissions Analysis Protocol (IEAP) (October 2009) and the Association of Environmental Professionals California Community-wide GHG Baseline Inventory Protocol (AEP Protocol) (June 2011). The community inventory identifies and quantifies emissions from the residential, commercial/industrial, transportation, off-road, and solid waste sectors. Emissions are calculated by multiplying activity data—such as kilowatt hours or gallons of gasoline consumed—by emissions factors, which provide the quantity of emissions per unit of activity. Activity data is typically available from electric and gas utilities, planning and transportation agencies and air quality regulatory agencies. Emissions factors are drawn from a variety of sources, including the California Climate Action Registry, the Local Governments Operations Protocol (LGOP) version 1.1 (May 2010), and air quality models produced by the California Air Resources Board.

In this inventory, all GHG emissions are converted into carbon dioxide equivalent units, or CO_2e, per guidance in the LGOP version 1.1, AEP Protocol, and IEAP. The LGOP provides standard factors to convert various greenhouse gases into carbon dioxide equivalent units; these factors are known as Global Warming Potential factors, representing the ratio of the heat-trapping ability of each greenhouse gas relative to that of carbon dioxide.

The following sections describe the specific data sources and methodology for calculating GHG emissions in each community sector.

RESIDENTIAL AND COMMERCIAL/INDUSTRIAL SECTORS

All residential and commercial/industrial sector emissions are the result of electricity consumption and the on-site combustion of natural gas. Pacific Gas and Electric Company (PG&E) and Southern California Gas Company (SoCal Gas Co.) provided residential electricity and natural gas consumption data. Specifically, data was provided by:

- Jillian Rich, Program Manager with PG&E Green Communities and Innovator Pilots (jillian.rich@pge.com), and John Joseph, PG&E GHG Data Requests

- Paulo Morais, Energy Programs Supervisor with Southern California Gas Company, Customer Programs (pmorias@semprautilities.com)

The raw data received from PG&E and SoCal Gas Co. is summarized in **Tables 1** and **2** below. This raw data was input into the CACP2009 software in kWh and therms. PG&E provided a 2005 carbon dioxide (CO_2) coefficient for electricity use and SoCal Gas Co. provided a carbon dioxide (CO_2) coefficient for natural gas (see "electricity and natural gas coefficients" section). Emissions coefficients for methane (CH_4) and nitrogen dioxide (N_2O) emissions were provided by the California LGOP version 1.1 and were converted into carbon dioxide equivalents and added to the CO_2 emissions to obtain carbon dioxide equivalent (CO_2e) emissions.

All commercial/industrial sector emissions are the result of electricity consumption and the on-site combustion of natural gas. Commercial and industrial electricity were combined into one section by PG&E due to the California 15/15 Rule. The 15/15 Rule was adopted by the California Public Utilities Commission (CPUC) in the Direct Access Proceeding (CPUC Decision 97-10-031) to protect customer confidentiality. The 15/15 Rule requires that any aggregated information provided by the utilities must be made up of at least 15 customers. A single customer's load must be less than 15% of an assigned category. If the number of customers in the complied data is below 15, or if a single customer's load is more than 15% of the total data, categories must be combined before the information is released. The rule further requires that if the 15/15 Rule is triggered for a second time after the data has been screened already using the 15/15 Rule, the customer must be dropped from the information provided. As a result, PG&E aggregated commercial and industrial energy consumption into one report, whereas SoCal Gas Co. separated commercial and industrial gas usage (shown in the chart below) into two reports. It would have been misleading to present an "Industrial" category for only natural gas emissions; therefore, the SoCal Gas Co. emissions were aggregated with commercial as well.

TABLE 1: RESIDENTIAL ENERGY USE

2005 Residential Energy Emissions	Scope	Input Data Metric Tons	Metric Tons CO_2e per year
PG&E Electricity	2	71,151,775 kWh	15,912
SoCal Gas Co. Natural Gas	1	4,657,834 Therms	24,778

TABLE 2: COMMERCIAL/INDUSTRIAL ENERGY USE

2005 Commercial / Industrial Energy Emissions	Scope	Input Data	Metric Tons CO_2e per year
PG&E Commercial + Industrial Electricity	2	59,204,973 kWh	13,241
SoCal Gas Co. Commercial + Industrial Natural Gas	1	1,321,587 Therms	7,030

To make the Inventory more accurate and representative of the city's real impact on climate change, tailored coefficient sets were obtained from PG&E and the LGOP version 1.1. Sources and coefficient values are summarized in the table below.

TABLE 3: ELECTRICITY COEFFICIENT SETS

Coefficient Set	Unit	Value	Source
Average Grid Electricity Set	Lbs / MWh	489 CO_2 0.011 N_2O 0.03 CH_4	Jillian Rich, Program Manager with PG&E Green Communities and Innovator Pilots (jillian.rich@pge.com), and John Joseph, PG&E GHG Data Requests (ghgdatarequests@pge.com) and LGOP version 1.1

TABLE 4: NATURAL GAS COEFFICIENT SETS

Coefficient Set	Unit	Value	Source
Fuel CO_2 (Natural Gas) Set	kg/MMBtu	53.06 CO_2	Coefficient set provided by LGOP version 1.1
RCI Average Set – Residential	kg/MMBtu	0.0001 N_2O 0.005 CH_4	Coefficient set provided by LGOP version 1.1
RCI Average Set – Commercial + Industrial	kg/MMBtu	0.0001 N_2O 0.005 CH_4	Coefficient set provided by LGOP version 1.1

TRANSPORTATION SECTOR

On-road transportation emissions were derived from local jurisdiction vehicle miles traveled (VMT) data and regional vehicle and travel characteristics. The transportation analysis, conducted by Fehr & Peers, utilized the San Luis Obispo Council of Governments (SLOCOG) Regional Travel Demand model to develop transportation-related GHG emissions data and VMT for trips that have an origin and/or destination in the city.

The SLOCOG Travel Demand Model was recently updated and validated to reflect 2010 conditions and to comply with the Regional Transportation Plan (RTP) guidelines on implementation of Senate Bill 375 (SB 375). The update included expanding the times of day, calibration of multiple modes, and reflecting the auto and of non-auto RTP transportation system, all beneficial when quantifying potential GHG reduction strategies. A 2005 land use scenario was developed by extrapolating 2035 and 2010. Similarly, a 2020 land use scenario was developed by interpolating between 2010 and 2035. See *Summary for the San Luis Obispo Council of Governments Model Improvement Project to Meet the Requirements of California Transportation Commission Guidelines for Regional Transportation Plans in Response to SB375* (February, 2012) for details on model calibration and validation.

Using the model, Fehr & Peers allocated vehicle trips and VMT to each of the cities in San Luis Obispo County and the unincorporated county by weighting trips based on their origin and destination. The VMT summarized for land use with each of the incorporated cities and unincorporated county includes:

a) All of the VMT associated with trips made completely internally within each jurisdiction;

b) Half of the VMT generated by jobs and residences located within each jurisdiction but that travels to/from external destinations (this is consistent with the recent SB 375 Regional Targets Advisory Committee (RTAC) decision that the two generators of an inter-jurisdictional trip should each be assigned half of the responsibility for the trip and its VMT); and

c) None of the responsibility for travel passing completely through the jurisdiction with neither an origin point, or a destination within the city (also consistent with RTAC decision).

The gateways exiting the model area were included in the VMT calculation. This means that a jurisdiction will be held responsible for some VMT occurring outside of the model borders. For

example, if a household in Pismo Beach travels across the Santa Maria Bridge to Santa Barbara, or through San Luis Obispo City to reach King City.

To capture the effects of congestion, the model VMT for each time period were summarized by speed for each time period and then aggregated to daily. The VMT results are summarized in **Table 5** for the baseline year (2005) and **Table 6** for 2020.

TABLE 5: VEHICLE MILES TRAVELED PER JURISDICTION, 2005

Vehicle Miles Traveled per Jurisdiction, 2005	Vehicle Miles Traveled (VMT)	
	Average Weekday Daily	Average Annual[1]
Arroyo Grande	231,019	80,163,593
Atascadero	375,925	130,445,975
Grover Beach	116,140	40,300,580
Morro Bay	140,915	48,897,505
Paso Robles	424,515	147,306,705
Pismo Beach	324,400	112,566,800
San Luis Obispo	2,280,295	791,262,365
Unincorporated County	2,635,017	914,350,899
Total	6,528,226	2,265,294,422

1 Average Annual VMT was calculated by applying a multiplier of 347 to average weekday daily VMT to account for the total number of weekdays in one year based on the recommendation from Caltrans.

TABLE 6: VEHICLE MILES TRAVELED PER JURISDICTION, 2020

Vehicle Miles Traveled per Jurisdiction, 2020	Vehicle Miles Traveled (VMT)	
	Average Weekday Daily	Average Annual[1]
Arroyo Grande	267,068	92,672,596
Atascadero	501,605	174,056,935
Grover Beach	153,407	53,232,378
Morro Bay	167,302	58,053,794
Paso Robles	559,372	194,102,084
Pismo Beach	498,453	172,963,018
San Luis Obispo	3,298,712	1,144,653,064
Unincorporated County	3,378,180	1,172,228,460
Total	8,824,099	3,061,962,329

1 Average Annual VMT was calculated by applying a multiplier of 347 to average weekday daily VMT to account for the total number of weekdays in one year based on the recommendation from Caltrans.

The EMFAC2011 model developed by the California Air Resources Board was then used to calculate emissions from the VMT figures above. EMFAC defaults for San Luis Obispo County include regionally-specific information on the mix of vehicle classes and model years, as well as ambient conditions and travel speeds that determine fuel efficiency. Types of emissions accounted for include: running exhaust, idle exhaust, starting exhaust, diurnal, resting loss, running loss, and hot soak. The model estimates carbon dioxide, methane, and nitrous oxide emissions from these factors and inputted vehicle activity data.

WASTE SECTOR

Emissions from the waste sector are an estimate of methane generation from the decomposition of landfilled solid waste in the base year (2005). The methane commitment method embedded in CACP2009 is based on the U.S. Environmental Protection Agency's Waste Reduction Model (WARM) model for calculating life cycle emissions from waste generated within the jurisdictional boundary of the city in 2005. The analysis does not use the waste-in-place method, which calculates emissions from all waste generated in 2005 and all waste already existing in the landfill before the baseline year.

The waste sector only takes into account the waste sent to landfills from city residents, businesses, and institutions. It does not calculate emissions from the total amount of waste sent to county landfills (Paso Robles, Cold Canyon, and Chicago Grade) in 2005 since those landfills accept waste from the unincorporated county and incorporated cities.

Solid waste tonnage data per jurisdiction was provided by:

- "2005 Disposal Report" by quarter, prepared by the San Luis Obispo Integrated Waste Management Board on 3/6/06. Document provided by Peter Cron, San Luis Obispo County Integrated Waste Management Authority (pcron@iwma.com).

Since the composition of waste sent to landfill in 2005 is unknown for the city, the following statewide average waste composition study was utilized:

- CIWMB 2004 Statewide Waste Characterization Study, http://www.ciwmb.ca.gov/Publications/default.asp?pubid=1097.

The waste characterization study's distribution of waste by type was then converted into the five categories included in the CACP2009 software, which resulted in the following waste characterization:

- Paper products: 21.0%
- Food waste: 14.6%
- Plant debris: 6.9%
- Wood/textiles: 21.8%
- All other waste: 35.7%

The CACP2009 software does not have the ability to assign an individual methane recovery factor to each landfill; therefore, we took a weighted average (60%) based on the portion of waste in each landfill. The methane recovery factors of the landfills are well documented by the San Luis Obispo Air Pollution Control District based on the system operations at that time. **Table 7** includes the methane recovery factors for the Chicago Grade and Cold Canyon landfills. Emissions factors were obtain from the LGOP version 1.1.

TABLE 7: COMMUNITY GENERATED WASTE, 2005

Methane recovery and indicator inputs, 2005	Methane Recovery	Total gas generated (mmcf/yr)	Total gas transferred (mmcf/yr)	Data Source	Waste Tonnage from city, 2005 (tons)
Chicago Grade	60%	157.47	94.48	APCD 2005 Inventory	31,097
Cold Canyon	60%	700.00	420.00	APCD 2005 Inventory	26

OFF-ROAD VEHICLES AND EQUIPMENT SECTOR

Off-road emissions were obtained from the California Air Resources Board's OFFROAD2007 model. The model was run using default equipment population, usage, and efficiency data for San Luis Obispo County. Emissions outputs were scaled to the local jurisdiction level by indicators identified in **Table 8**. Results were converted from short tons per day to metric tons per year. Methane and nitrous oxide emissions were converted to carbon dioxide equivalent units based on the Global Warming Potential factors from LGOP version 1.1.

TABLE 8: COUNTY-WIDE EMISSIONS INDICATORS

Equipment Type	Allocation Indicator	Source
Agricultural Equipment	Acres of cropland	San Luis Obispo County, GIS shape files
Construction and Mining Equipment	Construction and mining jobs	U.S. Census Bureau, Center for Economic Studies, On the Map Tool
Industrial Equipment	Industrial jobs	U.S. Census Bureau, Center for Economic Studies, On the Map Tool
Lawn and Garden Equipment	Households	Economics Research Associates. (July 2006). SLOCOG Long Range Socio-Economic Projections. 2005 baseline data
Light Commercial Equipment	Service and commercial jobs	U.S. Census Bureau, Center for Economic Studies, On the Map Tool

The OFFROAD2007 software calculates emissions from other sources of off-road equipment as well, including recreational vehicles and watercrafts; however these emissions were not included because there was no feasible methodology for separating these emissions per jurisdiction within the county. Population is proven to not be an accurate indicator of consumption rates. To remain consistent with protocol and practice, emissions must be separated in a spatial manner, similar to how highway emissions are determined by road segment length within each jurisdiction. It should also be noted that many location-sources of off-road emissions, such as recreational vehicle emissions, occur in state parks or beaches outside of the jurisdiction of each city or the county.

2020 FORECAST

The GHG emissions forecast provides a “business-as-usual estimate,” or scenario, of how emissions will change in the year 2020 if consumption trends and behavior continue as they did in 2005, absent any new federal, state, regional, or local policies or actions that would reduce emissions. The year 2020 was selected for the forecast in order to maintain consistency with AB 32.

The 2020 forecast calculate business-as-usual growth based on population and job growth rates obtained from the San Luis Obispo Council of Governments report, "San Luis Obispo County 2040 Population, Housing & Employment Forecast" prepared by AECOM in August 2001. Mid-range estimates of growth were used in both instances (**Figures ES-5** and **6-1**). Specifically population growth rates were applied to residential, waste, off-road, and wastewater sectors; job growth rates were applied to the commercial/industrial sector. For the transportation sector, Fehr & Peers provided VMT estimates for the year 2020 as shown in **Table 6** above.

It should be noted that these forecasts do not take into consideration any planned or actual efficiency or conservation measures after 2005. For example, the State Renewable Energy portfolio has advanced significantly since 2005, but the forecast calculates 2020 energy emissions by assuming constant emissions factors.

APPENDIX D:
DETAILED METHODOLOGY FOR CITY GOVERNMENT OPERATIONS INVENTORY

APPENDIX D: DETAILED METHODOLOGY FOR GOVERNMENT OPERATIONS INVENTORY

Detailed Methodology for Government Operations GHG Emissions Inventory

The municipal operations inventory follows the LGOP version 1.1, which was adopted in 2010 by CARB and serves as the national standard for quantifying and reporting GHG emissions from local government operations.

BUILDING SECTOR

The building sector includes all emissions from natural gas and electricity consumed in City-owned and - operated buildings and facilities. Pacific Gas and Electric Company (PG&E) and Southern California Gas Company (SoCal Gas Co.) provided municipal electricity and natural gas consumption data respectively. Specifically, data was provided by:

- Jillian Rich, Program Manager with PG&E Green Communities and Innovator Pilots (jillian.rich@pge.com), and John Joseph, PG&E GHG Data Requests
- Paulo Morais, Energy Programs Supervisor with Southern California Gas Company, Customer Programs (pmorias@semprautilities.com)

This raw data was input into the CACP2009 software in kWh and therms. PG&E provided a 2005 carbon dioxide (CO_2) coefficient for electricity use and SoCal Gas Co. provided a carbon dioxide (CO_2) coefficient for natural gas. Emissions coefficients for methane (CH_4) and nitrogen dioxide (N_2O) emissions were provided by the California LGOP version 1.1 and were converted into carbon dioxide equivalents and added to the CO_2 emissions to obtain carbon dioxide equivalent (CO_2e) emissions (see **Appendix C**, **Tables 3** and **4**).

VEHICLE FLEET SECTOR

The vehicle fleet sector includes gasoline and diesel vehicles from the following City departments:

- Community Development
- Community Services
- Fire
- Police
- Public Works

Gasoline and diesel consumption for calendar year 2005 was obtained from fuel billing statements provided by the Finance Department. The Police Department provided their own fuel

usage data as there record keeping was more complete. Specific sources of data within each organization are outlined in the notes of **Appendix B**. Emissions were calculated using the EMFAC software for the San Luis Obispo region, consistent with the community methodology described in **Appendix C**.

EMPLOYEE COMMUTE SECTOR

Employees were surveyed in June 2009 using an online survey instrument. The questions, attached as **Appendix E**, asked employees about their current commuting patterns. Of those questions, we used the following for our analysis:

- What is your approximate one-way distance to work (in miles)? Please indicate the most direct distance to work, discounting midway destinations that would be taken whether or not you drove to work each day (i.e. dropping off children at school).
- Please indicate the type of transportation you take to work each day in your average work week. Please note that there are two types of carpooling.
  - ◇ Drive alone
  - ◇ Carpool with fellow City employees
  - ◇ Carpool with drivers not employed by the City
  - ◇ Vanpool
  - ◇ Public transit
  - ◇ Motorcycle
  - ◇ Bicycle
  - ◇ Walk
  - ◇ Telecommute
  - ◇ Other
- What type of vehicle do you drive?
- What type of fuel does your vehicle use?
- If you carpool with fellow City employees, how many City employees ride with you? If you carpool with a different number each day, please indicate the average.

Approximately 69 employees responded to the survey with usable information, meaning that all essential questions were answered. Answers with mileage left blank or with highly inconsistent

data (ex: saying they walked three days to work, biked two, and drove five) were omitted. In addition, if a respondent did not describe their 'other' category of transportation, the entry was omitted.

To perform this analysis, we took the following steps:

1) Separate entries by what type of vehicle they own and operate (compact, midsize car, full-size car, small truck, medium-small truck, large truck, motorcycle or "don't drive"). Within each new group, separate the entries by diesel, gasoline or hybrid.

2) For each group of entries with the same vehicle type and technology, multiply the number of miles to work by 2 (to get round-trip estimate) and then by the number of 'drive alone' days for each entry. Multiply the number of miles to work by the number of 'carpool' days (half of the 'drive alone' emissions). Note: If a respondent entered that they motorcycle to work, but own a car as well, the motorcycle miles were moved to the motorcycle category). Adjust for hybrids (see below).

3) Add all miles per vehicle type and technology and multiply by 52.18 work weeks/year.

4) Calculate the multiplier to adjust survey response data to the entire 2005 employee population. In 2005, there were 128 employees. This, divided by the 69 survey entries, gives us our multiplier of 1.74.

5) Multiply the mileage per vehicle per technology type by the multiplier.

6) Divide the number of hybrid miles by 2.2 and add the difference to the 'passenger car' category. This is to account for the large increase in hybrid sales between 2005 and 2009 (Source: Hybridcars.com sales statistics).

7) Manipulate the vehicle classes to fit the CACP2009 software categories.

8) Enter final miles into the CACP2009 software per vehicle type and fuel.

TABLE 1: 2009 EMPLOYEE COMMUTE SURVEY

Vehicle Group	2009 Survey Results		Adjusted for 2005	
	Annual VMT	Fuel Type		
Light Trucks	56,197.86	Gasoline	107,536.92	Gasoline
	313.08	Diesel	6,645.64	Diesel
Large Trucks	22,620.03	Gasoline	19,750.03	Gasoline
	16,843.70	Diesel	34,785.80	Diesel
Passenger Vehicle	138,885.77	Gasoline	34,785.80	Gasoline
Motorcycle	208.72	Gasoline		Gasoline
Total	306,621.16	Gasoline	610,176.11	Gasoline
	20,819.82	Diesel	41,431.44	Diesel

The CACP2009 software does not provide a method of calculating emissions from hybrid cars. As a result, these emissions were divided by 2.20 based on the difference between average fuel economy of a 2005 Toyota Prius and the average fuel economy included in the 2005 SLO EMFAC data and then entered into the CACP2009 software under 'passenger vehicle' (Source: www.fueleconomy.gov).

STREETLIGHT SECTOR

PG&E provided electricity usage from streetlights in kWh for 2005. The total kWh were entered into the CACP2009 software using the electricity coefficients identified in **Appendix C**.

WATER / SEWAGE

This sector calculates emissions from energy consumption associated with City-owned and operated water and wastewater facilities and point-source emissions that arise due to fermentation of degraded biomass in the wastewater lagoons. The Finance Department provided the electricity consumption for each of the water facilities. Operational data provided by the Wastewater Treatment Plant Manager was utilized to determine total methane and nitrous oxide emissions using ICLEI's Wastewater Emissions Data tool. Both of these sources are outlined in **Appendix B**. These totals were entered into the CACP2009 software with the electricity and natural gas coefficient sets outlined in **Appendix C**.

WASTE

Atascadero Waste Alternatives reported solid waste tonnage produced by City operations. The City produced 168.65 tons of waste in 2005 that was sent to managed landfill. The waste composition was unknown for the city; therefore, the California averages provided by the 2004 California Integrated Waste Management Board Waste Characterization Report were used. A weighted average methane recovery factor of 60% was used in this analysis, as outlined in **Appendix C**.

APPENDIX E:
CITY EMPLOYEE COMMUTE SURVEY, 2009

City Employee Commute Survey, 2009

1) What is your approximate on-way distance to work (in miles)? Please indicate the most direct distance to work, discounting midway destinations that would be taken whether or not you drove to work each day (i.e. dropping off children at school).

_____

2) Please indicate the type of transportation you take to work each day in your average work week. Please note that there are two types of carpooling.

	Day 1	Day 2	Day 3	Day 4	Day 5
Drive Alone	☐	☐	☐	☐	☐
Carpool with fellow City employees	☐	☐	☐	☐	☐
Carpool with other drivers not employed by the City	☐	☐	☐	☐	☐
Vanpool	☐	☐	☐	☐	☐
Public transit	☐	☐	☐	☐	☐
Motorcycle	☐	☐	☐	☐	☐
Bicycle	☐	☐	☐	☐	☐
Walk	☐	☐	☐	☐	☐
Telecommute	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐

3) What type of vehicle do you drive?

- ☐ Compact/Sub-Compact car (Civic, Corolla, Focus, Neon, Cavalier, Jetta or similar)
- ☐ Mid-size car (Accord, Camry, Passat, Monte Carlo, Sable, Sebring or similar)
- ☐ Full-size car (Impala, Intrepid, Taurus, Crown Victoria, Bonneville, Town Car or similar)
- ☐ Small Truck/SUV/Pickup (RAV4, Chev S10, Pickup (4 cylinder), PT Cruiser or similar)
- ☐ Medium-Small Truck/SUV/Pickup (Minivan, Sonoma Pickup Truck or similar)
- ☐ Medium-Large Truck/SUV/Pickup (Durango, Safari Cargo Van, Ford F150 or similar)
- ☐ Large Truck/SUV/Pickup (Suburban, Expedition, Navigator, Ford E250/350/450 or similar)
- ☐ Motorcycle
- ☐ I don't drive alone or drive a carpool

4) What type of fuel does your vehicle from question 3 use?

- ☐ Gasoline
- ☐ Diesel
- ☐ Biodiesel
- ☐ Hybrid
- ☐ Electric
- ☐ I don't drive to work or drive a carpool
- ☐ Other (Specify): _____

5) If you carpool or vanpool with fellow City employees, home may City employees ride with you? If you carpool with a different number each day, please indicate the average. If 'not applicable', please enter "0".

Enter # of people: _____

APPENDIX B

TECHNICAL APPENDIX

GHG Measure Quantification Details

Several factors including GHG reduction potential as well as economic impacts were key factors in evaluating and selecting GHG emissions reduction measures for Atascadero's CAP. This appendix displays pages from the measure evaluation toolbox which detail the methodology, information sources, and assumptions for the GHG reduction potential and cost and savings estimates included in the CAP.

This appendix also contains details regarding the quantification of existing local measures and State reductions which were included in the adjusted forecast as described in Chapter 2 of the CAP.

About the CAP Measure Methods and Calculations

The GHG emission reduction potential of a given measure is quantified following standardized methods for estimating emissions detailed in the California Air Pollution Control Officers Association's (CAPCOA) report Quantifying Greenhouse Gas Mitigation Measures (August 2010). The calculations utilize emissions factors and results from the Atascadero' GHG Emissions Inventory, as well as assumptions made by the City about the degree of implementation in the year 2020.

Costs and savings directly associated with the implementation of each measure were estimated for the City, as well as for residents and businesses, where feasible. Cost estimates generally include initial capital costs (e.g., purchase and installation of technology, program development, etc.) needed to produce the emission reductions estimated by the GHG analysis in 2020, and are based on current (2013) prices. Savings include reduced costs associated with electricity, natural gas, and fuel usage, as well as the reduced need for maintenance, and are also based on current (2013) prices. Costs and savings were estimated using information specific to the region—when available—or for similar cities in the region, State of California, or United States, prioritized in that order. There are numerous factors that will affect the actual costs incurred if the measures are implemented. Because of the uncertainties and variability associated with costs and savings, they are reported as ranges in Chapters 3 and 4 of the CAP.

C-1 City Government Energy Efficiency Retrofits and Upgrades

Calculation Methodology and Equations

Key Assumptions for Calculations:

Target percentage of energy savings	20%	Percent
Staff time needed for this measure	0.20	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Municipal Electricity Energy Savings (kWh)=Em x P x 0.95 Municipal Natural Gas Savings (therms)=NGm x P x 0.05		
	Where:		
	Em=	2,299,617	Municipal electricity usage (GHG Emissions Inventory)
	NGm=	12,875	Municipal natural gas usage (GHG Emissions Inventory)
	P=	20%	Target percentage of energy savings (applied 95% electricity, 5% natural gas)
Resource Savings	436,927	Municipal electricity saved (kWh/year)	
	129	Municipal natural gas saved (therms/year)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e)=(Se/1,000 × 0.133)+(Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	10	= conversion factor for therm to MMBtu	
	0.133	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	59	MT CO2e	
Municipal Cost and Savings Calculations	Staff time needed to apply for funding and implement the upgrades.		
	FTE =	0.20	Estimated staff time per year to develop new program
	$/FTE=	$100,000	FTE cost
	Cost of staff time =	$20,000	Dollars
	Total Savings = kWh reduced/year x $/kWh + therms reduced/year x $/therm		
	Where:		
	$/kWh =	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	$/Therm =	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
Municipal Cost and Savings	Municipal Cost =	Varies	Dollars (costs will vary based on the level of implementation and financial rebates)
	Municipal Savings =	$83,135	Dollars

Notes

Actual energy and greenhouse gas emissions savings proposed upgrades. A study of building commissioning found whole-building energy savings of 15% at a cost of $0.27 per square foot (LBNL). An estimate of LEED for Existing Buildings found the program reduced energy use by 20% (SPUR).

Implementation Resources: PG&E webpage for local governments - http://www.pge.com/mybusiness/energysavingsrebates/incentivesbyindustry/government/local/

References

1. 2005 California End Use Survey http://www.energy.ca.gov/ceus/
2. Lawrence Berkeley National Laboratory. 2004. Cost-Effectiveness of Commercial-Buildings Commissioning: A Meta-Analysis of Energy and Non-Energy Impacts in Existing Buildings and New Construction in the United States (page 1). www.ga.wa.gov/eas/bcx/Cx_Cost Effectiveness.pdf
3. SPUR - San Francisco Commercial Energy Ordinance http://www.spur.org/publications/library/report/critical_cooling/option4

C-2 City Government Energy Efficient Public Realm Lighting

Calculation Methodology and Equations

Key Assumptions for Calculations:

Number of LED street lights installed by 2020	50	Street Lights
Number of LED traffic signals installed by 2020	50	Traffic Signals
Number of LED or CFL other outdoor lights installed by 2020	150	Other Outdoor Lights
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Total electricity saved (kWh) = (N x (Wi-We) x (h/Cf))		
	Where Street Lights:		
	N_{street} =	50	Number of street lights installed lights
	Wi =	200	Average estimated power rating in watts of high pressure sodium street light (Department of Energy [DOE] 2004. National Lighting Inventory and Energy Consumption Estimate)
	We =	50	Average power rating in watts of LED street lighting (DOE and PG&E 2008. LED Street Lighting)
	h =	4,100	Number of hours per year operating
	Cf =	1,000	Conversion factor for W to kW
	Where Traffic Signals:		
	$N_{traffic}$ =	50	Number of traffic installed lights
	Wi =	150	Average estimated power rating in watts of incandescent traffic signal light. (U.S.Department of Energy, 2004 in Stockton Climate Action Plan).
	We =	15	Average power rating in watts of LED traffic signal light (CAPCOA 2010)
	h =	8,760	Number of hours per year operating (24 hours a day)
	Cf =	1,000	Conversion factor for W to kW
	Where Other Private Outdoor Lighting (in Public Realm):		
	N_{other} =	150	Number of other outdoor installed lights
	Wi =	200	Average estimated power rating in watts of public realm lighting (Department of Energy [DOE] 2004. National Lighting Inventory and Energy Consumption Estimate)
	We =	50	Average power rating in watts of LED public realm lighting (DOE 2004)
	h =	3,650	Number of hours per year operating
	Cf =	1,000	Conversion factor for W to kW
Resource Savings	30,750	Electricity saved from LED street lights (kWh)	
	59,130	Electricity saved from LED traffic signals (kWh)	
	82,125	Electricity saved from LED "other" public realm lighting (kWh)	
	172,005	Total electricity saved (kWh)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e)=(Se/1,000 × 0.133)		
	Where:		
	Se=	electricity savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	0.133	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
GHG Emission Reduction	23	MT CO2e/year	
	Total energy savings = kWh reduced/year * $/kWh		
	Where:		
	$/kWh =	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total annual energy cost savings=	$32,681	Dollars per year
	Maintenance savings per fixture =	$17	Annual maintenance savings/fixture (Palo Alto)
	Some staff time may be needed to implement the program.		
	FTE =	0.1	Estimated staff time per year to develop new program

Municipal Costs and Savings Calculations	$/FTE=	$100,000	FTE cost
	Cost of staff time =	$10,000	Dollars
	Total Capital Cost = [Number of units installed x cost per unit] – [Available rebates]		
	Where Streetlights:		
	Number of units installed =	50	Units
	Cost per unit installed =	$350	Dollars/unit (Energy Solutions 2008; PNNL 2010)
	Total cost=	$17,500	Dollars
	Available rebates =	$125	Dollars/unit ($125 for 200 watt unit replaced - PG&E)
	Net cost =	$11,250	Dollars (total cost - available rebates)
	Where Traffic Signals:		
	Number of units installed =	50	Units
	Cost per unit installed =	$193	Dollars/unit (assuming a standard three 12" (red, yellow, and green) balls per signal (Western Pacific Signal 2011; eLightBulbs 2011))
	Cost installation =	$9,650	Dollars
	Available rebates =	$100	Dollars ($100 for 150 watt unit replaced - PG&E)
	Net cost =	$4,650	Dollars (total cost - available rebates)
	Where Other Private Outdoor Lighting (in Public Realm):		
	Number of units installed =	150	Units
	Cost per unit installed =	$300	Dollars/unit (Energy Solutions 2008; PNNL 2010)
	Cost installation =	$45,000	Dollars
	Available rebates =	$100	Dollars ($100 for 150 watt unit replaced - PG&E)
	Net cost =	$30,000	Dollars (total cost - available rebates)
Municipal Costs and Savings	Municipal Cost =	$55,900	Dollars
	Municipal Savings =	$33,731	Dollars

Notes

Lamp wattage varies. Stationary source outdoor lights range from 83W to 407 W (DOE, page 48). LED lamps are typically under 100 W (DOE and PG&E).

References

1. PG&E Streetlight program - http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/ref/lighting/lightemittingdiodes/streetlightprogram.shtml
2. DOE National Lighting Inventory and Energy Consumption Estimate http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/lmc_vol1_final.pdf
3. DOE and PG&E LED Street Lighting study - http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/gateway_sf-streetlighting.pdf
4. PG&E LED Streetlight Rebates - http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/ref/lighting/lightemittingdiodes/incentives/index.shtml
5. Western Pacific Signal 2011; eLightBulbs 2011; Energy Solutions 2008; PNNL 2010 from Stockton Draft CAP - http://www.stocktongov.com/files/ClimateActionPlanDraftFeb2012.pdf
6. Palo Alto - Demonstration Assessment of Light-Emitting Diode (LED) Roadway Lighting on Residential and Commercial Streets - http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/gateway_palo-alto.pdf

C-3 Renewable Energy Systems on City Property

Calculation Methodology and Equations

Key Assumptions for Calculations:

kW of municipal solar PV installations by 2020	675	kW
Number of solar hot water heaters	2	Systems
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Municipal Electricity Energy Savings (kWh)=(kW × 1,900) + (Msw × Ee)		
	Where:		
	Msi=	675	kW of solar installations by 2020
	Msw=	0.2	# of solar electric water heater installations by 2020
	Mswg=	1.8	# of solar natural gas water heater installations by 2020
	Ee=	2,945	average expected municipal solar water heater savings in kWh per year (California Solar Initiative (CSI 2) Thermal Program Cal Solar statistics)
	Eg=	139	average expected municipal solar water heater savings in therms per year (CSI 2 - 2012 Thermal Program Cal Solar statistics)
	Conversion factor=	1,900	conversion factor from kW to kWh per year (Solar Energy Industries Association [SEIA] Solar Radiation Conversion Map)
Resource Savings	250	Municipal natural gas saved (therms/year)	
	1,283,089	Municipal electricity saved (kWh/year)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	10	= conversion factor for therm to MMBtu	
	0.133	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reductions	172	MT CO2e	
Municipal Costs and Savings Calculations	Municipal cost savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Commercial $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/therm=	$0.81	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Staff time to obtain grant funding and implement project		
	FTE =	0.1	Estimated staff time to develop new program
	$/FTE	$100,000	Dollars per year
	Total Staff Cost=	$10,000	Dollars per year
	Total Capital Cost = Total Cost of Solar Units (bulk purchase + installation) + Total Staff Cost - Available Rebates		
	Where:		
	Commercial solar installation cost =	$4.38	Commercial Solar Installations per watt (Green Tech Media)
	Total solar PV installation cost =	$5,617,350	Average capital cost per kW (CSI statistics)
	Solar water heater cost =	$4,650	Dollars (Incremental installed cost of solar hot water heater (National Renewable Energy Lab, August 2012))
	Available rebates =	$2,175	Dollars (available Rebate for replacing natural gas heater with solar (Go Solar CA))
	Cost of solar hot water heater with rebate =	$2,475	Dollars (cost of solar hot water heater installation minus rebate)
	Total cost of solar water heaters =	$4,950	Dollars
Municipal Costs and Savings	Municipal Cost =	$5,632,300	Dollars
	Municipal Savings =	$238,857	Dollars

Notes

Municipal installation size assumptions are the averages for PV installations in California. The installation size uses the CSI rating, which accounts for a design factor, and is a more accurate reflection of energy generated by the installation. Municipal solar water heater savings is an average of the expected savings for all the projects that have applied for the CSI-Thermal
The model assumes that solar water heaters are installed in combination with both electric and natural gas water heaters. The model assumes that 90% of the systems installed offset natural gas water heaters; 10% offset electric water heaters.

References

1. California Solar Initiative (CSI) - http://www.californiasolarstatistics.ca.gov/
2. California Solar Initiative CSI-Thermal Program - http://www.gosolarcalifornia.ca.gov/solarwater/index.php
3. CEC Planning and Permitting Resources For Renewable Energy Systems -http://www.energy.ca.gov/localgovernment/planning_resources/
4. SEIA Solar Radiation Conversion Map - http://www.getsolar.com/blog/what-can-one-kilowatt-of-solar-do-for-you/13483/
5. http://www.greentechmedia.com/research/ussmi
6. National Renewable Energy Lab, August 2012 - http://www.nrel.gov/solar/
7. Go Solar CA - http://www.gosolarcalifornia.ca.gov/

C-4 Zero and Low Emission City Fleet Vehicles

Calculation Methodology and Equations

Key Assumptions for Calculations:

Number of municipal vehicles replaced by 2020	5	Vehicles
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Fuel savings (gallons) = V x M (1/Fi - 1/Fe)		
	Where:		
	Number of vehicles replaced (V) =	5	Vehicles
	Average miles driven per year (M) =	13,500	Miles per year (FHWA)
	Average fuel economy of replaced vehicles (Fi) =	10	Miles per gallon
	Average fuel economy of newer (more efficient) vehicles (Fe) =	50	Miles per gallon
Resource Savings	Fuel Savings =	5,400	Gallons of gasoline fuel
GHG Emission Reduction Calculations	GHG reduced (MT CO2e) = Fuel savings (gallons gasoline) x 8.81 / 1,000		
	8.81	= GHG emission from gasoline (kg CO2/gallon)	
	1,000	= Conversion from kg to metric tons	
GHG Emission Reduction	Total GHG Savings	48	MT CO2e
Municipal Costs and Savings	Energy cost per mile of regular gasoline vehicle =	$0.1468	Dollars per mile (standard car. Ex, Toyota Corolla) (RechargeIT)
	Energy cost per mile of hybrid vehicle =	$0.0690	Dollars per mile (Electric vehicles. Ex, Toyota Prius Plug-in Hybrid, RechargeIT)
	Difference in energy cost per mile =	$0.0778	Dollars per mile
	Estimate average miles driven per year =	13,500	Miles per year
	Difference in purchase price for hybrid above similar non-hybrid vehicle =	$4,315	Dollars (US DOE)
Municipal Costs and Savings	Municipal Costs =	$21,575	Dollars (Assumes no staff time needed above that required for purchasing regular gasoline vehicles.)
	Municipal Savings =	$3,151	Dollars

Notes

See RICAPS, Strategy TM4.

References

1. Federal Highway Administration (FHWA). Average Annual Miles per Driver. http://www.fhwa.dot.gov/ohim/onh00/bar8.htm
2. RechargeIT Driving Experiment: Demonstration of energy efficiency for electric vehicles. Google, org, 2007. http://www.google.org/recharge/
3. US Department of Energy (US DOE)- fueleconomy.gov

C-5 City Government Solid Waste Reduction

Calculation Methodology and Equations

Key Assumptions for Example Calculations:

Target diversion rate (2020)	15%	Percent
Number of new recycling receptacles	20	Recycling Receptacles
Staff time needed for this measure	0.1	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Tons Diverted = Landfilled Tonnage x Targeted Diversion Rate		
	Total City Future Year (2020) Solid Waste Tonnage =	169	Tons
	Paper Products =	21.0%	Percent
	Food Waste =	14.6%	Percent
	Plant Debris =	6.9%	Percent
	Wood/Textiles =	21.8%	Percent
	All Other Waste =	35.7%	Percent
	Future Year Paper Products =	35	Tons
	Future Year Food Waste =	25	Tons
	Future Year Plant Debris =	12	Tons
	Future Year Wood/Textiles =	37	Tons
	Future Year All Other Waste =	60	Tons
	Paper Products Diverted =	5.3	Tons
	Food Waste Diverted =	3.7	Tons
	Plant Debris Diverted =	1.7	Tons
	Wood/Textiles Diverted =	5.5	Tons
	All Other Waste Diverted =	9.0	Tons
Resource Savings	Future Year Total Waste Diverted =	25.4	Tons
	Total MT CO2e Diverted = (2.138)(Paper Products)(0.9072) + (1.120)(Food Waste)(0.9072) + (0.686)(Plant Debris)(0.9072) + (0.605)(Wood/Textiles)(0.9072) + (0.00)(All Other Waste)(0.9072) 1 - Emission Reduction Per Waste Category = Emissions Factor for Category x Future Year Category Tonnage Diverted x 0.9072 x (1 - Emissions captured at landfill)		
	0.9072	= Conversion from tons to metric tons	
	Emission Factor - Paper Products	2.138	MT CO2e / MT waste
	Emission Factor - Food Waste	1.210	MT CO2e / MT waste

GHG Emission Reduction Calculations	Emissions Factor - Plant Debris	0.686	MT CO2e / MT waste
	Emission Factor - Wood/Textiles	0.605	MT CO2e / MT waste
	Emission Factor - All Other Waste	0.000	MT CO2e / MT waste
	Emissions from Paper Products =	10	Metric Tons CO2e
	Emissions from Food Waste =	4	Metric Tons CO2e
	Emissions from Plant Debris =	1	Metric Tons CO2e
	Emissions from Wood/Textiles =	3	Metric Tons CO2e
	Emissions from All Other Waste =	0	Metric Tons CO2e
	Emissions captured at landfill =	60%	Percent
GHG Emission Reduction	Total GHG Emissions Reductions =	7	Metric Tons CO2e
Municipal Costs and Savings Calculations	Cost may include additional staff time.		
	FTE =	0.1	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Total staff time costs =	$10,000	Dollars
	Capital cost to City =	$10,000	Dollars (Assumes average cost of commercial recycling receptacle is $500.)
	Maintenance cost to City =	$400	Dollars
Municipal Costs and Savings	Municipal Costs=	$20,400	Dollars
	Municipal Savings=	$0	Dollars

Notes

All cities are assumed to have a baseline year diversion rate of 50%. This diversion has already been accounted for in the baseline year landfilled solid waste tonnage.

CAGR growth rates were calculated based on population growth.

GHG Emissions Calculations assume a landfill methane recovery rate of 60%.

ICLEI's CACP software incorporates emission factors for the diversion of certain materials from the waste stream, derived from the EPA WARM model.

Assumes average cost of a commercial recycling receptacle to be $500 and ongoing additional maintenance to be $20 per receptacle.

References

1. DRAFT City of Stockton Climate Action Plan (February 2012) - pg. C-77,C-78

2. Hayward Climate Action Plan (October, 2009) - pg. 170

3. County of San Bernardino Greenhouse Gas Emissions Reduction Plan (September 2011) - pg. 91

4. EPA's Waste Reduction Model (WARM), available at: http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

5. ICELI's Clean Air Climate Protection (CACP) Software (for members), available at: http://www.icleiusa.org/action-center/tools/cacp-software

C-6 City Government Tree Planting Program

Calculation Methodology and Equations

Note: There is no reduction in GHG emissions associated with preservation of existing trees or trees that are planted as mitigation for trees removed. Trees accounted for here are in addition to those identified for the community tree planting measure. See notes section below for additional detail.

Key Assumptions for Calculations:

Target number of trees planted on City-owned property	2,000	Trees
Capital cost per tree ($0 if to be paid for through grant funding)	$60	Dollars per Tree
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction Calculations	GHG Emissions Reductions = Number of Trees Planted x Carbon Sequestration Rate		
	0.0121	= Average carbon sequestration (MT CO_2/Tree) (CAPCOA)	
	2,000	= Number of Trees Planted	
GHG Emission Reduction	Annual GHG emissions reduced =	24	MT CO_2e
Municipal Costs and Savings Calculations	Capital cost = (cost per tree x number of trees planted)		
	Where:		
	Cost per tree=	$60	Dollars
	Number of trees planted=	2,000	Trees
	Capital cost to City=	$120,000	Dollars
	Maintenance cost = maintenance cost per tree x number of trees planted		
	Where:		
	Maintenance cost=	$34	Dollars/tree (McPherson, et al)
	Maintenance costs =	$68,000	Dollars
	Staff time needed to develop policy/ordinance and apply for funding.		
	FTE =	0.10	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Staff time cost =	$10,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$198,000	Dollars
	Municipal Savings =	$0	Dollars

Notes

According to the California Air Resources Board and California EPA Compliance Offset Protocol Urban Forests Projects (October 2011) and Intergovernmental Panel on Climate Change's (IPCC) Guidelines for National Greenhouse Gas Inventories Volume 4 (2006), there is no reduction in GHG emissions associated with the preservation of existing trees or open space or trees planted as a result of mitigation for trees removed. To account for reductions associated with trees and vegetation, there must be a "net gain" in trees or vegetated open space since 2005.

References

1. California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010) - pg. 403
2. McPherson, et al as cited in Stockton Draft CAP - http://www.stocktongov.com/government/boardcom/clim.html

C-7 Wastewater Treatment Methane Capture

Calculation Methodology and Equations

Key Assumptions for Example Calculations:

Target Additional Methane Recovery	36%	Percent
Current Wastewater Treatment Plant Methane Recovery	0%	Percent
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction Calculation	MT CO2e Reduction = GHG Emissions from Methane x Target Additional Methane Recovery x Effectiveness		
	GHG Emissions from Methane =	2,868	Projected (2020) GHG Emissions from Wastewater (MT CO2e)
	Target Additional Methane Recovery =	36%	Percent
	Effectiveness Factor =	95%	Percent (95-97% from CAPCOA AE-6. 95% used as a conservative estimate)
GHG Emission Reduction	Total GHG emissions reduction =	Unknown	Metric Tons CO2e
Municipal Costs and Savings Calculations	FTE =	0.10	Estimated staff time
	Capital Cost =	Unknown	Dollars
Municipal Costs and Savings	Total Cost =	Unknown	Dollars

Notes

Effectiveness Factor 95-97% from CAPCOA Measure AE-6. Used 95% as a conservative estimate.

References

1. California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010) - p. 150; AE-6
2. City of Atascadero Sphere of Influence Update Municipal Services Review (September 2011)

E-1 Energy Efficiency Outreach and Incentive Programs

Calculation Methodology and Equations

Key Assumptions for Calculations:

Percent of households participating by 2020	40%	Percent
Percent of businesses participating by 2020	40%	Percent
Targeted percent residential energy savings	10%	Percent
Targeted percent commercial energy savings	10%	Percent
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Residential Electricity Savings (kWh) = Rp × Rs x 95% x Re Residential Natural Gas Savings (therms) = Rp × Rs x 5% x Rn Commercial Electricity Savings (kWh) = Cp x Cs x 95%x Ce Commercial Natural Gas Savings (kWh) = Cp x Cs x 5% x Cn		
	Where:		
	Rp=	40%	Percent of residences participating in rebate and programs by 2020
	Cp=	40%	Percent of businesses participating in rebate and incentive programs by 2020
	Rs=	10%	Percent residential energy savings (applied 95% electricity, 5% natural gas)
	Cs=	10%	Percent commercial energy savings (applied 95% electricity, 5% natural gas)
	Re=	76,613,150	2020 residential electricity usage (kWh)
	Rn=	4,967,026	2020 residential natural gas usage (therms)
	Ce=	63,955,884	2020 commercial electricity use (kWh)
	Cn=	1,423,890	2020 commercial natural gas usage (therms)
Resource Savings	2,911,300	Residential electricity saved (kWh)	
	9,934	Residential natural gas saved (therms)	
	2,430,324	Commercial electricity saved (kWh)	
	2,848	Commercial natural gas saved (therms)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.2/1,000)		
	Where:		
	Se=	Residential or commercial electricity savings	
	Sg=	Residential or commercial natural gas savings	
	1,000	= Conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	10	= Conversion factor for therm to MMBtu	
	0.133	= Average projected emissions factor for electricity in 2020 in MT CO_2e/MWh	
	53.20	= Average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	440	Residential Reduction (MT CO2e)	
	338	Commercial Reduction (MT CO2e)	
	778	Total Reduction (MT CO2e) in 2020	
Municipal Costs and Savings Calculations	Staff time to participate in and promote existing programs.		
	FTE =	0.05	Estimated staff time per year
	$/FTE=	$100,000	FTE cost per year
Municipal Costs and Savings	Municipal Cost =	$5,000	Dollars
	Municipal Savings =	$0	Dollars
	Total savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		

Community Costs and Savings Calculations	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/therm=	$0.81	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total residential savings=	$562,286	Dollars per year
	Total commercial savings=	$454,347	Dollars per year
	Households =	11,893	Total number of households projected in 2020
	Households participating =	4,757	Households participating by 2020
	Commercial units =	2,130	Total number of projected commercial units in 2020
	Commercial units participating =	852	Commercial units participating by 2020
Community Cost and Savings	Residential Cost =	Varies	Dollars per household
	Commercial Cost =	Varies	Dollars per business
	Residential Savings =	$118	Dollars per household
	Commercial Savings =	$533	Dollars per business

Notes

Assumes that of the total percent reduction in energy use, 95% applies to electricity and 5% applies to natural gas.

References

1. Pacific Gas and Electricity Company. 2012. Energy Overview Tableau Reports.
2. Rincon Consultants. November 2012. Cities Greenhouse Gas Emissions Inventories.
3. California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast

E-2 Energy Audit and Retrofit Program

Calculation Methodology and Equations

Key Assumptions for Calculations:

Number of households audited by 2020	700	Units
Number of businesses audited by 2020	525	Units
Target percentage of energy savings	25%	Percent
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Residential Square Feet (Rsf) = Ru × 1,545 Residential Electricity Energy Savings (kWh)=E × 0.40 × Rsf × 3.5 Residential Natural Gas Savings (therms)=E × 0.40 × Rsf × 0.3		
	Ru=	700	# residential units audited by 2020
	Average residential unit size=	1,545	Square feet/dwelling unit (California Energy Commission [CEC] 2010 Residential Appliance Saturation Survey [RASS])
	Audit to retrofit conversion rate=	40%	Percentage of units that receive an audit that complete energy efficiency installation (Energy Savvy)
	Rsf=	432,600	# square feet of residential space retrofitted by 2020
	E=	25%	Target percentage of energy savings
	Residential electricity use intensity=	3.5	kWh/square foot/year (Average electric use intensity for residential buildings in kWh/square foot/year [RASS]).
	Residential natural gas use intensity=	0.3	Therms/square foot/year (Average natural gas usage intensity for residential buildings in therms/square foot/year [RASS]).
	Commercial Square Feet (Csf) = Cu × 4,500 Commercial Electricity Energy Savings (kWh)=E × 0.40 × Csf × 12.95 Commercial Natural Gas Savings (therms)=E × 0.40 × Csf × 0.3		
	Where:		
	Cu=	525	# of commercial units or buildings audited by 2020
	Average commercial unit size=	4,500	Average commercial unit/business size in square feet
	Audit to retrofit conversion rate=	40%	Percentage of units that receive an audit that complete energy efficiency installation (Energy Savvy)
	Csf=	945,000	Square feet of commercial space upgraded by 2020
	E=	25%	Target percentage of energy savings
	Commercial electricity use intensity=	12.95	kWh/square foot/year (Average electric use intensity for commercial buildings in kWh/square feet/year (California Energy Commission [CEC] 2005 California End Use Survey [CEUS], page 184)).
	Commercial natural gas use intensity=	0.3	therms/square foot/year (Average natural gas usage intensity for commercial buildings in therms/square feet/year (CEC 2005 CEUS, page 184)).
Resource Savings	383,922	Residential electricity saved (kWh)	
	37,842	Residential natural gas saved (therms)	
	3,060,619	Commercial electricity saved (kWh)	
	82,685	Commercial natural gas saved (therms)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.20/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric	
	10	= conversion factor for therm to MMBtu	
	0.133	= average projected 2020 electricity emissions factor (MT CO2e/MWh)	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	252	Residential Reduction (MT CO2e) in 2020	
	847	Commercial Reduction (MT CO2e) in 2020	
Municipal Cost and Savings Calculations	Staff time developing and administering program.		
	FTE =	0.10	Staff time needed for this measure
	$/FTE=	$100,000	Cost associated with staff time

Municipal Cost and Savings	Municipal Cost=	$10,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Total savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/therm=	$0.81	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	$107,759	Residential Savings ($/year)	
	$636,250	Commercial Savings ($/year)	
	Total Cost of residential retrofit =	$3,000	Cost per home (average ACEEE)
	Available residential rebates =	$2,500	Energy Upgrade California offers rebates ranging from $2,000-$4,000 ($2,500 rebate for 25% energy savings).
	Total cost of commercial retrofit =	$4,545	Cost per commercial unit ($1.01 per square foot - AECOM 2010; Gregerson 1997)
	Available commercial rebates =	$2,273	PG&E offers $0.09/kWh (PG&E Customized Retrofit Incentives) and SCE offers $1.00/therm (SCE Financial Incentives for Energy Efficiency) for retrofit projects, with the total incentive capped at 50% of the measure cost
Community Costs and Savings	Residential Cost =	$500	Dollars per household
	Commercial Cost =	$2,273	Dollars per business
	Residential Savings =	$154	Dollars per household
	Commercial Savings =	$1,212	Dollars per business

Notes

This is based on average energy consumption. Programs that emphasize audits and retrofits to buildings constructed prior to Title 24 (1980), will see greater reductions.

Audit to retrofit conversion rates and energy savings vary significantly by program. In a study of 16 audit programs around the country, audit to retrofit conversion rates ranged from 30% to 50% (Energy Savvy). In a study of 7 residential audit programs between 2000 and 2004 in California, expected savings ranged from 50 kWh per audit to 800 kWh per audit (NEEBPG). This represents between 1% and 15% of energy use (NEEBPG).

References

1. Energy Savvy - Energy Audit Programs That Work http://www.energysavvy.com/blog/2010/09/14/energy-audit-programs-that-work/
2. NEEBPG - Residential Audit Programs Best Practices Report http://www.eebestpractices.com/pdf/BP_R7.PDF
3. California Energy Commission [CEC] 2010 Residential Appliance Saturation Survey [RASS] - http://www.energy.ca.gov/appliances/rass/
4. PG&E Energy House Calls - http://www.energyhousecalls.com/?WT.mc_id=GSEHC154&WT.srch=1&gclid=CJ6xi8_jmLMCFQSqnQodsAEAiA
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8. PG&E Third Party Screen and Certification of Home Improvement Contractors - http://www.egia.org/Academy/rockymountainexchange2011/docs/JaneKruse.pdf
9. PG&E Customized Retrofit Incentives - http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/ief/
10. SCE Financial Incentives for Energy Efficiency - http://www.socalgas.com/documents/business/EECIPFactSheet.pdf
11. U.S. Department of Energy (DOE). 2011a. Home Energy Saver. Available: <http://hes.lbl.gov/consumer>. Accessed: July 6, 2011.
12. American Council for an Energy-Efficient Economy (ACEEE), Berkeley RECO Case Study - http://aceee.org/sector/local-policy/case-studies/berkeley-california-residential-energ

E-3 Income-Qualified Energy Efficient Weatherization Programs

Calculation Methodology and Equations

Key Assumptions for Calculations:

Residential units upgraded by 2020	100	Units
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Residential Square Feet (Rsf) = Ru × 1,545 Residential Electricity Energy Savings (kWh)=E × Rsf × 3.5 Residential Natural Gas Savings (therms)=E × Rsf × 0.3		
	Ru=	100	Residential units upgraded by 2020
	Average residential unit size=	1,545	Square feet/dwelling unit California Energy Commission [CEC] 2010 Residential Appliance Saturation Survey [RASS])
	Rsf=	154,500	Square feet of residential space upgraded by 2020
	E=	35%	Average first-year weatherization energy savings (Oak Ridge National Laboratory (ORNL) 2010 Weatherization Assistance Program Technical Memorandum: Background Data and Statistics. Page 5.)
	Residential electricity use intensity=	3.5499	kWh/square foot/year (Average electric use intensity for residential buildings in kWh/square foot/year [RASS]).
	Residential natural gas use intensity=	0.3	Therms/square foot/year (Average natural gas usage intensity for residential buildings in therms/square foot/year [RASS]).
Resource Savings	191,961	Residential electricity saved (kWh)	
	18,921	Residential natural gas saved (therms)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e)=(Se/1,000 × 0.133)+(Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	10	= conversion factor for therm to MMBtu	
	0.133	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	126	MT CO2e	
Municipal Costs and Savings Calculations	Staff time coordinating with CAPSLO and local utilities, and conducting outreach.		
	FTE =	0.05	Staff time needed for this measures
	$/FTE=	$100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost=	$5,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Residential cost savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total Community Savings =	$53,880	Residential Savings
Community Cost and Savings	Community Cost =	$0	Dollars per household
	Community Savings =	$539	Dollars per household

Notes

The first-year energy savings for LIHEAP households is approximately 34.5% or $437 (ORNL). The average energy savings per low-income housing unit for Weatherization Assistance is estimated by the State of California Department of Community Services and Development (CSD) to be $418 per year.
PG&E and SoCalGas contract with CAPSLO to provide weatherization services to the region as part of the statewide Energy Savings Assistance Program (ESAP).
http://www.cpuc.ca.gov/PUC/energy/Low+Income/liee.htm
For low-income households: no-cost weatherization under Energy Savings Assistance Program. For middle-income households: free weatherization under PG&E's Middle Income Direct Install program.

References

1. CSD - Helps Low-Income Families Manage and Reduce Energy Costs http://www.csd.ca.gov/Contractors/documents/Energy%20tab/LIHEAP-DOE%20Fact%20Sheet%20%282008%29.pdf
2. California Energy Commission [CEC] 2010 Residential Appliance Saturation Survey [RASS] - http://www.energy.ca.gov/appliances/rass/
3. ORNL 2010 Weatherization Assistance Program Technical Memorandum: Background Data and Statistics (page 5) - http://weatherization.ornl.gov/pdfs/ORNL_TM-2010-66.pdf
4. California Energy Commission (CEC) 2005 California End Use Survey - http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF
5. California Flex Your Power - http://www.fypower.org/feature/lowincome/
6. PG&E Direct Install -http://www.staplesenergy.com/residential-case-studies/pge-middle-income-direct-install-program

E-4 Incentives for Exceeding Title 24 Building Energy Efficiency Standards

Calculation Methodology and Equations

Key Assumptions for Calculations:

New or remodeled residences exceeding State standards	400	Units
New non-residential buildings exceeding State standards	150	Units
Target percentage of energy savings above State standards	20%	Percent
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Residential Square Feet (Rsf) = Ru × 1,545 Residential Electricity Energy Savings (kWh) = E × Eec × Rsf × (1 - CSP) × 3.5 Residential Natural Gas Savings (therms) = E × Egc × Rsf × (1 - CSP) × 0.3		
	Ru=	400	# of new residential units exceeding State standards by 2020
	Average residential unit size=	1,545	Square feet/dwelling unit (California Energy Commission [CEC] 2010 Residential Appliance Saturation Survey (RASS))
	Rsf=	618,000	# square feet of residential space that exceed State standards by 2020
	E=	20%	Target percentage of energy savings above State standards
	Eec=	32.8%	Percent of single family electricity use covered by Title 24 (Statewide Energy Efficiency Collaborative [SEEC] 2011 Greenhouse Gas Forecasting Assistant, page 7)
	Egc=	85.7%	Percent of single family natural gas use covered by Title 24 (SEEC 2011 Greenhouse Gas Forecasting Assistant, page 7)
	CSP=	25%	Percent single family residential energy savings above current State standards (CEC 2013 Building Efficiency Standards, slide 11)
	Residential electricity use intensity=	3.5	kWh/square foot/year (Average electric use intensity for residential buildings in kWh/square foot/year [RASS]).
	Residential natural gas use intensity=	0.3	Therms/square foot/year (Average natural gas usage intensity for residential buildings in therms/square foot/year [RASS]).
	Commercial Electricity Energy Savings (kWh)= E × Egc × (1 - CSP) × 12.95 × Csf Commercial Natural Gas Savings (therms)=E × Egc × (1 - CSP) × 0.3 × Csf		
	Where:		
	Cu=	150	# of commercial units or buildings audited by 2020
	Average commercial unit size=	4,500	Average square feet for all commercial buildings (Energy Information Administration)
	Csf=	675,000	# of new square feet of commercial space that exceeds State standards by 2020
	E=	20%	Target percentage of energy savings above State standards
	Eec=	64%	Percent of commercial electricity use covered by Title 24 (SEEC 2011 Greenhouse Gas Forecasting Assistant, page 9)
	Egc=	70%	Percent of commercial natural gas use covered by Title 24 (SEEC 2011 Greenhouse Gas Forecasting Assistant, page 9)
	CSP=	30%	Percent non-residential energy savings above current State standards (CEC 2013 Building Efficiency Standards, slide 17)
	Commercial electricity use intensity=	12.954999	kWh/square foot/year (Average electric use intensity for commercial buildings in kWh/square feet/year (California Energy Commission [CEC] 2005 California End Use Survey [CEUS]))
	Commercial natural gas use intensity=	0.34999	therms/square foot/year (Average natural gas usage intensity for commercial buildings in therms/square feet/year (CEC 2005 CEUS))
	107,937	Residential electricity saved (kWh)	

Resource Savings	27,797	Residential natural gas saved (therms)	
	783,518	Commercial electricity saved (kWh)	
	23,152	Commercial natural gas saved (therms)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural	
	10	= conversion factor for therm to MMBtu	
	0.13	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	162	Residential Reduction (MT CO2e/year)	
	227	Commercial Reduction (MT CO2e/year)	
Municipal Costs and Savings Calculations	Staff time developing new materials, identifying and adopting incentives.		
	FTE =	0.05	Estimated staff time per year to develop new program
	$/FTE=	$100,000	FTE cost
Municipal Costs and Savings	Municipal Cost=	$5,000	Dollars per year
	Municipal Savings =	$0	Dollars per year
Community Costs and Savings Calculations	Total savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Commercial $/therm=	$0.81	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total residential savings =	$46,082	Residential Savings ($/year)
	Total commercial savings =	$164,487	Commercial Savings ($/year)
	Average residential Cost =	$0.91	Residential average cost to implement (sqft) - Projected PG&E Zone 5 Costs (US Department of Energy)
	Average commercial Cost =	$1.25	Commercial average cost to implement (sq ft) - Projected PG&E Zone 5 Costs (CA Department of Energy)
Community Costs and Savings	Residential Cost =	$1,406	Dollars per household
	Commercial Cost =	$5,625	Dollars per business
	Residential Savings =	$115	Dollars per household
	Commercial Savings =	$1,097	Dollars per business

Notes

Title 24 covers only 64% of commercial electricity use and 70% of natural gas use (SEEC, page 7). 2013 Title 24 updates are expected to reduce non-residential energy use by 30% (CEC).

Title 24 covers only 32.8% of single family residential electricity use and 85.7% of natural gas use (SEEC, page 7). 2013 Title 24 updates are expected to reduce single family residential energy use by 25% and multifamily residential by 14% (CEC).

References

1. 2005 California End Use Survey http://www.energy.ca.gov/ceus/
2. CEC 2013 Building Efficiency Standards, slide 17 - http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2012-05-31_2013_standards_adoption_hearing_presentation.pdf
3. SEEC 2011 Greenhouse Gas Forecasting Assistant, page 7 - http://californiaseec.org/documents/forecasting-tools/seec-forecast-assistant-documentation
4. http://www.energy.ca.gov/title24/2008standards/ordinances/san_luis_obispo/CZ5_Cost-Effectiveness_Report-Final.pdf

E-5 Small-Scale On-Site Solar Photovoltaic (PV) Incentive Program

Calculation Methodology and Equations

Key Assumptions for Calculations:

Number of commercial solar PV installations (between 2013-2020)	80	Systems
Number of residential solar PV installations (between 2013-2020)	420	Systems
Number of residential solar water heaters installed by 2020*	0	Systems
Staff time needed for this measure	0.01	Full Time Equivalent (FTE)

*Approximately 0.013 installations per household as a result of the Solar Water Heating program established under Assembly Bill 1470, the Solar Thermal Heating Act of 2007.

Calculations:

Resource Savings Calculations	Commercial Electricity Energy Savings (kWh)= Csi × Acsi × 1,900 Residential Electricity Energy Savings (kWh)= (Rsi × Arsi × 1,900) + (Rsw × Ee) Residential Natural Gas Energy Savings (therms) = Rswg × Eg		
	Where:		
	Csi =	80	# of commercial solar installations by 2020
	Rsi =	420	# of residential solar installations by 2020
	Rsw =	0	# of residential solar electric water heater installations by 2020 (assumes 10% electric)
	Rswg =	0	# of residential solar natural gas water heater installations by 2020 (assumes 90% natural gas)
	Acsi =	15	average commercial solar installation size in kW (City of Atascadero)
	Arsi =	4.5	average residential solar installation size in kW (City of Atascadero)
	Ee =	2,945	average expected residential solar water heater savings in kWh per year (California Solar Initiative (CSI 2) Thermal Program Cal Solar statistics)
	Eg =	139	average expected residential solar water heater savings in therms per year (CSI 2 - 2012 Thermal Program Cal Solar statistics)
	Conversion factor =	1,900	conversion factor from kW to kWh per year (Solar Energy Industries Association [SEIA] Solar Radiation Conversion Map)
Resource Savings	3,591,000	Residential electricity saved (kWh)	
	0	Residential natural gas saved (therms)	
	2,280,000	Commercial electricity saved (kWh)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric	
	10	= conversion factor for therm to MMBtu	
	0.133	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reduction	781	MT CO2e	
Municipal Costs and Savings Calculations	Staff time developing new materials and performing marketing and outreach activities.		
	FTE =	0.01	Estimated staff time per year to develop new program
	$/FTE	$100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost =	$1,000	Dollars per year
	Municipal Savings =	$0	Dollars per year
	Commercial cost savings = [Electricity Savings x $/kWh] Residential cost savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast

Community Costs and Savings Calculations	Commercial $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total residential savings =	$682,290	Dollars
	Total commercial savings =	$424,080	Dollars
	Commercial solar installed cost =	$4.38	Commercial Solar Installations per watt (Green Tech Media)
	Residential solar installed cost =	$5.46	Residential Solar Installations per watt (Green Tech Media)
	Total cost of installed commercial solar =	$5,256,000	Dollars
	Total cost of installed residential solar =	$10,319,400	Dollars
	Residential solar water heater cost =	$4,650	Dollars (Incremental installed cost of solar hot water heater (National Renewable Energy Lab, August 2012))
	Available rebates =	$2,175	Dollars (available Rebate for replacing natural gas heater with solar (Go Solar CA))
	Cost of solar hot water heater with rebate =	$2,475	Dollars (cost of solar hot water heater installation minus rebate)
	Total cost of solar water heaters =	$0	Dollars
Community Cost and Savings	Residential Cost =	$24,570	Dollars per household
	Commercial Cost =	$65,700	Dollars per business
	Residential Savings =	$1,625	Dollars per household
	Commercial Savings =	$5,301	Dollars per business

Notes

Commercial and residential installation size assumptions are the averages for San Luis Obispo County PV installations for completed and PBI projects (Cal Solar). The installation size uses the CSI rating, which accounts for a design factor, and is a more accurate reflection of energy generated by the installation. Solar water heater savings is an average of the expected savings for all the projects that have applied for the CSI-Thermal rebate in San Luis Obispo County (CSI 2).
The model assumes that solar water heaters are installed in combination with both electric and natural gas water heaters. The model assumes that 90% of the systems installed offset natural gas water heaters; 10% offset electric water heaters.
Installed cost of conventional natural gas system is $1,350 and installed cost of residential solar water heaters: $6,000 (National Renewable Energy Lab).

References

1. Cal Solar - http://www.californiasolarstatistics.ca.gov/
2. California Solar Initiative CSI-Thermal Program - http://www.gosolarcalifornia.ca.gov/solarwater/index.php
3. CEC Planning and Permitting Resources For Renewable Energy Systems - http://www.energy.ca.gov/localgovernment/planning_resources/
4. SEIA Solar Radiation Conversion Map - http://www.getsolar.com/blog/what-can-one-kilowatt-of-solar-do-for-you/13483/
5. http://www.nrel.gov/docs/fy11osti/48986.pdf
6. http://www.greentechmedia.com/research/ussmi
7. National Renewable Energy Lab, August 2012 - http://www.nrel.gov/solar/
8. Go Solar CA - http://www.gosolarcalifornia.ca.gov/

E-6 Income-Qualified Solar PV Program

Calculation Methodology and Equations

Key Assumptions for Calculations:

Number of low-income residential solar PV installations by 2020	60	Systems
Number of low-income residential solar water heaters installed by 2020	25	Systems
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	Residential Electricity Energy Savings (kWh)= (Rsi × Arsi × 1,900) + (Rsw × Ee) Residential Natural Gas Energy Savings (therms) = Rswg × Eg		
	Rsi=	60	# of low-income residential solar PV installations
	Rsw=	2.5	# of low-income residential solar electric water heater installations by 2020 (assumes 10% electric)
	Rswg=	22.5	# of residential solar natural gas water heater installations by 2020 (assumes 90% natural gas)
	Arsi=	4.6	average residential solar installation size in kW (Cal Solar Initiative [CSI 1])
	Ee=	2,945	average expected residential solar water heater savings in kWh per year (California Solar Initiative (CSI 2) Thermal Program Cal Solar statistics)
	Eg=	139	average expected residential solar water heater savings in therms per year (CSI 2 - 2012 Thermal Program Cal Solar statistics)
	Conversion factor=	1,900	conversion factor from kW to kWh per year (Solar Energy Industries Association [SEIA] Solar Radiation Conversion Map)
Resource Savings	531,763	Residential electricity saved (kWh)	
	3,128	Residential natural gas saved (therms)	
GHG Emission Reduction Calculations	GHG Savings (MT CO2e) = (Se/1,000 × 0.133) + (Sg/10 × 53.2/1,000)		
	Where:		
	Se=	electricity savings	
	Sg=	natural gas savings	
	1,000	= conversion factor for kWh to MWh (electricity equation) or from kg to metric tons (natural gas equation)	
	10	= conversion factor for therm to MMBtu	
	0.13	= average projected emissions factor for electricity in 2020 in MT CO2e/MWh	
	53.20	= average emissions factor for natural gas (kg CO2e/MMBtu)	
GHG Emission Reductions	87	MT CO2e	
Municipal Costs and Savings Calculations	Staff time for collaboration and outreach.		
	FTE =	0.05	Estimated staff time per year to develop new program
	$/FTE=	$100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost=	$5,000	Dollars per year
	Municipal Savings =	$0	Dollars per year
Community Costs and Savings Calculations	Residential savings = [Electricity Savings x $/kWh] + [Natural Gas Savings x $/therms]		
	Where:		
	Residential $/kWh=	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Residential $/therm=	$0.92	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Total residential savings =	$103,912	Dollars
Community Costs and Savings	Community Cost =	$0	Dollars per household (Assumes to be paid for through programs.)
	Community Savings =	$1,222	Dollars per household

Notes

Residential installation size assumptions are the averages for San Luis Obispo County PV installations for completed projects (Cal Solar 1). The installation size uses the CSI rating, which accounts for a design factor, and is a more accurate reflection of energy generated by the installation. Solar water heater savings is an average of the expected savings for all the projects that have applied for the CSI-Thermal rebate in San Luis Obispo County (Cal Solar 2).

The model assumes that solar water heaters are installed in combination with both electric and natural gas water heaters. The model assumes that 90% of the systems installed offset natural gas water heaters; 10% offset electric water heaters.

References

1. California Solar Initiative (CSI) - http://www.californiasolarstatistics.ca.gov/
2. California Solar Initiative CSI-Thermal Program - http://www.gosolarcalifornia.ca.gov/solarwater/index.php
3. CEC Planning and Permitting Resources For Renewable Energy Systems - http://www.energy.ca.gov/localgovernment/planning_resources/
4. SEIA Solar Radiation Conversion Map - http://www.getsolar.com/blog/what-can-one-kilowatt-of-solar-do-for-you/13483/

TL-1 Bicycle Network

Calculation Methodology and Equations

Key Assumptions for Calculations:

Miles of new bike lane by 2020	30	Miles
Staff time needed for this measure	0.2	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	VMT Reduction = (A*B)+(A*D)		
	City Area =	25.64	Square Miles
	Forecast VMT (2020) =	174,056,935	VMT in 2020
	Decrease in VMT (B) =	1.0%	Estimated VMT reduction factor for incorporating bike lanes into street design (CAPCOA) (Assumes 1% decrease in VMT per mile of new bike lane per square mile area. Maximum reduction capped at 1% to avoid double counting from alternative travel related VMT reductions.)
	VMT reduction for installing bicycle racks (D)=	0.06%	Percent - (CAPCOA, SDT-6)
Resource Savings	Total VMT Reduction =	1,850,225	VMT per year
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	691	MT CO2e
Municipal Costs and Savings Calculations	Staff time required for developing policies and acquiring grant funding for bicycle infrastructure. There would be minimal additional costs associated with staff time needed for plan checks; however, this cost will be absorbed through development/permitting fees.		
	FTE =	0.15	Estimated staff time per year to develop new program
	$/FTE=	100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost =	$15,000	Dollars (Assumes that grant funding would be used to implement bicycle infrastructure. Minimal costs would occur as a result of incorporating multi-modal improvements into pavement resurfacing, restriping, and signalization operations (less than $5,000).)
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Community VMT Reduced=	1,850,225	Dollars per year
	Community operating cost per mile =	$0.56	Dollars
	Average round trip length =	17.82	Miles (Fehr & Peers)
	Round trips switching from driving to biking =	103,829	Round trips
	Cost per mile of new bicycle lane =	$40,000	Dollars per mile (Assumes $40,000 per mile average. Actual cost would depend on the type of bicycle lane being installed - see notes below)
	Total cost of new bicycle lanes =	$1,200,000	Dollars
	Cost of bicycle parking =	$0	Dollar (Bicycle parking standards for non-residential development went into effect January 1, 2001 as part of California Green Building Standards Code, and are therefore now a cost associated with doing business-as-usual)
Community Costs and Savings	Community Cost =	$0	Dollars per person (Assumes cost of bike lanes would be incurred by the City through grant funding and private developers.)
	Community Savings =	$10	Dollars per trip (Savings varies depending on how many bicycle trips are made by a single person.)

Notes

Calculation methodology derived from CAPCOA measures SDT-5 and SDT-6
The following is provided for informational purposes:
Cost of infrastructure development is highly variable. Cost estimates for bicycle infrastructure: Class I Bike Path - approximately $1,000,000 per mile; Class II Bike Lanes - $10,000 - $1,000,000 per mile (depending on level of roadway improvement required); Class III Bike Routes - $2,000 - $60,000 per mile (depending on the level of treatment; route signage only would be lower end, signage and shoulder striping, pavement markings, signal actuation would be higher end). The cost per mile of sidewalk is approximately $250,000.

References and Links

1. CAPCOA, Quantifying Greenhouse Gas Mitigation Measures (2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
2. Cambridge Systematics. Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions (2009). http://www.movingcooler.info/Library/Documents/Moving%20Cooler_Appendices_Complete_102209.pdf
3. Sacramento Metropolitan Air Quality Management District (SMAQMD) Recommended Guidance for Land Use Emission Reductions. (p.13) http://www.airquality.org/ceqa/GuidanceLUEmissionReductions.pdf
4. US Department of Transportation, http://www.nhtsa.gov/people/injury/pedbimot/bike/Safe-Routes-2002/safe.html#8

TL-2 Pedestrian Network

Calculation Methodology and Equations

Key Assumptions for Calculations:

Miles of new sidewalk added by 2020	25	Miles
Staff time needed for this measure	0.1	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	VMT Reduction = Forecast VMT x Percent VMT reduction		
	City Area =	25.64	Square Miles
	Forecast VMT (2020) =	174,056,935	VMT
	Percent VMT reduction from pedestrian network improvements=	0.5%	Percent reduction in VMT (CAPCOA SDT-1)
Resource Savings	Total VMT Reduction =	848,562	VMT per year
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	317	MT CO2e
Municipal Costs and Savings Calculations	Staff time required for review and approval of projects and acquiring grant funding for pedestrian infrastructure.		
	FTE =	0.1	Estimated staff time per year to develop new program
	$/FTE=	100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost =	$10,000	Dollars (Assumes that grant funding would be used to implement pedestrian infrastructure. Minimal costs would occur as a result of incorporating multi-modal improvements into pavement resurfacing, restriping, and signalization operations (less than $5,000).)
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Community VMT Reduced=	848,562	Dollars per year
	Community operating cost per mile =	$0.56	Dollars
	Cost per mile of new sidewalk =	$250,000	Dollars per mile
	Total cost of new bicycle lanes =	$6,250,000	Dollars
Community Costs and Savings	Community Cost =	$0	Dollars per person (Assumes cost would be incurred by the City through grant funding and the private developer.)
	Community Savings =	Varies	Dollars per person (Varies based on number of trips made by foot and distance travelled. Savings of $0.555 per mile.)

Notes

Calculation methodology derived from CAPCOA measure SDT-1

References

1. CAPCOA, Quantifying Greenhouse Gas Mitigation Measures (2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
2. Cambridge Systematics. Moving Cooler: An Analysis of Transportation Strategies for Reducing Greenhouse Gas Emissions (2009). http://www.movingcooler.info/Library/Documents/Moving%20Cooler_Appendices_Complete_102209.pdf
3. Sacramento Metropolitan Air Quality Management District (SMAQMD) Recommended Guidance for Land Use Emission Reductions. (p.13) http://www.airquality.org/ceqa/GuidanceLUEmissionReductions.pdf

TL-3 Expand Transit Network

Calculation Methodology and Equations

Key Assumptions for Calculations:

Percent Increase in Transit Service	15%	Percent
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	% VMT Reduction = Coverage * Elasticity * Mode* Adjustment (CAPCOA, Strategy TST-3, Page 277)		
	Forecast VMT (2020) =	174,056,935	VMT in 2020
	Coverage =	15%	Percent increase in transit service
	Elasticity =	1.01	Elasticity of transit ridership with respect to service coverage (CAPCOA, Strategy TST-3, Page 277)
	Mode =	1.3%	Existing transit mode share, countywide (CAPCOA, Strategy TST-3, Page 277)
	Adjustment =	0.67	Adjustments from transit ridership increase to VMT (CAPCOA, Strategy TST-3, Page 277)
	% VMT Reduction =	0.1%	Percent
Resource Savings	Total VMT Reduction due to transit network expansion=	229,679	VMT
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	86	MT CO2e
Municipal Costs and Savings Calculations	Staff time required for coordinating with RTA/transit agencies.		
	FTE =	0.10	Estimated staff time per year to develop new program
	$/FTE =	100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost =	$10,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Private costs and savings of increasing transit service, scaled to City population.		
	Private VMT reduced =	229,679	VMT
	Private vehicle operating cost =	$0.56	Dollars per mile
	Private savings from avoided driving =	$127,472	Dollars
	Cost of transit fare =	$2	Dollars/day (may vary depening on pass) (SLO RTA)
	City forecast (2020) population =	28,003	People
	Number of people switching to from driving to transit =	37	People
	Private cost from transit fares =	$19,215	Dollars
Community Costs and Savings	Community Cost =	$520	Dollars
	Community Savings =	$3,450	Dollars

Notes

Calculation methodology derived from CAPCOA measure TST-3.

References

1. CAPCOA, Quantifying Greenhouse Gas Mitigation Measures (2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
2. Transit Cooperative Research Program. TCRP Report 95 Traveler Response to System Changes – Chapter 10: Bus Routing and Coverage. 2004. (p. 10-8 to 10-10)
3. US Census Journey to Work
4. SLO RTA - http://www.slorta.org/fares/rta

TL-4 Increase Transit Service Frequency/Speed

Calculation Methodology and Equations

Key Assumptions for Calculations:

Percentage reduction in headways (increase in frequency)	10%	Percent
Bus rapid transit selected? (1 for yes, 0 for no)	1	Yes or No
Staff time needed for this measure	0.02	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	% VMT Reduction = Headway * B * C * Mode * E (CAPCOA, TST-4, Page 281)		
	Forecast VMT (2020) =	174,056,935	VMT
	Headway =	10%	Percent reduction in headways
	B =	0.36	Elasticity of transit ridership with respect to increased frequency of service (CAPCOA, TST-4, Page 281)
	C =	50%	Adjustment for level of implementation (number of lines improved/total number of lines assumed to be less than 50%) (CAPCOA, TST-4, page 281)
	Mode =	1.3%	Existing transit mode share, countywide (CAPCOA, TST-4, Page 281)
	E =	0.67	Ratio of decreased VMT to increased transit ridership (CAPCOA, TST-4, Page 281)
	% VMT Reduction from Headway=	0.02%	Percent VMT Reduction
	% VMT Reduction from Bus Rapid Transit =	0.02%	Percent VMT Reduciton if selected (0.02% VMT reduction from CAPCOA, TST-1, page 272)
	Total % VMT Reduction	0.04%	Percent VMT Reduction
Resource Savings	Total VMT Reduction due to transit network expansion=	62,100	Annual Reduced VMT due to transit frequency improvement
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	23	MT CO2e
Municipal Costs and Savings Calculations	Staff time required for coordinating with RTA/transit agencies.		
	FTE =	0.02	Estimated staff time per year to develop new program
	$/FTE=	100,000	Dollars per year
Municipal Costs and Savings	Municipal Cost =	$2,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Private VMT reduced =	62,100	VMT
	Vehicle operating cost per mile =	$0.56	Dollars per mile
	Private savings from avoided driving =	$34,466	Dollars
	Cost of transit fare =	$2	Dollars/day (may vary deepening on pass) (SLO RTA)
	City forecast (2020) population =	28,003	People
	Number of people switching to from driving to transit =	10	People
	Private cost from transit fares =	$5,195.27	Dollars
Community Costs and Savings	Community Cost =	$520	Dollars
	Community Savings =	$3,450	Dollars

Notes

Calculation methodology derived from CAPCOA measure TST-1 and TST-3.

References

1. Transit Cooperative Research Program. TCRP Report 95 Traveler Response to System Changes – Chapter 9: Transit Scheduling and Frequency (p. 9-14)
2. SLO RTA - http://www.slorta.org/fares/rta

TL-5 Transportation Demand Management Incentives

Calculation Methodology and Equations

Key Assumptions for Calculations:

Targeted percent of employees participating	25%	Percent
Staff time needed for this measure	0.04	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	VMT Reduction = Forecast Employee Commute VMT x (A x B)		
	Where:		
	Forecast Annual VMT (2020) =	174,056,935	VMT in 2020
	Forecast Annual Employee Commute VMT (2020)=	29,415,622	Employee commute VMT in 2020 (16.9% of total VMT, Fehr & Peers)
	Percent Reduction in Commute VMT (A) =	4%	Percent (4% from CAPCOA, page 240)
	Percent of Employees Participating (B) =	25%	Percent of employees to participate in the TDM program
Resource Savings	VMT Reduction =	294,156	VMT in 2020
GHG Emission Reduction Calculations	GHG Reduction = VMT Reduction x Cef		
	Where:		
	Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	110	MT CO2e
Municipal Costs and Savings Calculations	Annual staffing costs associated with coordination and marketing.		
	FTE =	0.04	Estimated cost of staff time
	$/FTE =	$100,000	Total annual cost per FTE
Municipal Costs and Savings	Municipal Cost =	$4,000	Dollars
	Municipal Savings =	$0	Dollars
Community Cost and Savings Calculations	Private VMT Reduced =	294,156	VMT
	Private vehicle operating cost per mile =	$0.56	Dollars per mile
	Total community savings =	$163,257	Dollars
	Total employees =	9,300	Employees (projected in 2020)
	Employees participating in TDM =	2,325	Employees
Community Costs and Savings	Community Cost=	$0	Dollars per employee
	Community Savings=	$70	Dollars per employee

Notes

Calculation methodology derived from CAPCOA measures TRT-7, page 240.

References

1. CAPCOA, Quantifying Greenhouse Gas Mitigation Measures (2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
2. Fehr & Peers calculation of countywide VMT associated with employee commute from the San Luis Obispo Council of Governments Regional Traffic Model 2.0, November 2012.

TL-6 Parking Supply Management

Calculation Methodology and Equations

Key Assumptions for Calculations:

Implementation Year	2016	Year
Net reduction in parking spaces	1000	Parking Spaces
New parking spaces by 2020 forecast under existing regulations	4,000	Parking Spaces
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

Resource Savings Calculations	VMT Reduction = VMT Growth x (((N - O)/O) x 0.5)		
	Baseline VMT (2005) =	130,445,975	Annual Vehicle Miles Traveled (VMT)
	Forecast VMT (2020) =	174,056,935	Annual VMT
	VMT Growth =	11,629,589	VMT generated by forecast development between implementation year and 2020
	N =	3,000	Parking spaces forecast under proposed regulations. (Placeholder value assumes 1,000,000 square feet of new development and 3.5 spaces per 1,000 square feet)
	O=	4,000	Parking forecast under existing regulations. (Placeholder value assumes 1,000,000 square feet of forecast development and 4 spaces per 1,000 square feet)
	P =	0.5	Estimated ratio of reduction in parking supply to reduction in vehicle trips (CAPCOA PDT-1)
	Percent change =	-25%	Percent change in new parking supply
Resource Savings	Annual VMT Reduction =	1,453,699	Annual reduction in VMT (CAPCOA PDT-1)
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where:		
	2020 Composite Emissions Factor Cef=	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emission Reduction	Total GHG Savings =	543	MT CO2e
Municipal Costs and Savings Calculations	Staff time to develop policy and establish in-lieu fees.		
	FTE =	0.05	Estimated staff time per year
	$/FTE=	$100,000	FTE cost per year
Municipal Costs and Savings	Municipal Cost =	$5,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Private costs and savings of increasing transit service, scaled to City population. Change in private costs = (A*B)+((D*E)/G)		
	Private VMT Reduced (A) =	1,453,699	VMT
	Private vehicle operating cost per mile (B) =	$0.56	Dollars per mile
	Private Savings from avoided driving (C) =	$806,803	Dollars
	Reduction in required parking spaces (D) =	1,000	Reduction in required parking spaces
	Surface parking construction costs (Excludes cost of land) =	$10,000	Dollars per space (U.S. parking structure construction costs are reported to average about $15,000 per space in 2008. Adjusted to reflect cost of ground floor spaces.) (Victoria Transport Policy Institute)
	Total cost savings from reduced parking construction (F) =	$10,000,000	Dollars (This is a savings for the project applicant/developer, not the general public.)
Community Costs and Savings	Community Cost =	$0	Dollars per parking space reduced
	Community Savings =	$807	Dollars per parking space reduced (Excludes savings to private developers.)

Notes

Calculation methodology derived from CAPCOA measure PDT-1.

References

1. California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
2. Nelson\Nygaard (2005). Crediting Low-Traffic Developments (p. 16): http://www.montgomeryplanning.org/transportation/documents/TripGenerationAnalysisUsingURBEMIS.pdf
3. SF Bay Area Metropolitan Transportation Commission Parking Code Guidance - http://www.mtc.ca.gov/planning/smart_growth/parking/6-12/Parking_Code_Guidance_June_2012.pdf
4. Victoria Transport Policy Institute - www.vtpi.org/tca/tca0504.pdf

TL-7 Electric Vehicle Network and Alternative Fueling Stations

Calculation Methodology and Equations

Key Assumptions for Calculations

Percent Adoption of Electric Vehicles Based on Implementation of Comprehensive EV Network	5%	Percent
Staff time needed for this measure	0.1	Full Time Equivalent

Calculations:

GHG Emission Reduction Calculations	GHG reduction = (City Forecast VMT x B) x D		
	City Forecast VMT (2020) =	174,056,935	VMT
	Estimated percent of drivers switching to EV's by 2020 (B) =	5%	Percent
	VMT driven by those shifting to EV's (C) =	8,702,847	VMT
	Default composite emissions factor =	0.000374	MT CO2e per VMT
	Emissions factor for plug-in hybrid vehicle =	0.000146	MT CO2e per VMT (Ex. Toyota Prius Plug-in Hybrid, http://www.google.org/recharge/experiment/CO2.html)
	Emissions-per mile difference between average car and EV (D) =	0.000228	MT CO2e per VMT
GHG Emission Reduction	Total GHG Savings =	1,984	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed for EV Readiness streamlining and coordination with APCD and Central Coast Clean Cities Coalition. (A specific program of investments has not yet been identified by APCD and the Central Coast Clean Cities Coalition. It is expected that localities would seek outside funds to support investments in EV charging stations and alternative fuel stations.)		
	FTE =	0.1	Estimated staff time to develop new program
	$/FTE =	$100,000	Total annual cost per FTE
Municipal Costs and Savings	Municipal Cost =	$10,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Cost of EV charging station =	$8,000	Dollars (Average total cost for commercial charging station including hardware and installation for AC Level 2, 7.5 kW, 240V Charger) (Ready Set Charge California)
Community Costs and Savings	Community Cost =	$0	Dollars per charging station (Assumes cost of EV charging stations would be incurred by private developer. Developer costs may be covered by applicable grants.)
	Community Savings =	$0	Dollars per charging station

Notes

References

1. Argonne National Laboratory. 2009. Multi-Path Transportation Futures Study: Vehicle Characterization and Scenario Analyses. ANL/ESD/09-5. Table 3-11a, p. 53.).

2. "Electric Vehicle Infrastructure, A Guide for Local Governments in Washington State: Model Ordinance, Model Development Regulations, and Guidance Related to Electric Vehicle Infrastructure and Batteries per RCW 47.80.090 and 43.31.970." http://www.psrc.org/assets/4325/EVI_full_report.pdf

3. RechargeIT Driving Experiment: Demonstration of energy efficiency for electric vehicles. Google, org, 2007. http://www.google.org/recharge/

4. Ready, Set, Charge California - A Guide to EV Ready Communities - http://www.rmi.org/Content/Files/Readysetcharge.pdf

TL-8 Smart Growth

Calculation Methodology and Equations

Note: This measure was quantified by Fehr & Peers utilizing the Regional Travel Model.

Key Assumptions for Calculations:

Percentage of new residential units located within 0.25 miles of transit by 2020	80%	Percent
Percentage of new jobs located within 0.25 miles of transit by 2020	90%	Percent
Density: Percent change from base density	63%	Percent
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)
Percent reduction in Vehicle Miles Traveled (VMT)	5%	Percent

Calculations:

Resource Savings Calculations	VMT Reduction = forecast VMT x Percent Reduction		
	Forecast VMT (2020) =	174,056,935	Units
	Percent Reduction in VMT=	5%	Percent
Resource Savings	Annual VMT Reduction =	8,702,847	VMT
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emissions Reduction	Total GHG Savings =	3,251	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to identify incentives and update codes and regulations.		
	FTE =	0.1	Estimated staff time to develop new program
	$/FTE =	$100,000	Total annual cost per FTE
Municipal Costs and Savings	Municipal Cost =	$10,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Private developers will gain from a wider choice of potential development opportunities, costs of which would vary based on the incentives provided.		
	Private VMT reduced =	8,702,847	VMT
	Private vehicle operating cost per mile =	$0.56	Private vehicle operating cost per mile
	Private savings from avoided driving =	$4,830,080	Private savings from avoided driving.
Community Costs and Savings	Community Cost =	$0	Dollars per unit
	Community Savings =	$6,037,600	Dollars per unit

Notes

CAPCOA measures LUT- (see link below); users should consult detailed CAPCOA guidance and example calculations when using this methodology.

References

1. CAPCOA, Quantifying Greenhouse Gas Mitigation Measures (2010): http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

3. Nelson\Nygaard, 2005. Crediting Low-Traffic Developments (p.12). Journal of the American Planning Association: http://www.montgomeryplanning.org/transportation/documents/TripGenerationAnalysisUsingURBEMIS.pdf

4. Boarnet, Marlon and Handy, Susan. 2010. "Draft Policy Brief on the Impacts of Residential Density Based on a Review of Empirical Literature."

5. Criteron Planner/Engineers and Fehr & Peers Associates (2001). Index 4D Method. A Quick-Response Method of Estimating Travel Impacts from Land-Use Changes. Technical Memorandum prepared for US EPA, October 2001.

6. TCRP Report 95, Transit Oriented Development Traveler Response to Transportation System Changes, Transit Oriented Development. (p 17-35) http://www.fta.dot.gov/documents/Transit_Oriented_Development_-_Traveler_Response_to_Transportation_System_Changes_TCRP_Report_95.pdf

TL-9 Halt Retail Leakage

Calculation Methodology and Equations

Note: This measure was quantified by Fehr & Peers utilizing the Regional Travel Model.

Key Assumptions for Calculations:

Percent reduction in Vehicle Miles Traveled (VMT)	23%	Percent
Staff time needed for this measure	0.10	Full Time Equivalent (FTE)

Resource Savings	VMT Reduction = forecast VMT x Percent Reduction		
	Forecast VMT (2020) =	174,056,935	Units
	Percent Reduction in VMT=	23%	Percent
	Annual VMT Reduction =	40,033,095	VMT
GHG Emission Reduction Calculations	GHG Savings = VMT Reduction × Cef		
	Where: Cef =	0.000374	Composite emission factor; MT CO2 per VMT (EMFAC 2011)
GHG Emissions Reduction	Total GHG Savings =	14,956	MT CO2e
Costs and Savings	Specific municipal and community costs and savings associated with measure not quantified. Generally, municipal costs of zoning adjustments would be very low, while private developers will gain from a wider choice of potential development opportunities. In addition, community savings would vary based on the incentives provided.		

Notes

References

O-1 Off-Road Vehicle and Equipment Upgrades, Retrofits, and Replacements

Calculation Methodology and Equations

Key Assumptions for Calculations:

Is this measure selected in conjunction with Measure 5a - Construction Equipment Efficiency?	No	Yes or No
Percentage of off-road equipment replaced with electric equipment	10%	Percent
Percentage of off-road equipment replaced with alternative fuels	10%	Percent
Staff time needed for this measure	0.1	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction Calculations	GHG Emissions Reduced = Reduction from Replacement with Electric Equipment + Reduction from Alternative Fuels 1 - GHG Reduced from Replacement with Electric Equipment = Forecast Construction Emissions x Percent Equipment Replaced x (Percent Diesel Equipment x Diesel Reduction) x (Percent Gasoline Equipment x Gasoline Reduction) 2 - GHG Emissions Reduced from Alternative Fuels = Forecast Construction Emissions x Percent Equipment Replaced x (Percent Diesel Equipment X Diesel Reduction) x (Percent Gasoline Equipment x Gasoline Reduction)		
	Total Forecast (2020) Off-Road GHG Emissions =	10,521	MT CO2e
	Forecast (2020) Off-Road GHG Emissions from Construction Equipment =	8,666	MT CO2e
	Percentage GHG Emissions from Diesel Equipment =	90%	Percent
	Percentage GHG Emissions from Gasoline Equipment =	8%	Percent
	Percentage GHG Emissions from Compressed Natural Gas =	2%	Percent
	GHG Reduction from Replacing Diesel Equipment with Electric Equipment =	72.9%	Percent (CAPCOA C-2, page 421)
	GHG Reduction from Replacing Gasoline Equipment with Electric Equipment =	72.4%	Percent (CAPCOA C-2, page 421)
	GHG Reduction from Purchase of Electric Equipment =	751	MT CO2e
	Emission Reduction Due to Fuel Switch from Diesel to Compressed Natural Gas =	18%	Percent (CAPCOA C-1, page 415)
	Emission Reduction Due to Fuel Switch from Gasoline to Compressed Natural Gas =	20%	Percent (CAPCOA C-1, page 415)
	GHG Reduction from Use of Alternative Fuels =	3	MT CO2e
GHG Emission Reduction	Total GHG Reduction =	754	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to conduct outreach and promotional activities.		
	FTE =	0.1	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
Municipal Costs and Savings	Municipal Cost =	$5,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings	Community Cost =	$0	Dollars (Assumes equipment replacement and upgrades would be funded through the Carl Moyer program.)
	Community Savings =	Varies	Dollars (Varies based on vehicle/equipment replacement type.)

Notes

Off-Road GHG Emissions were calculated from County-wide data from OFF-ROAD 2007.
Emissions reduction percentages from switching from diesel to compressed natural gas and from gasoline to compressed natural gas were calculated using the averages for all construction equipment type and horsepower categories for 2020 Tables in CAPCOA, C-1.

References

1. California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010): C-1, C-2, C-3
2. California Air Resources Board (ARB). Off-road Emissions Inventory. OFFROAD2007

W-1 Exceed SB X7-7 Water Conservation Target

Calculation Methodology and Equations

Key Assumptions for Calculations:

Percent water savings	10%	Percent
Staff time needed for this measure	0.1	Full Time Employee (FTE)

Calculations:

Resource Savings Calculations	Total Water Savings (gallons) = (Projected Water Consumption x Percentage Residential) x Savings Total Electricity Savings (kWh) = Gallons saved x 0.0013 kWh/gallon		
	Where:		
	Projected water consumption (2020 w/ SBx7-7) =	1,921,000,000	Gallons
	Percentage residential water consumption =	67%	Percent (Average for cities in San Luis Obispo County, calculated from 2010 Urban Water Management Plans)
	Projected residential water consumption (2020 w/ SBx7-7) =	1,287,070,000	Gallons
	Savings =	10%	Expected water use savings target per household (recommend 10%)
	0.00130	= kWh saved per gallon of water reduced (California Energy Commission,	
Resource Savings	Total Water Savings =	128,707,000	gallons/year
	Total Electricity Savings =	167,319	kWh/year
GHG Emission Reduction Calculations	Total Emissions Savings (MT) from Electricity Reductions = Electricity Savings (kWh)/1000 x 0.13		
	Where:		
	0.133	= Projected PG&E emissions factor in metric Ton per MWh (LGOP)	
	1,000	= Conversion factor from kWh to MWh (electricity equation)	
GHG Emission Reduction	Total GHG Emissions Savings =	22	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to write, implement, and enforce water policy. No capital costs expected.		
	FTE =	0.1	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
Municipal Costs and Savings	Municipal Cost =	$10,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Residential cost savings = [Electricity Savings x $/kWh]		
	$/kwh =	$0.19	California Energy Commission, California Energy Demand 2010-2020, Adopted Forecast
	Aggregated community savings=	$31,791	Dollars
Community Cost and Savings	Community Cost =	Varies	Dollars (Costs will vary based on implementation programs and mechanisms.)
	Community Savings =	Varies	Dollars (Per unit savings varies since the number of participating households and businesses is currently unknown.)

Notes

Senate Bill X7-7* (Water Conservation Act of 2009) was enacted in November 2009, requiring all water suppliers to increase water use efficiency. The legislation sets an overall goal of reducing per capita urban water use by 20% by December 31, 2020.

2020 energy rates are calculated based on information provided in the CEC's Report, California Energy Demand 2010-2020, Adopted Forecast. See Table 7, and also Form 2.3-California Energy Demand 2009 Natural Gas Rates, and Form 2.3: Electricity Prices (2007 cents/kwh) - PG&E.

References

1. California Energy Commission (CEC) Refining Estimates of Water-Related Energy Use in California (December 2006)
2. City of Atascadero Sphere of Influence Update Municipal Services Review (September 2011)
3. California Energy Commission (CEC) California Energy Demand 2010-2020, Adopted Forecast.
4. ICLEI Local Government Operations Protocol Version 1.1 (May 2010)
5. California Department of Water Resources - http://www.water.ca.gov/wateruseefficiency/sb7/

S-1 Solid Waste Diversion

Calculation Methodology and Equations

Key Assumptions for Example Calculations:

Target additional diversion rate (2020)	10%	Percent
Estimated staff time needed for this measure	0.2	Full Time Employee (FTE)

Calculations:

Resource Savings Calculations	Tons Diverted = Future Year Landfilled Tonnage x Future Year Diversion Rate 1 - Future Year Landfilled Tonnage = (1 + CAGR)^15 x Baseline Year Landfilled Solid Waste		
	Baseline Year (2005) Landfilled Solid Waste (Community-Wide) =	31,123	Tons
	Baseline Year (2005) GHG Emissions from Landfilled Solid Waste =	9,083	MT CO2e
	Projected (2020) GHG Emissions from Landfilled Solid Waste =	9,236	MT CO2e
	Compound Annual Growth Rate (CAGR) =	0.51%	Percent
	Total City Future Year (2020) Solid Waste Tonnage =	31,650	Tons
	Paper Products =	21.0%	Percent
	Food Waste =	14.6%	Percent
	Plant Debris =	6.9%	Percent
	Wood/Textiles =	21.8%	Percent
	All Other Waste =	35.7%	Percent
	Future Year Paper Products =	6,646	Tons
	Future Year Food Waste =	4,621	Tons
	Future Year Plant Debris =	2,184	Tons
	Future Year Wood/Textiles =	6,900	Tons
	Future Year All Other Waste =	11,299	Tons
	Paper Products Diverted =	665	Tons
	Food Waste Diverted =	462	Tons
	Plant Debris Diverted =	218	Tons
	Wood/Textiles Diverted =	690	Tons
	All Other Waste Diverted =	1,130	Tons
Resource Savings	Future Year Total Waste Diverted =	3,165	Tons
GHG Emission Reduction Calculations	Total MT CO2e Diverted = (2.138)(Paper Products)(0.9072) + (1.120)(Food Waste)(0.9072) + (0.686)(Plant Debris)(0.9072) + (0.605)(Wood/Textiles)(0.9072) + (0.00)(All Other Waste)(0.9072) 1 - Emission Reduction Per Waste Category = Emissions Factor for Category x Future Year Category Tonnage Diverted x 0.9072 x (1 - Emissions captured at landfill)		
	0.9072	= Conversion from short tons to metric tons	
	Emission Factor - Paper Products =	2.138	MT CO2e / MT waste
	Emission Factor - Food Waste =	1.210	MT CO2e / MT waste
	Emissions Factor - Plant Debris =	0.686	MT CO2e / MT waste
	Emission Factor - Wood/Textiles =	0.605	MT CO2e / MT waste
	Emission Factor - All Other Waste =	0.000	MT CO2e / MT waste

	Emissions from Paper Products =	1,289	MT CO2e
	Emissions from Food Waste =	507	MT CO2e
	Emissions from Plant Debris =	136	MT CO2e
	Emissions from Wood/Textiles =	379	MT CO2e
	Emissions from All Other Waste =	0	MT CO2e
	Emissions captured at landfill =	60%	Percent
GHG Emission Reduction	Total GHG Emissions Reductions =	924	MT CO2e
Municipal Costs and Savings Calculations	Cost may include additional staff time.		
	FTE =	0.2	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
Municipal Costs and Savings	Municipal Costs=	$20,000	Dollars
	Municipal Savings=	$0	Dollars
Community Costs and Savings	Community Costs =	$0	Dollars
	Community Savings =	$0	Dollars

Notes

All cities are assumed to have a baseline year diversion rate of 50%. This diversion has already been accounted for in the baseline year landfilled solid waste tonnage.
CAGR growth rates were calculated based on population growth.
ICLEI's CACP software incorporates emission factors for the diversion of certain materials from the waste stream, derived from the EPA WARM model.
GHG Emissions Calculations assume a landfill methane recovery rate of 60%.

References

1. DRAFT City of Stockton Climate Action Plan (February 2012) - pg. C-77,C-78
2. Hayward Climate Action Plan (October, 2009) - pg. 170
3. County of San Bernardino Greenhouse Gas Emissions Reduction Plan (September 2011) - pg. 91
4. EPA's Waste Reduction Model (WARM), available at: http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html
5. ICELI's Clean Air Climate Protection (CACP) Software (for members), available at: http://www.icleiusa.org/action-center/tools/cacp-software

T-1 Tree Planting Program

Calculation Methodology and Equations

Note: There is no reduction in GHG emissions associated with preservation of existing trees or trees that are planted as mitigation for trees removed. Trees accounted for here are in addition to those identified for the City government tree planting measure. See notes section below for more detail.

Key Assumptions for Calculations:

Target number of trees planted (net new trees)	3,000	Trees
City subsidy of tree cost and planting	50%	Percent Subsidized by City
Cost per tree	$60	Dollars per Tree
Staff time needed for this measure	0.05	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction Calculations	GHG Emissions Reduction=Number of Trees Planted x Carbon Sequestration Rate		
	0.0121	= Average carbon sequestration rate (MT CO_2/Tree) (CAPCOA)	
	3000	= Number of Trees Planted	
GHG Emission Reduction	Total GHG Emissions Reduced =	36	MT CO2e
Municipal Costs and Savings Calculations	Cost per tree =	$60	Dollars/tree
	City subsidy of tree cost and planting =	50%	Percent subsidized
	City cost per tree =	$30	Dollars per tree
	Total capital cost=	$90,000	Dollars
	FTE =	0.05	Estimated staff time to develop program
	$/FTE	$100,000	FTE cost per year
	Cost of staff time =	$5,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$95,000	Dollars
	Municipal Savings =	$0	Dollars
Community Costs and Savings Calculations	Capital cost = (cost per tree x number of trees planted x percentage of city subsidy)		
	Where:		
	Community cost per tree =	$30	Dollars/tree
	Number of trees planted =	3,000	Trees
	Total tree capital cost (for community)=	$90,000	Dollars
	Maintenance cost = maintenance cost per tree x number of trees planted. (Assumes community covers all maintenance costs.)		
	Maintenance cost=	$34	Dollars/tree (McPherson, et al)
	Total maintenance cost (for community) =	$102,000	Dollars
Community Costs and Savings	Community Cost =	$64	Dollars per tree
	Community Savings =	$0	Dollars per tree

Notes

According to the California Air Resources Board and California EPA *Compliance Offset Protocol Urban Forests Projects* (October 2011) and Intergovernmental Panel on Climate Change's (IPCC) *Guidelines for National Greenhouse Gas Inventories Volume 4* (2006), there is no reduction in GHG emissions associated with the preservation of existing trees or open space or trees planted as a result of mitigation for trees removed. To account for reductions associated with trees and vegetation, there must be a "net gain" in trees or vegetated open space since 2005.

References

1. California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures (August 2010) - pg. 403

2. McPherson, et al as cited in Stockton Draft CAP - http://www.stocktongov.com/government/boardcom/clim.html

T-2 Native Forest Regeneration

Calculation Methodology and Equations

Key Assumptions for Calculations:

Target Net New Acres of Vegetated Land	1400	Acres
Staff time needed for this measure	0.08	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction Calculation	GHG Emissions Reduction =Acres of Land Restored x Carbon Sequestration Rate		
	44	= Carbon sequestration per hectare 100-yr old mixed oak woodland (Metric Tons CO_2/hectare) (CA Oak Foundation)	
	567	= Hectares Restored	
GHG Emission Reduction	GHG Emissions Reduced =	1,745	Metric Tons CO2e
Municipal Costs and Savings Calculations	FTE =	0.08	Estimated staff time to collaborate with community partner, obtain funding, and maintenance thereafter.
	Capital Cost =	$0	Assumed to be paid for through grant funding.
Municipal Costs and Savings	Total Cost =	$8,000	Dollars
	Total Savings	$0	Dollars
Community Costs and Savings	Community Costs =	$0	Dollars
	Community Savings =	$0	Dollars

Notes

Carbon sequestration rate for central coast mixed oak woodland from Oaks 2040 - Carbon Resources in California Oak Woodlands. There is no reduction in GHG emissions associated with preservation or mitigation. Net new acrage only.

References

1. Oaks 2040 - Carbon Resources in California Oak Woodlands, Tom Gaman, California Oak Foundationm, 2008

Climate Change Vulnerability

Calculation Methodology and Equations

Key Assumptions for Calculations:

Staff time needed for this measure	0.02	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction	Annual GHG emissions reduced =	N/A	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to to participate in meetings and planning activities and incorporate new adaptation measures into City documents as appropriate.		
	FTE =	0.02	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Staff time cost =	$2,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$2,000	Dollars
	Municipal Savings =	$0	Dollars

Notes

References

Public Health and Emergency Preparedness

Calculation Methodology and Equations

Key Assumptions for Calculations:

Staff time needed for this measure	0.08	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction	Annual GHG emissions reduced =	N/A	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to time to coordinate with other agencies and community-based organizations. Additional staff time needed for community education and outreach related to this measure.		
	FTE =	0.08	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Staff time cost =	$8,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$8,000	Dollars
	Municipal Savings =	$0	Dollars

Notes

References

Water Management

Calculation Methodology and Equations

Key Assumptions for Calculations:

Staff time needed for this measure	0.02	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction	Annual GHG emissions reduced =	N/A	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to time to collaborate with other jurisdictions. Costs of seeking grant funding is business-as-usual.		
	FTE =	0.02	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Staff time cost =	$2,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$2,000	Dollars
	Municipal Savings =	$0	Dollars

Notes

References

Infrastructure

Calculation Methodology and Equations

Key Assumptions for Calculations:

Staff time needed for this measure	0.08	Full Time Equivalent (FTE)

Calculations:

GHG Emission Reduction	Annual GHG emissions reduced =	N/A	MT CO2e
Municipal Costs and Savings Calculations	Staff time needed to time to complete a climate assessment and incorporate climate change consideration in infrastructure planningl.		
	FTE =	0.08	Estimated staff time per year
	$/FTE =	$100,000	FTE cost per year
	Staff time cost =	$8,000	Dollars
Municipal Costs and Savings	Municipal Cost =	$8,000	Dollars
	Municipal Savings =	$0	Dollars

Notes

References

State Measures - Quantification Details

Measure Title	2020 Reduction (MT CO_2e)	Assumptions
Clean Car Standards, AB 1493 (Pavley I)	11,064	CARB anticipates that the Pavley I standard will reduce GHG emissions from new California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016. Reductions in GHG emissions from the Pavley I standard were calculated using CARB's EMFAC2011 model for San Luis Obispo County. To account for this standard, EMFAC2011 integrates the reductions into the mobile source emissions portion of its model (CARB, 2013).
Low Carbon Fuel Standard	On-Road: 7,226 Off-Road: 1,052	The Low Carbon Fuel Standard (LCFS) requires a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. Reductions in GHG emissions from LCFS were calculated using CARB's EMFAC2011 model for San Luis Obispo County. To account for this standard, EMFAC2011 integrates the reductions into the mobile source emissions portion of its model (CARB, 2013).
Title 24	592	The California Energy Commission (CEC) estimates that the 2008 standards reduce consumption by 10 percent for residential buildings and 5 percent for commercial buildings, relative to the previous standards. For projects implemented after January 1, 2014, the CEC estimates that the 2013 Title 24 energy efficiency standards will reduce consumption by 25 percent for residential buildings and 30 percent for commercial buildings, relative to the 2008 standards. These percentage savings relate to heating, cooling, lighting, and water heating only and do not include other appliances, outdoor lighting that is not attached to buildings, plug loads, or other energy uses. Therefore, these percentage savings were applied to the percentage of energy use covered by Title 24. The calculations and 2020 GHG emissions forecast assume that all growth in the residential and commercial/industrial sectors is from new construction (CEC, 2008; Statewide Energy Efficiency Collaborative, 2011).
Renewable Portfolio Standard	12,688	PG&E must have a renewable portfolio of 33% by 2020. In order to calculate future emissions that take into account the Renewable Portfolio Standard, PG&E's 2020 emissions factor was applied (PG&E, 2011).

Existing Local Measures - Quantification Details

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
Energy (Community)	Solar Energy Installations (Commercial)	• Since 2005, 183 kW of solar photovoltaic and hot water systems have been installed on commercial properties in Atascadero. Many of these installations utilized rebates offered through the California Solar Initiative (CSI), a solar rebate program for California consumers that are customers of the investor-owned utilities, such as PG&E. The CSI program is a key component of the Go Solar California campaign for California. • The City participates in the CaliforniaFIRST program, which provides financing for renewable energy and energy efficient building improvements (applies to commercial properties). • The City has PV System Expedited Permits and Reduced Fees. This policy and staff dedication ensures safe installation of PV systems while removing perceived road blocks associated with permitting process	183 kW of solar installed	-47	California Solar Initiative	CAPCOA AE-2	0%-100%	347,700	kWh	Use 1,900 to convert CEC rating to kWh. Emissions factor of 0.133 metric tons CO2e/MWh (2020 PG&E emissions factor)	Solar Capacity from CA Solar (CEC PTC Rating); Conversion factor from US DOE
Energy (Community)	Solar Energy Installations (Residential)	• Since 2005, 642 kW of solar photovoltaic and hot water systems have been installed on residential properties in Atascadero. Many of these installations utilized rebates offered through the California Solar Initiative (CSI), a solar rebate program for California consumers that are customers of the investor-owned utilities, such as PG&E. The CSI program is a key component of the Go Solar California campaign for California. • The City participates in the CaliforniaFIRST program, which provides financing for renewable energy and energy efficient building improvements (applies to multi-family residential properties only). • The City has PV System Expedited Permits and Reduced Fees. This policy and staff dedication ensures safe installation of PV systems while removing perceived road blocks associated with permitting process. • The City collaborates with GRID Alternatives on outreach and eligibility to promote the Single-family Affordable Solar Homes (SASH) Program (24 in process of completion).	584 kW of solar installed; 58 kW from SASH = 642 kW total	-166	California Solar Initiative	CAPCOA AE-2	0%-100%	1,219,800	kWh	Use 1,900 to convert CEC rating to kWh; average solar PV system installed under SASH program assumed to be 2.4 kW. Emissions factor of 0.133 metric tons CO2e/MWh (2020 PG&E emissions factor).	Solar Capacity from CA Solar (CEC PTC Rating); Conversion factor from US DOE. California Solar Initiative. 2.4 kW is the average size of solar PV systems installed in San Luis Obispo region through SASH.
Energy (Community)	Energy Efficiency and Conservation Education and Outreach	• Since 2009, the City has participated in a joint partnership of PG&E, SoCal Gas, Economic Vitality Corporation, SLO County and participating municipalities. Partnership has provided extensive training, outreach, and energy-saving opportunities for the City as well as for local businesses and property owners. • Since 2005, the City has worked with SLO Green Build to host community workshops and seminars for homeowners, builders, and the general public. Workshops have included: grey water systems, sustainable landscaping, photovoltaic systems and alternative energy									To be accounted for as part of CAP with continued implementation and monitoring procedures to support potential reductions.

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
		production, and green building technologies. City staff meets quarterly with SLO Green Build to discuss how City can encourage sustainable design. A SLO Green Build public information kiosk is located at the City Hall front counter.									
Energy (Municipal)	Solar Energy Installations (Municipal)	• Municipal solar installation	9 kW of solar installed	-2	California Solar Initiative	CAPCOA AE-2	0%-100%	17,651	kWh	Use 1,900 to convert CEC rating to kWh. Emissions factor of 0.133 metric tons CO2e/MWh (2020 PG&E emissions factor).	Solar Capacity from CA Solar (CEC PTC Rating); Conversion factor from US DOE
Energy (Municipal)	Municipal Energy Efficient Lighting Retrofits - Facilities Energy Retrofit (Phase 1)	• Nine City facilities received light retrofit projects.	37,000 kWh hours per year	-5	Sustainability Activities in Atascadero memo	CAPCOA LE-1	16%-40%	37,000	kWh	Emissions factor of 0.133 metric tons CO2e/MWh (2020 PG&E emissions factor).	
Energy (Municipal)	Municipal Building Energy Efficiency Improvements	• An Energy Efficiency and Conservation Block Grant funded $152,644 in energy efficiency retro-fit projects, including upgrades at Fire Station 1 and 2, Police Station, Pavilion, Police Station, Wastewater Treatment Plant and Public Works Corp Yard, 17 High SEER replacement HVAC units, 17 programmable thermostats, 564 florescent tube lamps 28watt, 19 Low watt T8 ballasts, 18 LED parking lot lights Retrofit kits, 28 Induction wall packs 40watt	An estimated 81,000 kwh of annual savings	-11	Sustainability Activities in Atascadero memo	CAPCOA BE, LE	Varies	81,000	kWh	Emissions factor of 0.133 metric tons CO2e/MWh (2020 PG&E emissions factor).	
Energy (Municipal)	Municipal Building Energy Efficiency Improvements - Staples Direct Install program energy upgrades	• Staples Direct Install program for Municipal Facilities; energy savings opportunity made available through the Energy Watch Partnership • 77 separate projects completed at five (5) facilities • Upgrades such as occupancy sensors, new light fixtures and light bulb replacements completed at the current City Hall building, Pavilion, Public Works Yard, Wastewater Treatment Plant and Indoor Skate Park	An estimated annual energy savings of 51,200 kWh	-7	Sustainability Activities in Atascadero memo	CAPCOA LE-1	16%-40%	51,200	kWh	Emissions factor of 0.133 metric tons CO2e/Mwh (2020 PG&E emissions factor).	
Energy (Municipal)	Municipal Building Energy Efficiency Improvements - Building Operator Certification Course	• Two City employees completed Building Operator Certification Course. Staff was trained to evaluate and improve operational efficiencies in municipal facilities and cut down on energy usage (lighting, thermostats & more)	Operator awareness alone has cut energy use at the Community Center by 20%	-5	Sustainability Activities in Atascadero memo		Varies	38,256	kWh	Emissions factor of 0.133 metric tons CO2e/Mwh (2020 PG&E emissions factor).	
Energy (Municipal)	Municipal Wastewater Treatment Plant Upgrades	• Continual redesign and improvement of sewer system to reduce energy requirements by taking advantage of gravity flow; two lift stations have been eliminated & a third is slated for elimination • Inefficient pumps & aerators replaced with more efficient models; those not being replaced are being re-wound with more efficient wiring	285,280 kWh	-5	PG&E Municipal Electricity Data			285,280	kWh	Emissions factor of 0.133 metric tons CO2e/Mwh (2020 PG&E emissions factor).	PG&E Municipal Electricity Data
Energy (Municipal)	Municipal Building Energy Efficiency Improvements – City Hall Retrofits	• Energy efficiency upgrades to historic City Hall building, including new high efficiency HVAC units with individual temp controls for every room, energy efficient light fixtures with occupancy sensors, energy efficient appliances in break rooms, low flush water closets and urinals, added insulation on the 4th floor.	Unknown commitment								Can be quantified during the CAP development process with additional data (estimated reduction in kWh and therms)

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
Transportation and Land Use	Increase Diversity and Density of Land Use - Smart Growth	The City's General Plan (2002) is based on the Smart Growth Principles of encouraging infill and reuse of existing land and infrastructure: Encourage mixed-use infill development & revitalization of the Downtown Core		Not quantified – already captured in the SLOCOG travel demand model forecasting process.	General Plan	CAPCOA LUT-1				Already captured in the SLOCOG travel demand model forecasting process.	The SLOCOG 2010 travel demand model used to estimate 2005 baseline and 2020 vehicle miles traveled (VMT) is based on year 2009-2011 traffic counts and adopted City land use as of 2010. Therefore, this measure is already captured in the SLOCOG travel demand model forecasting process.
Transportation and Land Use	Increase Diversity and Density of Land Use - Residential multifamily zoning	High Density Residential areas up zoned in the General Plan and Zoning Ordinance to allow a minimum 20 units per acre in order to increase density in the urban core (implemented in 2011)	Unknown at this time		General Plan and Zoning Ordinance						The SLOCOG 2010 travel demand model used to estimate 2005 baseline and 2020 vehicle miles traveled (VMT) is based on year 2009-2011 traffic counts. As such, results for transit and transportation demand management are inherent to the model results. In addition, year 2020 VMT estimates included SLOCOG travel demand forecast model "4-Ds" adjustments for the built environment (land use Density, Design, Diversity, and access to Destinations). Thus, applying additional reductions off-model would double count reductions.

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
Transportation and Land Use	Increase Diversity and Density of Land Use -Mixed Use and infill development	Ordinance for mixed use – promotes mixed use development, streamlined permitting process	Grouped with smart growth development		Mixed use ordinance					Already captured in the SLOCOG travel demand model forecasting process.	The SLOCOG 2010 travel demand model used to estimate 2005 baseline and 2020 vehicle miles traveled (VMT) is based on year 2009-2011 traffic counts. As such, results for transit and transportation demand management are inherent to the model results. In addition, year 2020 VMT estimates included SLOCOG travel demand forecast model "4-Ds" adjustments for the built environment (land use Density, Design, Diversity, and access to Destinations). Thus, applying additional reductions off-model would double count reductions.
Transportation and Land Use	Transit Improvements - Improved transit service, frequency, connectivity, and bike improvements.	City expanded public transportation system to include hourly transportation along major shopping, education, health service and housing corridors. Buses equipped with bicycle racks and connect to regional and national bus service and rail for expanded multi-modal opportunities	Transit beyond what is included in the regional travel demand model forecast	-26	Sustainability Activities in Atascadero memo, 2011	CAPCOA TST-3	0.1%-8.2%	70,671	VMT	Assumes a 5% increase in transit service, suburban setting	CAPCOA TST-3
Transportation and Land Use	Park and Ride Facilities	Public Park & Ride lots located off HWY 101 at Santa Barbara Road & San Luis Ave. Bike lockers installed at both Park & Ride lots. Worked with Topaz Solar Farm to establish Park & Ride lot to facilitate bus transportation to Carrizo Plain during project construction	12 park and ride stalls at Santa Barbara and 48 at Santa Lucia		Sustainability Activities in Atascadero memo, 2009	CAPCOA RPT-4	0.5% VMT reduction	874	VMT	Already captured in the SLOCOG travel demand forecasting process.	The SLOCOG 2010 travel demand model used to estimate 2005 baseline and 2020 vehicle miles traveled (VMT) uses a 2010 base year and its VMT are calculated and calibrated to 2009-2011 traffic counts. As such, results for alternative transportation modes and transportation demand management are inherent to the model results.
Transportation and Land Use	Bicycle Network Improvements - new lanes	New bike lanes constructed on El Camino Real, Lewis Ave Bridge, Traffic Way, San Andres Road, Santa Rosa Road.	2.4 miles	-17	Bicycle Master Plan	CAPCOA SDT-5	1% increase in share of workers commuting by bike for each additional mile of bike lane per square mile	45,267	VMT	Assumes 1% bike mode share. Average reduction in trip length is 20 miles (round trip). Assumed average of 260 working days per year.	CAPCOA SDT-5

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
Transportation and Land Use	Bicycle Network Improvements - Bike racks, restrooms and shower facilities, changing facilities	Bike rack installation required with all new retail & public projects. Bike racks installed at all existing parks, City facilities and schools.	Contributes to overall bicycle network improvement reductions. Grouped measure.	Not quantified - grouped measure	Bicycle Master Plan	CAPCOA SDT-6 and SDT-7	N/A			Contributes to overall bicycle network improvement reductions. Grouped measure.	
Transportation and Land Use	Pedestrian Network - Downtown Streetscape Improvements	Downtown Streetscape Projects - Pedestrian and operational improvements including bulb outs, landscaped medians, street furniture, and lighting for the Downtown.	Unknown commitment			CAPCOA SDT-1	0%-2%				Can be quantified as part of CAP process with additional data (miles of improvements are approximated).
Transportation and Land Use	Bicycle Network Improvements - Education and outreach	Partnership with SLO Bicycle Coalition to sponsor events to increase awareness & ridership during Bike Month each May.	As a result of engaged staff and Council members, participation increased from 30 to over 300 riders in 2012, with more events planned	Not quantified - support measure	Sustainability Activities in Atascadero memo						These events efforts are supportive of overall GHG reduction efforts. These will be mentioned in the CAP but are not directly quantifiable.
Transportation and Land Use	Electric Vehicle Network	Electric Vehicle chargers currently installed at Rabobank, soon to be installed at Walgreens and Albertsons. Partnership established in 2012 with APCD to obtain grant funding to install more charging systems in the City; City staff involvement in program to make California Plug-in Electric Vehicle ready.		Not quantified	Sustainability Activities in Atascadero memo						To be accounted for as part of CAP as this measure will rely on implementation assumptions that will need to be monitored to ensure effectiveness.
Transportation (Municipal)	Vehicle Idling Policy	Public Works adopted a policy to reduce vehicle idling and the associated emissions. The Police Department has also given directions to staff to minimize idling of vehicles when possible.	Unknown commitment	Not quantified	Sustainability Activities in Atascadero memo	CAPCOA VT-1					Not quantifiable due to lack of data; however, for municipal vehicles alone, this is likely negligible in terms of GHG emissions.
Waste (Community)	Green Waste Diversion	The City has a "green waste" recycling program with local contracted trash hauler. City collaboration on programs with Atascadero Waste Alternatives.	Unknown commitment	Not quantified		CAPCOA SW-1	BMP				Not quantifiable due to lack of data. May be accounted for in CAP if additional data is provided.
Waste (Community)	Construction and Demolition Debris Diversion	As of 2010, the California Green Building Standards Code (CalGreen) requires that 50% of non-hazardous construction and demolition debris be recycled or reused.	50% diversion of construction and demolition debris	-569	California Green Building Standards Code	CAPCOA p. 43; SW-2	Varies			According to the California 2008 Statewide Waste Characterization Study, construction and demolition debris makes up 29% of the waste stream and 40% of that is non-hazardous and recyclable.	California 2008 Statewide Waste Characterization Study

Emissions Category	Measure Title	Detailed Description	Actual Measure or Commitment	Emissions Reduction in 2020 ($MTCO_2e$)	Measure Source	GHG Calculation Methodology Source	Incremental Reduction (%) - Including Range	Activity Data	Units	Assumptions	Data Sources
Trees and Other Vegetation	Native Tree Ordinance, Tree Planting, and Streetscape Improvements	• The 2012 CIP calls for the planting of 3,000 native oak tree seedlings throughout Atascadero on sites determined by the Native Tree Atlas. • The Native Tree Ordinance is a key tool for tree preservation and regeneration of new trees. Native trees are required to be protected whenever feasible, and permits must be obtained for native trees removal. • Tree and habitat survey completed with GIS and work with biologist to study Atascadero's oak forest and success of the tree replanting sites.	The 2012 CIP calls for the planting of 3,000 additional native oak tree seedlings throughout Atascadero on sites determined by the Native Tree Atlas.	-36	Sustainability Activities in Atascadero memo	CAPCOA V-1	Varies	3,000	Net New Trees	Assumes annual CO2 reduction rate per tree to be 0.0121 (most conservative rate provided in CAPCOA)	CAPCOA V-1. Please note there is no reduction associated with open space or tree preservation or mitigation. This measure can only account for net new trees planted or net new vegetated acreage created (so there is an overall net increase in carbon sequestration). Survey and study support implementation of tree planting, but do not directly result in the planting of trees or a reduction in GHG emissions.
Water	Water Conservation Programs	Implementation of programs identified to reduce water consumption. According to data provided by the Atascadero Mutual Water District, this will result in 110,100,000 gallons of water savings by 2020.	110,100,000 gallons of water savings	-19	Atascadero Mutual Water District	CAPCOA WSW-2	Varies	110,100,000	Gallons	Assumes 1,300 kWh/million gallons electricity required to supply, treat, and distribute water. Assumes 0.133 MT CO2e/MWh electricity.	California Energy Commission Refining Estimates of Water-Related Energy Use in California (December 2006)

City of Atascadero

6907 El Camino Real
Atascadero, CA 93422

Sustainability and Energy Efficiency Efforts

Activity	Purpose	Description	Date	Notes
Alternative Transportation & Fuel Reduction				
Public Transportation	Carbon Reduction	• City expanded public transportation system to include hourly transportation along major shopping, education, health service and housing corridors • Buses equipped with bicycle racks and connect to regional and national bus service and rail for expanded multi-modal opportunities	Ongoing since 2011	Accounted for in adjusted forecast.
Atascadero Bicycle Transportation Plan	Carbon Reduction Eco Tourism Healthy Communities	• Plan provides a blueprint for the development of a comprehensive bicycling system to facilitate bicycle transportation and encourage recreational cycling • Developed through public workshops to gather input on routes, connections, bicycle tourism, enhancements & facilities • Adopted plan will allow for the City to be eligible for State and Federal grants to construct bike routes	Bike Plan adopted November 2010	Included in Chapter 3 as a CAP measure
Atascadero Trail System	Carbon Reduction Eco Tourism Healthy Communities	• "Atascadero Creek Trail Enhancement Project" constructed along HWY 41 from San Gabriel to Portola, and design in process to connect El Camino Real to the Colony Park Community Center & Stadium Park • Portions of Salinas River trail constructed • Ongoing work with ALPS to establish trails throughout City parks & help acquire additional land for open space and future trails	Trail plan approved 2006 Installation of trails ongoing	Included in SLOCOG's regional travel model; mentioned in Chapter 3 of CAP
North County Regional Trail System	Carbon Reduction Eco Tourism Healthy Communities	• Currently working with SLOCOG on the "North County Regional De Anza Trail Master Plan," funded by a Caltrans planning grant • Regional effort to create a safe and fully integrated off-highway, multiuse trail system for recreationalists and commuters; will connect all communities in North County, from San Miguel to Santa Margarita, along the Salinas River & De Anza Trail • Adopted plan will allow for the City to be eligible for State and	Grant received 2012 Master plan in process	Included in Chapter 3 as a CAP measure

		Federal grants to construct multiuse trails		
Sidewalks & Bike Lanes Installed	Carbon Reduction Healthy Communities	• Bike lanes & sidewalks installed on El Camino Real & Traffic Way to connect major commercial and residential corridors • "Safe Routes to School" bike lanes, striping, signage & sidewalks installed near Atascadero High school, San Gabriel & Santa Rosa Schools	Ongoing since 2008	Any improvements implemented prior to 2012 were included in SLOCOG's regional travel model and accounted for in the adjusted forecast
Ride Share Programs	Carbon Reduction	• Public Park & Ride lots located off HWY 101 at Santa Barbara Road & San Luis Ave. Bike lockers installed at both Park & Ride lots • Worked with Topaz Solar Farm to establish Park & Ride lot to facilitate bus transportation to Carrizo Plain during project construction	Park & Ride expansion 2009 Solar farm lot est. 2012	Park and ride lot expansions were included in SLOCOG's regional travel demand model and accounted for in the adjusted forecast. Topaz Solar Farm park and ride was not accounted for because it is temporary during construction, which will end prior to 2020.
Bridges & Pedestrian Connections	VMT Reduction Healthy Communities	• Lewis Ave. Bridge constructed with sidewalks and bike lanes. Provides much needed connection to reduce travel time, and creates dual circulation system in downtown with non-vehicular travel options • Pedestrian tunnel enhancements to connect High School and residential neighborhoods to downtown through accessway under HWY 101 • Currently working on design of pedestrian bridge which will connect the new movie theater to the Sunken Gardens to create a walkable downtown district	Lewis Ave. bridge 2006 Ped tunnel 2010 Ped bridge in process	Lewis Avenue bridge and pedestrian tunnel were accounted for in the regional travel demand model and included in the adjusted forecast. The pedestrian bridge is quantified and included in Chapter 3 as a CAP measure.
Bike Racks	Carbon Reduction	• Bike rack installation required with all new retail & public projects • Bike racks installed at all existing parks, City facilities and schools	Ongoing	Bike racks do not directly reduce GHG emissions; however, bike racks support GHG reductions. Therefore, bike racks are grouped and accounted for in Chapter 3 of the CAP.
Bike Month	VMT Reduction Healthy Communities	• Partnership with SLO Bicycle Coalition to sponsor events to increase awareness & ridership during Bike Month each May. • As a result of engaged staff and Council members, participation increased from 30 to over 300 riders in 2012, with more events planned	Annual events	These efforts are supportive of overall GHG reduction efforts. These will be mentioned in the CAP but are not directly quantifiable.
City Facility Upgrades				
Facilities Energy Retro-fit (Phase 1)	Energy Conservation	• Nine (9) City facilities received light retrofit projects to potentially ***decrease energy consumption by 37,000 kWh hours per year, which is up to $6,100 in annual energy cost savings***	2009	Accounted for in adjusted forecast.
Fire Stations	Energy, Resource & Water Conservation	• Efficiency and conservation updates at Fire Stations 1 & 2: – Installation of tinted engine bay windows & exhaust extraction system and – Standby generators replacement with propane or natural gas instead of electric	2008/2009	First two items would not reduce GHG emissions. The efficient appliances are accounted for in the adjusted forecast.

		– Efficient refrigerators and washers/dryers & low flow toilets/showers/bath faucets		
EECBG Grant for Municipal Energy Efficiency Retro-fits	Resource & Energy Conservation	• California Energy Commission (CEC) completed energy audit using AARA funds to determine what projects would provide the best payback • ***Energy Efficiency and Conservation Block Grant (EECBG) funded $152,644 in energy efficiency retro-fit projects*** • Included upgrades at Fire Station 1, Police Station, Pavilion, Police Station, Waste Water Treatment Plant and Public Works Corp Yard - 17 High SEER replacement HVAC units - 17 programmable thermostats - 564 florescent tube lamps 28watt - 119 Low watt T8 ballasts - 18 LED parking lot lights Retrofit kits - 28 Induction wall packs 40watt	Dec. 2009	Accounted for in adjusted forecast.
Staples Direct Install (Funded by PG&E)	Resource & Energy Conservation	• Staples Direct Install program for Municipal Facilities; energy savings opportunity made available through the Energy Watch Partnership • ***77 separate projects completed at five (5) facilities, with an estimated annual energy savings of 51,200 kWh*** • Upgrades such as occupancy sensors, new light fixtures and light bulb replacements completed at the current City Hall building, Pavilion, Public Works Yard, Wastewater Treatment Plant and Indoor Skate Park	Aug 2011	Accounted for in adjusted forecast.
Wastewater Treatment Plant Upgrades	Resource & Energy Conservation	• Continual redesign and improvement of sewer system to reduce energy requirements by taking advantage of gravity flow; two lift stations have been eliminated & a third is slated for elimination • Inefficient pumps & aerators replaced with more efficient models; those not being replaced are being re-wound with more efficient wiring	Ongoing since 2009	Accounted for in adjusted forecast.
Colony Park Community Center	Energy, Resource & Water Conservation	• Sustainable construction practices such as use of compressed recycled paper for bathroom partitions and counters, recycled plastics for flooring and counters, and recycled rubber for the sports court • Building is designed to be low maintenance to reduce water, power, and chemical use	Constructed 2006	Reduces lifecycle emissions, which are not accounted for in GHG inventory. Water reductions accounted for in adjusted forecast
Charles Paddock Zoo Restroom Facility	Public Education Energy, Resource & Water Conservation	• New public restrooms incorporate green building features such as: – Rainwater collection & daylighting (no electric lights needed during the day) – Passive ventilation and thermal walls (no HVAC needed) – Straw bale constructed walls & renewable materials	Constructed 2011	Accounted for in adjusted forecast.

		throughout – Low flow toilets & faucets		
Historic City Hall Restoration	Energy, Resource & Water Conservation	• The historic restoration of this 1914 City landmark includes major upgrades for energy efficiency which will result in huge savings in ongoing operating costs: – New high efficiency HVAC units with individual temp controls for every room – Energy efficient light fixtures with occupancy sensors – Energy efficient appliances in break rooms – Low flush water closets and urinals – Added insulation on the 4th floor	Construction to be completed 2013	Quantified in Chapter 3 as a CAP measure.
Green Parking Lot at Lake Park	Public Education Stormwater	• Demonstration project at Lake Park, funded by Urban Greening Grant Program • Replace an existing dirt parking lot with a low impact development parking lot • Designed to mitigate the stormwater runoff and pollutants which enter Atascadero Creek	Construction in Process	Not quantifiable, but not accounted for in GHG inventory
City Facility Policies	Energy & Water Conservation	• Directive from the City Manager outlining Citywide Energy Conservation Measures issued in September 2008 in order to cut City budget and operation costs • It is the City's policy to always purchase energy efficient equipment and appliances • ***10% reduction in combined usage of all City buildings shown between 2009 and 2011, with many facilities showing an energy reduction of 20% or more based on City operations and facility upgrades in just the past few years***	2008	Quantified in Chapter 3 as a CAP measure.
Building Operator Certification Course	Education Energy, Resource & Water Conservation	• Two (2) City employees completed Building Operator Certification Course • Staff was trained to evaluate and improve operational efficiencies in municipal facilities and cut down on energy usage (lighting, thermostats & more) • Operator awareness alone has cut energy use at the Community Center by 20%, and this is a brand new building with modern and energy conscious construction! • Shows that investing in new technologies isn't enough; well-trained operators make the difference in reducing energy use and costs	2010	Accounted for in adjusted forecast.
Energy Tracking	Energy Conservation Education	• Currently benchmarking energy performance and water usage of Municipal Facilities to manage overall energy use and identify where the energy consumption hogs are • Monthly usage date within individual buildings & across entire building portfolio is automatically measured and tracked through Portfolio Manager • ***Will be able to identify new opportunities to save, where***	Data input & setup in process	Not quantifiable as it does not directly reduce GHG emissions. However, supports monitoring of reductions and informed decisionmaking.

		to focus energy efficiency efforts, and what rebates and funding sources City is eligible for		
Energy Efficiency				
SLO Energy Watch Partnership	Energy Conservation Education & Outreach	• A joint partnership of PG&E, SoCal Gas, Economic Vitality Corporation, SLO County and participating municipalities • Partnership has provided extensive training, outreach, and energy-saving opportunities for the City as well as for local businesses and property owners • ***The City of Atascadero has taken full advantage of this partnership, becoming a leader in SLO County in obtaining energy grants & upgrading City facilities***	Participation since 2009	Accounted for in Chapter 3 of the CAP with continued implementation and monitoring procedures to support potential reductions
SLO Green Build Partnership	Energy, Resource & Water Conservation Education & Outreach	• City works with SLO Green Build to host community workshops and seminars for homeowners, builders, and the general public • Workshops have included: grey water systems, sustainable landscaping, photovoltaic systems and alternative energy production, and green building technologies • City staff meets quarterly with SLO Green Build to discuss how City can encourage sustainable design • A SLO Green Build public information kiosk is located at the City Hall front counter	Ongoing since 2005	Accounted for in Chapter 3 of the CAP with continued implementation and monitoring procedures to support potential reductions
Building Code	Energy Conservation Water Conservation	• California Green Building Code became effective January 1, 2011 • Title 24 energy requirements are strictly enforced for all new construction in the City, including significant energy efficiency standards for lighting and appliances	New code adopted 2011	Accounted for in adjusted forecast (2013 Title 24 energy requirements).
PV System Expedited Permits & Reduced Fees	Energy Conservation	• The City of Atascadero has the lowest permit fees for solar in the County, and building permits for PV system installation receive expedited processing • This policy and staff dedication ensures safe installation of PV systems while removing perceived road blocks associated with permitting process	Ongoing	Accounted for in adjusted forecast. Supportive measure.
Affordable Solar Home Program (SASH)	Energy Conservation	• The Single-family Affordable Solar Homes (SASH) Program is a comprehensive low-income solar program made available by California Public Utilities Commission • City staff has been collaborating with Grid Alternatives on outreach and eligibility • As part of the SASH program, PV systems will be installed on 24 new affordable units being constructed next year by People's Self Help Housing, and hopefully on many more affordable single family homes currently existing throughout the City • SASH is a first-of-its-kind solar program, structured to promote or provide energy efficiency for low income families, workforce development and green jobs training opportunities,	Currently in process	24 new affordable units accounted for in adjusted forecast.

		and broad community engagement		
Greenhouse Gas Reduction				
U.S. Mayors Climate Protection Agreement	Carbon Reduction	• Encourages policies and programs to create well planned communities and improve the urban forest	Adopted 2005	Not quantifiable as it does not directly reduce GHG emissions. Sequestration from trees planted since 2005 were accounted for in adjusted forecast.
SLO Air District GHG Stakeholder Group	Carbon Reduction Education	• In 2007, the APCD convened a committee of city and county agency stakeholders to initiate a discussion of climate change, including science, policy, funding, mitigation, adaptation, and public engagement • Bimonthly meetings are held to share information, identify funding sources, and develop local programs, policies, and activities that to reduce GHG emissions	Ongoing since 2006	Not quantifiable as it does not directly reduce GHG emissions.
Local Governments for Sustainability (ICLEI)	Conservation Carbon Reduction	• Atascadero joined ICLEI and agreed to participate in the Cities for Climate Protection Campaign • ICLEI provides technical consulting, training, and information services to share knowledge and support local government in the implementation of sustainable development at the local level	2009/2010 ICLEI member	Not quantifiable as it does not directly reduce GHG emissions.
Greenhouse Gas Inventory	Carbon Reduction	• Grant funded Greenhouse Gas Inventory identifies major sources of emissions within City • Measures progress made in reducing GHG from City operations and community wide and forecasts how emissions will grow if no behavioral changes or improvements are made	Completed 2010	Not quantifiable as it does not directly reduce GHG emissions.
Greenhouse Gas Reduction Plan	Carbon Reduction	• Grant funded regional planning project in collaboration with SLOAPCD, PG&E, and the Cities of Paso Robles, Arroyo Grande, Grover Beach, Morro Bay, and Pismo Beach • Development of a local plan to reduce GHG emissions and improve energy efficiency • Recognize local needs and perspectives and focus on practical, implementable solutions	Grant Received 2012 Development In process	NA
PG&E Climate Smart Program	Carbon Reduction	• First city in the County to join PG&E program to make energy use at City facilities carbon neutral • Climate Smart program designed to make people aware of the challenges posed by climate change while also helping establish the infrastructure for a low carbon economy in California	Since 2005	Climate Smart no longer in existence.
City Vehicles	Emissions Reduction	• City vehicle idling policies in place to reduce emissions • Filters installed on heavy duty diesel engines and old diesel vehicles retired to reduce emissions • Fire Department tests all engines and command vehicles for emissions; two new engines exceed the 2007 EPA specs for trucks and heavy equipment	City Operations Ongoing	For City vehicles alone, GHG reductions would be negligible. Filters help with air quality, but not GHGs.
Electric Vehicle	Emissions	• Partnership with APCD to obtain grant funding to install more	2012 & Ongoing	Accounted for as part of CAP as this

Charging Stations	Reduction	charging systems in the City • City staff involvement in program to make California Plug-in Electric Vehicle ready		measure relies on assumptions that will need to be monitored to ensure effectiveness.
Land Use & Development				
Atascadero General Plan	Resource Conservation Carbon Reduction	• The City's General Plan is based on the Smart Growth Principles of encouraging infill and reuse of existing land and infrastructure: ○ Encourage mixed-use infill development & revitalization of the Downtown Core ○ Preserve & protect the oak woodlands, creeks & wetlands	Adopted 2002	Accounted for in regional travel model. Please note in regards to trees and open space, reductions can only result from additional trees planted (net new trees) (cannot credit for trees planted as mitigation).
Mixed Use, Retail & job development	Reduce Vehicle Miles Traveled	• City Office of Economic Development created to encourage retail, job development, and infill in the downtown & urban core. Providing services and shopping within Atascadero will reduce vehicle miles traveled for residents who currently have to drive for goods and employment • Mixed use promoted, simplified permit process, City and staff support with development projects • Redevelopment Agency funding provided to new businesses and downtown affordable housing • Better jobs to housing balance created so that residents can work, shop and live in the City • High Density Residential areas upzoned in 2011 to increase density in the urban core (upzoned from RMF-16 to RMF-20)	City Services Ongoing	Quantified in Chapter 3 as a CAP measure.
South El Camino Real Corridor Visioning Study	Planning for Sustainable Communities	• Plan to envision how to integrate housing, economic development, jobs and transportation with a complete street concept for El Camino Real for people, bicycles, transit and automobiles • Collaboration with SLOCOG through a grant from the Department of Conservation; plan will help City to obtain additional grants for infrastructure and improvements along El Camino Real • Pilot project that will be used to illustrate how cities can integrate a mix of land uses and densities, alternative forms of transportation and complete streets	2012	Accounted for as part of CAP as this measure relies on assumptions that need to have implementation actions and be monitored to ensure effectiveness.
Recycling & Waste Reduction				
Cold In-Place Road Recycling	GHG Reduction Resource Conservation Waste Reduction	• City road surface repair project where existing asphalt road is crushed and mixed in with additives then immediately used to repave road in a single process • Innovative road reconstruction process which is a fast, cost-effective alternative to more traditional methods of rebuilding asphalt roadways • "Cold In-Place Recycling" eliminates hundreds of asphalt and gravel truck trips which would traditionally be required to carry out the old asphalt, and carry in new asphalt	2012 City Operations	Not quantifiable, as not included in baseline GHG inventory. Mentioned as a supportive measure in CAP.

Recycling Program	Resource Conservation Waste Reduction	• City collaboration on programs with Atascadero Waste Alternatives • Semiannual "Citywide clean-up days" for residents to recycle household waste at no cost • Free curbside co-mingled recycling program and "green waste" recycling program • Atascadero became the first municipal agency in SLO County to reach targeted 50% diversion of citywide trash going to landfill	Ongoing	Quantified in Chapter 3 as a CAP measure.
Urban Forestry				
Native Tree Ordinance & Replanting Sites	Carbon Reduction	• Ordinance requires protection of native trees and replanting or mitigation fees for removals • Tree mitigation funds used to plant almost 1000 new native trees throughout the City, with an additional 500 native trees given to private property owners • Tree and habitat survey completed with GIS and work with biologist to study Atascadero's oak forest and success of the tree replanting sites	Ongoing since1999	The CAP accounts for net number of new trees planted from 2006-2020. Cannot account for trees planted as a result of mitigation or preservation of existing trees. Survey and study support implementation of tree planting, but do not directly result in the planting of trees or a reduction in GHG emissions.
Tree City USA & Atascadero Native Tree Association (ANTA)	Carbon Reduction Education	• Recognized as a Tree City member for 24 years • Atascadero Native Tree Association creates tree planting areas and does educational programs and outreach which focus on the care and renewal of native forest	Ongoing	The CAP accounts for net number of new trees planted from 2006-2020. Cannot account for trees planted as a result of mitigation or preservation of existing trees.
Downtown Streetscape Projects & Tree Plantings	Reduces urban heat island, City Facilities	• Pedestrian and operational improvements including bulb outs, landscaped medians, street trees, street furniture and lighting for the Downtown according to the RVC Plan • Trees planted with the recent upgrades to the waste water facility & corporation yard to create shade and reduce the urban heat island	Public Works 2006 & Ongoing	Quantified as part of CAP measures in Chapter 3.
Updates to Landscape Ordinance	Reduces urban heat island Citywide	• Landscape standards adopted for multifamily & commercial, plus parking lots to establish minimum requirements for landscape coverage, decorative planting and shade trees.	Adopted September 2005	Included as supportive measure in Chapter 3 of CAP.
Water Conservation				
Water Conservation Landscape & Irrigation Ordinance	Water Conservation Citywide & City Operations	• Limits high water use landscapes with new commercial and residential development • Encourages drought tolerant plants that are well suited for Atascadero's dry climate • Limitations on the amount of turf lawns and spray irrigation	Adopted By City Council Jan. 2010	Accounted for in adjusted forecast
City Facility Operations & Landscape Water Conservation	Water Conservation City Operations Cost Savings	• Irrigation control systems, with sensors to respond to weather conditions, installed at City parks • Solar panels installed to power the irrigation controller for the landscape areas at Las Lomas • Areas of underutilized turf removed at Atascadero Lake Park,	City Operations Ongoing since 2008	Accounted for in adjusted forecast

Measures		Paloma Creek Park & Fire Station • Drought tolerant and low maintenance landscaping installed in Downtown Streetscape project • City water analysis shows a 25% reduction in water use at City facilities in the past 3 years		
Washing Machine & Toilet Retrofit Programs	Water Conservation Citywide Rebates	• 692 rebates have been distributed by Atascadero Mutual Water Company to customers • $90,300 of equipment installed, including high-efficiency & ultra-low flow toilets, high-efficiency clothes washers, plus cooling tower conductivity meters	AMWC 2005 & Ongoing	Accounted for in adjusted forecast
Landscape Rebate Program	Water Conservation Citywide Rebates	• 214 landscape rebates have been distributed by Atascadero Mutual Water Company • $33,123 in rebates have been distributed to customers for turf conservation, lawn aeration, rain sensors, weather-based irrigation controllers, soil moisture sensors, multi-stream rotary nozzles and rainwater harvesting	AMWC 2005 & Ongoing	Accounted for in adjusted forecast
Annual Garden Tour & Sustainable Landscape Workshop Series	Education Water and Energy Conservation Citywide	• Atascadero Mutual Water Company hosts the annual garden tour where residents can gather ideas for beautiful drought tolerant landscapes • Workshops which about irrigation types and plant selection suited to our local climate • Community members learn how to create beautiful outdoor landscapes which use native plants which are water efficient and require minimal maintenance, thereby saving time, reducing the need for fertilizers, pesticides, and use of power equipment	AMWC 2010	Supportive measure, but water reduction was accounted for in adjusted forecast
Home Water Survey Program	Water Conservation Citywide Cost Savings	• The highly successful Home Water Survey Program is free to customers and helps them conserve water by learning how to manage landscape irrigation more efficiently • AMWC's water conservation staff helps property owners create a site-specific irrigation schedule, recommended irrigation system improvements for the, and checks for leaks	AMWC 2009	Accounted for in adjusted forecast

APPENDIX C

CAP CONSISTENCY WORKSHEET

CAP Consistency Worksheet

The City of Atascadero CAP was developed to comprehensively analyze and mitigate the significant effects of GHG emissions consistent with CEQA Guidelines Section 15183.5(b) and to support the State's efforts to reduce GHG emissions under Executive Order S-3-05 and AB 32 (see CAP Chapter 1, Sections 1.1 and 1.4). Pursuant to CEQA Guidelines Sections 15064(h)(3) and 15130(d), if a project is consistent and complies with the requirements of an adopted plan, such as a CAP, that includes the attributes specified in CEQA Guidelines Section 15183.5(h), the lead agency may determine that the project's GHG impacts are less than significant with no further analysis required. This appendix sets forth a CAP consistency worksheet that an applicant may use to demonstrate project compliance with the CAP. This checklist should be filled out for each new project, subject to discretionary review of the City of Atascadero.

To determine project consistency and compliance with the CAP, the applicant should complete Sections A and B below, providing project-level details in the space provided. Generally, only projects that are consistent with the General Plan land use designations, and SLOCOG population and employment projections, upon which the GHG emissions modeling and CAP is based, can apply for a determination of consistency with the CAP. In addition, all mandatory actions identified in Section B must be incorporated as binding and enforceable components of the project for it to be found consistent with the CAP. If an action is not applicable to the proposed project, please identify and explain.

At this time, the voluntary actions are not required for project consistency with the CAP; however, if a project does include voluntary actions identified in Section B, project-level details should be described to help the City track implementation of voluntary CAP actions that would contribute to Atascadero's achievement of its GHG emissions reduction target.

If the project cannot meet one or more of the mandatory actions, substitutions (preferably starting with the voluntary actions) may be allowed if the applicant can demonstrate how substituted actions would achieve equivalent reductions to the City's satisfaction. The applicant would also be required to demonstrate that the project would not substantially interfere with implementation of the mandatory CAP actions.

If it is determined that a proposed project is not consistent with the CAP, further analysis would be required and the applicant would be required to demonstrate that the proposed project's GHG emissions fall below the APCD's adopted GHG significance thresholds (see CAP Chapter 1, Section 1.8.3 and Table 1-2). The project would also be required to demonstrate that it would not substantially interfere with implementation of the CAP.

A. PROJECT INFORMATION

Date:	
Project Name:	
Project Address:	
Project Type:	
Project Size:	
Land Use Designation(s):	
Zoning Designation(s):	
Project Service Population (Residents + Employees):	
Brief Project Description:	
Compliance Checklist Prepared By:	

B. CAP COMPLIANCE WORKSHEET

Measure	Project Actions	Mandatory or Voluntary	Project Compliance (Yes/No/NA)	Details of Compliance*
Energy				
Measure E-4: Incentives for Exceeding Title 24 Energy Efficiency Building Standards	Does the project exceed 2013 Title 24 Building Energy Efficiency Standards?	Voluntary		
Measure E-5: Small-Scale On-Site Solar PV Incentive Program	Does the project include installation of small-scale on-site solar PV systems and/or solar hot water heaters? If so, what type and how much renewable energy would be generated?	Voluntary		
Measure E-6: Income-Qualified Solar PV Program	Does the project include installation of small-scale on-site solar PV systems and/or solar hot water heaters on income-qualified housing units? If so, what type and how much renewable energy would be generated?	Voluntary		
Transportation and Land Use				
Measure TL-1: Bicycle Network	Does the project incorporate bicycle lanes, routes, and/or shared-use paths into street system, as currently required by the General Plan and Municipal Code, to provide a continuous network of routes, facilitated with markings, signage, and bicycle parking?	Mandatory		

Measure	Project Actions	Mandatory or Voluntary	Project Compliance (Yes/No/NA)	Details of Compliance*
	Does the project incorporate bicycle facilities and/or amenities beyond those required?	Voluntary		
Measure TL-2: Pedestrian Network	Does the project provide a pedestrian access network that internally links all uses and connects all existing or planned external streets and pedestrian facilities contiguous with the project site, as currently required by the General Plan and Municipal Code?	Mandatory		
	Does project minimize barriers to pedestrian access and interconnectivity, as currently required by the General Plan and Municipal Code?	Mandatory		
	Does the project implement traffic calming improvements as appropriate (e.g., marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, median islands, mini-circles, tight corner radii, etc.), as currently required by the General Plan and Municipal Code?	Mandatory		
	Does the project incorporate pedestrian facilities and/or amenities beyond those required?	Voluntary		

Measure	Project Actions	Mandatory or Voluntary	Project Compliance (Yes/No/NA)	Details of Compliance*
Measure TL-3: Expand Transit Network	Does the project provide safe and convenient access to public transit within and/or contiguous to the project area, as currently required by the General Plan and Municipal Code?	Mandatory		
Measure TL-7: Electric Vehicle Network and Alternative Fueling Stations	Does the project include the installation of electric or other alternative fueling stations?	Voluntary		
Measure TL-8: Smart Growth	Is the project consistent with the City's land use and zoning code?	Mandatory		
	Does the project include any "smart growth" techniques, such as mixed-use, higher density, and/or infill development near existing or planned transit routes, in existing community centers/downtowns, and/or in other designated areas?	Voluntary		
Off-Road				
Measure O-1: Equipment Upgrades, Retrofits, and Replacements	If the project involves construction or demolition, does equipment utilize low- or zero-emissions vehicles or equipment?	Voluntary		
Water				
Measure W-1: Exceed SB X7-7 (Water Conservation Act of 2009), Water Conservation Target	Does the project incorporate grey water or recycled water infrastructure?	Voluntary		

Measure	Project Actions	Mandatory or Voluntary	Project Compliance (Yes/No/NA)	Details of Compliance*
Solid Waste				
Measure S-1: Solid Waste Diversion Rate	If the project involves demolition, will the contractor divert 70 percent of non-hazardous debris?	Mandatory		
Trees and Vegetation				
Measure T-1: Tree Planting Program	Does the project include the planting of native and drought-tolerant trees beyond those required as mitigation for tree removal? If so, how many?	Voluntary		

*Please attach additional pages as needed to complete the description and provide project details.