

City of Elk Grove

Climate Action Plan: 2019 Update



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Introduction

This Climate Action Plan (CAP) demonstrates the City of Elk Grove's (City) commitment to reducing greenhouse gas (GHG) emissions consistent with State legislation. The City will reduce GHG emissions and adapt to climate change through the goals, measures, and strategies identified herein. These efforts will not only reduce GHG emissions, but create a healthier, more sustainable, and resilient community for City residents and businesses.

Purpose and Scope

Local governments can play an important role in reducing GHG emissions in their communities. While State and federal agencies play a key role in setting policy and regulations regarding climate change, local governments hold an important responsibility in supporting and enacting these to ensure GHG reductions are achieved. Local governments also have the ability to influence many of the policies and decisions that will affect local GHG emissions sectors. Critical aspects of local city planning such as land use decisions, transportation, waste management, and resource conservation can all play a key role in reducing GHG emissions. These policies can also have significant co-benefits for residents such as reduced energy costs, improved air quality, economic growth, and an enhanced quality of life.

In December 2009, the City was awarded an Energy Efficiency and Conservation Block Grant (EECBG) from the United States Department of Energy. The City dedicated a portion of its EECBG funds to prepare the City's first CAP which was adopted by the City Council on March 27, 2013.

This document serves as the first update to the City's CAP and will support the current CAP implementation work being done at the City while providing new information and strategies to reduce the City's GHG emissions.

The purpose of the CAP is to identify how the City will achieve State-recommended targets of reducing GHG emissions to 1990 levels by 2020 and 40 percent below 1990 levels by 2030 pursuant to Assembly Bill (AB) 32 and Senate Bill (SB) 32. The CAP also demonstrates initial progress towards meeting the State's long-term 2050 goal of reducing emissions to 80 percent below 1990 levels as stated in Executive Order S-03-05. The CAP provides goals and associated measures, also referred to as GHG reduction strategies, in the sectors of energy use, transportation, land use, and solid waste.

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This CAP:

- Identifies and provides an inventory of GHG emissions associated with activities within the City’s jurisdictional boundary.
- Uses key indicators, such as population growth, to forecast future annual GHG emissions in the City for the years set for achieving reduction targets.
- Provides GHG reduction strategies for each emissions sector to reduce the City’s annual per capita GHG levels to specific targets, which are aligned with the State targets, as follows:
 - 7.6 MTCO_{2e} by 2020,
 - 4.1 MTCO_{2e} by 2030
- Quantifies, using substantial evidence, the emissions reduction targets and reduction measures included in the CAP, ensuring they are feasible and in line with State emissions reduction targets and measures pursuant to AB 32, SB 32, as well as State guidance issued pursuant to Public Resources Code Section 21083.05, which requires the Governor’s Office of Planning and Research (OPR) and the California Natural Resources Agency (CNRA) to periodically update the California Environmental Quality Act (CEQA) guidelines related to the analysis and mitigation of GHG emissions. [The CEQA Guidelines encourage the adoption of policies or programs that mitigate GHG emissions as a means of addressing comprehensively the cumulative impacts of projects. See State CEQA Guidelines, Chapter 3 of Division 6 of Title 14 of the California Code of Regulations, § 15064, subd. (h)(3), § 15130, subd. (d).]

Relationship to the General Plan

The CAP is linked to the General Plan through key goals and policies in the policy document, most importantly “GOAL NR-5: Reduced GHG Emissions that Align with Local, State, and Other Goals” included in the Community and Resource Protection Chapter. The General Plan and CAP are two separate, but related, components of the City’s sustainability strategy. The Community and Resource Protection Chapter of the General Plan highlights the City’s goals related to sustainability and resource protection and provides new direction and vision to maintain a healthy, balanced, and more sustainable community. As a complementary document, the CAP focuses on strategies to reduce GHG emissions and provides direction to reduce emissions consistent with State law and CEQA. The CAP is a tool that allows the City to look at its impact on GHG emissions, establish targets and goals for emissions reductions, and identify and implement specific measures that reduce GHG emissions to achieve the targets. The CAP builds on the goals and vision of the General Plan but translates these goals into numeric thresholds and targets for GHG emissions reductions. The CAP will be linked to the General

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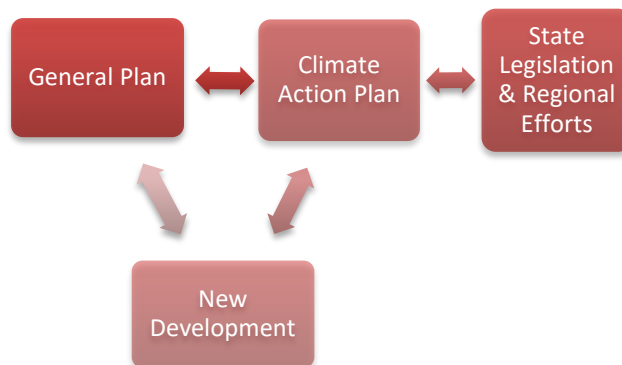
Plan as a stand-alone policy document and as an implementation item coordinated with the adopted Community and Resource Protection chapter.

This CAP is intended to be an adaptively managed document with the flexibility to be modified as the science and regulatory framework is further refined in the coming years. It is recommended that the CAP be reviewed every five years to understand the successes and barriers of implementation and ensure the most appropriate information and emissions reduction measures are included.

This CAP update provides a summary of the current CAP strategies being implemented by the City and establishes new sector specific strategies to reduce GHG emissions. By incorporating the goals and measures of the updated CAP into the General Plan, the City is ensuring that future development and planning activities within the City conform to the objectives of the CAP and State reduction targets.

Illustrated in **Figure 1-1**, the CAP serves as a link between the City and local development, State requirements, and regional planning efforts. This CAP update will also ensure the City's consistency with State legislation related to GHG emissions or their associated activities including AB 32 and SB 32, as well as SB 97, which mandates that lead agencies analyze GHG emissions in environmental documents.

Figure 1-1: *Climate Action Plan in Relation to Other Planning Documents and Legislation*



Relationship to the California Environmental Quality Act

This CAP is structured to serve as a programmatic tiering document for the purposes of CEQA. A tiering document front-loads the analysis needed for many projects to decrease the time and money needed for project-level environmental analyses. For future projects that the City determines are not exempt from CEQA and are subject to environmental review (e.g., an initial study/negative declaration or an EIR is required) and that seek to streamline the review process for analysis of GHG emissions

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impacts, projects can achieve streamlining pursuant to the provisions of Section 15183.5 by including all applicable GHG reduction measures in this CAP in the project designs and/or as mitigation measures in the environmental document, thus demonstrating that the project would have a cumulatively less than significant impact on the environment.

The City will ensure the appropriate use of the CAP for CEQA streamlining by maintaining the prerogative to use mandatory and voluntary measures as standards for new developments seeking streamlining as part of the CAP Consistency review process, as appropriate. The City will work with applicants seeking GHG streamlining on a project-by-project basis regarding the CEQA benefits of the CAP, identifying measures to integrate into a project's design or mitigation measures. This approach allows the City to ensure that new development projects can benefit from CEQA streamlining while also ensuring that the City is on target to achieve the GHG reduction targets established in the CAP. Chapter 5 of the CAP, "Conclusions and Next Steps" provides a detailed discussion of the CAP consistency review process that the City will use to help streamline project-level review pursuant to CEQA Guidelines Section 15183.5.

Public Involvement in the Climate Action Plan Development Process

As part of the development of the City's original CAP (2013), public engagement in the planning process was integral in ensuring that community-specific needs were reflected. During this process, several community workshops were held to inform the public about the planning process and receive community feedback for the development of the CAP.

Implementation

Implementation of the CAP, in coordination with the City's General Plan, will ensure achievement of considerable GHG reductions in the short- and long-term and consistency with State GHG reduction targets and goals. To facilitate timely implementation of the CAP, each GHG reduction measure identifies the department or agency responsible for implementation and provides public and/or private cost estimates. As outlined in Chapter 5, the City will conduct annual monitoring and reporting on progress of CAP implementation. The City will also develop additional implementation tools to help staff integrate the CAP into ongoing planning activities, including a monitoring and reporting tool and a development compliance checklist.

Background

An Overview of Climate Change

In recent decades human-caused climate change and its impacts have been a growing concern for the State and its residents. The greenhouse effect results from the concentration of atmospheric gases referred to as greenhouse gases (GHGs), which insulate the Earth and help regulate temperature. The most prevalent GHGs in our atmosphere include water vapor, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone, chlorofluorocarbons (CFCs), and hydrofluorocarbons (HFCs). These GHGs serve as global insulators, reflecting Earth's visible light and infrared radiation to keep temperatures on Earth stable. Without the greenhouse effect, Earth would not be able to support life as we know it. **Figure 2-1** illustrates the processes involved in the greenhouse effect.

How Are Greenhouse Gases Measured?

“Carbon dioxide equivalent” (CO₂e) is a way to equalize the different potencies of the six internationally recognized greenhouse gases (carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). For example, methane has 28 times the potency of carbon dioxide; therefore, 28 metric tons CO₂e could be 28 metric tons of carbon dioxide or 1 metric ton of methane. (IPCC 2014)

Over the past century, human activities (e.g., the burning of fossil fuels for transportation and energy, increasing rates of deforestation) have contributed to elevated concentrations of GHGs in the atmosphere. Human-caused (i.e., anthropogenic) emissions of GHGs have resulted in above-normal ambient concentrations of GHGs in the atmosphere, intensifying the greenhouse effect, and leading to a trend of abnormal warming of the Earth's climate. Through substantial evidence and observation, there is strong scientific consensus that it is “extremely likely” that most of the changes in the Earth's climate during the last 50 years are a result of anthropogenic GHG emissions (Intergovernmental Panel on Climate Change [IPCC] 2014: 3, 5).

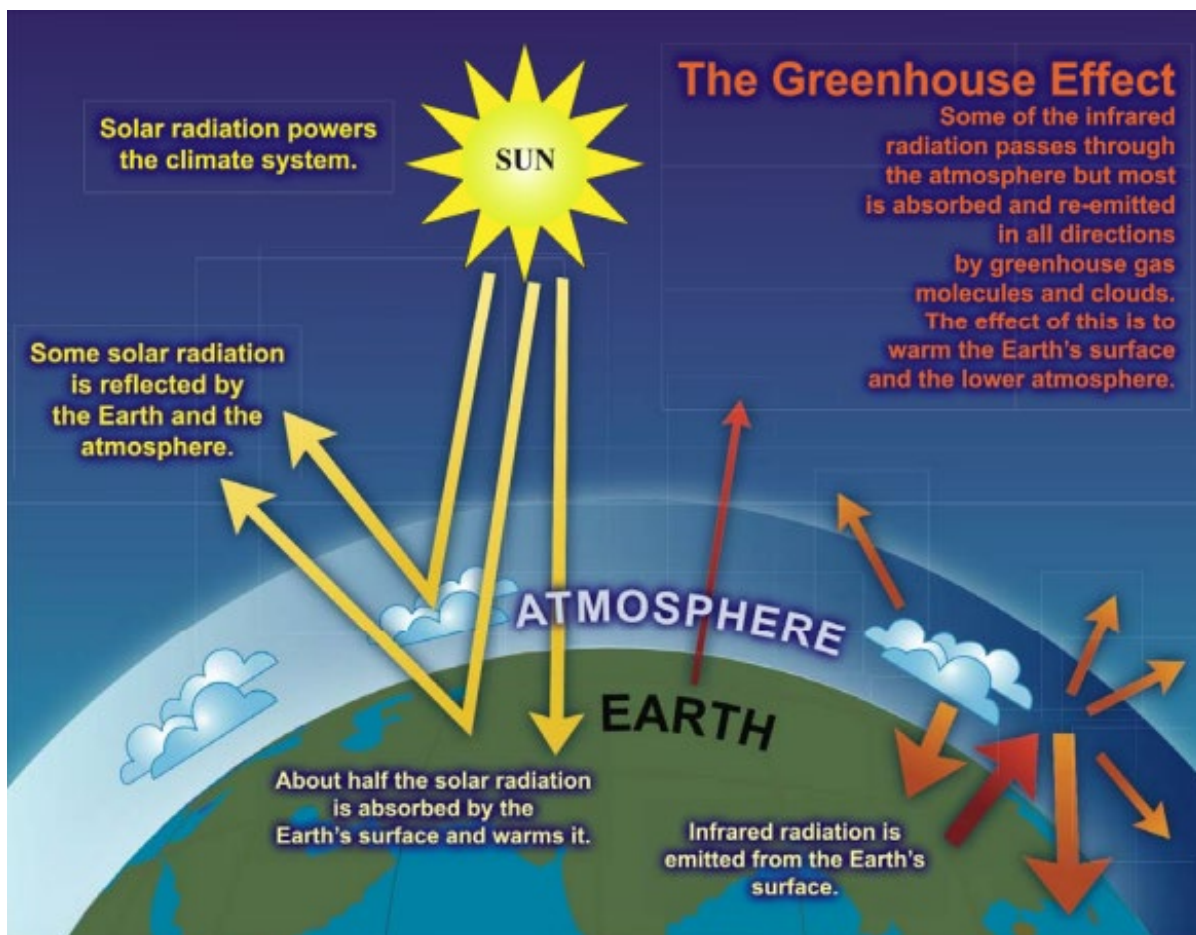
Furthermore, short-lived climate pollutants (SLCPs), which are GHGs that remain in the atmosphere for a much shorter period than long-lived climate pollutants (i.e., CO₂ and N₂O), are more powerful climate forcers that have an outsized impact on climate change in the near term. Despite their relatively shorter atmospheric lifespan, their relative potency in terms of how they heat the atmosphere [i.e., global warming potential (GWP)] can be tens, hundreds, or even thousands of times greater than that of CO₂.

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SLCPs include CH₄; fluorinated gases (F-gases), including hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF₆); and, black carbon.

Climate change is a global phenomenon and can lead to significant fluctuations in regional climates and weather patterns. While there is consensus that global climate change is occurring and that it is exacerbated by human activity, the specific timing, severity, and potential consequences of the climate change phenomena will be variable, particularly at the local level. However, the range of projected changes in temperature, precipitation, and other reasonably foreseeable physical changes can be characterized through the “downscaling” of climate change data, allowing for more detailed analysis of climate change impacts at the regional level. The following section of this chapter provides a more detailed discussion on the global and local impacts of climate change.

Figure 2-1: The Greenhouse Effect



Source: IPCC 2007.

Climate Change Impacts

Global Impacts

The Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report's Working Group I Summary for Policymakers synthesizes current scientific understanding of global climate change and projects future climate change using the most comprehensive set of established global climate models. The report incorporates findings of the current effects of global climate change. These findings include an increase in tropical cyclone (hurricane) intensity, a loss in seasonally frozen ground in the Northern Hemisphere, and an increase in drought intensity since the 1970s. According to the IPCC, the global average temperature is expected to increase by 3 to 7 degrees Fahrenheit (°F) by the end of the century, depending on future GHG emission scenarios (IPCC 2007). According to the California Natural Resources Agency (CNRA), temperatures in California are projected to increase 2 to 5 °F by 2050 and by 4 to 9 °F by 2100 (CNRA 2009).

As discussed in the IPCC Fourth Assessment Report, if trends remain unchanged, continued GHG emissions at or above current rates will induce further warming changes in the global climate system that will exceed trends observed to date and pose even greater risks than those currently witnessed.

Given the scientific basis of basic climate change facts and expected trends, the challenge remains to prepare for and mitigate climate change through deliberate global and local action.

The IPCC and Climate Change Science

What does the IPCC do? The role of the Intergovernmental Panel on Climate Change (IPCC) is to transparently and objectively assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

Why is the IPCC's work important? Work produced by the IPCC has become the "international gold standard in scientific assessments of climate change," reflecting the most current state of knowledge about the field.

Who contributes to IPCC work? IPCC reports are constructed through the work of thousands of unpaid scientists from leading research institutions, universities, and scientific organizations; the members of the IPCC (the world's national governments); and the IPCC's elected leadership.¹

¹ IPCC 2010a, b, c.

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Adaptation or mitigation alone cannot avoid all of the anticipated impacts of climate change, but in coordination, these two strategies can complement each other and reduce climate change risks.² The burden to implement these strategies falls to governments. However, this burden also creates tremendous opportunity—acting on these strategies yields both mitigation and economic benefits.

State and Local Impacts

Research suggests and recent annual weather conditions demonstrate that the State will experience hotter and drier conditions, reductions in winter snow and increases in winter rains, sea level rise, and an increased occurrence of extreme weather events. Such compounded impacts will affect economic systems throughout the State. To refrain from action is costly and risky; the California Climate Adaptation Strategy estimates that no action to address the potential impacts of climate change will lead to sector-wide losses of “tens of billions of dollars per year in direct costs’ and ‘expose trillions of dollars of assets to collateral risk.’ ”³

According to CNRA’s draft report, *Safeguarding California Plan: 2017 Update* (CNRA 2017), the State experienced the driest four-year statewide precipitation on record from 2012 through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2017). In contrast, the northern Sierra Nevada range experienced its wettest year on record in 2016 (CNRA 2017). The changes in precipitation exacerbate wildfires throughout California with increasing frequency, size, and devastation. As temperatures increase, the increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada and Cascade mountains until spring would flow into the Central Valley concurrently with winter rainstorm events. This scenario would place more pressure on California’s levee/flood control system (CNRA 2017). Furthermore, in the extreme scenario involving the rapid loss of the Antarctic ice sheet, sea level along the State’s coastline could rise by up to 10 feet by 2100, which is approximately 30 to 40 times faster than sea level rise experienced over the last century (CNRA 2017).

The City of Elk Grove (City) has prepared a Vulnerability Assessment (VA) that summarizes best estimates of likely future environmental conditions, based on local demographic projections and the most recently available scientific projections of future climate conditions, given current trends. While it is

² Ibid.

³ California Natural Resources Agency 2009.

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difficult to predict exactly how climate change will affect these community-specific issues, it is important to be aware of the general risks and implement mitigation strategies according to local needs. The VA, contained in Chapter 12 (Technical Appendix: Vulnerability Assessment) of the Elk Grove General Plan is the technical basis for informing policies in Elk Grove General Plan Chapter 8, Services, Health, and Safety intended to assist the city in adapting to those identified future conditions. It complies with Section 65302 of the California Government Code, which requires every general plan safety element to include a vulnerability assessment identifying the risks that climate change poses and the geographic areas at risk from climate change impacts. The likely impacts to the State and Elk Grove are also briefly summarized below. More detailed analyses on these and other local impacts are covered within the VA.

The City will continue to study hydrology patterns, water quality issues, land use, native species, and many other sectors that could be affected by climate change.

Increased Rate of Wildfires

Wildfire risk is based on a combination of factors including precipitation, winds, temperature, and vegetation. Wildfires are likely to grow in number and size throughout the State because of increased temperatures induced by climate change. Even under the “medium” warming scenario predicted by IPCC, wildfire risk will likely increase by 55 percent in California.⁴ Further, as wildfires increase in frequency and size, they will also increase in intensity.⁵

Wildfire hazards in the mostly urbanized City are low, although they could occur with greater frequency in areas where development has expanded into previously rural areas. Grass fires could occur in portions of the South and East Study Areas that are currently undeveloped.

Although urbanized Elk Grove itself is unlikely to experience increased fire risk directly, wildfires in the Sierra Nevada and areas outside the county affect air quality in the Planning Area. Wildland fires produce substantial emissions of particulate matter (i.e., smoke, soot), which may cause adverse health effects.

⁴ California Climate Change Center 2006.

⁵ California Natural Resources Agency 2009.

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Negative Impacts on Wildlife

As temperatures rise, species are moving north in California or to higher elevations. This change in migration disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change on different time frames. Further, those species that are unable to migrate face the danger of extinction: “The amount of future warming expected in California may likely exceed the tolerance of endemic species (i.e., those that are native to a specific location and that only occur there) given their limited distribution and microclimate.”⁶

With vegetation, reduction in soil moisture will result in early dieback of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes. Many of the potential effects on wildlife are still being studied, but due to an inability to adapt to new climates, the potential for severe species loss is present.

Several potential hydrological changes associated with global climate change could also specifically influence the ecology of aquatic life in California and have negative effects on cold-water fish. For example, if a rise in air temperature by just a few degrees Celsius occurs, this change could be enough to raise the water temperatures above the tolerance of salmon and trout in many streams, favoring instead non-native fishes such as sunfish and carp. Unsuitable summer temperatures would be particularly problematic for many of the threatened and endangered fish that spend summers in cold-water streams, either as adults or juveniles or both.

Heat and Deteriorating Public Health

When extreme heat is experienced over a period of five or more days, they are known as heat waves. In the past (1950-2000) in Sacramento County, heat waves occurred at a rate of about one to two per decade. In the next 50 years, Elk Grove would be expected to experience approximately three heat waves per year.

Heat waves are expected to have a major impact on public health, as well as decreasing air quality and increasing mosquito breeding and mosquito-borne diseases. Further, climate change is expected to alter the spread and prevalence of disease vectors, in addition to leading to a possible decrease in food

⁶ California Natural Resources Agency 2009.

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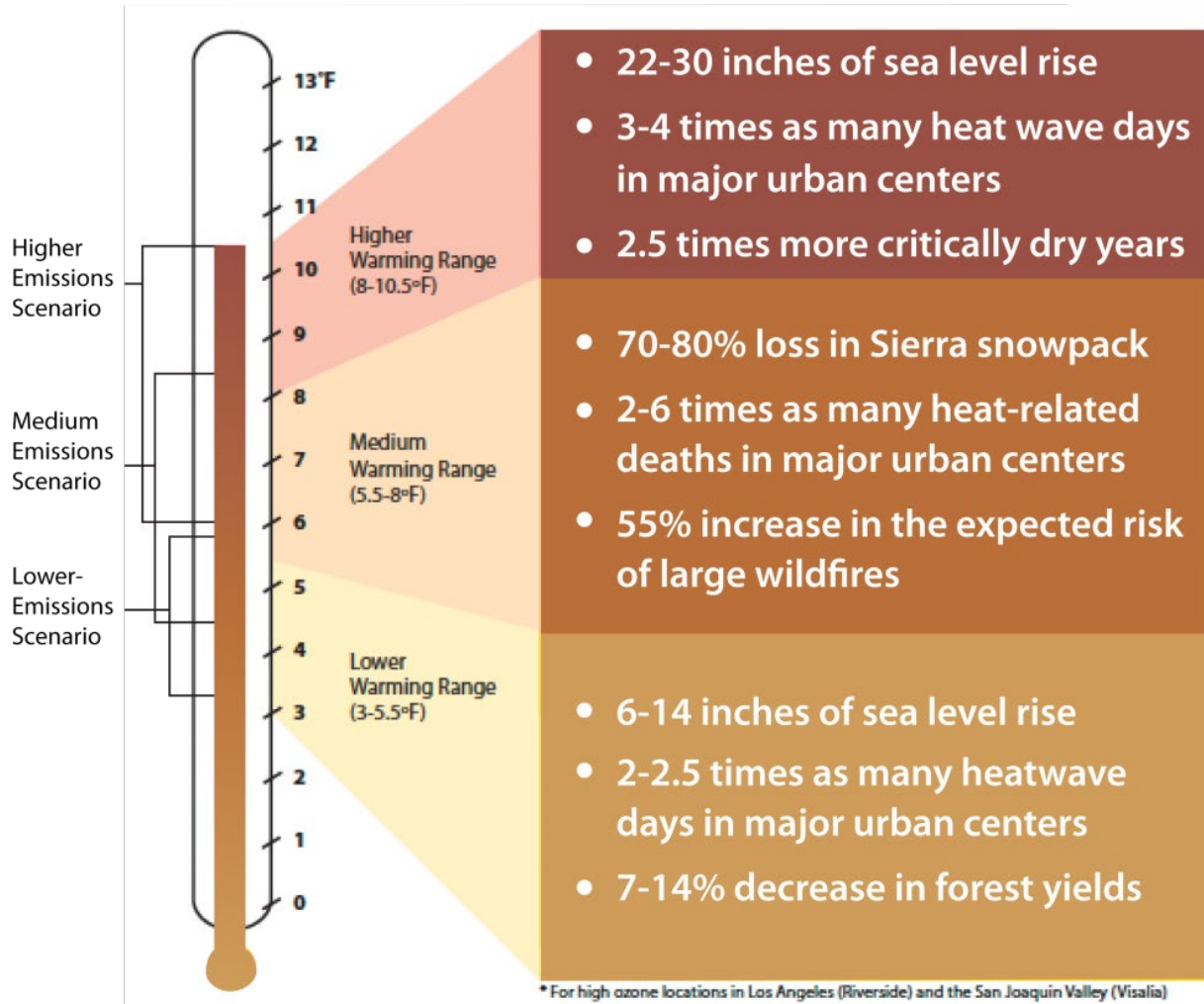
quality and security.⁷ Vector control districts throughout the state are already evaluating how they will address the expected changes to the State's climate.

Taking cost-effective measures to reduce GHG emissions and protect public health is important for local governments. The new study provides evidence of what is becoming known as the “climate penalty,” where rising temperatures increase ground-level ozone and airborne health-damaging particles, despite the reductions achieved by programs targeting smog-forming emissions from cars, trucks, and industrial sources.⁸ Vulnerable populations, such as the elderly and the young, are more likely to be impacted by the effects of climate change, populations which also often lack sufficient resources to adapt to these effects. These vulnerable populations require assistance to respond to the short and long-term impacts of climate change. Additionally, social equity issues related to the unequal distribution of resources and increased costs to address community-wide health risks will need to be addressed proactively to reduce the potential for financial strain on local governments.

⁷ Ibid.

⁸ Ibid.

Figure 2-2: California Climate Change Impacts⁹



⁹ California Department of Water Resources 2008

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A Decreasing Supply of Fresh Water

The State's water supply is already under stress and is anticipated to shrink under even the most conservative climate change scenario. Warmer average global temperatures cause more rainfall than snowfall, making the winter snowfall season shorter and accelerating the rate at which the snowpack melt in the spring. The Sierra snowpack is estimated to experience a 25 to 40 percent reduction from its historic average by 2050 and 48 to 65 percent by 2100.¹⁰ With rain and snow events becoming less predictable and more variable, the rate of flooding could increase and the State's ability to store and transport fresh water for consumption could decrease. Further, warmer weather will lead to longer and hotter growing seasons and increase water demand for agricultural uses.¹¹

The City is supplied by a mix of surface water, groundwater, and recycled water. Much of this water ultimately originates as snowmelt from the Sierra Nevada and reaches Elk Grove through the State Water Project and the Central Valley Project. With these supplies declining, water shortages for all uses in the planning area may be affected.

Increased Severity and Frequency of Flood Events

Climate change forecasts indicate more intense rainfall events, generating more frequent or extensive runoff, and flooding. Localized flood events may increase in periods of heavy rain due to increased precipitation rates. As explained by the Climate Adaptation Strategy, the State's water system is structured and operated to balance between water storage for dry months and flood protection during rainy seasons.¹² Although climate change is likely to lead to a drier climate overall, risks from regular, more intense rainfall events can generate more frequent and/or more severe flooding that upsets this managed balance between storage and protection. Several areas in the City have been determined by the Federal Emergency Management Agency (FEMA) and California Department of Water Resources (DWR) to fall within 500-, 200-, and 100-year floodplains.¹³ The City is within the larger Sacramento-San Joaquin Delta, and flooding in the Delta will be dependent on the resilience of the existing levee system, which is undergoing deterioration due to several stressors beyond land subsidence. Areas within the floodplains will likely be more vulnerable to the heightened flooding threats that are

¹⁰ Department of Water Resources 2008.

¹¹ California Natural Resources Agency 2009.

¹² California Natural Resources Agency 2009.

¹³ City of Elk Grove 2003.

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anticipated to result from climate change. Areas within the City that are at increased risk of flooding should remain a high priority for flood risk planning and efforts to address the local impacts of climate change.

State and Federal Regulatory Framework

State elected officials have taken an aggressive stance on reducing GHG emissions. The State has developed a comprehensive framework of legislation that provides a method for local governments to address climate change and reduce GHG emissions consistent with State goals and GHG reduction targets. The various components of this framework which are relevant to the CAP are described below.

State Regulatory Framework

The State is working proactively to reduce emissions, having a long history of proven leadership in addressing climate change issues that spans the last 30 years. Over these 30 years, the State has made continuous progress in addressing climate change through statewide legislation and initiatives to reduce GHG emissions and adapt to the impacts of climate change. These initiatives have strengthened the ability of State entities to engage in accurate data collection and have created targets and regulation that have and will continue to directly lead to GHG reductions. The State's efforts lead the U.S. for climate planning strategies and have earned global recognition as being a global leader on climate change.

Federal Direction

The Federal government has yet to enact legislative targets for GHG emissions reductions. However, numerous efforts have been undertaken at the federal level to limit emissions from the various activity sectors associated with GHG emissions.

In 2011, the Federal government announced a proposal to enact stronger national fuel economy and GHG pollution standards for 2017–2025 vehicle model years, increasing fuel economy to 54.5 miles per gallon for cars and light-duty trucks by model year 2025. The federal government also previously granted the State with authority to implement groundbreaking vehicle efficiency standards in 2009. However, with the release of the national fuel economy standards, CARB committed to collaborate with the U.S. Environmental Protection Agency (EPA) and the Department of Transportation to jointly coordinate the development of regulations. Additionally, the EPA has adopted multiple tiers of emission standards for non-road diesel engines which include compression ignition systems. These regulations

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require engine manufacturers to phase in the production of new engines with advanced emission control technologies.

Existing Sustainability Efforts in the City of Elk Grove

Beyond the State’s legislative framework to reduce GHG emissions, the City has implemented ambitious and innovative policies, programs, and development standards that enhance the local quality of life and serve to reduce GHG emissions. All such actions are addressed and, to the extent possible, integrated into the CAP. Below are examples of current sustainability initiatives—both public and private that have helped contribute to GHG reductions. These initiatives provide an important foundation for the vision established in the City’s General Plan Update and the actions included in the CAP.

- **Energy.** The City has continued to support innovative energy policy for local residents and businesses. Based on information from the California Energy Commission, there are currently 11 solar photovoltaic systems within the City planning area that are large enough to be considered power plants. These systems range in size from approximately 1 to 18 Megawatts (MW). The City also has many smaller solar photovoltaic arrays, primarily for on-site power demand for local residents and businesses. From 2005 through September 2015, the City issued permits for approximately 670 solar energy systems. The City has also provided permits for five solar water heating systems for domestic use and to heat swimming pools (City 2016). Additionally, in 2015, the City conducted a Title 24 Tier 1 Cost-Effectiveness Study to better understand the costs and payback periods associated with requiring all new buildings constructed to be more energy efficient than the minimum standards of the California Building Standards Code. This study helps better assess the feasibility of implementing such requirements in the future as well as providing valuable information for the GHG reduction strategies included in the CAP.
- **Land Use.** The City strives for a balance of local land uses that will reduce the need to use personal vehicles for all trips. The Chamber of Commerce and the Shop Elk Grove program promote local economic activity, encouraging the localization of employment and recreational shopping. The City also provides Startup and Expansion Assistance for local businesses and the development of local services, reducing the need for residents to travel outside the City for shopping and other services.
- **Transportation.** The City’s workforce is served by multiple commuting programs. Options include the Sacramento Region Commuter Club and resources provided by local employer-based Employee Transportation Coordinators. In 2014, the City adopted the Bicycle, Pedestrian and Trails Master Plan, intended to guide pedestrian and bicycle policy and provide a more safe, comfortable,

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convenient and enjoyable environment for walking and biking in the City. The City has completed numerous bus stop improvements and has worked to install new bus shelters citywide.

- **Water Conservation.** The Elk Grove Water District, in partnership with the Sacramento Municipal Utilities District, provides free mulch that reduces moisture evaporation in outdoor landscaping. The Florin Resource Conservation District (Florin RCD) has received funding from the California Department of Conservation to implement a Community Conservation Education Program. The program is intended to increase the public's knowledge about local resource conservation issues. The program includes a Community Conservation Workshop Series in partnership with the Elk Grove Community Garden and Learning Center through spring of 2018 as well as the Student and Landowner Education and Watershed Stewardship Program in partnership with the Center for Land-Based Learning, Natural Resources Conservation Service, Stone Lakes National Wildlife Refuge, the Sacramento Tree Foundation, and Valley High School.
- **Waste Reduction.** Numerous City programs facilitate recycling and reduce landfilled waste, including curbside e-waste pickup, curbside recycling, and a restaurant waste program. In 2010, the City adopted mandatory commercial recycling for all commercial properties that generate four cubic yards or more of solid waste per week.

Greenhouse Gas Emissions Inventory & Forecast

An inventory of greenhouse gas (GHG) emissions is an important first step in the climate action planning process. It identifies major sources of GHG emissions and provides a baseline against which progress can be measured.

2005 Greenhouse Gas Emissions Inventory Background

In June 2009, the Sacramento County Department of Environmental Review and Assessment and the Sacramento Municipal Utility District (SMUD) partnered with local agencies to complete a comprehensive countywide GHG emissions inventory, including individual GHG inventories for each jurisdiction in Sacramento County. The inventory calculated annual GHG emissions produced from both government operations and community-wide activities for the baseline year of 2005 (County of Sacramento 2009).

The government operations inventory is a subset of the community-wide inventory. Emissions from the government operations inventory mostly take place within the City of Elk Grove (City), meaning that all government operations are included in the nonresidential, transportation, waste, and other sectors of the community-wide inventory.

The 2005 inventory used the baseline year of 2005 based on the availability of reliable data and to maintain consistency with California's Assembly Bill (AB) 32 and other agencies throughout the State. The 2005 inventory was an important first step for the City to create a baseline against which it can measure future progress. The largest GHG emissions sectors and opportunities for reduction were first revealed through the 2005 inventory, making it an integral component of the City's sustainability efforts.

2013 Greenhouse Gas Emissions Inventory Update

Purpose of the Update

As part of the City's General Plan and CAP update process, a GHG inventory update was completed using the new baseline year of 2013. The initial results of the 2013 inventory were included in the Existing Conditions Report for the General Plan Update, and subsequently modified during preparation of the CAP Update. Complete 2013 inventory results are included in Appendix A.

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The 2013 inventory focused specifically on community-wide emissions sectors, which refers to emissions generated from sources and activities attributable to residents and businesses in the City. This serves as a benchmark to understand how emissions have changed between 2005 and 2013 as well as helping to identify the community activities which continue to generate GHG emissions. This inventory also highlights opportunities and constraints for reducing emissions in each of these sectors and establishes a baseline against which emissions forecasts and GHG reduction targets can be set. The 2013 inventory was conducted using the same emissions sector categories as the 2005 inventory, allowing for consistency between inventory updates.

Consistent with guidance from the Governor's Office of Planning and Research (OPR), the 2005 and 2013 community-wide inventories were conducted using the 2012 U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, commonly known as the U.S. Community Protocol (ICLEI 2012). Additionally, the 2005 inventory used global warming potential (GWP) values from the Intergovernmental Panel on Climate Change's (IPCC) 2nd Assessment Report, which was published in 1995. The 2013 inventory uses GWP values from the IPCC's 5th Assessment Report, published in 2014, which demonstrates changes to expected GWP from methane and nitrous oxide. To ensure a consistent comparison could be made between the 2005 and 2013 inventories, the 2005 inventory was updated to use GWP values from the 5th Assessment Report. Additionally, as part of the 2013 inventory update, refinements were made to electricity use for wastewater related emissions based on updated data provided by SMUD. Following U.S. Community Protocol principles and best practices among State government GHG inventories, the community-wide inventory was modified to exclude some emissions sources that the City has no power to control or affect through this CAP or any other action. Several sectors excluded from the updated inventory include high-GWP GHGs for electricity transmission, high-GWP GHGs typically associated with industrial and manufacturing processes (i.e., perfluorocarbons, sulfur hexafluoride), and off-road emissions from activities not occurring in the City such as watercraft operation.

For the 2013 inventory, the City has also updated the transportation emissions analysis to reflect more accurate countywide vehicle fuel use data from the California Air Resources Board (CARB). The original analysis calculated emissions from all vehicle miles in the jurisdictional boundary of the City, regardless of origin or destination. The updated analysis is based on calculated emissions from vehicle miles that have an origin and/or a destination in the City, with adjustments per the methods and recommendations developed by CARB's Regional Targets Advisory Committee (RTAC), consistent with regional efforts to implement SB 375 (CARB 2009).

Inventory Structure

The 2013 inventory is focused specifically on community-wide GHG emissions and provides an assessment of activities throughout the community which contribute to City's total annual GHG emissions. The inventory is organized into sectors and sub-sectors based on various community

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activities. As shown in **Table 3-1**, sectors in the 2013 inventory include: residential and commercial/industrial building energy use, on-road vehicles, off-road vehicles, solid waste, wastewater, and agriculture.

In the 2013 inventory, on-road vehicle emissions were the largest sector, resulting in approximately 430,340 metric tons of carbon dioxide equivalent (MTCO₂e) and 47 percent of the City's total emissions. Off-road vehicles resulted in 93,340 MTCO₂e and 10 percent of total emissions. The transportation sector, including on-road and off-road vehicles, resulted in 523,630 MTCO₂e, 57 percent of the City's total emissions.

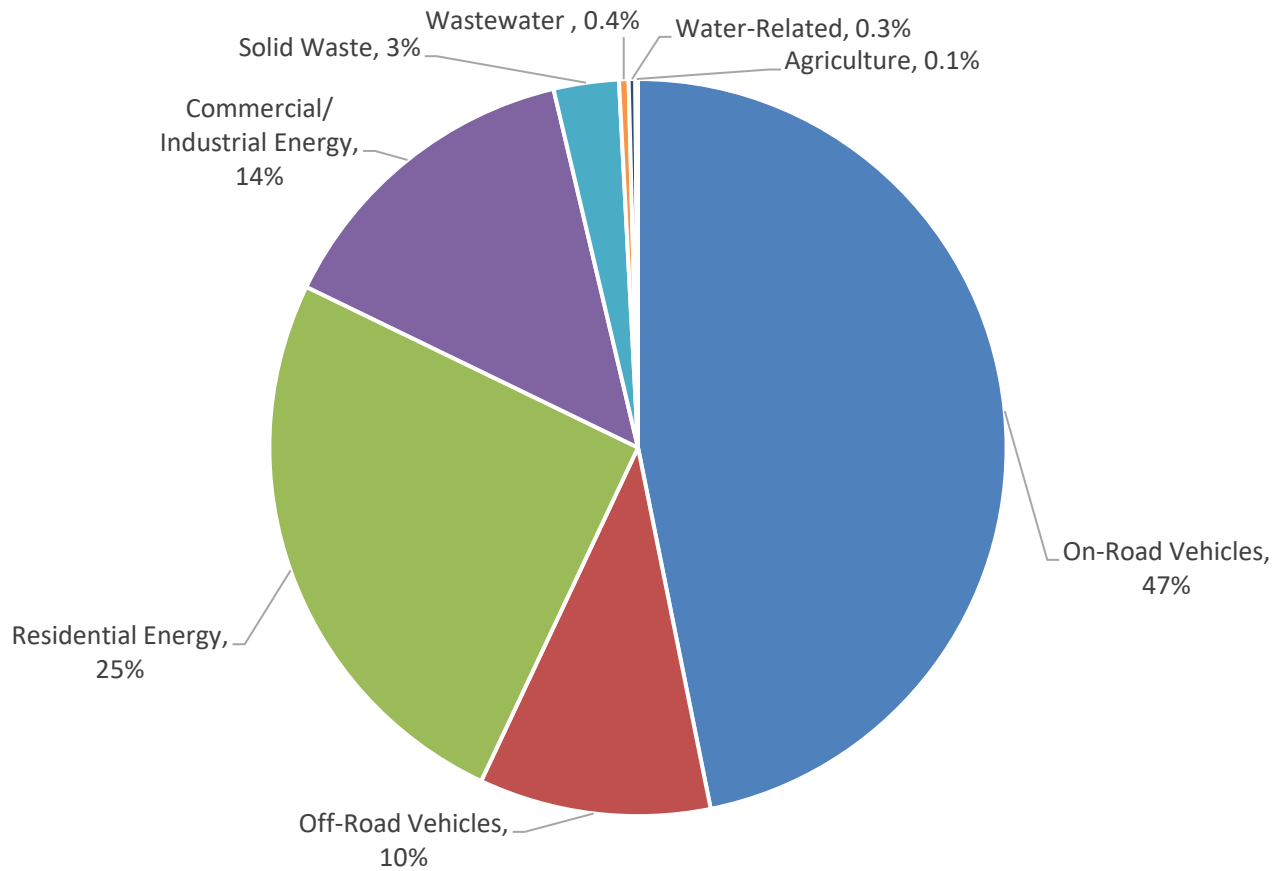
Residential energy use, which includes both electricity and natural gas consumption for space heating and water heating, resulted in 231,400 MTCO₂e, 25 percent of the City's total emissions. Commercial/Industrial energy use, which includes electricity use and natural gas consumption for commercial and industrial activities, resulted in 129,860 MTCO₂e, 14 percent of the City's total emissions in 2013. The building sector, which includes residential energy use and commercial/industrial energy use, resulted in 361,260 MTCO₂e, accounting for 39 percent of the City's total emissions.

In 2013, solid waste produced by residents and businesses within the City resulted in 26,260 MTCO₂e, accounting for 3 percent of the City's total emissions. Emissions associated with wastewater produced in the City resulted in 3,854 MTCO₂e, accounting for less than one percent of the City's total emissions. Electricity use associated with water use in the City resulted in 2,708 MTCO₂e, accounting for less than one percent of the City's total emissions. Emissions associated with agricultural activity within the City resulted in 1,030 MTCO₂e, accounting for less than one percent of the City's total emissions.

General Plan Update Study Areas

As part of the City's General Plan Update process, four study areas within unincorporated Sacramento County to the south and east of the City have been identified for potential annexation in the future. The study areas are partially within the City's sphere of influence. In consideration of these study areas, GHG emissions inventories were conducted for the four study areas. These emissions inventories are important in understanding the City's potential future growth and subsequent emissions. As shown below, **Table 3-2** provides emissions inventories for each of the four study areas using the same sector categories as the City's 2013 GHG emissions inventory. The study area inventories are used in the GHG emissions forecasts discussed below, helping to understand how emissions from each sector may change in the future with the City's anticipated growth.

Figure 3-1: 2013 Greenhouse Gas Emissions (CO₂e) from Community-Wide Sources



Source: Data compiled by Ascent Environmental in 2018.

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Table 3-1: Community-Wide Greenhouse Gas Emissions by Sector (2013)

Sector	Metric Tons CO ₂ e	Percentage (%)
On-Road Vehicles	430,340	47
Off-Road Vehicles	93,340	10
Transportation Sector Total	523,680	57
Residential Energy	231,400	25
Commercial/Industrial Energy	129,860	14
Building Sector Total	361,260	39
Solid Waste	26,260	3
Wastewater	3,854	<1
Water-Related	2,708	<1
Agriculture	1,030	<1
Total (All Sectors)	918,790	100

Source: Data compiled by Ascent Environmental in 2018.

Table 3-2: Study Area Greenhouse Gas Emissions Inventories (2013)

Sector	East Study Area	South Study Area	West Study Area	North Study Area
On-Road Vehicles	140	160	80	193
Off-Road Vehicles	660	1,250	720	724
Residential Energy	280	230	100	159
Commercial/Industrial Energy	10	0	0	485
Solid Waste	10	10	10	34
Water-Related and Wastewater	700	1,340	770	259
Agriculture	750	1,560	760	150
Total (All Sectors)	2,550	4,550	2,440	2,004

Source: Data compiled by Ascent Environmental in 2018.

2020, 2030, and 2050 Community-Wide Greenhouse Gas Emissions Forecast

To understand what annual GHG emissions will look like in the future, the City modeled two future emissions growth scenarios based on projected trends in energy use, driving behavior, job growth, and population growth for the target years 2020 and 2030, as well as a longer-term 2050 goal, based on the State's established GHG reduction goals. Emissions forecasts allow the City to assess the effectiveness of various GHG reduction strategies over time while also providing a snapshot of how annual emissions levels will likely change under two scenarios, a business-as-usual (BAU) and a legislative-adjusted BAU Scenario shown in **Figure 3-2**.

Business-as-Usual Forecast

The basis for all emission growth scenarios is the BAU forecast. A BAU forecast predicts how GHG emissions will increase assuming rates of energy use and behaviors do not change from baseline levels, while population, households, and driving behavior continue to increase based on the City's growth rate projections. The BAU emission forecast is based on predicted growth in existing demographic forecasts, including population, jobs, and household growth as well as travel behavior and land use changes between 2013 and 2050. These assumptions were provided from data used in the City's 2013 CAP and the General Plan Update planning process. (City of Elk Grove 2017). **Table 3-3** below shows the various growth rates used to model 2020, 2030, and 2050 emissions levels.

Under a BAU scenario, the City's emissions would grow by approximately 31 percent between 2013 and 2020, from 918,790 to 1,199,232 MTCO₂e. By 2030, the City's BAU emissions would increase from 2020 levels by 27 percent from 1,002,402 to 1,523,936 MTCO₂e. By 2050, the City's annual emissions would increase from 2030 levels by 43 percent, from 1,523,936 MTCO₂e to 2,174,042 MTCO₂e. Overall, under a BAU scenario, between 2013

WHY 2020, 2030 AND 2050 FORECAST YEARS?

The City has chosen the forecast years of 2020, 2030, and 2050 based on the State's GHG reduction target years established in key legislation. The year 2020 aligns with the GHG reduction target year set in AB 32 of reducing statewide emissions to 1990 levels by 2020. The 2030 forecast aligns with the GHG reduction target year set in SB 32 of reducing statewide emissions to 40 percent below 1990 levels by 2030. The City also modeled the forecast year 2050 which aligns with Executive Orders EO B-30-15 and S-3-05 which set a long-term goal of reducing statewide emissions to 80 percent below 1990 levels by 2050.

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and 2050, the City's annual emissions would increase 137 percent from 918,790 to 2,174,042 MTCO₂e. **Table 3-3** and **Figure 3-3** show the results of the forecast.

Table 3-3: Business-as-Usual Growth Rate Factors – 2020, 2030, and 2050

Growth Rate Factors	Growth Rate (%)		
	2013 to 2020	2020 to 2030	2030 to 2050
Population	32	35	33
Dwelling Units	10	21	33
Jobs	14	33	50
Vehicle Miles Traveled	49	31	47
Agricultural Acres	-29	-60	-77

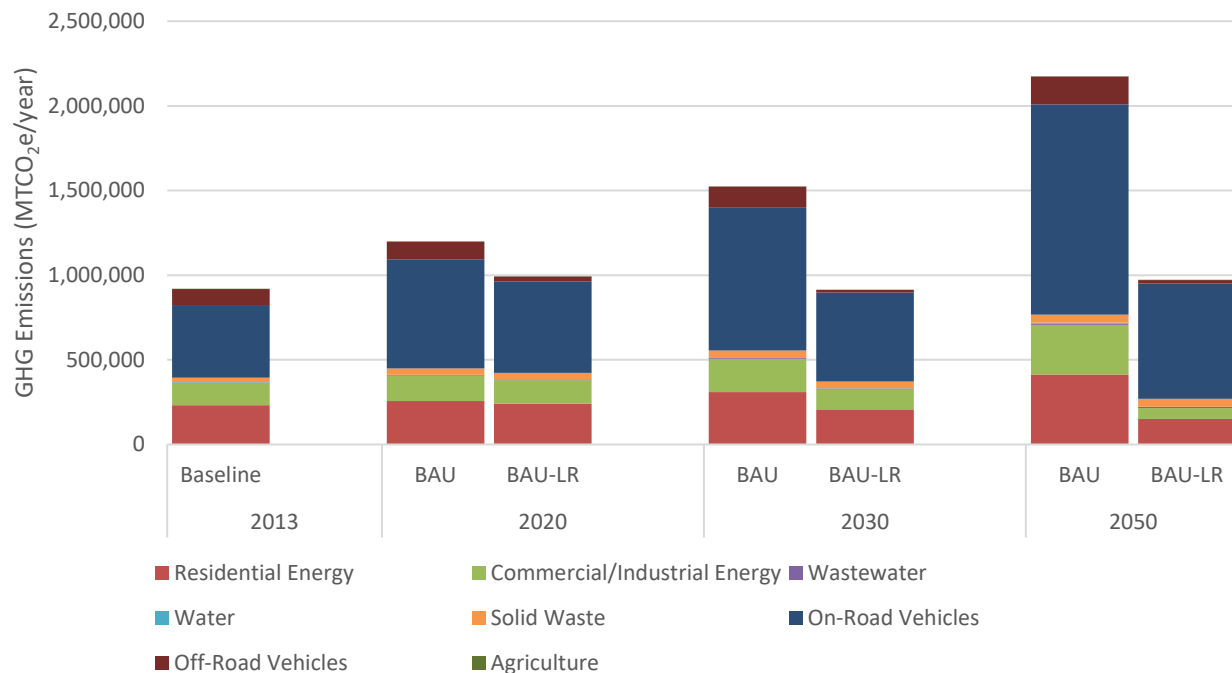
Source: Data compiled by Ascent Environmental in 2018.

Table 3-4: Business-as-Usual Greenhouse Gas Emissions Forecast – 2020, 2030 and 2050

GHG BAU Forecast	Metric Tons CO ₂ e			
	2013	2020	2030	2050
Residential Energy	231,400	257,171	310,017	413,560
Commercial /Industrial Energy	129,860	147,685	196,037	293,532
On-Road Vehicles	430,340	645,542	844,317	1,241,867
Off-Road Vehicles	93,340	102,776	123,896	165,275
Solid Waste	26,260	36,181	39,817	47,781
Wastewater	3,854	4,283	5,163	6,888
Water-Related	2,708	3,010	3,628	4,840
Agriculture	1,030	2,585	1,061	299
Total	918,790	1,199,232	1,523,936	2,174,042

Source: Data compiled by Ascent Environmental in 2018.

Figure 3-2: Business-as-Usual Emission Forecast by Sector – 2020, 2030 and 2050



Notes: BAU = Business-As-Usual; BAU-LR = Business-As-Usual with Legislative Reductions; GHG = greenhouse gas; MTCO_{2e}/year = metric tons of carbon dioxide equivalent per year.
Source: Data compiled by Ascent Environmental in 2018.

Legislative-Adjusted Business-as-Usual Forecast

The City adjusted the BAU forecast to demonstrate how Federal and State actions will impact local emissions for various sectors, even if no local actions are taken to reduce GHG emissions. The Federal and State actions included in this adjustment have been approved, programmed, and/or adopted. Incorporating them into the forecast and reduction assessment provides a more accurate picture of future emissions growth and the responsibility and ability of local governments versus the State to reduce GHG emissions. Brief descriptions of each of these policies, which are incorporated into the legislative-adjusted BAU scenario, are provided below.

- **Assembly Bill 1493 (Pavley Clean Car Standards).** Signed into law in 2002, AB 1493 requires carmakers to reduce GHG emissions from new passenger cars and light trucks beginning in 2009. It is expected that new vehicles sold in California will result in an average of 16 percent less GHG emissions than models previous to 2009.

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- **Advanced Clean Car Standards.** In 2012, CARB adopted the Advanced Clean Cars program, which established coordination between CARB, the U.S. Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) to set limits on the emission of smog-causing pollutants and GHGs for vehicle model years 2015 through 2025.
- **Renewable Portfolio Standard.** First established under SB 1078 and updated through various legislation, the Renewable Portfolio Standard (RPS) requires that all electricity retailers in the State sell a certain percentage of electricity from renewable resources. SB X1-2, signed in 2011, requires 33 percent of electricity sales to come from renewable resources by 2020. In 2018, SB 100 increased California’s Renewable Energy Portfolio targets to 52 percent renewables by 2027 and 60 percent renewables by 2030. SB 100 also established a new requirement to achieve 100 percent zero-carbon electricity by 2045.
- **Title 24 – Building Energy Efficiency Standards.** The California Energy Code, first established in 1978 by the California Energy Commission (CEC), sets energy efficiency standards for new construction of residential and non-residential buildings in the State. These standards are routinely updated to incorporate new energy efficiency standards and methods which reduce energy use. The 2016 Energy Efficiency Standards are the most recent version of the regulation, which took effect on January 1st, 2017. The 2019 Title 24 Part 6 Building Energy Efficiency Standards were adopted by CEC on May 9, 2018 and will take effect on January 1, 2020. CEC estimates that the combination of mandatory on-site renewable energy and prescriptively-required energy efficiency features will result in new residential construction that uses 53 percent less energy than the 2016 standards. Nonresidential buildings are anticipated to reduce energy consumption by 30 percent compared to the 2016 standards primarily through prescriptive requirements for high-efficiency lighting (CEC 2018).
- **AB 341.** Established in 2011, this policy sets the goal that no less than 75 percent of solid waste generated in the State be reduced, recycled, or composted by the 2020. Cal-Recycle, the State agency tasked with guiding implementation of this policy, are providing strategies for local jurisdiction to meet these targets. The five priority strategies proposed by Cal-Recycle are: 1) Moving Organics Out of the Landfill, 2) Expanding Recycling/Manufacturing Infrastructure, 3) Exploring New Approaches for State and Local Funding of Sustainable Waste Management Programs, 4) Promoting State Procurement of Post-Consumer Recycled Content Products, and 5) Promoting Extended Producer Responsibility.
- **SB X7-7 (The Water Conservation Act of 2009).** This legislation requires that water suppliers in the State increase water use efficiency with the goal of reducing urban water consumption 20 percent by the year 2020. The legislation includes 18 actions to reduce water consumption, which

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the Department of Water Resources (DWR) is required to implement through various policy mechanisms. The actions under SB X7-7 include a variety of activities which will be undertaken by DWR including strategies to convene specific task forces to address specific water conservation issues, work with the California Urban Water Conservation Council to provide a public information platform for reporting on water use metrics in California, develop a method for calculating urban water use to track the 20 percent reduction required in the law, adopt regulations for implementation of SB X7-7, report to the Legislature on the progress toward achieving the 20 percent reduction in urban water use, and update the Urban Water Management Plan (UWMP) Guidebook for local jurisdictions. The projects also include strategies specific to the agriculture and urban sectors such as quantifying the efficiency of agricultural water use and updating criteria for funding sources to implement agricultural and urban water conservation projects.

In addition to the State legislation discussed above, several Federal policies would also result in GHG reductions from activities within the City. These include:

- **Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles.** In 2016, the U.S. EPA and NHTSA adopted fuel efficiency standards for medium- and heavy-duty vehicles which focus on vehicle and engine performance standards for model years 2018-2027 for certain tractor-trailers and model years 2021-2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks.
- **EPA Off-Road Compression-Ignition Engine Standards. (40 CFR Part 89).** This regulation establishes federal standards for the phasing in of EPA diesel engine tiers for off-road compression-ignition equipment. The regulation serves to reduce emissions by integrating engine and fuel control systems to achieve emissions reductions and requiring equipment manufacturers to produce engines with advance emissions control technologies.

Other State initiatives such as funding mechanisms and loan programs are not included in State reductions. Rather, they are included within the GHG reduction measures as appropriate because of the need for or requirement for local government implementation or contribution to the effort.

The Federal and State policies described above are anticipated to decrease the BAU forecast by approximately 21 percent, translating to 205,442 MTCO_{2e} in reductions by 2020. By 2030, Federal and State policies are expected to decrease BAU emissions by 67 percent or 611,280 MTCO_{2e}. By 2050, these Federal and State policies are expected to decrease BAU emissions by 124 percent or 1,202,640 MTCO_{2e}. Details on how the individual legislative reductions were integrated into the City's emissions forecast are included in Appendix A. The BAU and legislative-adjusted BAU forecasts are shown in **Figure 3-2**.

Greenhouse Gas Emissions Reduction Target

As discussed above, the years chosen for the emissions forecast are intended to align with reduction target years included as part of the statewide GHG reduction goals set forth in State legislation (AB 32, SB 32) and Executive Orders (EO B-30-15 and S-3-05).

CARB's 2017 Scoping Plan (Scoping Plan), adopted in November 2017, provides guidance on how the State's established GHG reduction targets will be achieved through various State and local actions. As discussed in Chapter 5 of the Scoping Plan "Achieving Success", local jurisdictions working to set GHG reduction targets aligned with the State targets may use per capita emission estimates to recognize the GHG reductions needed to remain in line with State targets. For the CAP update, proportional per capita targets were developed that express the level of GHG emissions reductions that would be needed locally between 2013 and the established future target years. These are in alignment with the State's recommended per capita targets of reducing statewide annual emissions to 6 MTCO_{2e} by 2030, and a longer-term goal of reducing annual emissions to 2 MTCO_{2e} per capita by 2050. Additionally, the 050 per capita goal aligns with the Under 2 Memorandum of Understanding (MOU) which has been adopted by the State along with 188 jurisdictions and 39 countries. Central to the Under 2 MOU is the agreement amongst these entities to reduce per capita emissions to below 2 MTCO_{2e} by 2050, which is the reduction needed to limit global warming to below two degrees Celsius.

Importantly, the per capita targets reported in the Scoping Plan are framed as statewide 2030 targets that must be met on a statewide basis; however, this does not mean that the statewide per capita targets must be applied uniformly to every local jurisdiction. Considering that the per capita emissions reduction targets recommended in the Scoping Plan account for emissions from all sectors, emissions inventories and reduction strategies adopted by local jurisdictions would necessarily exclude emissions sources that cannot be controlled at the local level. For example, the GWP sector is a highly-regulated source of GHG emissions; thus, it is excluded from the City's inventory and forecasts. Thus, an adjustment to the State reductions achieved under the Scoping Plan to reflect applicable sectors for local GHG reduction planning and target-setting is necessary and appropriate.

Based on this approach, the following recommended GHG reduction targets for 2020 and 2030 have been established to reduce the City's annual GHG emissions consistent with the framework used to develop the State's per capita targets. Additionally, a GHG reduction goal has been included that would ensure the City is consistent with the State's long-term 2050 goal of reducing statewide emissions to 80 percent below 1990 levels as stated in Executive Order S-03-05. The City will reduce emissions to:

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- 7.6 MTCO₂e per capita by 2020;
- 4.1 MTCO₂e per capita by 2030; and
- 1.4 MTCO₂e per capita by 2050.

For a detailed description of how these targets were established and adjusted from the statewide emissions inventory, see Appendix A.

As shown in **Table 3-5**, based on the per capita emissions targets established and the legislative-adjusted BAU forecast, the City would achieve the 2020 target of 7.6 MTCO₂e through legislative reductions alone. However, to achieve the 2030 target of 4.1 MTCO₂e per capita by 2030, the City would have to further reduce annual emissions to 895,862 MTCO₂e by 2030. To achieve the long-term goal of reducing emissions to 1.4 MTCO₂e per capita, the City would have to reduce annual emissions to 408,073 MTCO₂e.

The 2020 and 2030 targets are the primary focus of this CAP, consistent with legislative targets established by AB 32 and SB 32. While the City's long-term 2050 goal is consistent with the State's long-term goal, it is not a specific reduction target that can or must be met currently in local plans. This is due to the lack of current State regulations or plans addressing post-2030 emission reductions required to achieve the State's 2050 goal, uncertainties in emissions forecasts, and technological and economic constraints.

Figure 3-3 illustrates the necessary reductions needed to reach the mass emissions and per capita emissions targets compared to the legislative-adjusted BAU scenario. The following chapter serves to provide the GHG reduction strategies which, if fully implemented, would allow the City to achieve the established 2020 and 2030 per capita emissions targets.

Table 3-5: Greenhouse Gas Emissions Reduction Targets: 2020, 2030, and 2050

Source	Metric Tons CO ₂ e			
	2013	2020	2030	2050
Baseline Emissions and Legislative-Adjusted BAU Forecast	918,790	993,790	912,656	971,402
Population	163,093	181,257	218,503	291,481
Target Per Capita Emissions	NA	7.6	4.1	1.4
Per Capita GHG Emissions with Legislative Reductions	5.6	5.5	4.2	3.3
Legislative-Adjusted BAU Forecast with CAP Measures	NA	975,506	826,589	675,971
Per Capita GHG Emissions with Legislative Reductions and Measures	5.6	5.4	3.8	2.3

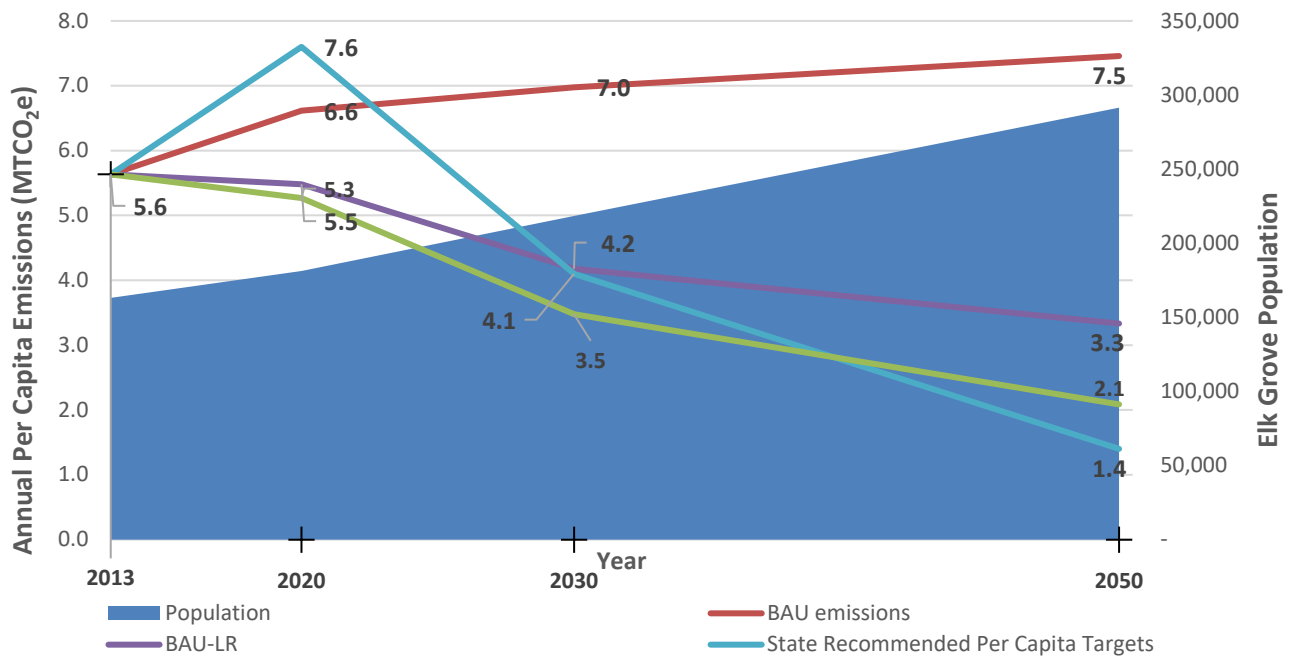
Notes: MTCO₂e = metric tons of carbon dioxide equivalent; NA = not applicable.

¹Negative values indicate a surplus in GHG reductions.

Source: Calculated by Ascent Environmental in 2018.

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Figure 3-3: Legislative-Adjusted Business-As-Usual Per Capita Forecast Emissions and Recommended Per Capita Emission Reduction Targets: 2020, 2030, and 2050



Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent
 Source: Calculated by Ascent Environmental in 2018.

Reduction Strategy

This chapter summarizes the Climate Action Plan's (CAP) measures to reduce greenhouse gas (GHG) emissions from community-wide sources within City boundaries.

Summary of Policy Topics and Measures

The City's actions to reduce GHG emissions are referred to as *measures*. All measures are organized into three categories based on their sources:

1. Innovative and Efficient Built Environment,
2. Resource Conservation, and
3. Transportation Alternatives and Congestion Management.

Detailed GHG reduction calculations for each measure are presented in **Appendix B**. Reductions for all measures, separated by policy topic, are summarized below. Detailed descriptions follow on page 4-4.

The following summary information is presented for each of the three policy topics when available:



This icon identifies measures based on existing policies, codes, and programs.

2020, 2030, and 2050 Reductions: The annual GHG reductions in 2020, 2030, and 2050 are a result of policies to be implemented over this period. Note that due to rounding, 2020, 2030, and 2050 reductions may not equal the sum of each supportive measure for the policy topic.

Responsible City Department(s)/Agency: City department or outside agency responsible for implementation.

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Cost to City: Net cost to the City for implementation of the goal after revenues and rebates. Incremental costs were estimated in current (2017) dollars (e.g., 2030 costs are in addition to 2017 and 2020 costs, not inclusive).

- Negligible = \$0 or less (requires no investment or generates a profit)
- Low = under \$25,000 (uses existing staff)
- Low-Mid = \$25,000 to \$100,000 (existing staff can implement, but will require reprioritization of workload)
- Medium = \$100,000 to \$200,000 (requires new staff or contracts to implement)
- Medium-High = \$200,000 to \$500,000 (requires new staff or contract(s) to implement)
- High = over \$500,000 (requires new staff or contract(s) to implement)

Private Investment: The level of private investment needed for the goal assumptions to be implemented. Costs are in current (2017) dollars (e.g., 2030 costs are in addition to 2017 and 2020 costs, not inclusive of 2017 and 2020 costs).

- Minimal = less than \$25,000
- Low = \$25,000 to \$500,000
- Low-Mid = \$500,000 to \$1,000,000
- Medium = \$1,000,000 to \$10,000,000
- Medium-High = \$10,000,000 to \$30,000,000
- High = Over \$30,000,000

The implementation cost information is provided for each policy topic as a summary of all measures within that policy topic. Following this summary, each supporting measure is discussed in detail including how it is aligned with existing City plans or documents, such as General Plan policies. A full description of the methodology and assumptions used for each measure is provided in **Appendix B**.

Attainment of Reduction Targets

The measures presented here would reduce GHG annual emissions by 18,284 metric tons CO₂ equivalent (MTCO_{2e}) by 2020. These reductions would result in per capita annual emissions of 5.4 MTCO_{2e} and would be below the state-recommended 7.6 MTCO_{2e} per capita target for 2020. This translates into a 2 percent reduction from the legislative-adjusted BAU scenario for 2020. By 2030, these measures would reduce annual emissions by 86,067 MTCO_{2e}, resulting in annual per capita emissions of 3.7 MTCO_{2e} and would be below the 4.1 MTCO_{2e} per capita target for 2030. This translates into a 9 percent reduction from the legislative-adjusted BAU scenario for 2030. Finally, as the proposed GHG reduction measures continue to be implemented over the long-term and become an integral part of the City's policies for new growth between 2030 and 2050, annual emissions would be reduced by 295,431 MTCO_{2e}, a 30 percent reduction from the legislative-adjusted BAU scenario for 2050.

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Through implementation of all proposed measures, including State-mandated efforts, the City would achieve and exceed its reduction target of reaching 7.6 MTCO₂e by 2020 and 4.1 MTCO₂e by 2030. However, even with all reduction measures implemented, annual 2050 per capita emissions would be 3 MTCO₂e and would remain above the 1.4 MTCO₂e long-term goal set for 2050. As the GHG reduction measures are implemented and adjusted over time through future CAP updates, the City will work to achieve the long-term goal of reducing annual per capita emissions to 1.4 MTCO₂e.

Table 4-1 presents the GHG emissions reductions for 2020, 2030, and 2050 for each policy, separated into the three main categories.

What is the difference between a policy topic and a sector?

Policy topics are separated groups of measures which correspond to emissions sources in the GHG Inventory. Each policy topic yields a quantifiable reduction in GHG emissions.

Emissions Sectors refer to the activity that creates GHG emissions, regardless of the policy topic it falls under. Emissions Sectors demonstrate the types of emissions-generating activities that are being affected through the CAP measures. For instance, commercial, residential, waste, and transportation are common sectors.

Together, policy topics and sectors create a more comprehensive picture of how the CAP affects GHG emissions in the City.

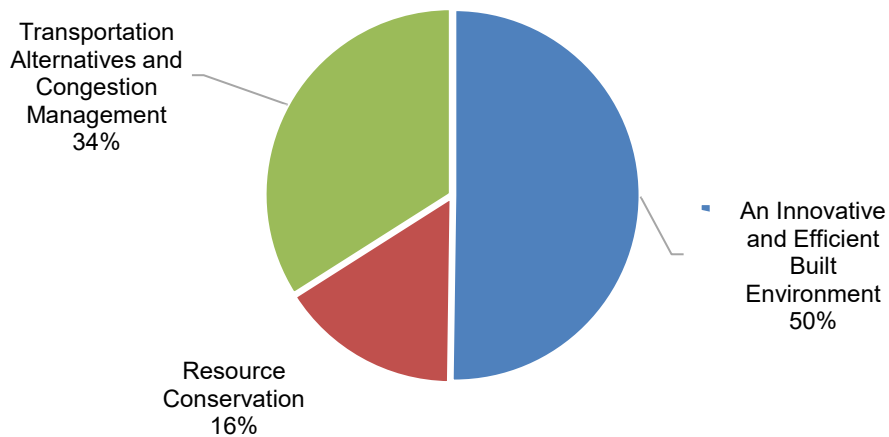
Table 4-1: Greenhouse Gas Reductions by Policy Topic (MTCO_{2e})

Policy Topic	2020	2030	2050
An Innovative and Efficient Built Environment	- 12,826	- 41,875	- 200,077
Resource Conservation	- 5,272	- 13,147	- 43,627
Transportation Alternatives and Congestion Management	- 63	- 28,352	- 48,673
Total Reductions	- 18,162	- 83,374	- 292,378
Legislative Adjusted Emissions Forecast	993,790	912,656	971,402
Net Emissions with CAP Reductions	975,629	829,282	679,024
Per Capita GHG Emissions with Legislative Reductions and Measures	5.4	3.8	2.3
State Recommended Target Per Capita Emissions	7.6	4.1	1.4

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent;

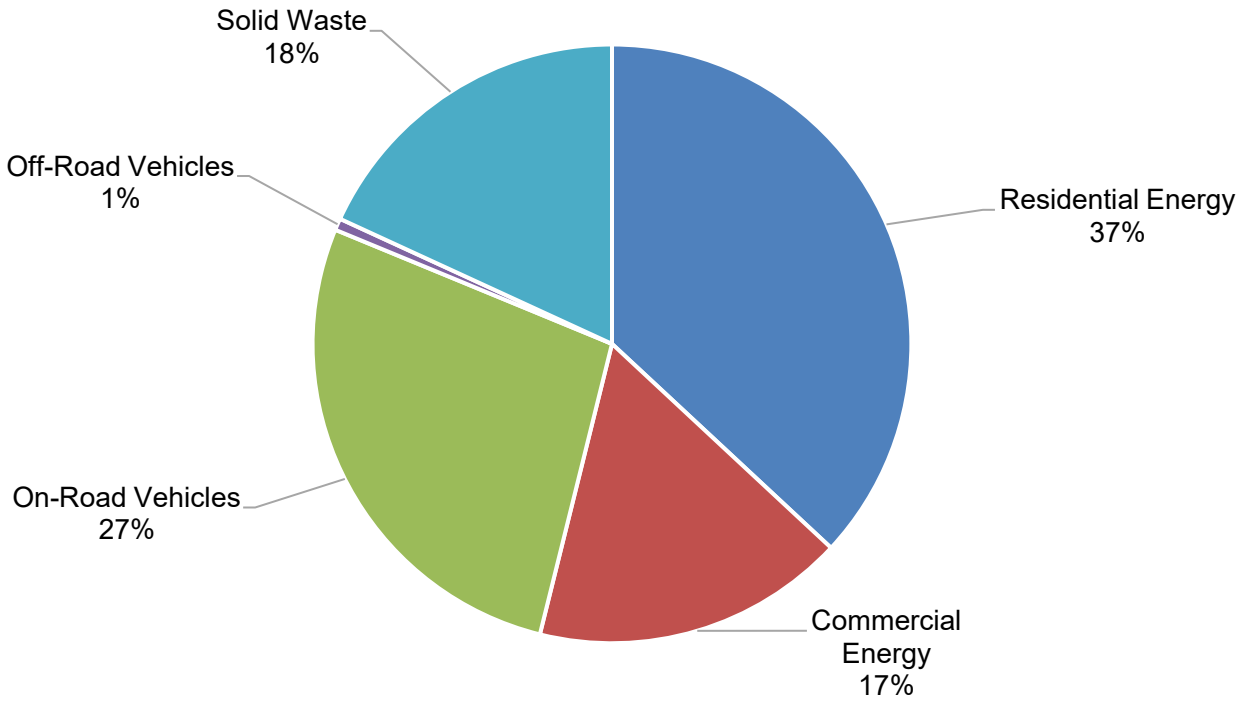
Source: Data compiled by Ascent Environmental in 2018.

Figure 4-1: 2030 Reductions by Policy Topic



Source: Data compiled by Ascent Environmental in 2018.

Figure 4-2: 2030 Reductions by Sector



Source: Data compiled by Ascent Environmental in 2018.

Table 4-2: Reductions by Sector for 2020, 2030, and 2050 (MTCO_{2e})

Emissions Sector	2020	2030	2050
Residential Energy	- 10,758	- 26,741	- 136,821
Commercial/Industrial Energy	- 2,067	- 15,134	- 63,257
On-Road Vehicles	- 63	- 27,708	- 57,781
Off-Road Vehicles	N/A	- 644	- 892
Solid Waste	- 5,272	-13,147	- 43,627
Total	- 18,162	- 83,374	- 292,378

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent;

Source: Data compiled by Ascent Environmental in 2018.

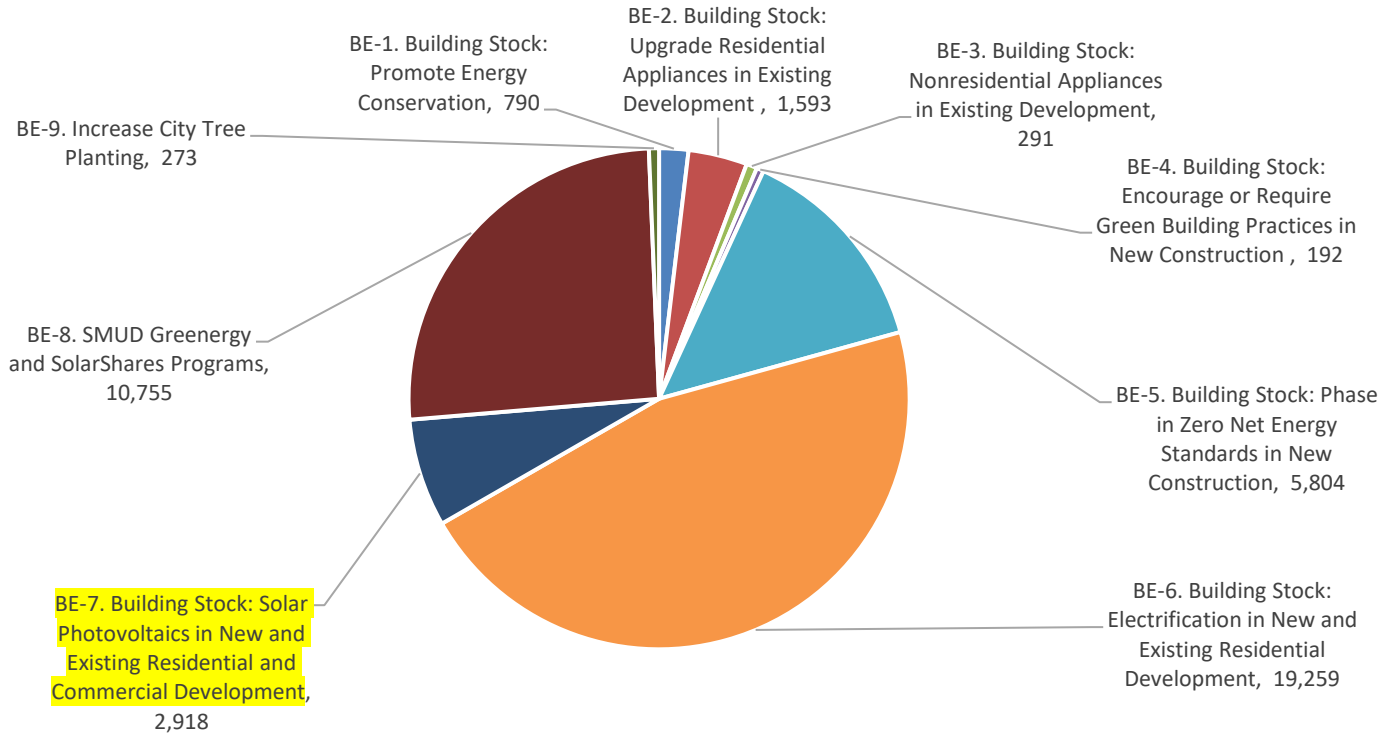
An Innovative and Efficient Built Environment (BE)

The built environment is a dynamic system that relies on a constant energy supply. Energy production needed for daily activities in the built environment generates GHG emissions. Existing levels of energy consumption are often inefficient and wasteful, and thus reducing energy use and associated GHG emissions in the built environment can be achieved through energy efficiency and conservation, and also by transitioning to renewable energy resources. These improvements also lead to important co-benefits including energy cost savings, improved air quality, and local economic development opportunities. The following reduction measures are focused on the relationship between energy use and the City's built environment, depicting how changes in construction practices, energy efficiency improvements, and increases in renewable energy generation will reduce GHG emissions and ensure the City's long-term energy security.

Several measures included in this section use assumptions regarding GHG emissions reductions based on the State's current 2016 Building Energy Efficiency Standards, which will remain in effect through 2019. Beginning on January 1st, 2020, the 2019 Building Energy Efficiency Standards will go into effect, resulting in increased energy efficiency and GHG reductions compared to the 2016 standards. In May 2018, the CEC adopted proposed changes for the 2019 Building Energy Efficiency Standards as part of the rulemaking process. The proposed new standards are not officially adopted yet and require final approval from the California Building Standards Commissions; however, they are not anticipated to change substantially from what has been proposed thus far. The major changes include a new requirement for the installations of photovoltaic solar systems for new low-rise residential buildings, updates to the current ventilation and indoor air quality requirements, and extending the Title 24 Building Energy Efficiency Standards to apply to healthcare facilities. Additionally, the proposed changes include updates to the CALGreen energy efficiency provisions in Title 24, Part 11 and will be updated through a parallel rulemaking process. In consideration of these anticipated changes, the measures in this section serve to compliment the new standards but certain requirements in these measures (e.g. CALGreen Tier 1) may become less applicable as similar levels of GHG reductions are achieved through new minimum requirements in the 2019 Building Energy Efficiency Standards (e.g. photovoltaic solar systems). Ultimately, City staff will need to monitor implementation of ongoing changes and updates to Title 24 requirements and determine the best path forward, including potential future updates to the CAP.

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Figure 4-3: BE Greenhouse Gas Reductions by Measure by 2030 (MTCO_{2e})



Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent;
Source: Data compiled by Ascent Environmental in 2018.

GHG Reductions per Year (MTCO _{2e})	
2020:	- 1,832
2030:	- 4,187
2050:	- 10,004
Responsible City Department/Public Agency	
Planning, Building, and Public Works	
Cost to the City	
Medium	
Private Investment	
High	

Supporting Measures for the Built Environment

BE-1. Building Stock: Promote Energy Conservation

Promote energy conservation by residents and businesses in existing structures in close coordination with other agencies and local energy providers, including the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E).

Energy conservation can be achieved through small changes to daily behaviors with little to no upfront investment. Through this measure, the City will encourage strategies utilizing marketing and education in coordination with local energy utilities to increase energy conservation. These strategies will be designed to yield energy reductions and cost savings for residents and businesses.



Existing Efforts

Builds on utility programs

General Plan Policy NR-6-1

In addition, this measure will leverage statewide programs and regulations that facilitate ongoing energy benchmarking and tracking as tools that can help residents and businesses understand, monitor, and improve their energy efficiency.

This measure will be implemented in collaboration with the local electricity utility, SMUD, and natural gas utility, PG&E, who both currently administer energy efficiency and conservation programs. SMUD and PG&E currently provide a series of free classes and workshops focused on energy efficiency strategies for homes and businesses. These include trainings on general energy efficiency practices as well more specific topics such as lighting; pump systems; heating, ventilation and air conditioning (HVAC) systems; and, the Title 24 Energy Efficiency Standards. The City will work with SMUD and PG&E to promote these and other energy efficiency programs offered by the utilities.

To understand the benefits of various energy efficiency strategies, energy use benchmarking and public disclosure of energy use is an important first step in tracking and monitoring energy use in businesses and homes. AB 802, adopted in 2015, directs the CEC to develop a building energy use benchmarking and public disclosure program for buildings over 50,000 square feet. The bill requires, effective January 1, 2017, energy utilities to provide building-level energy use data to building owners and/or operators upon request for buildings with no residential utility accounts in 2018, and in 2019 for buildings with 17 or more residential utility accounts. This program will work to provide important energy use information for residences and businesses working to increase energy efficiency in the City.

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Additionally, the City will work to educate residents and business owners about steps they can take to improve energy efficiency. This will be achieved through a coordinated energy efficiency marketing campaign involving the City in collaboration with local and regional partners.

Action Items

- Work closely with SMUD, PG&E, and other private partners to support widespread marketing strategies and prepare tools to encourage conservation and greater energy efficiency in homes and businesses.
- Partner with the Chamber of Commerce, utility providers, and other local and regional partners to launch an energy efficiency marketing program for local businesses that promotes energy efficient business practices that result in cost savings.
- Promote and leverage the CEC Building Energy Benchmarking Program (AB 802) to help benchmark and monitor energy use for participating businesses seeking to increase energy efficiency and realize cost savings.
- Provide educational materials to encourage participation in energy monitoring programs at large multi-tenant commercial developments through SMUD and PG&E programs or via the Energy Star Portfolio Manager.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- Four percent of households and businesses participating in conservation programs by 2030

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BE-2. Building Stock: Upgrade Residential Appliances in Existing Development

Support residential upgrades to more energy-efficient, cost-saving appliances for existing homes, leveraging regional and State resources to target and replace indoor and outdoor appliances and equipment in existing homes.

As houses age, their appliances, water heaters, HVAC units, windows, and insulation often become outdated or decrease in efficiency. This measure facilitates energy efficiency upgrades by connecting residents to cash incentives for appliances that reduce energy bills and maintenance costs. The State of California, SMUD, PG&E, and local retailers offer numerous rebates for residential appliances. The City will work to inform residents and businesses about these available programs via the City website, newsletters, and handouts at community events.



Existing Efforts

Builds on utility programs

General Plan Policy NR-6-2

SMUD currently offers rebates for the purchase of energy efficient equipment and appliances through the SMUD Energy Store, providing a convenient online store for the purchase of items which qualify for these incentives. PG&E currently provides a series of education and rebate programs for improving natural gas energy efficiency for residents and businesses within their service territory. For example, the Energy Savings Assistance Program provides free home energy assessments and improvements for income qualified households, resulting in natural gas savings through weatherization and natural gas equipment testing and optimization.

The City's additional outreach will help to educate residents about the benefits of cost-effective appliance upgrades. For instance, many homes have outdoor pools. Pool pumps and filtration systems are commonly oversized and operate at a single speed, expending more energy than is necessary. Older pool pumps are often energy-intensive, single-speed models. Newer two-speed or variable-speed pool pumps allow the system to shift speeds as appropriate, functioning at a lower speed while maintaining adequate water circulation.

This measure serves to increase residential energy efficiency upgrades for appliances through the marketing, education and the use of regional and State resources.

Action Items

- Educate City residents via the City website, newsletters, and handouts at community events about appliance and equipment incentives and rebates offered by utility providers, the CEC, and the Sacramento Metropolitan Air Quality Management District.

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- During permitting process for residential and commercial development, provide informational material regarding energy efficiency strategies and resources. Materials should include information about energy efficient appliances and available rebates offered by SMUD, home and business energy conservation strategies, and information on the Property Assessed Clean Energy (PACE) program providers offered in the City.
- Work with SMUD, PG&E and Sacramento County to conduct targeted mailing campaigns to homeowners with pools to promote financial incentives for upgrades of residential pool pumps to more efficient, variable-speed pumps. Pool owners will be identified with County assessor's parcel data and GIS files.
- Promote existing home energy assessment programs offered by SMUD and PG&E which include rebates for appliances and HVAC units and Leverage existing programs such as the City's Home Repair and Rehabilitation Program and PG&E's Energy Savings Assistance Program to target energy efficiency improvements for low-income residents in the City.
- Partner with SMUD and PG&E to promote the energy and cost saving benefits of solar hot water heating systems for businesses and residents in the City through the City website, newsletter, and handouts.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- Single Family:
 - Two percent single-family household participation in energy efficient appliance programs by 2030
 - Five percent single-family household participation in energy efficient appliance programs by 2050
- Multi-Family:
 - Two percent multi-family household participation in energy efficient appliance programs by 2030
 - Five percent multi-family household participation in energy efficient appliance programs by 2050

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BE-3. Building Stock: Nonresidential Appliances in Existing Development

Equip City businesses to reduce operational expenses and maximize energy efficiency using energy-efficient and cost-effective indoor and outdoor appliances and equipment.

Inefficient energy use is an operational expense that takes revenues out of a company's bottom line. Further, newer, energy-efficient equipment typically reduces ongoing maintenance costs associated with business operations. Efficiency and conservation of energy resources is a strategy not only to save money but also to improve a company's resilience to external shocks such as energy price fluctuations, creating a competitive market edge for businesses. As a result, businesses can decrease energy costs allowing local businesses to invest in growth and hire new employees, contributing to the City's economic development and increasing local employment opportunities.



Existing Efforts

Builds on utility programs

General Plan Policy NR-6-2

The City will encourage local businesses to transition to equipment and appliances that help them operate more efficiently and to save money in the process. The City will work with PG&E and SMUD to promote classes focused on energy efficiency improvements for businesses as well as information about rebates on energy efficient appliances, lighting, and installation services. The City will leverage these resources as a strategy to support economic development throughout the community.

Action Items

- Work with SMUD and PG&E to promote free appliance improvements and rebate programs, including rebates for lighting, motors, office equipment, and heating and cooling systems via the City website, newsletter, and handouts.
- Integrate materials on energy efficiency resources and opportunities into the City's economic development resources and programs.
- Develop a standardized tenant improvement checklist and informational materials to encourage the installation of energy-efficient appliances such as Energy Star through the tenant-improvement process.
- Partner with SMUD to promote their Energy Management Solutions Program for small and mid-sized commercial customers. This program focuses on energy system efficiency optimization of information technology systems, allowing businesses improved control of HVAC and lighting schedules for their businesses.

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- Promote SMUD’s custom and prescriptive lighting standards and rebates for qualifying commercial lighting systems, and support outreach efforts through targeted mailing campaigns and direct outreach to the business community through the Chamber of Commerce and other networks.
- Continue to promote the City’s PACE programs including Home Energy Renovation Opportunity, Clean Energy Sacramento, California Enterprise Development Authority, and CaliforniaFirst. Work to expand PACE program options for City residents and continue to promote the programs to Elk Grove property owners seeking to obtain low-interest financing for energy efficiency improvements.
- Continue to connect businesses and residents with programs that provide free or low-cost energy efficiency audits and retrofits.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.


- Three percent participation of businesses participating in appliance upgrades by 2030
- Five percent participation of businesses participating in appliance upgrades by 2050

BE-4. Building Stock: Encourage or Require Green Building Practices in New Construction

Encourage new construction projects to comply with CALGreen Tier 1 standards, including a 15 percent improvement over minimum Title 24 Part 6 Building Energy Efficiency Standards.

For projects that the City determines are not exempt from CEQA (i.e., an environmental document is required) and that qualify for project-level GHG analysis streamlining under CEQA Guidelines Section 15183.5, compliance with CALGreen Tier 1 may be required as a mitigation measure, unless other measures are determined by the City to achieve equivalent GHG reductions such that the CAP remains on track to achieving the overall GHG reduction target. (See Chapter 5, Implementation Measure 2 for additional details).

This measure encourages new development in the City to meet and exceed California’s Green Building Standards (Title 24, Part 11 of the California Code of Regulations, also known as “CALGreen”) and Building Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6, of the California Code of Regulations). CALGreen and the Building Energy Efficiency standards together serve to ensure that new buildings built in California meet increasingly efficient energy standards to conserve energy and water, reduce waste, and improve indoor and outdoor air quality. The CEC is responsible for updating and adopting Title 24, Part 6 energy code while the Building Standards Commission maintains the Title 24, Part 11 CALGreen Code in partnership with the Department of Housing and Community Development. Both agencies typically update these codes every three years to incorporate new feasible energy efficiency and green building technologies and construction practices.



Existing Efforts

Builds on Title 24 Building Code requirements.

General Plan Policy NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2

Beginning with the 2010 code update, the CALGreen code system was incorporated into the building code, requiring a series of resource efficient and environmentally focused standards including updated energy efficiency standards. The CALGreen code provides California builders with a certifiable green standard without the additional cost of third-party programs while working to help achieve the states resource conservation goals including increases in water conservation, improvements in air quality, increased recycling associated with construction activities as well as increases in building energy efficiency. In addition to the required standards, CALGreen provides a two-tiered system (Tier 1 and Tier 2) to allow local jurisdictions to adopt energy efficiency requirements which go above and beyond the states mandatory requirements in Title 24, Part 6, to provide a 15 and 30 percent additional reduction in energy use, respectively. As discussed at the beginning of this section, changes to the CALGreen standards are anticipated to occur as a result of the 2019 Title 24 Energy Efficiency Standards update which would increase the energy efficiency of new construction after 2020. This

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measure should be implemented prior to 2020 and be reassessed for efficacy and applicability beginning in 2020.

As discussed at the beginning of the Innovative and Efficient Built Environment section, changes to the CALGreen standards are anticipated to occur as a result of the 2019 Title 24 Energy Efficiency Standards update which would increase the energy efficiency of all new construction and introduce new on-site renewable generation system requirements for some types of buildings starting in 2020. As a result, the GHG reductions assumed under this measure may become superseded as similar levels of GHG reductions are achieved through new minimum standards in the 2019 Building Energy Efficiency Standards. Thus, this measure encourages compliance with CALGreen's Tier 1 standards for all new construction in the City. Therefore, this measure should be implemented prior to 2020 and be reassessed for efficacy and applicability beginning in 2020. By encouraging energy efficiency standards that go above and beyond what is required by the state, the City can establish itself as a leader in sustainability, realize energy and cost savings for new City residents and businesses, and remain ahead of the curve when the 2019 Title 24 Energy Efficiency Standards take effect.

Action Items

- Encourage compliance with CALGreen Tier 1 standards, along with exceeding the Title 24, Part 6 Building Energy Efficiency Standards, for all new construction projects.
- For projects that the City determines are not exempt from CEQA (i.e., an environmental document is required) and that qualify for project-level GHG analysis streamlining under CEQA Guidelines Section 15183.5, compliance with CALGreen Tier 1 may be required as a mitigation measure, unless other measures are determined by the City to achieve equivalent GHG reductions such that the CAP remains on track to achieving the overall GHG reduction target (see discussion regarding 2019 Building Energy Efficiency Standards above). See Chapter 5, Implementation Measure 2: CAP Checklist, for a full discussion of how the CAP consistency review process would be implemented during environmental review for eligible projects seeking streamlined review.
- Analyze future Title 24 updates released by the CEC and encourage the level of efficiency above minimum standards necessary to achieve the energy reduction potential outlined in the CAP.
- Partner with local energy provider(s) to develop a pilot program to demonstrate energy-efficient techniques and products in new municipal buildings.
- Support the use of innovative and alternative building materials and designs to improve efficiency, encouraging voluntary action such as compliance with Leadership in Energy and Environmental Design or Build It Green GreenPoint rating systems.

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- Update the City’s website and proactively work with applicants to make compliance with the energy efficiency standards as effective and efficient as possible.
- Partner with SMUD to promote the Savings By Design program, which provides cash incentives and technical assistance to help new commercial projects to maximize energy efficiency.
- Collaborate with the Northern California Chapter of the U.S. Green Building Council, SMUD and PG&E to provide local training and workshops for energy efficiency and green building training.
- Continue to enforce zoning provisions that require outdoor lighting fixtures in parking areas to be energy efficient.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- Three percent participation of new residential development from 2020-2030 to comply with Tier 1 standards
- Five percent participation of new residential development from 2030-2050

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BE-5. Building Stock: Decrease Energy Emissions in New Construction

Decrease energy emissions beginning in 2025 for new residential construction. Phase in Zero Net Energy (ZNE) standards by 2030 for new commercial projects. .

As part of the CEC’s 2007 Integrated Energy Policy Report and the state’s first Long Term Energy Efficiency Strategic Plan, adopted by the CPUC in 2008, the state established goals and a timeline for achieving ZNE for new residential construction by 2020 and all new commercial construction by 2030. A ZNE building, based on the CEC’s 2015 Integrated Energy Policy Report, is defined as [one where the societal value of the amount of energy provided by on-site renewable energy sources is equal to the value of the energy consumed by the building at the level of a single “project”.] (CEC 2016).



Existing Efforts

*General Plan Policy NR-6-1;
NR-6-2; NR-6-3; SD-2-1;
SD-2-2*

While reports expected that new ZNE standards would be implemented through future updates to the Title 24 Building Energy Efficiency Standards, this has not taken place. Neither the 2019 nor 2022 triennial update to Title 24 include ZNE standards, nor does the draft 2025 update. Rather, the 2019 Title 24 Energy Efficiency Standards make significant gains towards achieving GHG emissions reductions through solar PV requirements and improvements in building envelope design. The solar PV requirements can be met through access to off-site community solar programs in addition to installed on-site solar. With the 2022 Title 24 Standards, further gains were made in emission reductions. As part of the 2022 Title 24 standards, the CEC estimated the improvements between the 2019 and 2022 standards for different building types and climate zones. CEC’s modeling shows that, for climate zone 12 (including Elk Grove), single-family homes use 35 percent less natural gas and 25 percent more electricity under the 2022 standards compared with the 2019 standards. The modeling also shows that multifamily residential buildings use 16 percent less natural gas and 6 percent more electricity under the 2022 standards compared with the 2019 standards (CEC 2021).

For residential projects, rather than implementing ZNE requirements, the City has revised this Measure to require projects to demonstrate consistency with the GHG emissions reductions assumed to occur had ZNE standards been adopted. This would allow residential projects to comply with this measure by reducing their energy related emissions whether on- or off-site. While ZNE requires only on-site considerations, the revised language allows a combination of on-site and off-site reduction measures to meet the same emission reductions. For example, new residential developments could install additional electric appliances on-site, reducing the natural gas emissions for the building, and participate in SMUD’s Neighborhood Solar Shares program for off-site solar generation to meet the measure requirements. The target indicators set forth below take into consideration the improvements in building energy performance in the 2022 Title 24 standards described above.

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For commercial projects, ZNE buildings requirements will be phased in beginning in 2030. As part of the Climate Action Plan Update prior to January 1, 2030, the City will consider updates to Title 24 standards for nonresidential buildings to ensure consistency and utilize the most up-to-date measures for reducing GHG emissions from commercial buildings. With the 2030 timeframe for implementation related to commercial buildings, ZNE standards for commercial are still feasible.

Action Items

- Analyze future Title 24 updates released by the CEC, and amend the City Code as appropriate to ensure consistency with future energy standards. Begin updating energy requirements for all new residential development to ensure that all new residential development reduce energy related emissions by 2025.
- For projects that the City determines are not exempt from CEQA (i.e., an environmental document is required) and that qualify for project-level GHG analysis streamlining under CEQA Guidelines Section 15183.5, compliance with BE-5 may be required as a mitigation measure, as determined by the City, unless other measures are determined by the City to achieve equivalent GHG reductions such that the CAP remains on track to achieving the overall GHG reduction target. (See Chapter 5, Implementation Measure 2 for additional details).
- Update the City's website and proactively work with applicants to make compliance with the new standards as effective and efficient as possible.
- Use resources in California's ZNE Action Plan to assist with developing ZNE standards for new commercial development.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.


- New Residential Development:
 - All new single-unit residential buildings permitted after January 1, 2025 to reduce natural gas emissions by 15 percent from 2022 Title 24 standards.
 - All new multi-unit residential buildings permitted after January 1, 2025 to reduce natural gas emissions by 34 percent from 2022 Title 24 standards.
 - All new residential development would need to demonstrate a 50 percent reduction in electricity emissions from 2019 levels.
- New Commercial Development:
 - 100 percent participation of new commercial development from 2030-2050 to comply with ZNE standards.

BE-6. Building Stock: Electrification in New and Existing Residential Development

Encourage and incentivize new residential developments to include all-electrical appliances and HVAC systems in the design of new projects. Support local utilities in implementing residential retrofit programs to help homeowners convert to all electrical appliances and HVAC systems. Explore the feasibility of phasing in minimum standards for all-electric developments.

For certain projects that the City determines are not exempt from CEQA (i.e., an environmental document is required) and that qualify for project-level GHG analysis streamlining under CEQA Guidelines Section 15183.5, compliance with this measure may be required as a mitigation measure, unless other measures are determined by the City to achieve equivalent GHG reductions such that the CAP remains on track to achieving the overall GHG reduction target. (See Chapter 5, Implementation Measure 2 for additional details).

This measure provides incentives and encourages new residential developments in the City to include all electrical appliances and HVAC systems in the design of new projects to replace natural gas with electricity for space heating, water heating, cooking, or other appliances. SB 350, passed in 2015, requires the State to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. As part of SB 350, publicly owned utilities are required to develop integrated resource plans (IRPs) to help achieve the statewide energy efficiency goals. A large part of achieving emissions reductions in the building sector will be a transition to all-electric homes for new construction and electrification retrofits for existing homes.



Existing Efforts

General Plan Policy NR-6-1; NR-6-2; NR-6-3; SD-2-1; SD-2-2

All-electric homes and developments can achieve significant cost savings to developers due to the avoided cost of extending natural gas infrastructure to new development sites. SMUD reported recently that up to \$1,000 in avoided costs could be achieved per single-family home by going all-electric, while also resulting in 1 metric ton of CO₂e reductions per year per unit (SMUD n.d.). SMUD currently administers an incentive program specifically focused on residential electrification, providing financial incentives for homebuilders who participate in the SMUD’s All-Electric Smart Homes program. SMUD also provides incentives for including electrification measures in existing building retrofits. This measure provides a starting point for the City to work closely with SMUD in promoting and incentivizing the design and construction of new all-electric developments in the City as an initial step towards phasing in all-electric residential standards in the future.

Action Items

- Promote electric appliance and HVAC system retrofits in existing homes, as well as all-electric new homes, by promoting the existing SMUD All-Electric Smart Homes program and other

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incentive programs for existing building retrofits on the City's website as well as at the planning and permitting counters in the City's planning department.

- Develop a program to reduce or waive planning, permitting and inspection fees and streamline the development review process for homebuilders who commit to developing all-electric homes as part of new residential development projects.
- Update the City's website and proactively work with applicants to make the design and construction of all-electric homes as effective and efficient as possible.
- Conduct a feasibility study for phasing in minimum standards for all-electric developments in the future, with a goal of implementing new minimum standards prior to 2030. If determined to be feasible after further study, phase in minimum standards for all-electric homes for certain types of new developments. Where appropriate, coordinate the timing and extent of minimum standards with future updates to Title 24.
- Partner with SMUD to develop a pilot program to demonstrate all-electric appliances in new municipal buildings.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- Existing Residential:
 - 15 percent of existing residential units converted to all-electric homes by 2030
 - 99 percent of existing residential units converted to all-electric homes by 2050
- New Residential:
 - Ten percent of new residential development to be all-electric by 2030

(Note: Electrification of new residential buildings is assumed to continue beyond 2020. However, to avoid double counting reductions with BE-5 between 2020 and 2030 in which a ZNE standard for new development will be adopted (and through which electrification would be a foreseeable component of achieving ZNE) GHG reductions from electrification of new residential development beyond 2020 are credited to implementation of BE-5).

BE-7. Building Stock: Solar Photovoltaics in New and Existing Residential and Commercial Development

Encourage and require installation of on-site solar photovoltaic (PV) in new single-family and low-rise multi-family developments. Promote installation of on-site PV systems in existing residential and commercial development.

This measure includes incentives to facilitate the installation of on-site solar PV systems in existing residential and commercial development and helps the City prepare for PV system requirements that will be implemented through the 2019 Title 24 energy standards, which become effective in 2020. The City will work closely with SMUD to provide information to residences and businesses about key components of solar system installation including financing, rebates, contracting, permitting requirements, installation, and maintenance. The City will also support commercial development projects that include solar PV systems and promote the feasibility and benefits of these design standards for future commercial development in the City in general.



Existing Efforts

*General Plan Policy NR-6-1;
NR-6-2; NR-6-3; SD-2-1;
SD-2-2*

The City will revise and update existing building standards to begin the transition to requiring on-site solar PV systems for all new single-family residential development and to require solar-ready construction for multi-family and non-residential buildings as part of the 2019 Title 24 standards. PV systems installation for multi-family and non-residential buildings will not be required in the 2019 Title 24 energy standards, though there are solar ready requirements for certain new and expanded buildings.

Action Items

- The City will adopt 2019 Title 24 building energy efficiency standards update, requiring:
 - A. New single-family residential construction to include solar PV systems installed consistent with Part 6, Section 150.1.(c).14;
 - B. New construction of multi-family residential, nonresidential or mixed-use projects, and additions of 2,000 square feet or more to provide structural capacity for on-site solar energy production that would supply at least 15 percent of the project's annual electricity demand, consistent with Part 6, Section 110.10; and
 - C. For development unable to comply with A or B above to meet on-site demand, require other improvements, including but not limited to other roof-mounted or ground-mounted solar energy production opportunity, or purchase of off-site credits (or combination thereof).

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The City may also implement this action in combination with actions intended to further implementation of Measure BE-5.

- Promote SMUD’s solar incentive programs on the City’s website and at the planning and permitting counters in the City’s Planning Department.
- Partner with private developers and SMUD to incentivize new developments to participate in design assistance and incentive programs to both increase efficiency and maximize renewable energy generation potential.
- Develop a program to reduce or waive planning, permitting, and inspections fees for the solar portion of permit fees; and, streamline the development review process for new commercial projects who commit to including solar PV systems as part of the project.
- Work with SMUD and private developers to prepare locally-specific preapproved single-family plans aligned with current solar or other relevant design assistance and incentive programs.
- Work with SMUD and non-profit community organizations to identify locations for large-scale solar installations that would benefit low income communities in Elk Grove
- Review and update the Citywide Design Guidelines and the Zoning Code to remove impediments to the installation of renewable energy facilities.
- Promote and provide additional incentives for SMUD’s Commercial Battery Storage program for commercial projects that are including solar PV systems in the project design.
- Develop strategies to overcome barriers to PV solar system installation in non-residential buildings which are leased to multiple-tenants. The City will identify barriers expressed by building owners for installing PV solar systems in non-residential buildings and design incentives to overcome identified barriers. Common strategies used to overcome this barrier could include:
 - Provide information to property owners on "green leases" for tenants in which tenants commit to participating in shared cost of PV solar system installation.
 - Promote the benefits of PV solar systems to sell electricity back to the utilities through a Feed-In-Tariff program.
 - Promote the ease and availability of third-party PV system ownership in which third party sells electricity directly, often at lower rate than the utility, to the building tenant at a fixed or escalating electricity rate for a predetermined period of time.
 - If on-site PV systems are determined to be infeasible, encourage non-residential property owners to participate in off-site renewable energy programs, such as SMUD’s SolarShares or Greenergy programs (see Measure BE-8).

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Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- Residential:
 - Five percent participation rate for installation of PV systems in existing residential development by 2030.
- Commercial:
 - Five percent participation rate for installation of PV systems in existing and new commercial development by 2030.

(Note: Because of new requirements for the installation of PV systems for new residential development as part of the 2019 Title 24 standards beginning in 2020, this measure does not credit additional reductions from PV systems to avoid double counting reductions already accounted for in the legislative-adjusted BAU forecast discussed in Chapter 3.)

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BE-8. SMUD Greenergy and SolarShares Programs

Encourage participation in SMUD’s offsite renewable energy programs (i.e., Greenergy, SolarShares), which allow building renters and owners to opt into cleaner electricity sources.

SMUD currently administers several programs to support increases in renewable energy by the utility. SMUD’s Greenergy program allows customers to opt-in to purchasing 50 or 100 percent of their electricity from renewable resources for a small additional monthly fee on their electricity bill.

Through the program, customers can see where their renewable energy is coming from. The program has been certified by Green-e Energy, a third-party clean energy certification organization.

SMUD also administers the SolarShares program which allows SMUD customers to receive electricity generated by solar power with no upfront costs or equipment installation. As part of the program, participating customers will have a portion of their electricity bill invested in the construction and maintenance of large-scale solar power facilities to be owned and operated by SMUD. Customers can choose the size of their “virtual rooftop system” (i.e. number of SolarShares) as well as a fixed monthly fee for participation in the program. Customers then receive credit on their energy bill each month for the energy produced by their “virtual rooftop system”.

This measure works to promote increased participation in SMUD’s clean energy program through marketing and outreach strategies which target City customers and businesses not currently participating in the program.

Action Items

- Promote participation in SMUD’s Greenergy program, which allows all electricity customers to pay low monthly fees to meet electricity needs from either 50 percent or 100 percent renewable sources.
- Promote participation in SMUD’s SolarShares program, which allows all account holders to pay a fixed monthly fee to purchase solar electricity produced a local solar facility.
- Update the City’s website and materials for residents and businesses to promote SMUD’s green electricity source options.
- Work closely with SMUD to conduct local outreach, events, and promotions for SMUD’s clean energy programs.



Existing Efforts

*General Plan Policy NR-6-6;
NR-6-5*

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Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation.

- The following percentages of customers participating in SMUD’s Greenergy program with half of participating customers opting for the 50 percent renewable option and half choosing the 100 percent renewable option.
 - 10 percent participation rate by customers in SMUD’s Greenergy program by 2020.
 - 10 percent participation rate by customers in SMUD’s Greenergy program by 2030.

(Note: SMUD does not currently offer the SolarShare Program but plans to resume offering the program beginning in 2020. To remain conservative and because sufficient information is not available regarding the future SolarShares Program, this measure does not assume any GHG reductions from participation in this program. Any participation from Elk Grove residents in the future SolarShares Program would result in additional GHG reductions to Greenergy participation already assumed in this measure.)

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BE-9. Increase City Tree Planting

Plant an average of 700 trees per year with assistance from the Sacramento Tree Foundation or similar organizations.

The City, along with the Sacramento Tree Foundation, is currently working to double the number of trees in the region over the next 40 years. In 2017, the City updated regulations for the preservation of the City's current stock of trees. The regulation provides guidelines for the protection of existing trees in the City, the permitting of new trees, the planting and maintenance of new trees, and mitigation measures for the removal of existing trees.



Existing Efforts

General Plan Policy NR-6-6

In continuing the work to support the region's urban tree canopy, the City, in collaboration with 28 local governments in the six-county region, is working with the Sacramento Tree Foundation to implement the Greenprint initiative. As the first City to join the program, Elk Grove is working to develop tree canopy optimization goals, policies and ordinances, best management practices, and community involvement strategies. As a first step in this process, the City has conducted an Urban Forest Canopy Assessment to understand the City's current tree canopy coverage and identify key areas for improvement.

Along with providing shade and aesthetic value for City residents, the City's tree canopy provides a series of co-benefits including energy savings through the mitigation of the urban heat island effect, air quality improvements through pollutant sequestration, storm water runoff reductions, and property value increases. Additionally, the planting of new trees in the City serves as form of carbon sequestration, with new trees sequestering carbon dioxide through the process of photosynthesis.

This measure sets the target of planting 700 trees in the City annually through the year 2050, working to sequester carbon dioxide and providing a series of additional co-benefits for the community.

Action Items

- Work with the Sacramento Tree Foundation or similar organization to organize tree plantings and determine areas that could benefit from shade coverage.
- Use the Sacramento Tree Foundation's Greenprint Toolkit to guide implementation of this measure.
- Use data collected in the Urban Forest Canopy Assessment to guide targeted tree planting efforts and continued implementation of this measure.

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- Review and consider updates to the City's development standards to support annual tree planting targets and implementation of this measure.

Target Indicators

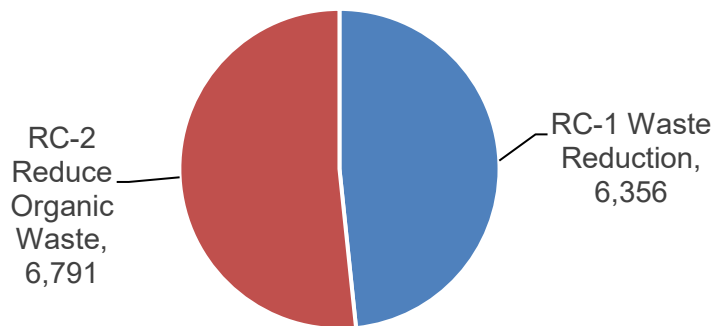
The following target indicators serve to monitor progress towards achieving measure implementation:

- An average of 700 trees planted per year beginning in 2020.

Resource Conservation (RC)

Resource Conservation (RC) is a basic tenet of sustainability that also reduces GHG emissions. The consumption and disposal of resources requires energy and emits GHGs. For instance, emissions are generated by the energy used to produce food and transport this food to the community, while emissions also result from the decomposition of resources that have been converted into waste. By acting to help the community reduce the consumption of such resources and more effectively manage waste, the City can reduce its GHG emissions while fostering environmental stewardship in the community.

Figure 4-4: RC Greenhouse Gas Reductions by Measure in 2030 (MTCO_{2e})



Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent;
 Source: Data compiled by Ascent Environmental in 2018.

GHG Reductions per Year (MTCO _{2e})	
2020:	- 753
2030:	-1,315
2050:	- 2,181
Responsible City Department/Public Agency	
Waste and Recycling, Planning, Building	
Cost to the City	
Medium	
Private Investment	
Low	

Supporting Measures for Resource Conservation

RC-1. Waste Reduction

The City shall facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste generated.

The City has implemented several waste reduction programs for residents and businesses in the City. The City will continue to identify local and regional programs as they become available to increase the amount of waste diverted from the landfill. In 2013, the City reported a 75 percent diversion rate of its waste through recycling, composting, and green waste pickup.



Existing Efforts

EGMC 30.70

*General Plan Policy CAQ-25
and CWDG-5.A.2.35*

Residents can dispose of green waste and recyclable materials along with their normal garbage through the City's curbside pickup program. They can also use additional curbside services to dispose of bulky waste, e-waste, sharps, and household batteries.

Businesses may have their food waste and grease picked up for a fee. As part of the development standards, the City has created the Space Allocation and Enclosure Design Guidelines for Trash and Recycling (DGTR), which works to ensure adequate space is allocated for trash, recycling, and organics disposal as applicable for new residential and commercial development in the City.

This measure supports the City's existing recycling and waste reduction efforts, while working to increase the City's overall diversion rate to 95 percent by 2050 as well as achieving interim increases in diversion rates for 2030, 2030, and 2040. The action items included below support and expand the City's current efforts to increase the effectiveness of waste reduction opportunities.

Action Items

- Continue to provide curbside green waste opportunities for residents and businesses.
- Expand the types of material accepted for curbside recycling.
- Encourage and create incentives for the use of recycled concrete in all base material used in City and private road construction.

Target Indicators

The following target indicator serves to monitor progress towards achieving measure implementation:


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- Maintain a 75 percent diversion rate from landfills by 2020
- Achieve an 80 percent diversion rate from landfills by 2030
- Achieve an 85 percent diversion rate from landfills by 2040
- Achieve a 95 percent diversion rate from landfills by 2050

RC-2. Organic Waste Reduction

The City will target reduction of organic waste disposal, consistent with statewide goals, of 50 percent of 2014 levels by 2020 and 75 percent by 2025, using alternatives such as composting, anaerobic digestion, and biomass energy.

Organic waste, through the process of decomposition, generates methane and nitrous oxide, contributing to overall GHG emissions. The disposal of organic waste through traditional waste streams decomposes in landfills and contributes to a City’s GHG emissions. Organic waste diversion strategies such as composting can help reduce GHG emissions associated with a City’s solid waste generation. The City currently offers composting workshops for residents interested in converting their food scraps and yard waste into nutrient-rich soil. The production of methane through organic waste decomposition can also be harnessed through the use of anaerobic digesters, in which methane emitted from the decomposition of organic material under anaerobic conditions is captured and used to generate electricity or natural gas for use in other processes.



Existing Efforts

EGMC 14.10

General Plan Policy CIF-1.1; CIF-1.2

This measure is designed to be consistent with current state law regarding commercial organic waste diversion rates set forth in AB 1826. The law establishes the phasing in of requirements for businesses, including multifamily residential dwellings (of five or more units) over time based on the amount and type of waste the business produces. Full implementation of the law will be realized in 2019. Additionally, the measure serves to support progress towards the organic waste reduction goals set forth in SB 1383 of achieving a 50 percent reduction in the level of the statewide disposal of organic waste from 2014 levels by 2020 and a 75 percent reduction by 2025. By 2019, CalRecycle is expected to develop and adopt new regulations mandating organic waste reduction programs statewide in order to meet these targets, pursuant to the authority granted in SB 1383.

This measure serves to support the City’s efforts while setting new targets for the diversion of organic waste from traditional waste streams. By incorporating an organic waste disposal program into the City’s existing waste disposal services and providing information to City residents and businesses, the City can support the State’s organic waste reduction targets.

Action Items

- Create a curbside organic waste collection program for residents.

As part of this program, provide information on compostable materials accepted by the program on the City website.

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- Provide businesses with a means to collect or drop off organic waste.
- Develop process to monitor progress towards organic waste disposal reduction targets that is consistent with forthcoming reporting requirements for AB 1826 compliance and new forthcoming statewide regulations pursuant to SB 1383.
- Explore options for the diversion of organic waste collected through these programs for delivery to a regional anaerobic digestion, compost, or biomass energy facility.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

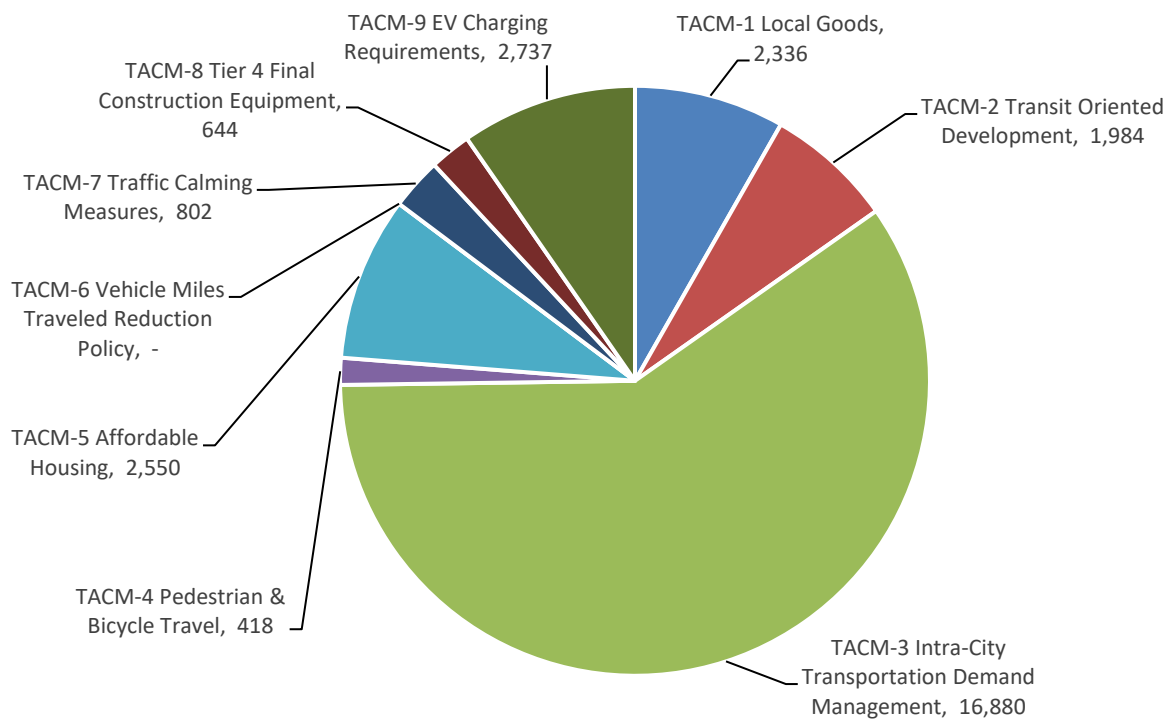
- 75 percent reduction in organic waste sent to landfills by 2025.
- 85 percent reduction in organic waste sent to landfills by 2030.

Transportation Alternatives and Congestion Management (TACM)

Land use and transportation patterns play an integral role in GHG emissions in a community from the transportation sector. The distribution of land uses throughout a community, and choices people make about where to live, shape transportation choices. Daily life requires that people make choices about transportation that have direct impacts on GHG emissions. Likewise, transportation options and accessibility in turn shape daily lifestyle choices. Transportation is often the largest contributor of GHGs within a community and one of the most complex sectors to address due to its close relationship with lifestyle choices.

The following measures investigate more closely the connection between transportation and land use in the City, providing a strategy to optimize this relationship for the maximum benefit of residents while also reducing GHG emissions.

Figure 4-5: TACM Greenhouse Gas Reductions by Measure In 2030 (MTCO_{2e})



Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent;

Source: Data compiled by Ascent Environmental in 2018.

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GHG Reductions per Year (MTCO_{2e})	
2020:	- 9
2030:	- 2,835
2050:	- 2,434
Responsible City Department/Public Agency	
Transit Services, Planning, Public Works	
Cost to the City	
High	
Private Investment	
High	

Supporting Measures for Transportation Alternatives and Congestion Management (TACM)

TACM-1. Local Goods

Promote policies, programs, and services that support the local movement of goods to reduce the need for travel by personal vehicles.

Promoting commerce between local businesses and residents reduces the amount of travel required to meet the service needs of residents. The City's Think, Shop, Live campaign program encourages participating businesses to host events and provide incentives or discounts to residents to shop at local and independently owned stores. The City's weekly Farmers' Market also provides an opportunity for residents to purchase food and produce from local farmers, reducing the distance of food shopping trips from local residents. Additionally, improvements in pedestrian and bicycle facilities can support residents to buy and shop locally and promote local trips made by biking and walking.



Existing Efforts

General Plan Policies MOB-3.5; MOB-6.4; MOB-7.8

Shopping locally supports new local employment opportunities, increases local tax revenue, and can help to fund other emissions reduction programs. This measure supports strategies to encourage shopping locally while reducing trip distances required to meet the service needs of City residents.

Action Items

- Support efforts that encourage Elk Grove residents and businesses to buy goods and services locally.
- Support strategies to increase business-to-business commerce in the City.
- Create a program to recognize employers that contribute to the quality of life in the community.
- Actively promote revitalization of Old Town as well as major commercial corridors.
- Support strategies to increase business-to-business commerce in the City.

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Target Indicators

The following target indicator serve to monitor progress towards achieving measure implementation:

- Divert 10 percent of local vehicle miles traveled (VMT) to alternative modes through increased business serving local residents by 2030

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TACM-2. Transit-Oriented Development

Support higher-density, compact development along transit by placing high-density, mixed-use sites near transit opportunities.

This measure ensures that new development is directed toward areas close to existing or proposed transit or bike thoroughfares to decrease City residents' dependence on single-occupancy vehicle trips. The measure would also allow new developments within transit-oriented areas to be built at higher densities and encourage a mix of commercial and residential uses.



Existing Efforts

General Plan Policy H-3

Action Items

- Identify and designate opportunity areas for transit-oriented development.
- Per the General Plan Update and updated zoning maps and standards, promote infill projects on TOD opportunity sites.

Target Indicators

The following target indicator serve to monitor progress towards achieving measure implementation:

- Increase citywide density by 34 percent by 2030, and an additional 33 percent by 2050 compared to 2013 citywide density.

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TACM-3. Intracity Transportation Demand Management

The City shall continue to implement strategies and policies that reduce the demand for personal motor vehicle travel for intracity (local) trips.

The City's Transit Services (e-tran) collaborates closely with the Sacramento Area Council of Governments (SACOG) to implement transportation demand management program measures to reduce the dependence of residents and employees on personal vehicle travel. The goal of the program is to make the region a better place to live, work, and shop by promoting innovative solutions to parking, commuting, and air quality issues. Services provided include:



Existing Efforts

Builds on regional transit programs

General Plan Policy NR-4-5

- Promotion of active transportation modes (walking, biking, public transit, or ride-sharing) to all residents
- Promotion of Sacramento Region 511 and other regional alternative transportation programs
- Promotion of the Sacramento Region Commuter Club website, and ride matching (carpools/vanpools/bicycling) services provided within that resource.
- Outreach to employers about alternative transportation
- Technical assistance to employer transportation coordinators and employers in preparing a trip reduction plan or developing a transportation demand management program
- Information for residents and employees on transit routes and schedules, bicycle and pedestrian trails, paths, and routes, rideshare programs, and opportunities for telecommuting
- Promotion of the City's local and commuter transit services to attract and retain businesses within the City

The TDM program measures aim to reduce local commute traffic by 15 percent. More information can be found on the City's website at http://www.elkgrovecity.org/residents/transportation/transit_e-tran/commuter_alternatives/

Action Items

- Implement policies and actions in the Mobility Element which seek to encourage active transportation modes (biking and walking) in the City.

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- The City will support positive incentives such as carpool and vanpool parking, bus turnouts, and pedestrian-friendly project designs to promote the use of transportation alternatives.
- The City shall participate in the preparation and implementation of a Congestion Management Plan (CMP) consistent with legal requirements which gives priority to air quality goals, alternatives to automobile travel, and the development of demand reduction measures over additional road capacity.
- Implement the requirements for designated carpool and vanpool parking for all new office developments and update standards to meet VMT reduction targets (note: implementation of this item would also be required for discretionary projects seeking to qualify for GHG analysis streamlining by demonstrating consistency with the CAP. To be determined during project review).
- Facilitate SACOG partnerships with community and employer organizations that are intended to support proactive and innovative transportation demand management programs covering all parts of the urbanized area, to offer a variety of choices to driving alone.
- Create a standard for shopping center carpool parking spaces near store entries to encourage multiple occupant vehicle visitors.

Target Indicators

The following target indicator serve to monitor progress towards achieving measure implementation:

- Implementation of Transportation Demand Management Program measures to achieve a 5 percent reduction in local road VMT by 2030, 5 percent reduction by 2050.

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TACM-4. Pedestrian and Bicycle Travel

Provide for safe and convenient pedestrian and bicycle travel through implementation of the Bicycle, Pedestrian, and Trails Master Plan and increased bicycle parking standards.

The City's Bicycle, Pedestrian, and Trails Master Plan was most recently updated in July 2014, detailing the City's anticipated future bike and pedestrian facility improvements. Increases in the availability of bike and pedestrian facilities serves to increase trips made by biking and walking for City residences and reduce trips made by personal vehicles. This measure quantifies the increase in the number of trips made by bicyclists and pedestrians based on existing and planned improvements for the bike and pedestrian infrastructure outlined in the Bicycle, Pedestrian, and Trails Master Plan. Trips made by biking or walking are assumed to replace a trip that would have been made by a single occupant in a vehicle.



Existing Efforts

General Plan Policy NR-4-4; PT-2-4; MOB-1.5; MOB-3.1; MOB-3.7; MOB-3.9; MOB-3.15; MOB-3.16; MOB-3.17; MOB-4.2; MOB-4.3; MOB-4.4; MOB-4.5; HTH-1.3

Action Items

- Commercial parking standards will be revised to require a ratio of one bicycle parking space per 20 vehicle parking spaces. Multi-family parking standards will be revised to require one long-term bicycle storage space per unit. Storage options may include a multitude of options that provide secured storage.
- Revise standards to require the provision of bicycle support facilities (e.g., lockers, shower rooms) for appropriate development.
- New multi-family development constructed by the measure target years will be characterized by internal and off-site pedestrian and bicycle connections that are in excess of those called for in the Bicycle, Pedestrian and Trails Master Plan.
- Ensure that applications for new office and mixed-use developments analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. To the extent feasible, the project should be oriented toward an existing transit, bicycle, or pedestrian corridor with minimum setbacks. Exceptions may be considered for site-specific project constraints or projects that support equivalent pedestrian, bicycle, or alternative transportation through other methods.
- Require applications for new office and mixed-use development to minimize setbacks from the street and provide pedestrian pathways. City staff shall work with project applicants to ensure that entrance locations and parking lot designs encourage pedestrian access and safety, using

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design features such as clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

- Encourage pedestrian-oriented plazas, walkways, bike trails, bike lanes, and street furniture and connections to other community areas.

Promote pedestrian convenience and recreational opportunities through development conditions requiring sidewalks, walking paths, or hiking trails connecting various land uses and including safety amenities such as lighting and signage.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

- Pedestrian-oriented design to be integrated into new development
- Bicycle parking in all new multi-family and nonresidential development
- Construct 10 new lane miles of pedestrian, bicycle or joint pedestrian-bicycle facilities between 2020 and 2030, consistent with projects identified in the Bicycle, Pedestrian and Trails Master Plan.
- Construct 20 additional new lane miles of pedestrian, bicycle or joint pedestrian-bicycle facilities between 2030 and 2050, consistent with projects identified in the Bicycle, Pedestrian and Trails Master Plan.

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TACM-5. Affordable housing

Continue to promote and require the development of affordable housing in the City.

As a general trend, lower-income households and senior citizens often own fewer vehicles and drive less. Furthermore, an adequate supply of affordable housing within a city ensures the growth of an equitable and just community in which people of all income levels can live. This measure works to ensure the construction and maintenance an adequate supply of affordable housing within the City. Additionally, when affordable housing is located near transit and alternative transportation modes, VMT can be reduced while still allowing mobility for lower-income households.



Existing Efforts

General Plan Policy H-2-1

Action Items

- Provide for affordable housing development in Elk Grove consistent with the goals and actions of the Housing Element, as well as SACOG's Regional Housing Needs Allocation.
- Apply for affordable housing grant funding to help reach SACOG's Regional Housing Needs Allocation for the City.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

- Approximately 2,270 new housing units that are below market rate by 2030.
- Approximately 3,357 homes that are below market rate by 2050. Bicycle parking in all new multi-family and nonresidential development

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TACM-6. Limit Vehicle Miles Traveled

Achieve a 15 percent reduction in daily VMT compared to existing conditions (2015) for all new development in the City, consistent with state-mandated VMT reduction targets for land use and transportation projects.

In 2013, California Governor Jerry Brown signed SB 743 into law, beginning the process of updating the way transportation impacts are analyzed under CEQA. The legislation focuses on updating transportation impact analysis methods under CEQA to focus on VMT impacts and better align this process with the state goals to promote infill development, active transportation, and the reduction of GHG emissions. Additionally, the legislation works to support the regional VMT reduction targets established for Metropolitan Planning Organizations (MPO) through SB 375.



Existing Efforts

*General Plan Policy
MOB1.1*

This measure serves to support Policy MOB1.1 in the City's General Plan, which requires new development projects in the City to achieve a VMT reduction of 15 percent over existing conditions (2015) threshold set for its underlying land use. New proposed development projects must demonstrate that project daily VMT per service population is equal to or below the established VMT thresholds established for its land use designation identified by the General Plan Land Use Map (e.g. low-density residential, regional commercial). Projects which do not meet these VMT thresholds will be required to implement mitigation measures to ensure the VMT targets are met. By establishing VMT thresholds for new development, the policy works to limit new VMT in the City, while prioritizing low VMT projects which promote more sustainable transportation modes such as biking, walking and public transportation.

Action Items

- Develop and adopt mitigation measures which achieve VMT reductions for new land use and transportation projects and support the TACM measures included in this CAP.
- Develop and implement incentives, through the development review process, for projects which demonstrate VMT reductions above the established VMT thresholds and support implementation of other TACM measures in this CAP.
- Develop and adopt a fee-based mitigation program to offset project-level and cumulative VMT impacts from projects with funding allocated towards implementation of the City's Bicycle, Pedestrian, and Trails Master Plan.

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Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

- Development and adoption of mitigation measures which achieve VMT reductions for new land use and transportation projects by 2020.
- Development and adoption of a fee-based mitigation program to offset project-level and cumulative VMT impacts from new land use and transportation projects by 2025.

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TACM-7. Traffic Calming Measures

Increase the number of streets and intersections that have traffic calming measures.

Traffic calming measures such as marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, and bulb-outs have been shown to divert traffic from local streets and decrease vehicle speeds when present. In turn, those who would otherwise be deterred by high traffic volumes and speeds on local roads are more likely to walk and bike to destinations. Through traffic calming measure requirements for new roadway development and the inclusion of traffic calming features on existing roadways and intersections, the City can encourage residents to take more trips by active transportation modes such as biking and walking.



Existing Efforts

General Plan Policy NR-4-8

This measure encourages the development of traffic calming measures along local streets and intersections to decrease traffic volumes and speeds and increase biking and walking trips by residents.

Action Items

- Install a variety of traffic calming measures on streets and intersections, prioritizing measures proven to promote trips by active transportation modes.
- Review and consider updates to City development standards for new roadways and existing roadway improvements to include traffic calming measure.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

- 25 percent of streets and 25 percent of intersections include traffic calming measures by 2030.
- 50 percent of streets and 50 percent of intersections include traffic calming measures by 2050.

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TACM-8. Tier 4 Final Construction Equipment

Require all construction equipment used in Elk Grove to achieve EPA-rated Tier 4 Final diesel engine standards by 2030 and encourage the use of electrified equipment where feasible.

Beginning in 1994, the EPA began to regulate emissions from newly manufactured off-road diesel engines to reduce emissions rates of Particulate Matter (PM) and Nitrogen Oxides (NOx) from engines. Using a tiered standard system (Tier 1 – 4), since 1994, the EPA has implemented increasingly

stringent standards for PM and NOx on off-road diesel engines. On May 11, 2004, EPA signed the final rule introducing Tier 4 emission standards to be phased in between 2008 and 2015. Alongside reductions in PM and NOx emissions associated with these engine types, the regulation has led to increases in the fuel efficiency of these engines as well.



Existing Efforts

General Plan Policy CAQ-33

This measure supports the use of electrified construction equipment and supports requirements for Tier 4 off-road diesel engines to be used in all construction activity occurring in the City by 2030, serving to reduce GHG emissions associated with construction activity in the City.

Action Items

- Work with Sacramento Metropolitan Air Quality Management District to ensure grading permits are not issued until project applicants verify construction will use Tier 4 Final diesel engines where applicable.
- Encourage the use of electrified construction equipment where feasible in all construction activity occurring in the City.

Target Indicators

The following target indicator serve to monitor progress towards achieving measure implementation:

- 100 percent of diesel equipment used in construction is EPA-rated Tier 4 Final by 2030.

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TACM-9. EV Charging Requirements

Adopt an electric vehicle (EV) charging station ordinance that establishes minimum EV charging standards for all new residential and commercial development. Increase the number of EV charging stations at municipal facilities throughout the City.

The State continues to lead the way for the country in the adoption of Zero Emissions Vehicle (ZEV) technologies. In January 2018, the State adopted a new target of five million ZEVs and 250,000 vehicle charging stations in California by 2030. Due to the increasing affordability of EVs and increased access

to public and private EV charging stations, there are now over 350,000 EVs on California roadways. This measure serves to support increased rates of EV ownership in the City by establishing minimum standards for EV charging stations and associated infrastructure in new residential and non-residential development. The measure also sets targets for installing EV charging stations at public facilities, setting the City up as a leader in the adoption of EV technologies. As recent studies have shown, for EV owners, 80 percent of charging is done at home. If individuals have access to workplace charging, approximately 96 percent of charging is either done at home or work (Idaho National Laboratory 2015). As a result, this measure places a strong emphasis on investments for residential and workplace EV charging stations. This measure supports increased EV ownership among City residents by removing barriers to EV ownership and increasing public awareness of the availability of EV charging stations in the City.



Existing Efforts

General Plan Policy MOB-7.9

Action Items

- Adopt an ordinance, concurrently with adoption of the 2022 Building Code, updating minimum requirements for either pre-wiring or installing electric vehicle supply equipment (EVSE), as defined by Article 625 of the California Electrical Code, and Sections 4.106.4 or Sections 5.106.5 of the California Green Building Code, in all new residential and non-residential development. The following requirements shall be included in the ordinance:
 - **One- and two- unit residential development with attached private garages:** Garages or other parking areas serving each new dwelling unit will be “EV Ready” to allow for the future installation of EVSE to provide an electric vehicle charging station for use by the resident. The definition of “EV Ready” for this measure means a parking space that is pre-wired with a dedicated 208/240 branch circuit installed in the wall that originates at the electrical service panel or sub-panel with a 40 ampere minimum overcurrent protection device, and terminates into a cabinet, box, or enclosure, in a manner approved by the building official. The goal is to ensure

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adequate electrical system capacity and design to allow for future residents to install EVSE if desired, with minimal additional cost or effort.

- **Multiple unit residential and hotel/motel developments:** New multiple unit residential projects, hotel/motel, and residential parking facility projects shall be designed and constructed to include dedicated EV parking spaces, including a minimum number of spaces with EVSE installed, as well as dedicated spaces for future installation of additional EVSE as demand for on-site EV charging increases. **Table 4-3** includes the specific requirements for new multi-unit, hotel/motel, and residential parking facilities EV Parking.

Table 4-3: Multiple Residential Unit and Hotel/Motel EV Parking Requirements

Development Size	Minimum EV Capable Spaces	Minimum Spaces EV Ready for future expansion of EVSE	Spaces EV Ready for future expansion of EVSE
All Sizes	N/A	40% of the total number of parking spaces shall be equipped with low power Level 2 EV charging receptacles	10% of the total number of parking spaces shall be equipped with Level 2 EVSE
Alterations of Parking Facilities Serving Existing Multiple Residential Unit Buildings	10% of the total number of parking spaces are capable of supporting future Level 2 EVSE	N/A	N/A

Non-Residential (Other Than Previously Provided): New non-residential projects, shall be designed and constructed to include dedicated EV parking spaces. The number and types of EVSE installed shall be decided based on either a space allocation, as per Table 4-4, or a power allocation method, as per Table 4-5. The space allocation method requires both infrastructure for future EVSE installation and the installation of charging equipment. The power allocation method specifies the total kVA requirements, which can be met with any combination of EV Capable Spaces, including low-power Level 2, Level 2, or DCFC.

Table 4.4

Total Number of Actual Parking Spaces	Minimum Number of Required EV Capable Spaces	Minimum Number of EV Capable Spaces with EVSE Installed
0-9	0	0

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10-25	4	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 and over	20% of total parking spaces	25% of EV capable spaces

Table 4.5

Total Number of Actual Parking Spaces	Minimum Total kVA @ 6.6 kVA	Total kVA Required in Any Combination of EV Capable LPL2, L2, or DCFC
0-9	0	0
10-25	26.4	26.4
26-50	52.8	52.8
51-75	85.5	85.5
76-100	112.2	112.2
101-150	165	165
151-200	231	231
201 and over	20% of actual parking spaces x 6.6	Total required kVA = Parking spaces x 0.2 x 6.6

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- Develop guidelines for the design of EV charging stations for incorporation into the City's development code as part of the EV charging station ordinance process. Use the Governor's Office of Planning and Research's "Zero-Emission Vehicle Community Readiness Guidebook" to help guide development of the EV charging station guidelines.
- Develop a program to waive planning, permitting and inspection fees and streamline the development review process for homebuilders who commit to including EV charging stations in single family home developments.
- Promote residential and non-residential EV charger incentives offered by SMUD during the permitting process for all new residential and non-residential developments.
- Provide promotional material regarding EV charger incentives offered by SMUD at the City's planning counter.
- Promote State rebates (e.g., California Clean Vehicle Rebate Program), federal EV tax credits and SMUD's EV charger incentive program incentives to all new homeowners in Elk Grove through the City's website.
- Install a minimum of two EV charging stations at all major municipal facilities.
- Develop a strategy to work with Transportation Network Companies (e.g., Uber, Lyft), car sharing services, and other transportation service companies to provide EV charging stations at strategic locations to promote EV usage by drivers employed by these businesses in the City.

Target Indicators

The following target indicators serve to monitor progress towards achieving measure implementation:

- Installation of EV charging stations at all public facilities and commercial land uses.
 - 10 EV charging stations installed in public facilities and commercial land uses by 2020.
 - 100 EV charging stations installed in public facilities and commercial land uses by 2030.
 - 200 EV charging stations installed in public facilities and commercial land uses by 2050.
- 459 EV charging stations installed in multi-family residential and office land uses by 2030
- 907 EV charging stations installed in multi-family residential and office land uses by 2050

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Conclusion and Next Steps

Reducing greenhouse gas (GHG) emissions to meet the 2020 and 2030 reduction targets and long-term 2050 goal established in this climate action plan (CAP) will be a significant task. This chapter outlines how the City of Elk Grove (City) will monitor progress in achieving the 2020 and 2030 targets and ensure that the CAP's goals, measures, and actions are implemented in a timely manner.

Plan Implementation and Integration

For this CAP to be successful, it must be integrated into regional and local planning processes as well as daily City operations. This strategy will ensure that CAP serves as a living document. The CAP will also be updated every five years to ensure new programs, technologies, and emissions reduction strategies can be leveraged to meet the City's GHG reduction goals. The CAP's relationship to the General Plan gives the CAP a tie to all new development in the City, achieving necessary GHG reductions as the City continues to grow. As the City moves forward with zoning code (Title 23 of the Municipal Code) updates, specific plans, housing elements, and other planning documents, staff will ensure that these documents support and are consistent with the GHG reduction measures included in the CAP. City staff will implement the CAP through ongoing planning activities, programs, and the discretionary review process. As part of implementation, City staff will develop tools such as a CAP checklist to identify all mandatory and voluntary CAP measures for qualifying development projects.

Furthermore, as a programmatic tiering document under the California Environmental Quality Act (CEQA), the CAP will be the City's one-stop shop for GHG analysis and mitigation under CEQA. The City will use the CAP to streamline project-level GHG analysis during environmental review of discretionary projects by maintaining the prerogative to use both mandatory and voluntary measures as standards for new development, as appropriate. The City will work with applicants on a project-by-project basis to determine appropriate use of the CEQA benefits of the CAP, identifying appropriate mandatory and voluntary measures to integrate into project design or mitigation.

For developments wanting to benefit from CEQA streamlining provisions, the City may require measures in this CAP as mandatory conditions of approval or as mitigation in a mitigated negative declaration or an environmental impact report, as appropriate. This approach allows the City to ensure that new development can benefit from CEQA streamlining provisions while also ensuring that the City is making progress to achieve the identified reduction targets.

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CAP implementation requires strong leadership from community leaders, City staff, and elected officials. The City will designate one or more members of the City staff as leaders in the implementation of the CAP, ensuring established responsibilities for GHG reduction measures are integrated into City departments and funding is appropriately allocated for measure implementation.

Assigned City staff will conduct annual monitoring and reporting on implementation of CAP measures and overall progress toward CAP reduction targets. The City is committed to monitoring the CAP's implementation progress overtime and reporting to the City Council on the CAP's progress on an annual basis. If the City determines during annual reporting that the City is falling short of reduction targets, the City will investigate the need to create additional voluntary and mandatory measures to attain the City's overall reduction goals.

The City is also committed to updating the inventory, forecast, and reduction measures a minimum of once every five years. The City will use an implementation and monitoring tool to assist in tracking progress on CAP implementation and developing annual reports for City Council presentations. The following policies are presented to ensure the City is successful in the implementation and monitoring of the CAP.

Implementation Measures

The City is committed to the following implementation measures as the path to achieve the 2020 and 2030 GHG reduction targets established in the CAP.

Implementation Measure 1: Climate Action Team

Develop a Climate Action Team (CAT) comprised of key staff from City departments who will be involved in CAP implementation.

Action Items

- Action 1.1: Identify a "CAP Liaison" within the City staff who will serve as the key point person for the CAT.
- Action 1.2: Review and identify all GHG reduction measures which include responsibility for City Departments
- Action 1.3: Identify key staff within each participating City department to include on the CAT.
- Action 1.4: Establish CAT membership from participating City departments and establish scheduled meetings to discuss GHG reduction measure implementation and CAP monitoring responsibilities.

Implementation Measure 2: CAP Checklist

Develop CAP Development Review Checklist to assist in the CEQA streamlining process in reference to CEQA Section 15183.5 and include all necessary GHG reduction measures for new development to achieve 2020 and 2030 reduction targets.

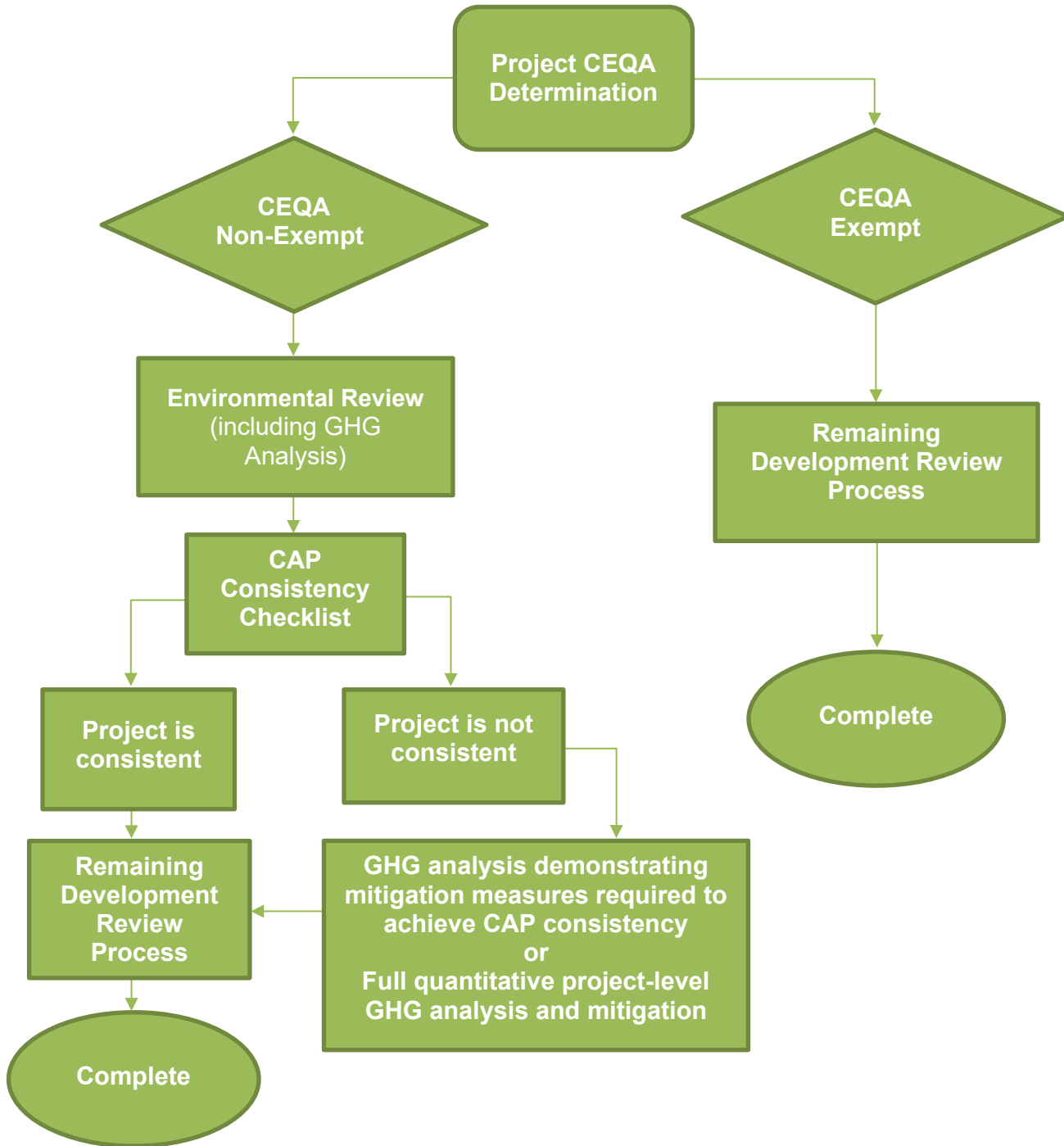
The CAP will serve as the City’s “plan for the reduction of greenhouse gases”, per Section 15183.5 of the CEQA Guidelines, which provides the opportunity for tiering and streamlining of project-level GHG emissions analysis for certain types of projects subject to CEQA review. By using a CAP Consistency Review Checklist (i.e., CAP Checklist) for projects subject to environmental review that are not otherwise exempt from CEQA, the City will provide the opportunity for tiering and streamlining of project-level GHG analysis and avoid the need for a full GHG emissions analysis as part of the environmental review process.

A CAP Checklist will serve as a tool for the City and applicants to determine whether the project is eligible for streamlining, and if so, which GHG reduction measures would be required to be included as mitigation measures or conditions of approval for different types of development projects in the City in order to qualify for streamlining under CEQA Section 15183.5. By completing the CAP Checklist and demonstrating that a project is eligible and includes all applicable GHG measures, a project may demonstrate CAP consistency and, as a result, the project’s GHG emissions impacts would be determined to be less than significant.

The CAP Checklist would only apply to certain development projects that require discretionary approval and that the City determines must undergo environmental review (i.e., does not qualify for an exemption) pursuant to CEQA. Projects that only require ministerial review (e.g., only building permits) would not be subject to the Checklist. Figure 5-1 illustrates when the CAP Checklist would and would not be use in the City’s project review process. Table 5-1 also provides a summary of which GHG reduction measures would typically be applicable for determining a project’s consistency with the CAP for streamlining per CEQA Guidelines section 15183.5.

Some future projects may not be eligible for project-level streamlining because they are not consistent with the General Plan or zoning, or because they are unique in nature for specified reasons and thus are not included in the growth projections assumed in the CAP. In such cases, staff may still require certain discretionary projects undergoing environmental review to complete separate, project-specific GHG analyses and incorporate such analyses and any project-level mitigation required into CEQA documents. The final determination of whether the CAP Checklist may be used, or whether a project-specific analysis is required, will be made by staff.

Figure 5-1: GHG Analysis Streamlining Process



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Checklist Procedures

The following is a list of CAP Checklist procedures which could be incorporated into the City's discretionary review process to establish the pathway for GHG streamlining pursuant to Section 15183.5.

- The City's Development Services Department reviews development applications and will make determinations regarding environmental review requirements under CEQA. City staff will make the final determination as to whether environmental review is required, and if so, whether completion of the CAP Checklist is required for a proposed project or whether a separate project-level GHG analysis is required.
- Projects that are determined by the City to be exempt from CEQA will not be required to complete the CAP checklist.
- The specific requirements outlined in the Checklist, along with any items the applicant agrees to in consideration of this process, will be required as a condition of approval.
- The applicant will be required to provide a written explanation that demonstrates how the proposed project will implement each Checklist requirement. If a question in the Checklist is deemed not applicable (N/A) to a project, an explanation must be provided to the satisfaction of the Development Services Department.
- The City may allow applicants to provide alternate GHG reduction measures to those included in this checklist, so long as the alternate measures are demonstrated to be equivalent or more effective than those being replaced. Applicants requesting use of alternate GHG reduction measures must submit supporting documentation along with the completed CAP Checklist, including detailed GHG reduction calculations and a written narrative, substantiating how the alternate measures would achieve equivalent or more GHG reductions.
- Development projects that are either ineligible for streamlining or that cannot demonstrate consistency with the CAP using the Checklist will be required to prepare a separate, more detailed project-level GHG analysis as part of the CEQA document prepared for the project.
- The Checklist will be an administrative document that may be updated periodically by City staff to incorporate new GHG reduction measures or to comply with later amendments to the CAP or local, State, or federal law. Any updates to the Checklist will be administered by the Planning Division at the staff level.

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Table 5-1: Applicability of GHG Reduction Measures for CAP Consistency Review Checklist

GHG Reduction Measures	Applicability of GHG Measure			
	Existing Development Only	New Development Only	Existing and New Development	Applies to Projects Seeking CEQA GHG Streamlining
An Innovative and Efficient Built Environment (BE)				
BE-1. Building Stock: Promote Energy Conservation	X			
BE-2. Building Stock: Upgrade Residential Appliances in Existing Development	X			
BE-3. Building Stock: Nonresidential Appliances in Existing Development	X			
BE-4. Building Stock: Encourage or Require Green Building Practices in New Construction		X		X
BE-5. Building Stock: Decrease Energy Emissions in New Construction		X		X
BE-6. Building Stock: Electrification in New and Existing Residential Development	X	X		X
BE-7. Building Stock: Solar Photovoltaics in Residential and Commercial Development		X		X
BE-8. SMUD Greenergy and SolarShares Programs			X	
BE-9. Increase City Tree Planting			X	
Resource Conservation (RC)				
RC-1. Waste Reduction			X	
RC-2. Organic Waste Reduction			X	
Transportation Alternatives and Congestion Management (TACM)				
TACM-1. Local Goods			X	
TACM-2. Transit-Oriented Development		X		

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GHG Reduction Measures	Applicability of GHG Measure			
	Existing Development Only	New Development Only	Existing and New Development	Applies to Projects Seeking CEQA GHG Streamlining
TACM-3. Intracity Transportation Demand Management			X	
TACM-4. Pedestrian and Bicycle Travel			X	
TACM-5. Affordable Housing		X		
TACM-6. Limit Vehicle Miles Traveled		X		
TACM-7. Traffic Calming Measures			X	
TACM-8. Tier 4 Final Construction Equipment		X		
TACM-9. EV Charging Requirements		X		X

Action Items

- Action 2.1: Review all GHG reduction measures related to new development for inclusion in the final CAP Development Review Checklist.
- Action 2.2: Develop CAP Development Review Checklist. Adopt CAP Checklist and integrate into the City's development review process within six months of the CAP's adoption date.
- Action 2.3: Monitor the implementation and use of the CAP Development Review Checklist in the City's current planning and environmental review processes for inclusion in annual CAP monitoring report.
- Action 2.4: Review implementation and use of the CAP Development Review Checklist and, if necessary, update the Checklist for improvements on a regular basis.

Implementation Measure 3: CAP Implementation and Monitoring

Monitor CAP implementation on a quarterly basis and report progress toward achieving the CAP's GHG reduction targets to the City Council on an annual basis.

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Action Items

- Action 3.1: Update the monitoring and reporting tool to assist with annual reports, which will include an implementation matrix for consolidated tracking and reporting on measure-by-measure progress.
- Action 3.2: Facilitate implementation of measures and actions from the three policy topics. Prioritize implementation of the GHG reduction measures based on funding, feasibility, and alignment with other City objectives identified in the City's General Plan Update.
- Action 3.3: Provide support to City staff within the CAT to facilitate implementation of measures and actions.
- Action 3.4: Monitor progress of CAP implementation on a quarterly basis. Integrate quarterly monitoring into annual progress report for review and consideration by the City Council, Planning Commission, and other applicable advisory bodies.
- Action 3.5: Include annual updates on CAP implementation progress on the City's new Sustainability and Climate Change web page to be developed as part of the General Plan Update process. Include mechanism on the Sustainability and Climate Change web page to receive feedback on CAP implementation progress from Elk Grove residents.
- Action 3.6: Integrate the results of the annual monitoring and reporting into the General Plan annual report or other annual monitoring exercises.

Implementation Measure 4: Update GHG Inventory and CAP

Update the baseline GHG emissions inventory and CAP at a minimum of every five years.

Action Items

- Action 4.1: Update the City's GHG Inventory every three years beginning in 2018.
- Action 4.2: Update the CAP no later than 2024 to incorporate new technology, new State programs and legislative reductions, and new or updated local measures to reduce GHG emissions.
- Action 4.3: Should the annual reporting and monitoring actions (Actions 1.1 through 1.6) identify that the reduction measures included herein are not collectively meeting the GHG reduction targets for 2020 and 2030, City staff shall prepare and present to the City Council recommended revisions to the CAP that would modify or replace measures to the extent necessary to achieve the GHG reduction targets.

Implementation Measure 5: Collaborative Partnerships

Continue to develop partnerships that support implementation of the CAP.

Action Items

- Action 5.1: Continue formal memberships and participation in local and regional associations or collaboratives and partner with local agencies that provide tools and support for energy efficiency, energy conservation, greenhouse gas emissions reductions, adaptation, education, and implementation of this CAP. Key partnering agencies, organizations, and collaboratives include:
 - Sacramento Municipal Utility District (SMUD);
 - Sacramento Metropolitan Air Quality Management District (SMAQMD);
 - The Capital Region Climate Readiness Collaborative;
 - The Sacramento Clean Cities Coalition; and
 - The Sacramento Green Capital Alliance.

Implementation Measure 6: Funding Sources

Implementation of the GHG reduction measures under each Policy Topic will require funding sources from both external funding sources such as grants and private-public partnerships as well as the allocation of City resources to achieve comprehensive implementation of the CAP and achieve long-term GHG reductions for the City. Provided below is a sample list of current funding sources and programs that could help support implementation of the CAPs GHG reduction measures. Funding sources are constantly changing, thus the City will need to evaluate individual funding needs and potential funding sources for each measure on a case-by-case basis. The City may also need to take future actions to pursue competitive funding opportunities such as grants, or develop new partnerships or agreements with other agencies that already provide funding through existing programs.

Residential and Commercial Energy

- **City of Elk Grove PACE Programs**: The City currently offers four PACE programs for residents and businesses to finance energy efficiency improvements which are repaid via the property owner's tax bill over a period of time.
- **SMUD Rebates and Financing**: SMUD offers a series of rebates for residents and businesses that are purchasing energy efficient appliances for their home or business. Rebates are offered for LED lighting, induction cooktops, refrigerators, smart thermostats, heat pump water heaters, room air conditioners, and clothes washers and dryers. SMUD also offers financing for whole-home energy efficiency upgrades including heating and cooling system upgrades and sealing and insulation improvements. SMUD also provides incentives for residential solar installations.

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- **SMUD All-Electric Smart Homes:** SMUD's All-Electric Smart Homes program offers financial incentives of up to \$5,000 for homebuilders to build new single-family and multi-family homes which include all electric appliances for heating, hot water and cooking. Examples of all-electric smart homes in the Sacramento region include the Broadway Redux homes at 9th and Broadway in Sacramento.
- **SMUD Gas to Electric Conversion:** SMUD's Gas to Electric Conversion program offers incentives of up to \$3,000 for customers who wish to convert their homes to all-electric appliances. The program offers incentives for replacement of hot water heaters, space heating systems as well incentives for full gas to electric home conversions.
- **CEC One Percent Interest Rate Loans:** The CEC offers one percent loans for local jurisdictions to conduct projects with proven energy savings at municipal facilities.
- **California Lending for Energy and Environmental Needs (CLEEN) Center:** This funding source, as a program of California Infrastructure and Economic Development Bank, provides direct public financing to municipalities, universities, schools and hospitals to help meet the State's goals for greenhouse gas reduction, water conservation, and environmental preservation.
- **GRID Alternatives:** GRID Alternatives is a non-profit organization which provides no-cost solar installations to low-income residents and provides assistance for communities in developing multi-family and community-scale solar installations. The organization also provides hands-on job training for volunteers interested in employment in the solar industry.
- **Low-Income Weatherization Program - Community Resource Project:** Community Resource Project, Inc. is the regional administrator for the Low-Income Weatherization Program in Northern California. This program provides a variety of services intended to promote the use of safe and clean energy in households living within the disadvantaged communities in Sacramento region. Home and appliance upgrades include refrigerators, heaters/air conditioners, solar panels, water heaters, dishwashers, washing machines, new windows and glass repair, weatherization (sealing the holes and cracks around windows, doors and pipes) and attic and floor insulation.
- **Sacramento Tree Foundation Sacramento Shade:** The Sacramento Tree Foundation, in partnership with SMUD, administers the Sacramento Shade program, which provides up to 10 free shade trees to homeowners to help decrease energy demand for home cooling by providing natural shading.

Transportation and Land Use

- **Caltrans Active Transportation Planning Program:** This program provides competitive planning grants for jurisdictions working on planning projects to increase the proportion of trips accomplished by biking and walking and reduce communitywide VMT.

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- **Caltrans Transportation Planning Grant Program**: The Transportation Planning Grant provides competitive planning grants to help local jurisdictions in a variety of transportation planning efforts including development and implementation of Regional Transportation Plans, address multimodal transportation deficiencies with a focus on transit, and support planning actions that advance climate adaptation efforts for local transportation systems.
- **California Clean Vehicle Rebate Project**: This CARB program provides rebates of up to \$7,000 for the purchase or lease of a new, eligible zero-emission or plug-in hybrid light-duty vehicle.
- **SMUD EV Charging Infrastructure Incentives**: SMUD offers EV charging infrastructure incentives for single-family residential customers, multi-family residences, and workplace charging stations.
- **Affordable Housing and Sustainable Communities Program**: This program, administered by the California Department of Housing and Community Development, funds land use, housing, transportation, and land preservation projects that support infill and compact development and reduce GHG emissions. Funds are available in the form of loans and/or grants in two kinds of project areas: TOD Project Areas and Integrated Connectivity Project Areas.
- **Senate Bill 2 Planning Grant Program**: This planning grant program provides financial and technical assistance to local governments to update planning documents and zoning ordinances in order to streamline housing production, including, but not limited to, general plans; community plans; specific plans; implementation of sustainable communities strategies; and local coastal programs. The Program does not use a competitive process to award funds. All localities that meet the eligibility requirements outlined in the grant application will be funded.
- **Strategic Growth Council Affordable Housing and Sustainable Communities Program**: This program makes it easier for Californians to drive less by making sure housing, jobs, and key destinations are accessible by walking, biking, and transit. Program funding can be used for affordable housing development, sustainable transportation infrastructure and related amenities that reduce VMT, and programs to encourage increases in active transportation modes.

Off-Road Vehicles

- **SMAQMD Construction Equipment Replacement Program**: As part of the Carl Moyer Grant Program, the Off-Road Equipment Replacement Program provides grant funds to replace Tier 0, Tier 1 and Tier 2 high-polluting off-road equipment with Tier 4 Final or zero-emission level equipment.

Solid Waste

- **CalRecycle Food Waste Prevention and Rescue Grant Program**: The purpose of this competitive grant program is to reduce overall GHG emissions by establishing new or expanding

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existing food waste prevention projects (source reduction or food rescue for people) in California to reduce the amount of food being disposed of in landfills.

- **CalRecycle Local Enforcement Agency Grant Program**: CalRecycle administers a noncompetitive grant program to assist Local Enforcement Agencies with their solid waste facilities permit and inspection program.

General Funding and Staff Capacity

- **CivicSpark Program**: The CivicSpark Program supports sustainability-focused research, planning, and implementation projects throughout California by providing public agencies and other organizations with high-quality capacity building support and community engagement through volunteer engagement via highly motivated emerging sustainability AmeriCorps Fellows for eleven months.
- **California Climate Investments**: California Climate Investments is a statewide initiative that provides funds from the states Cap-and-Trade Program for projects and programs which work to reduce greenhouse gas emissions in the state. Funds from the California Climate Investments can go to support a variety of projects including affordable housing, renewable energy, public transportation, zero-emission vehicles, environmental restoration, more sustainable agriculture, recycling, and more. Numerous State programs already itemized above are funded by California Climate Investments; however, the program continues to evolve and is updated by the State periodically to include new or modified programs.

The funding sources and programs listed above are subject to change over time. Aside from seeking the above listed funding source, the City should continue to search for new funding sources through the State's Climate Change [Funding Wizard](#) website which provides the most up to date information on funding opportunities for projects for climate change mitigation and adaptation.

Action Items

- Action 6.1: Identify all relevant federal, regional, and local funding sources for each GHG reduction measure.
- Action 6.2: Prioritize GHG reduction measures with the CAT and ensure implementation through the inclusion of emissions reduction and adaptation measures in department budgets, the capital improvement program, and other plans as appropriate.
- Action 6.3: Pursue local, regional, state, and federal grants as appropriate to support implementation.

Monitoring and Updating this CAP

The City will update the monitoring and reporting tool to track, monitor, and update the CAP document. As the City reports on CAP implementation progress in implementing the CAP, staff will evaluate implementation characteristics associated with each measure (e.g., target indicators, staff time, cost, effectiveness) to ensure that the anticipated GHG reductions are occurring. If the GHG reductions do not occur as expected, the City will be able to modify and/or add further policies and measures to the CAP to ensure the City meets the established reduction targets.

Outcome of the Climate Action Plan

The CAP outlines ways in which the City will be able to reduce GHG emissions to reach the per capita targets set for 2020 and 2030 as well as setting the City on the path to achieve longer-term GHG reductions by 2050. The implementation of this CAP will take significant effort on the part of the City and the community to ensure compliance with the State-recommended GHG reduction targets, while also creating a safer, healthier, sustainable, and more economically-prosperous City for all residents.

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Glossary of Terms

This section includes an explanation or description of terms used throughout the Climate Action Plan.

1. **Adaptation:** Adaptation refers to adjustments in natural or human systems or the built environment to reduce vulnerability to the impacts of climate change.
2. **Baseline:** The first year an annual greenhouse gas inventory is completed; a calculated level of annual emissions against which future inventories can be compared.
3. **Composting:** A process by which organic materials such as yard waste, grass, tree trimmings, fruit, and sometimes meat products and sewage sludge are converted to fertilizer through controlled decomposition.
4. **Carbon Dioxide Equivalent (CO₂e):** A way to equalize the different warming potencies of the six internationally-recognized greenhouse gases (i.e., carbon dioxide [CO₂], methane [CH₄], nitrous oxide [N₂O], ozone [O₃], chlorofluorocarbons [CFCs], and hydrofluorocarbons [HFCs]).
5. **Density:** The number of people or dwelling units within one unit of land, often expressed in the number of dwelling units per acre.
6. **Electric Vehicle:** A vehicle which is operated using an electric motor for propulsion.
7. **Greenhouse Gas:** A gas within the atmosphere which absorbs and emits radiant energy in the thermal infrared range. The most prevalent GHGs in our atmosphere include water vapor, CO₂, CH₄, N₂O, O₃, CFCs, and HFCs.
8. **Global Warming Potential (GWP):** The relative potency of various GHGs when compared to carbon dioxide. For example, CH₄ has 28 times the potency of CO₂; therefore, 28 metric tons CO₂e could be 28 metric tons of CO₂ or 1 metric ton of CH₄. The GWPs for various greenhouse gases are used to calculate the total CO₂e from emissions sources for use in GHG inventories.
9. **Heating, Ventilation, and Air Conditioning (HVAC) Systems:** The system which controls thermal comfort and indoor air quality within buildings using heating, ventilation, and air conditioning equipment.
10. **Land use:** The way a parcel of land is used or occupied.

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11. **Metric Ton Carbon Dioxide Equivalent (MTCO_{2e}):** A measurement often used in GHG inventories which quantifies emissions from various GHG's into CO_{2e} and measured in metric tons, which is slightly smaller than a short ton, equal to about 1.1 short tons or 2,205 pounds.
12. **Mixed-use:** Development that includes a mix of uses in one area within proximity, such as residential, commercial, and/or business.
13. **Open space:** Open space includes land that is used for recreation, farm land, and land that is not developed.
14. **Renewable energy:** Energy produced from fuel sources which produce very small or no quantities of greenhouse gas emissions and are produced from a renewable resource (e.g., solar, wind, tidal, and biogas). **Short-lived climate pollutants (SLCPs):** Greenhouse gases that remain in the atmosphere for a much shorter period than long-lived climate pollutants but are often much stronger in their GWP (e.g., CH₄, CFCs, and HFCs).
15. **Traffic Calming Measures:** Roadway design features which serve to decrease vehicle speeds, make drivers more aware of their surroundings, or divert vehicles from neighborhood roadways not intended for through traffic.
16. **Transit-oriented development (TOD):** The development of housing, commercial space, services, and job opportunities near public transit nodes.
17. **Transportation demand management (TDM):** Transportation demand management or travel demand management (both TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), traffic congestion, or to redistribute this demand in space or in time.
18. **Vehicle Miles Traveled (VMT):** A measurement for quantifying the number of on-road passenger vehicle or other vehicle miles traveled by an individual or a community over a certain period, often quantified by day or year.
19. **Zero Net Energy (ZNE) Building:** A building in which “the societal value of the amount of energy provided by on-site renewable energy sources is equal to the value of the energy consumed by the building at the level of a single ‘project’.” This means, in general, that the amount of energy used in a building is equal to or less than the amount of energy produced by on-site renewable resources (e.g., solar) annually.

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20. **Zoning:** Zoning is a device of land use regulation used by local governments to organize land uses. The word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another, often to avoid nuisances.

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Appendix A:

City of Elk Grove GHG Inventory and Forecast

Background

In June 2009, the Sacramento County Department of Environmental Review and Assessment completed the Greenhouse Gas Emissions Inventory for Sacramento County. The inventory included government and community-wide emissions inventories for the unincorporated county and cities of Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova, and Sacramento. The inventory used the baseline year of 2005 to maintain consistency with other agencies throughout the State as well as with California's Assembly Bill 32.

In 2017, as part of the City of Elk Grove's (City) General Plan Update (GPU) and Climate Action Plan (CAP) update process, a new greenhouse gas (GHG) inventory update was completed using the new baseline year of 2013. The initial results of the 2013 inventory were included in the Existing Conditions Report for the GPU, and subsequently modified during preparation of the CAP Update. The CAP relies on the inventory as a baseline against which the City can measure future progress and growth. As such, it is important that the baseline inventory be as accurate and up to date as possible in order to streamline the CAP analysis.

Consistent with guidance from the Governor's Office of Planning and Research, the 2013 community-wide inventory was conducted using the 2012 U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, commonly known as the U.S. Community Protocol. Additionally, the

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2005 inventory used global warming potential (GWP) values from the Intergovernmental Panel on Climate Change's (IPCC) 2nd Assessment Report, which was published in 1995. The 2013 inventory uses GWP values from the IPCC's 5th Assessment Report, published in 2014, which demonstrates changes to expected GWP from methane and nitrous oxide. To ensure a consistent comparison could be made between the 2005 and 2013 inventories, the 2005 inventory was updated to use GWP values from the 5th Assessment Report. Additionally, as part of the 2013 inventory update, refinements were made to electricity use for wastewater related emissions based on updated data provided by Sacramento Municipal Utility Division (SMUD).

2013 Community-Wide Inventory

The inventory calculated GHG emissions resulting from activity within the municipal boundaries of the City in calendar year 2013. The inventory is focused on community-wide GHG emissions and provides an assessment of activities throughout the community which contribute to City's total annual GHG emissions. The inventory is organized into sectors and sub-sectors based on various community activities. These sectors include: residential and commercial/industrial building energy use, on-road vehicles, off-road vehicles, solid waste, wastewater, and agriculture.

As show in **Table A-1**, on-road vehicle emissions were the largest sector, resulting in approximately 430,340 metric tons of carbon dioxide equivalent (MTCO_{2e}) and 47 percent of the City's total emissions. Off-road vehicles resulted in 93,340 MTCO_{2e} and 10 percent of total emissions. The transportation sector, including on-road and off-road vehicles, resulted in 523,630 MTCO_{2e}, 57 percent of the City's total emissions. Residential energy use, which includes both electricity and natural gas consumption for space heating and water heating, resulted in 231,400 MTCO_{2e}, 25 percent of the City's total emissions. Commercial/Industrial energy use, which includes electricity use and natural gas consumption for commercial and industrial activities, resulted in 129,860 MTCO_{2e}, 14 percent of the City's total emissions in 2013. The building sector, which includes residential energy use and commercial/industrial energy use, resulted in 361,260 MTCO_{2e}, accounting for 39 percent of the City's total emissions.

GHG emissions for each sector of the inventory are calculated using activity data (e.g., electricity use, solid waste disposal) for the various the activities which contribute to the City's annual emissions. Below is a detailed description of how emissions from each sector are estimated.

Table A-1: 2013 Community-Wide Greenhouse Gas Emissions by Sector (MTCO_{2e})

Sector	Metric Tons CO _{2e}	Percentage (%)
On-Road Vehicles	430,340	47
Off-Road Vehicles	93,340	10
Transportation Sector Total	523,680	57
Residential Energy	231,400	25
Commercial/Industrial Energy	129,860	14
Building Sector Total	361,260	39
Solid Waste	26,260	3
Wastewater	3,854	<1
Water-Related	2,708	<1
Agriculture	1,030	<1
Total (All Sectors)	918,790	100

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent.
 Source: Data compiled by Ascent Environmental in 2017.

Residential and Non-Residential Energy

The inventory calculated emissions from electricity and natural gas consumption from residential and non-residential customers in the City. Residential and non-residential electricity use data for the baseline year of 2013 was provided by SMUD. Residential and non-residential natural gas use data was provided by Pacific Gas and Electric Company (PG&E). This data was then used to calculate GHG emissions associated with electricity and natural gas use. Emissions from electricity use in the City was calculated using emissions factors specific to SMUD for the year 2013 based on the specific mix of energy sources (e.g. natural gas, solar, wind) purchased or produced by the utility. Natural gas emissions were calculated using an emissions factor specific to the combustion of natural gas for space and water heating.

On-Road Emissions

As part of the City’s General Plan and CAP update, a transportation engineering consulting firm was hired to model vehicle miles traveled (VMT) based on trip origins and destinations in the City. The model appropriates VMT in the following manner per trip type:

- Internal-Internal (I-I): 100%

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The model appropriates all VMT for trips with an origin and a destination in the City with no stops in between.

- Internal-External (I-X): 50%
The model appropriates half of the VMT for trips that begin in the City and end outside of the City.
- External-Internal (X-I): 50%
The model appropriates half of the VMT for trips that begin outside of the City and end inside the City.

This method was developed by the California Regional Targets Advisory Committee, a committee responsible for the method used for regional target setting under SB 375. Using this new method will better position the CAP for use in other planning documents both locally and regionally.

The estimated annual VMT attributable to the City is then used to calculate GHG emissions associated with on-road vehicles using emissions factors for various vehicle types included in the California Air Resources Boards (CARB) Emission Factor (EMFAC) 2014 model.

Off-Road Emissions

The inventory calculated emissions from off-road vehicles in the City for the year 2013 using the CARB OFFROAD 2007 software. OFFROAD accounts for emissions from various types of off-road equipment. The inventory only accounts for the types of off-road equipment and vehicles:

- Construction equipment
- Lawn and garden equipment

Waste

The inventory includes emissions generated from the disposal of solid waste from residences and businesses within the City in the year 2013. The inventory includes two types of emissions from waste:

- 1) Landfill Emissions from Waste Generation in 2013 – Emissions from waste generated by Elk Grove residents and businesses in 2013, regardless of where the waste is landfilled.
- 2) Landfill Emissions from Waste-In-Place in 2013 – “Waste-in-place” emissions for all waste landfilled within the City in 2013, regardless of where the waste came from or who operates the landfill.

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The first type of emissions accounts for activity in 2013, while the second type accounts for historical activity up until 2013. The waste-in-place method calculates methane released in 2013 from landfills within the geopolitical boundary of the City. The City does not own or operate these landfills. One of the landfills is closed while the other accepts waste from throughout the region. Emissions factors used in these calculations were obtained from the CARB Landfill Model.

Wastewater Treatment

The inventory includes an estimate of emissions from wastewater treatment and discharge based on calculation methodologies included in the ICLEI US Community Protocol based on the City population and wastewater treatment processes. The inventory also included emissions generated from electricity use associated with the transportation of water for various uses in the City. Electricity use associated with these processes was obtained from SMUD.

Agriculture

The inventory accounts for emissions from various agricultural activities occurring in the City. Agricultural activities which involve off-road agricultural equipment are estimated based on the number of acres of active agricultural land in the City. The inventory also includes emissions associated with the livestock population in the City, which produces GHG emissions through the digestive process known as enteric fermentation. Finally, the inventory accounts for nitrous oxide emissions associated with the application of synthetic agricultural fertilizers on field crops in the City.

General Plan Update Study Areas

As part of the City's GPU process, four study areas within unincorporated Sacramento County to the south and east of the City have been identified for potential annexation in the future. The study areas are currently within the City's sphere of influence. In consideration of these study areas, GHG emissions inventories were conducted for the four study areas. These emissions inventories are important in understanding the City's potential future growth and subsequent emissions. As shown below, **Table A-2** provides emissions inventories for each of the four study areas using the same sector categories as the City's 2013 GHG emissions inventory. The study area inventories are used in the GHG emissions forecasts discussed below, helping to understand how emissions from each sector may change in the future with the City's anticipated growth.

Table A-2: Study Area Greenhouse Gas Emissions Inventories for 2013 (MTCO_{2e})

Sector	East Study Area	South Study Area	West Study Area	North Study Area
On-Road Vehicles	140	160	80	193
Off-Road Vehicles	660	1,250	720	724
Residential Energy	280	230	100	159
Commercial/Industrial Energy	10	0	0	485
Solid Waste	10	10	10	34
Water-Related and Wastewater	700	1,340	770	259
Agriculture	750	1,560	760	150
Total (All Sectors)	2,550	4,550	2,440	2,004

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent.

Source: Data compiled by Ascent Environmental in 2017.

GREENHOUSE GAS EMISSIONS FORECASTS for 2020, 2030, AND 2050

The City selected the forecast years of 2020, 2030, and 2050 based on the State's GHG reduction target years established in key legislation. The year 2020 aligns with the GHG reduction target year set in AB 32 of reducing statewide emissions to 1990 levels by 2020. The 2030 forecast aligns with the GHG reduction target year set in SB 32 of reducing statewide emissions to 40 percent below 1990 levels by 2030. The City also modeled the forecast year 2050 which aligns with Executive Orders EO B-30-15 and S-3-05 which set a long-term goal of reducing statewide emissions to 80 percent below 1990 levels by 2050. The energy, waste, and agriculture sectors are based on growth projections for population, household, and job growth in the Elk Grove. Growth rate projections used in the forecast were provided by City staff and in alignment with the Notice of Preparation for the City's GPU Growth rates for each forecast year vary for population, dwelling units, and jobs. **Table A-3** below shows the growth rates used to forecast BAU emissions for 2020, 2030, and 2050

Table A-3: Business-as-Usual Growth Rate Factors – 2020, 2030, and 2050

Growth Rate Factors	Growth Rate (%)		
	2013 to 2020	2020 to 2030	2030 to 2050
Population	32	35	33
Dwelling Units	10	21	33
Jobs	14	33	50
Vehicle Miles Traveled	49	31	47
Agricultural Acres	-29	-60	-77

Source: Data compiled by Ascent Environmental in 2018.

Business-as-Usual Forecast

A business-as-usual (BAU) forecast determines how baseline GHG emissions will grow with future population, housing, and job growth if current consumption trends and efficiencies do not change. A BAU forecast serves as the essential “no project” scenario to demonstrate how conditions will change without implementation of the CAP.

Legislative-Adjusted Business-as-Usual Forecast

The BAU forecast was then adjusted to demonstrate how Federal and State actions will impact local emissions for various sectors, even if no local actions are taken to reduce GHG emissions. The Federal and State actions included in this adjustment have been approved, programmed, and/or adopted. Incorporating them into the forecast and reduction assessment provides a more accurate picture of future emissions growth and the responsibility and ability of local governments versus the State to reduce GHG emissions. A brief description of how legislative reductions were incorporated in the forecast for each emissions sector for the forecasted years is provided below.

Table A-4: GHG Inventory “Business-as-Usual” Forecast Results

GHG BAU Forecast	Metric Tons CO ₂ e			
	2013	2020	2030	2050
Residential Energy	231,400	257,171	310,017	413,560
Commercial /Industrial Energy	129,860	147,685	196,037	293,532
On-Road Vehicles	430,340	645,542	844,317	1,241,867
Off-Road Vehicles	93,340	102,776	123,896	165,275
Solid Waste	26,260	36,181	39,817	47,781
Wastewater	3,854	4,283	5,163	6,888
Water-Related	2,708	3,010	3,628	4,840
Agriculture	1,030	2,585	1,061	299
Total	918,790	1,199,232	1,523,936	2,174,042

Source: Data compiled by Ascent Environmental in 2018

Building Energy

Emissions from future electricity and natural gas use were estimated by multiplying anticipated energy use with forecasted emission factors. Future energy use was forecasted in three parts. First, energy use was scaled by growth factors detailed in **Table A-3**. Second, energy emission factors were adjusted to reflect California’s Renewables Portfolio Standard (RPS) targets. Electricity emission factors are anticipated to decline based on current regulations, while natural gas emission factors stay constant. Third, energy intensity factors were adjusted to reflect

increased stringency expected under California’s Title 24 building energy efficiency standards (i.e., 2013 standards which became effective in 2014, and 2016 standards which became effective in 2017), which are expected to achieve decreases in electricity and natural gas consumption in new construction. The assumptions to energy efficiency and future electricity emission factors are described below. **Table A-5** summarizes the legislative factors used to scale building use by energy type.

Table A-5: Building Energy Emissions Forecast Methods and Legislative Reductions by Source

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Scaled by population growth for residential building energy; scaled by job growth for commercial/industrial building energy.	RPS achieved to date and scheduled targets (i.e., 33 percent renewable by 2020, 50 percent renewable by 2030) applied to SMUD's emission factors. Accounts for 2008 to 2013, 2013 to 2016, and 2016 to 2019 Title 24 energy efficiency gains in new construction.
Natural Gas	Scaled by population growth for residential building energy; scaled by job growth for commercial/industrial building energy.	Accounts for 2008 to 2013, 2013 to 2016, 2016 and 2019 Title 24 energy efficiency gains in new construction.

Notes: RPS = Renewable Portfolio Standard; SMUD = Sacramento Municipal Utility District.
Source: Ascent Environmental 2017.

Residential Building Energy

Between 2013 and 2030, electricity and natural gas emissions from residential buildings would increase by 9 percent from 231,400 to 240,608 MTCO_{2e} per year with legislative adjustments and considering overall population growth of 34

percent over the same time. **Table A-6** shows the baseline and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2013, 2020, 2030, and 2050.

Table A-6: Residential Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) (MTCO_{2e}/year)

Energy Type	2013	2020	2030	2050
Electricity	113,180	118,109	75,993	-
Natural Gas	118,220	122,676	131,812	149,713
Total Residential Building Energy Emissions	231,400	240,785	207,804	149,713

Notes: Totals may not add due to rounding. MTCO_{2e} = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

Commercial and Industrial Building Energy

Between 2013 and 2030, electricity and natural gas emissions from commercial and industrial buildings would decrease by 41 percent from 129,860 to 75,993 MTCO_{2e} per year with legislative adjustments and considering job growth of 51 percent over the same time. **Table A-7** shows the baseline and legislative-adjusted BAU forecasted emissions for the commercial and industrial building energy sector by energy type for 2013, 2020, 2030, and 2050.

Table A-7: Commercial and Industrial Building Energy Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050) (MTCO_{2e}/year)

Energy Type	2013	2020	2030	2050
Electricity	88,680	95,096	66,554	-
Natural Gas	41,180	43,811	50,949	149,713
Total Commercial and Industrial Building Energy Emissions	129,860	138,907	117,503	149,713

Notes: Totals may not add due to rounding. MTCO_{2e} = metric tons of carbon dioxide equivalent. Source: Data compiled by Ascent Environmental in 2017.

Electricity Emission Factors

Emissions from the building energy sector would see gradual declines through 2030 without additional City action, despite growth, due to State measures already in place. After 2030, growth in the City would outpace the reductions in emissions due to current State measures. Electricity emission factors for carbon dioxide (CO₂) are based on factors reported for 2013 provided by SMUD directly. Electricity emission factors for methane (CH₄) and nitrous oxide (N₂O) were obtained from the U.S. Environmental Protection Agency’s (EPA’s) Emissions & Generation Resource Integrated Database 2012 GHG Annual Output Emission Rates.

California utility providers, including SMUD, are scheduled to reach a 33 percent renewable electricity generation mix by 2020 and 50 percent by 2030, pursuant to statewide implementation of the RPS pursuant to SB 350. SMUD’s 2020 emission factor is 531.47 pounds of CO₂ per megawatt hour (lb CO₂/MWh), the 2030 emission factor is 317.14 lb CO₂/MWh.

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Energy Efficiency

The State's Title 24 Building Energy Efficiency Standards apply to both new construction and existing buildings. The 2016 Title 24 standards went into effect January 2017. The California Energy Commission (CEC) estimates that new residential buildings built to the 2016 standards would be 28 percent more efficient than residential buildings built to the previous standards (CEC 2015). CEC estimates that new non-residential built to the 2016 standards would be five percent more efficient than non-residential buildings built to the previous standards (CEC 2015). The 2019 Title 24 Part 6 Building Energy Efficiency Standards were adopted by CEC on May 9, 2018 and will take effect on January 1, 2020. CEC estimates that the combination of mandatory on-site renewable energy and prescriptively-required energy efficiency features will result in new residential construction that uses 53 percent less energy than the 2016 standards. Nonresidential buildings are anticipated to reduce energy consumption by 30 percent compared to the 2016 standards primarily through prescriptive requirements for high-efficiency lighting (CEC 2018).

Forecasts of future building energy accounts for the 2019 Title 24 Building Energy Efficiency Standards. It is assumed that all new construction taking place between 2020 and 2050 would be 53 percent more energy efficient for residential buildings and 30 percent more energy efficient for non-residential buildings.

WATER AND WASTEWATER

Between 2013 and 2030, water- and wastewater-related emissions from the City would decrease by 5 percent from 7,177 to 6,8077MTCO₂e per year, with legislative adjustments and considering population growth of 34 percent over the same time. This change reflects an increase in water consumption and wastewater generation with lower electricity factors related to the 2020 and 2030 RPS targets, consistent with SB 100 legislative actions described above, as well as a 20 percent water efficiency reduction, consistent with SBX7-7. **Table A-8** summarizes the legislative reductions used to forecast water and wastewater emissions.

Table A-8: Water and Wastewater Forecast Methods and Legislative Reductions by Source

Activity	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Water Consumption	Scaled by population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020 and 2030 RPS schedule. Assumes 20 percent reduction in water-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.
Wastewater Treatment	Scaled by population growth.	Assumes electricity use for pumping, conveyance, and treatment follow the 2020 and 2030 RPS schedule. Assumes 20 percent reduction in wastewater-related energy due to 20 percent reduction in water usage per requirements of SBX7-7.

Notes: RPS = Renewable Portfolio Standard; SMUD = Sacramento Municipal Utility District.
Source: Ascent Environmental 2017.

Table A-9 shows the baseline and legislative-adjusted BAU forecasted emissions from water- and wastewater-related sources for 2013, 2020, 2030, and 2050.

Table A-9: Water and Wastewater Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050)
(MTCO_{2e}/year)

Activity	2013	2020	2030	2050
Water-Related	2,898	2,421	1,891	N/A
Wastewater Treatment	4,279	4,251	5,059	6,620
Total Water and Wastewater Emissions	7,177	6,672	6,807	6,620

Notes: Totals may not add due to rounding. MTCO_{2e} = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

SOLID WASTE

Between 2013 and 2030, solid waste emissions generated from the City would increase by 50 percent from 26,260 to 38,037 MTCO_{2e} per year, with legislative adjustments applied and considering population growth of 34 percent over the same time. **Table A-10** summarizes the legislative reductions used to forecast emissions from the solid waste sector.

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Table A-10: Solid Waste Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Landfill Disposal	Scaled by population growth.	Assumes California's 75 percent waste diversion goal would be achieved by 2020.

Notes: Totals may not add due to rounding. MTCO_{2e} = metric tons of carbon dioxide equivalent.
Source: Ascent Environmental 2017.

The forecasts shown in **Table A-11** below account for the CH₄ and CO₂ emissions from waste decay generated annually. With respect to solid waste generation, the California Department of Resources Recycling and Recovery (CalRecycle) established a target pursuant to AB 341 (Chapter 476, Statutes of 2011) to achieve a statewide waste diversion of 75 percent by 2020, which is equivalent to a disposal rate of 2.7 pounds of waste per resident per day. The City's waste disposal tonnage, disposal rates, and disposal targets are reported to CalRecycle by year. These data show that the City has already achieved a disposal rate in terms of waste per resident that is lower than the target per capita disposal rate in 2013. Emission forecasts for this sector assume the City's disposal rate would remain constant through 2050.

Table A-11: Solid Waste Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050)
(MTCO_{2e}/year)

Source	2013	2020	2030	2050
Municipal Solid Waste	22,570	25,084	30,238	40,337
Alternative Daily Cover	1,150	1,278	1,541	2,055
Landfill	2,540	7,644	6,258	4,195
Total Solid Waste Emissions	26,260	34,006	38,037	46,588

Notes: Totals may not add due to rounding. MTCO_{2e} = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

TRANSPORTATION

On-Road Vehicles

Between 2013 and 2030, GHG emissions from on-road vehicles would increase by approximately 36 percent from 430,340 to 525,344 MTCO_{2e} per year, accounting for an increase in VMT of 94 percent,

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and future vehicle emission factors modeled in the CARB's EMFAC 2014 model. With respect to the legislative adjustments included in this forecast, State and federal policies and associated regulations incorporated in the on-road vehicle sector include the Pavley Clean Car Standards, Advanced Clean Car Standards, and fuel efficiency standards for medium- and heavy-duty vehicles. These policies are already included in EMFAC's emission factor estimates and forecasts. It should be noted that the Low Carbon Fuel Standard was excluded in EMFAC 2014 forecasts because most of the emission benefits originate from upstream fuel production and do not directly reduce emissions in the City's GHG inventory or forecasts. **Table A-12** summarizes the legislative reductions used to forecast on-road vehicle emissions.

Table A-12: On-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Fleet	Scaled by VMT estimates provided by Fehr & Peers.	EMFAC emission factor considerations include ACC, Pavley, and fuel efficiency standards for medium- and heavy-duty vehicles.

Notes: VMT = vehicle miles traveled; EMFAC = California Air Resources Board's Emission Factor model; ACC = Advanced Clean Cars; Pavley = Pavley Clean Car Standards.

Source: Ascent Environmental 2017.

Table A-13 shows the baseline and legislative-adjusted BAU forecasted emissions from on-road vehicles for 2013, 2020, 2030, and 2050.

Table A-13: On-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050)
(MTCO_{2e}/year)

Source	2013	2020	2030	2050
On-Road Vehicles	430,340	542,084	525,344	681,363

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent.

Source: Data compiled by Ascent Environmental in 2017.

Off-Road Vehicles

Between 2013 and 2030, emissions associated with off-road vehicles used in the city would decrease by 81 percent from 93,340 to 15,503 MTCO_{2e} per year, with legislative adjustments applied and considering building permit and dwelling unit growth of 33 percent over the same time. With respect to the legislative adjustments in the off-road vehicle sector, emission factors were used from CARB's

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OFFROAD 2007 model, which incorporates regulatory actions such as reformulated fuels and more stringent emission standards. **Table A-14** summarizes the legislative reductions used to forecast off-road vehicle emissions.

Table A-14: Off-Road Vehicles Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Off-Road Fleet	Construction equipment scaled by building permit growth; landscape equipment scaled by dwelling unit growth.	OFFROAD emission factor considerations include EPA off-road compression-ignition engine standards implementation schedule.

Notes: OFFROAD = CARB's OFFROAD 2007 model; EPA = U.S. Environmental Protection Agency.
Source: Ascent Environmental 2017.

Table A-15 shows the baseline and legislative-adjusted BAU forecasted emissions from the off-road vehicle sector for 2013, 2020, 2030, and 2050.

Table A-15: Off-Road Vehicles Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050)
(MTCO_{2e}/year)

Source	2013	2020	2030	2050
Off-Road Vehicles	93,340	27,329	15,503	20,762

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent.
Source: Data compiled by Ascent Environmental in 2017.

AGRICULTURE

Between 2013 and 2050, emissions associated with the agriculture sector in the City would decrease by 71 percent from 4,250 to 299 MTCO_{2e} per year. Forecasted emissions from the agricultural sector are based on the City's forecasted changes in land use from agricultural to other developed urban uses under the GPU, as well as estimated future agricultural activities that would continue under certain land use designations in the GPU. Agricultural emissions are directly scaled by the anticipated change in acreages, shown in **Table A-16**. **Table A-16** also shows the baseline and legislative-adjusted BAU forecasted emissions from the agricultural sector for 2013, 2020, 2030, and 2050.

Table A-16: Agriculture Legislative-Adjusted Business-As-Usual Emissions Forecasts (2013-2050)
(MTCO_{2e}/year)

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Source	2013	2020	2030	2050
Agricultural Equipment	2,920	2,006	812	214
Livestock	300	8	3	1
Fertilizer	1,030	571	246	84
Total Agricultural Emissions	4,250	2,585	1,061	299
Percent Change from 2013 (%)	0	-29%	-71%	-92%

Notes: MTCO_{2e} = metric tons of carbon dioxide equivalent.

Source: Data compiled by Ascent Environmental in 2017.

Appendix B:

GHG Reduction Measure Assumptions

This appendix outlines the greenhouse gas (GHG) reductions for each measure, along with the methodology and assumptions that contributed to each calculation.

Built Environment (BE)

BE-1. Building Stock: Promote Energy Conservation

Promote energy conservation by residents and businesses in existing structures in close coordination with other agencies and local energy providers, including the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E).

GHG Reductions

- 2020 reductions metric tons carbon dioxide equivalent (MTCO_{2e}): 500
- 2030 reductions (MTCO_{2e}): 790
- 2050 reductions (MTCO_{2e}): 2,500

Target Indicators

- 4 percent of household and business participation in conservation programs and monitoring programs by 2020
- 4 percent household and business participation in these programs by 2030
- 4 percent household and business participation in these programs by 2050

Method: Based on a 2011 Residential Behavior Profile and findings for SMUD identified by ICF, assumed participation rates in outreach programs and in-home monitoring programs calculated for existing households. Energy reductions are based on case studies and SMUD reports on smart-grid efficacy.

Appendix B

Sources

Impact & Persistence Evaluation Report Sacramento Municipal Utility District Home Energy Report Program <http://www.oracle.com/us/industries/utilities/smud-home-energy-rpt-program-3631971.pdf> Additional Performance Summary

- Outreach – reduction per household kilowatt hours (kWh): 89
- Outreach – reduction per household (therms): 4
- Outreach – number of households: 52,783
- Monitoring – reduction per household (kWh): 358
- Monitoring – reduction per household (therms): 17
- Monitoring – number of households participating: 52,783
- Outreach – reduction per business (kWh): 410
- Outreach – reduction per business (therms): 9
- Outreach – number of businesses: 8,710

BE-2. Building Stock: Residential Appliances in Existing Development

Support residential upgrades to more energy-efficient, cost-saving appliances for existing homes, leveraging regional and state resources to target indoor and outdoor appliances and equipment in existing homes.

GHG Reductions

- 2020 reductions (MTCO₂e): 2,660
- 2030 reductions (MTCO₂e): 1,593

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Target Indicators

- Two percent of single-family households' participation in energy-efficient appliance programs by 2030
- Two percent multi-family household participation in energy-efficient appliance programs by 2020
- Five percent single-family household participation in energy efficient appliance programs by 2050
- Five percent multi-family household participation in energy efficient appliance programs by 2050

Method: Calculation assesses impact of appliance upgrades for existing development only. Reductions for each category of appliance upgrades were calculated using single-family and multi-family household electricity from CAPCOA Table BE 4-2 for climate zone 12 and applied to baseline electricity usage per household to render reductions by household. A target utilization rate of 50 percent was applied to all participating households and total reductions to reflect the likelihood that not all appliances, internal to the CAPCOA assumption, will be retrofitted in the participating homes. Solar water heater reductions calculated based on the amount of natural gas offset on average in comparison to conventional water heaters in climate zone 12.

Pool pump savings calculated using the 2010 Residential Appliance Saturation Study, assuming the average amount of electricity used per household on pool pumps. Usage data for PG&E service territory was used; usage data was not available for SMUD territory or climate zone 12 information. As the use is not climate-dependent, usage in PG&E's service territory was used as a proxy. Information provided by the City of Elk Grove was used to calculate the average annual number of pool permits issued since incorporation. This estimate of the number of pools was combined with the target participation rates and the CEC source below for reductions from retrofitting a conventional pump to a variable-speed-drive pool pump.

Sources

Impact & Persistence Evaluation Report Sacramento Municipal Utility District Home Energy Report Program <http://www.oracle.com/us/industries/utilities/smud-home-energy-rpt-program-3631971.pdf>

California Energy Commission. 2007. Draft Residential Swimming Pool Report. http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-DRAFT_REPORT_RESIDENTIAL_SWIMMING_POOL.PDF.

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CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. <http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.

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Additional Performance Summary

- Target single-family household participation rate in energy-efficient appliance program (percentage of all homes): Two percent by 2030, five by 2050
- Target multi-family household participation rate in energy efficient appliance program (percentage of all homes): Two percent by 2030, five by 2050

BE-3. Building Stock: Nonresidential Appliances in Existing Development

Equip businesses in Elk Grove to reduce operational expenses and maximize energy efficiency through the use of energy-efficient and cost-effective indoor and outdoor appliances and equipment.

GHG Reductions

- 2020 reductions (MTCO₂e): 487
- 2030 reductions (MTCO₂e): 291

Target Indicators: Three percent of businesses participating in appliance upgrades by 2030 and five percent by 2050.

Method: Nonresidential electricity and natural gas use was assessed by end-use using the 2007 California Commercial End-Use Survey. Energy savings by end-use function calculated based on case studies. A target utilization rate was applied to reflect the likelihood that not all efficiency measures would take place in participating businesses. Reductions only include savings for end-uses associated with nonresidential appliances. An estimated number of square feet per employee was calculated based on an assumption of 400 square feet per employee. Participation rates were assumed based on regional assessments prepared by SMUD in a 2011 analysis for SMUD.

Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. <http://enduse.lbl.gov/info/LBNL-1096E.pdf>.

Impact & Persistence Evaluation Report, Sacramento Municipal Utility District Home Energy Report Program <http://www.oracle.com/us/industries/utilities/smud-home-energy-rpt-program-3631971.pdf>

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

Appendix B

Itron, Inc. 2007. California Commercial End-Use Survey – Results Page.
<http://capabilities.itron.com/CeusWeb/Chart.aspx.Comi>

Additional Performance Summary

- Number of businesses participating in energy efficiency upgrades: 261 by 2030, 436 by 2050

BE-4. Encourage or Require Green Building Practices in New Construction

Encourage new construction projects to comply with CALGreen Tier 1 standards, including a 15 percent improvement over minimum Title 24 Part 6 Building Energy Efficiency Standards.

For projects that the City determines are not exempt from CEQA (i.e., an environmental document is required) and that qualify for project-level GHG analysis streamlining under CEQA Guidelines Section 15183.5, compliance with CALGreen Tier 1 may be required as a mitigation measure, unless other measures are determined by the City to achieve equivalent GHG reductions such that the CAP remains on track to achieving the overall GHG reduction target. (See Chapter 5, Implementation Measure 2 for additional details).

GHG Reductions

- 2030 reductions (MTCO₂e): 192

Target Indicators

- Three percent participation of new residential development from 2020-2030 to comply with Tier 1 standards
- Five percent participation of new residential development from 2030-2050

Method: This measure focuses on the energy-savings potential for new development in Elk Grove in compliance with CALGreen Tier 1 standards. Assumptions include a 15 percent (residential) and 10 (non-residential) energy efficiency increases above Title 24 Part 6 Building Energy Efficiency Standards. These increases are based on the CALGreen Tier 1 performance metrics established in Section A4.203.1.2.1 (residential) and Section A4.203.1.2 (non-residential) of the 2016 California Green Building Code Standard.

Sources

2016 California Green Building Standards Code Available: https://www.ladbs.org/docs/default-source/publications/code-amendments/2016-calgreen_complete.pdf?sfvrsn=6

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Additional Performance Summary

- Total reduction in residential electricity use (kWh) by **2030**: 853,675
- Total reduction in commercial electricity use (kWh) by **2030**: 360,610
- Total reduction in commercial natural gas use (therms) by **2030**: 7,807
- Participation rate for new construction: three percent by **2030**

BE-5. Building Stock: Decrease Energy Emissions in New Construction

Decrease energy emissions beginning in 2025 for new residential construction. Phase in Zero Net Energy (ZNE) standards by 2030 for new commercial projects.

GHG Reductions

- 2030 reductions (MTCO₂e): 5,804
- 2050 reductions (MTCO₂e): 42,013

Target Indicator

- All new single-unit residential buildings permitted after January 1, 2025 to reduce natural gas emissions by 15 percent from 2022 Title 24 standards.
- All new multi-unit residential buildings permitted after January 1, 2025 to reduce natural gas emissions by 34 percent from 2022 Title 24 standards.
- All new residential development would need to demonstrate a 50 percent reduction in electricity emissions from 2019 levels.
-
- 100 percent participation of new commercial development from 2030-2050 to comply with ZNE standards.

Method: Based on the CEC's 2015 Integrated Energy Policy Report, a ZNE building is defined as "one where the societal value of the amount of energy provided by on-site renewable energy sources is equal to the value of the energy consumed by the building at the level of a single "project". Based on this language, it was assumed for this measure that residential and non-residential construction built under the ZNE standard would produce no GHG emissions and all net energy demand for ZNE buildings would be produced on-site from renewable resources. For new commercial construction, this method was used. For new residential construction, the calculations used to determine the reduction in natural gas use for both single-unit and multi-unit residential buildings is based on the CEC's energy

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savings modeled for the 2022 Title 24 standards as part of the Environmental Impact Report for the code update. As part of the 2022 Title 24 standards, the CEC estimated the improvements between the 2019 and 2022 standards for different building types and climate zones. CEC's modeling shows that, for climate zone 12 (including Elk Grove), single-unit homes use 35 percent less natural gas and 25 percent more electricity under the 2022 standards compared with the 2019 standards. The modeling also shows that multi-unit residential buildings use 16 percent less natural gas and 6 percent more electricity under the 2022 standards compared with the 2019 standards.

Sources

2015 Integrated Energy Policy Report CEC-400-2015-037-CMF. Available:
<http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR->

Additional Performance Summary

- Total reduction in residential electricity use (kWh) by **2030**: 9,000,052, **2050**: No reductions due to 100% renewable energy assumption
- Total reduction in residential natural gas use (therms) by **2030**: 846,233, **2050**: 4,130,139
- Total reduction in commercial natural gas use (therms) by **2050**: 3,763,267
- Total reduction in commercial electricity use (kWh) by **2050**: No reductions due to 100% renewable energy assumption

BE-6. Building Stock: Electrification in New and Existing Residential Development

Encourage and incentivize new residential developments to include all-electrical appliances and HVAC systems in the design of new projects. Support local utilities in implementing residential retrofit programs to help homeowners convert to all electrical appliances and HVAC systems. Explore the feasibility of phasing in minimum standards for all-electric developments.

GHG Reductions

- 2030 reductions (MTCO₂e): 19,259
- 2050 reductions (MTCO₂e): 154,478

Target Indicators

- Two percent of all new residential development to be all-electric by 2020
- 15 percent of existing residential units converted to all-electric homes by 2030

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- 99 percent of existing residential units converted to all-electric homes by 2050
- Ten percent of new residential development to be all-electric by 2030

Method: SMUD’s most recent IRP includes aggressive goals for achieving GHG reductions in their service territory by investing in building electrification for new and existing buildings. From 2020 to 2040, SMUD plans to invest over \$1.5 billion in building electrification and energy efficiency. The IRP SMUD currently administers an incentive program specifically focused on residential electrification, providing financial incentives for homebuilders who participate in the SMUD’s All-Electric Smart Home program. Assumptions regarding building electrification adoption rates for new and existing buildings are based on internal discussions with SMUD staff regarding the IRP and planned investments in the All-Electric Smart Home program.

Sources

SMUD. July 2018. Draft Integrated Resource Plan Scenarios Summary Report. Available: <https://www.smud.org/-/media/Documents/Corporate/About-Us/Board-Meetings-and-Agendas/2018/Aug/Draft-SMUD-IRP-Scenario-Summary-Report.ashx>

Additional Performance Summary

- Total reduction in residential natural gas use (therms) by **2030**: 3,832,581, **2050**: 25,248,055
- Total reduction in commercial natural gas use (therms) by **2030**: 573,321, **2050**: 3,783,917
- Participation rate for existing residential and commercial buildings: thirty percent by **2030**, and 99 percent by **2050**
- Ten percent of new residential development to be all-electric by 2030
- (Note: Electrification of new residential buildings is assumed to continue through 2030. However, due to the implementation of BE-5 between 2020 and 2030 in which a ZNE standard for new development will be adopted and to avoid double counting reductions, it is assumed that electrification of new residential development will take place as part of implementation of BE-5 beyond the date of adoption for the ZNE standard.)

BE-7. Building Stock: Solar Photovoltaics and Solar Water Heating in Residential and Commercial Development

Encourage and require installation of on-site solar photovoltaic (PV) in new single-family and low-rise multi-family developments. Promote installation of on-site PV systems in existing residential and commercial development.

GHG Reductions

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- 2020 reductions (MTCO₂e): 502
- 2030 reductions (MTCO₂e): 2,918

Target Indicators

- Total electricity generation (kWh) from residential solar systems by **2020:** 1,444,960 **2030:** 15,894,560
- Total electricity generation (kWh) from non-residential solar systems by **2020:** 635,253 **2030:** 4,306,354
- Five percent participation rate for installation of PV systems in existing residential development by 2030.
- Five percent participation rate for installation of PV systems in existing and new commercial development by 2030.

(Note: Due to requirements for the installation of PV systems for new residential development as part of the 2019 Title 24 standards beginning in 2020, this measure does not credit additional reductions from PV systems to avoid double counting reductions already accounted for in the legislative-adjusted BAU forecast discussed in Chapter 3)

Method: The number of 2020 households was divided by the City's 2020 residential kWh projection to determine 2020 kWh per household. The number of existing households was subtracted from the 2020 household estimate to identify the number of new households that will be constructed and addressed by this measure. Average annual energy production for residential and commercial solar systems in Elk Grove were calculated using the National Renewable Energy Laboratory's PV Watts Calculator tool. Using this tool, solar exposure and annual potential energy production from solar systems was estimated specific to the Elk Grove area.

Sources

CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. <http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.

National Renewable Energy Laboratory PVWatts Calculator Available:
<http://pvwatts.nrel.gov/pvwatts.php>

Additional Performance Summary

- Total number of single-family homes with new solar systems by **2020:** 235, **2030:** 2,354

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- Total number of businesses with new solar systems by **2020**: 103, **2030**: 598

BE-8. SMUD Greenergy and SolarShares Programs

Encourage participation in SMUD's offsite renewable energy programs (i.e., Greenergy, SolarShares), which allow building renters and owners to opt into cleaner electricity sources.

GHG Reductions

- 2020 reductions (MTCO₂e): 8,652
- 2030 reductions (MTCO₂e): 10,755

Target Indicators

- 10 percent participation in Greenergy by 2020
- 10 percent participation in Greenergy by 2030

Method: SMUD allows customers to opt into the Greenergy program in order to achieve up to a 100 percent renewable energy mix. To ensure that the renewable credit goes toward participating customers, SMUD retains the Renewable Energy Credits for this program. Based on existing Greenergy trends identified by ICF, this measure assumes an existing regional customer participation rate of 9 percent in the SMUD territory and assumes an equivalent participation rate in Elk Grove. City will support up to a 20 percent market penetration for local participation in the Greenergy program by 2030. This measure assumes the incremental benefit for participating customers to exceed the minimum Renewable Portfolio Standard's energy mix assumed in the adjusted forecast. Greenergy provides option for participants to receive either 50 percent or 100 percent renewable energy, depending on the monthly payment. Measure assumes an average 75 percent renewable energy mix to account for participation across both program options.

Sources

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

SMUD. 2010. Greenergy Label. http://www.energy.ca.gov/sb1305/labels/2010_labels/SMUD_PCL.pdf.

SMUD. 2012. Greenergy Program. <https://www.smud.org/en/residential/environment/greenergy/>.

Additional Performance Summary

- Current market penetration for Greenergy: nine percent
- Forecast electricity mix by 2020 – Renewables Portfolio Standard: 33 percent

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- Forecast electricity mix by 2030 – Renewables Portfolio Standard: 60 percent
- Greenergy opt-in option 1: renewable electricity mix: 50 percent
- Greenergy opt-in option 2: renewable electricity mix: 100 percent
- Average Greenergy opt-in renewable electricity mix: 75 percent
- Additional renewable electricity credit in addition to Renewables Portfolio Standard: 42 percent
- Target market penetration for Greenergy in Elk Grove: 10 percent by 2020, 10 percent by 2030
- (Note: SMUD does not currently offer the SolarShare Program but plans to continue offering the program beginning in 2020. To remain conservative and because sufficient information is not available regarding the future SolarShares Program, this measure does not assume any reductions from participation in this program. Any level of participation from Elk Grove residents in the future SolarShares Program would serve as additional GHG reductions to those accounted for in this measure.)

BE-9. Increase City Tree Planting

Plant an average of 700 trees per year with assistance from the Sacramento Tree Foundation or similar foundation.

GHG Reductions

- 2020 reductions (MTCO₂e): 25
- 2030 reductions (MTCO₂e): 273
- 2050 reductions (MTCO₂e): 1,087

Target Indicators

- Planting of 700 trees on average per year through 2050

Method: Carbon sequestration potential for this measure was calculated by multiplying the average carbon sequestration potential of one tree per year by the number of new trees to be planted per year. The total carbon sequestration of new trees planted was then calculated for target indicators years of 2020, 2030, and 2050. Assumptions regarding the carbon sequestration for trees planted is based on rates obtained from the Appendix A of California Emissions Estimator Model (CalEEMod) User Guide and assumes a mix of tree types will be planted as part of the measure.

Sources

Appendix B

California Air Pollution Control Officers Association. 2016. CalEEMod Version 2016.3.1. Appendix A Available: <http://www.caleemod.com/>.

Additional Performance Summary

- Miscellaneous Trees planted by 2050: 30,700
- Average emissions reduction per year per tree (MTCO₂e): 0.0354

Resource Conservation (RC)

RC-1. Waste Reduction

The City shall facilitate recycling, reduction in the amount of waste, and re-use of materials to reduce the amount of solid waste generated in Elk Grove.

GHG Reductions

- 2020 reductions (MTCO₂e): 5,272
- 2030 reductions (MTCO₂e): 6,356
- 2050 reductions (MTCO₂e): 33,914

Target Indicator

- Achieved diversion rate by **2020**: 75 percent, **2030**: 80 percent, **2040**: 85 percent, and **2050**: 95 percent.

Method: In 2013, the City of Elk Grove reported a 75 percent diversion rate for solid waste. This measure calculates the reduction in emissions that will result from achieving an 85 percent diversion rate. Through the enactment of AB 341, CalRecycle is tasked with implementing a plan to achieve a policy goal of 75 percent diversion of the solid waste generated to be source-reduced, recycled or composted by 2020. This will be achieved through statewide improvements to recycling infrastructure, an increase in services for organics, and mandatory recycling requirements for commercial uses.

Sources

CalRecycle. Jurisdiction Profile, <http://www.calrecycle.ca.gov/LGCentral/Datatools/Reports/DivDispRtSum.htm>, accessed January 2018.

Appendix B

CalRecycle (2012). California's New Goal: 75 percent Recycling. <http://www.calrecycle.ca.gov/75percent/Plan.pdf>. Additional Performance Summary

- Business-as-usual tonnage in **2020**: 89,854, **2030**: 108,318, **2050**: 144,496
- Baseline diversion rate: 0.75
- Target diversion rate by 2050: 0.85
- Additional tonnage diverted through measure by 2050: 57,798

RC-2. Reduce Organic Waste

Target reduction of disposal of organic waste, consistent with statewide goals of 50 percent of 2014 levels in 2020 and 75 percent of 2014 levels in 2025, using alternatives such as composting, anaerobic digestion, and biomass energy.

GHG Reductions

- 2030 reductions (MTCO₂e): 6,791
- 2050 reductions (MTCO₂e): 9,713

Target Indicators

- 75 percent reduction in organic waste sent to landfills by 2025.
- 85 percent reduction in organic waste sent to landfills by 2030.

Method: This measure is calculated to assume that 50 percent of residential and commercial food waste and 80 percent of green waste is diverted from landfills by 2030. Additionally, it is assumed that by 2050, 95 percent of residential and commercial food waste and 100 percent of green waste citywide would be diverted from landfills. It is assumed these reductions will be achieved through the introduction of new organic waste disposal programs and infrastructure in the City by the specified target years. Details on measure implementation are included in Chapter 5 of the CAP.

Sources

2017 Commercial Streams Export from CalRecycle Waste Characterization Web Tool Results for Elk Grove Available: <https://www2.calrecycle.ca.gov/WasteCharacterization/>

Additional Performance Summary

- Tons of organic waste to be diverted by **2030**: 16,658, and **2050**: 26,393

Transportation Alternatives and Congestion Management (TACM)

TACM-1. Local Goods

Promote policies, programs, and services that support the local movement of goods in order to reduce the need for travel.

GHG Reductions

- 2030 reductions (MTCO₂e): 2,336
- 2050 reductions (MTCO₂e): 3,312

Target Indicators

- Divert 10 percent of local vehicle miles traveled (VMT) to alternative modes through increased business serving local residents to achieve a 20 percent reduction in VMT by 2020, a 30 percent reduction in VMT by 2030, and a 30 percent reduction in VMT by 2050.

Method: This measure quantifies the benefit of reduced VMT from heavy trucks, based on evidence in a case study. The case study identifies that a 10 percent increase in local production and consumption would result in a 20 percent reduction in local heavy trucking VMT by 2020 and a 30 percent reduction by 2030 and 2050. The measure quantifies the impact on local trucking VMT using VMT and emissions factor data from EMFAC 2014.

Sources

California Air Resources Board EMFAC 2014 Modeling Tool

Leopold Center for Sustainable Agriculture. 2001. Food, Fuel, and Freeways, Table 9 http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf.

Additional Performance Summary

- Annual VMT attributed to trucking/shipping in Elk Grove in 2030: 7,590,944
- Annual VMT attributed to trucking/shipping in Elk Grove in 2050: 12,202,279

TACM-2. Transit-Oriented Development

Support higher-density, compact development along transit by placing high-density, mixed-use sites near transit opportunities.

GHG Reductions

- 2030 reductions (MTCO₂e): 1,984

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- 2050 reductions (MTCO₂e): 2,765

Target Indicators

- 34 percent increase in citywide density by 2030
- 33 percent increase in citywide density by 2020

Method: The performance of this measure is related to the elasticity of increased density and reduced travel associated with increased mixing of land uses. Case studies support a range of reductions for VMT based on increases in density and increases in proximity and convenience to jobs access. CAPCOA identifies a range of VMT reduction potential for increased density of up to 30 percent. To calculate the net increase in density in the City between 2013 and the target years of 2020, 2030, and 2050, this measure uses the metric of population and employee density per acre. Using this metric, the measure assumes a 100 percent increase in density results in a 5 percent reduction for city-wide VMT due to co-location of homes and other uses.

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. (Appendix B). Citing TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures. A resource for local governments to assess emission reductions from greenhouse gas mitigation measures.

Oak Ridge National Laboratory. 2004. Transportation Energy Book. US Department. of Energy <http://cta.ornl.gov/data/index.shtml>.

San Joaquin Valley Air Pollution Control District. 2009. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. CCAP Transportation Emission Guidebook.

California Air Resources Board EMFAC 2014 Modeling Tool

Additional Performance Summary

2030 Performance:

- Percentage increase density from 2005 (citywide): 34 percent
- Percentage decrease in VMT (citywide) for increased density: 2 percent
- Annual citywide decrease in VMT for increased density: 6,447,459

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2050 Performance:

- Percentage increase density from 2005 (citywide): 33 percent
- Percentage decrease in VMT (citywide) for increased density: 2 percent
- Annual citywide decrease in VMT for increased density: 10,188,623

TACM-3. Intracity Transportation Demand Management

The City shall continue to implement strategies and policies that reduce the demand for personal motor vehicle travel for intracity (local) trips.

GHG Reductions

- 2030 reductions (MTCO_{2e}): 16,880
- 2050 reductions (MTCO_{2e}): 29,673

Target Indicators

- Implementation of the City's Transportation Demand Management program to achieve a 10 percent reduction in local road VMT

Methods: The literature supports a 30 percent reduction in overall VMT through the implementation of a local transportation demand management (TDM) program. Assumes only VMT on local roads will be affected by the TDM program. Effectiveness of a TDM program will be incremental, with the full VMT reduction potential being reached by 2050.

Source

- Victoria Transport Policy Institute. 2010. Transportation Management Programs. <http://www.vtpi.org/tdm/tdm42.htm>.

Additional Performance Summary

- Percentage reduction in local road VMT: 5 percent by 2030, and 10 percent by 2050

TACM-4. Pedestrian and Bicycle Travel

Provide for safe and convenient pedestrian and bicycle travel through implementation of the Bicycle, Pedestrian, and Trail Master Plan and increased bicycle parking standards.

GHG Reductions

- 2030 reductions (MTCO_{2e}): 418
- 2050 reductions (MTCO_{2e}): 745

Target Indicators

- Pedestrian design to be integrated into new development

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- Bicycle parking in all new multi-family and nonresidential development

Method: Quantifies the impact of increased bikeways, on-street bike lanes, and bicycle parking on reducing communitywide VMT through the implementation of the City’s Bicycle, Pedestrian, and Trail Master Plan. The CAPCOA guidebook, entitled Quantifying Greenhouse Gas Mitigation Measures, provides estimates for the VMT reductions which can be attributable the implementation of bicycle programs and improvements in bicycle facilities for new development.

Impact of pedestrian facilities is quantified based on findings of the CCAP guidebook, which attributes emissions reductions for a variety of pedestrian measures. Applicable measures include a 0.5 percent reduction for connectivity to transit from improvements in pedestrian facilities, as the increased density and ridership will facilitate improvement in transit frequency. The measure assume that all new VMT is due to increased development within the City, and that development will include the removal of physical barriers between residential and non-residential uses that impede bicycle or pedestrian circulation. CAPCOA also demonstrates that the provision of long-term bike parking at the rate of 1 per unit supports a 0.625 percent reduction in emissions. This measures assumes that VMT reductions will result from both pedestrian and bicycle facility improvements independently through implementation of the City’s Bicycle, Pedestrian, and Trail Master Plan.

Sources

Recommended Guidance for Land Use Emission Reductions Version 3.3 Available: <http://www.airquality.org/LandUseTransportation/Documents/SMAQMD%20Land-Use-Emission-Reductions-FINALv3-3.pdf>

City of Elk Grove Bicycle, Pedestrian, and Trails Master Plan July 2014.

California Air Pollution Control Officers Association (CAPCOA) Quantifying Greenhouse Gas Mitigation Measures. August 2010. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>

Additional Performance Summary

- Construct 10 lane miles of new pedestrian, bicycle or joint ped-bike facilities between 2020 and 2030, per the Bicycle, Pedestrian and Trails Master Plan.
- Construct 20 additional lane miles of new pedestrian, bicycle or joint ped-bike facilities between 2030 and 2050, per the Bicycle, Pedestrian and Trails Master Plan.

TACM-5. Affordable Housing

Continue to promote and require the development of affordable and senior housing in Elk Grove.

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GHG Reductions

- 2030 reductions (MTCO₂e): 2,550
- 2050 reductions (MTCO₂e): 4,790

Target Indicators

- Approximately 2,268 homes below market rate by 2030
- Approximately 3,357 homes below market rate by 2050

Methods: CAPCOA suggests that a 4 percent reduction in vehicle trips can be attributed to each deed-restricted below-market-rate unit. Thus, the total VMT reduction is as follows: The addition of 2,268 new affordable housing units by 2030, accounting for 19 percent of all new dwelling units built by 2030, would result in a VMT reduction of 28,595,217. By 2050, new affordable units would continue to comprise 19 percent of all new units to be developed. Again, assuming a constant percentage of new units would be built over this period, new affordable housing would result in a 1 percent decrease in annual VMT (4 percent * 19 percent).

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act (Appendix B MSG-21).

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures: A resource for local governments to assess emission reductions from greenhouse gas mitigation measures.

Nelson/Nygaard Consulting Associates. 2005. Creating Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS.

Additional Performance Summary

- Percentage decrease in VMT for below-market-rate housing by 2030 and 2050: 1 percent

TACM-6. Limit Vehicle Miles Traveled

Achieve a 15 percent reduction in daily VMT compared to existing conditions (2015) for all new development in the City, consistent with state-mandated VMT reduction targets for land use and transportation projects.

GHG Reductions

- This reduction measure has not been quantified for GHG reductions but may be determined on a project by project basis in the future.

TACM-7. Traffic Calming Measures

Increase the number of streets and intersections that have traffic calming measures.

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GHG Reductions

- 2030 reductions (MTCO₂e): 802
- 2030 reductions (MTCO₂e): 1,335

Target Indicators

- 25 percent of streets and 25 percent of intersections would feature traffic calming measures by 2030.
- 50 percent of streets and 50 percent of intersections include traffic calming measures by 2050.

Methods: CAPCOA states that providing traffic calming measures for residents can encourage trips to be made by walking and biking. By reducing vehicles speeds, pedestrians and bicyclists feel more comfortable along streets, encouraging more trips to be taken by biking and walking. CAPCOA suggest that communities in which 25 percent of intersections include traffic calming results in a reduced VMT by .25 percent. Additionally, communities which have traffic calming measure on 25 percent of roadways can reduce VMT by .25 percent. This measure assume that 25 percent of streets and 25 percent of intersections would feature traffic calming measures by 2020 and 50 percent of intersections and streets by 2050. Based on CAPCOA assumption, this would lead to a combined reduction in annual VMT of .5 percent citywide.

Sources

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures: A resource for local governments to assess emission reductions from greenhouse gas mitigation measures. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>

Additional Performance Summary

- Total VMT reduction by **2030**: 2,605,494
- Total VMT reduction by **2050**: 4,919,890

TACM-8. Tier 4 Final Construction Equipment

Require all construction equipment used in Elk Grove to achieve Environmental Protection Agency (EPA) rated Tier 4 Final diesel engine standards by 2030 and encourage the use of electrified equipment where feasible.

GHG Reductions

- 2030 reductions (MTCO₂e): 644
- 2050 reductions (MTCO₂e): 892

Target Indicators

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- 100 percent of diesel equipment used in construction is EPA-rated Tier 4 Final by 2030.

Methods: On May 11, 2004, the EPA signed the final rule introducing Tier 4 emission standards for construction equipment to be phased in between 2008 and 2015. Alongside reductions in PM and NOx emissions associated with these engine types, the regulation lead to increases in the fuel efficiency of these engines. Based on manufacturing estimates (Caterpillar Inc.), Tier 4 engines result in a 5 percent increase in fuel efficiency and, therefore, a 5 percent decrease in GHG emissions associated with construction equipment. This measure calculates a 5 percent reduction in projected GHG emissions associated with off-road construction equipment beginning in 2030.

Sources

- Empire CAT Tier 4 Emissions Technology Summary Available: http://www.empire-cat.com/Power_Systems/Emissions_Solutions/Tier_4_Technology.aspx

Additional Performance Summary

- Average percent improvement in fuel efficiency with Tier 4 equipment: 5 percent

TACM-9. EV Charging Requirements

Adopt an electric vehicle (EV) charging station ordinance that establishes minimum EV charging standards for all new residential and commercial development. Increase the number of EV charging stations at municipal facilities throughout the City.

GHG Reductions

- 2030 reductions (MTCO₂e): 63
- 2030 reductions (MTCO₂e): 2,737
- 2050 reductions (MTCO₂e): 5,161

Target Indicators

- Installation of EV charging stations at all public facilities and commercial land uses.
- 10 EV charging stations installed in public facilities and commercial land uses by 2020.
- 100 EV charging stations installed in public facilities and commercial land uses by 2030.
- 200 EV charging stations installed in public facilities and commercial land uses by 2050.
- 459 EV charging stations installed in multi-family residential and office land uses by 2030
- 907 EV charging stations installed in multi-family residential and office land uses by 2050

Appendix B

Methods: The increase in EV ownership and use in the City will serve to reduce GHG emissions associated with on-road vehicles as the City continues to grow through 2050. The installation of new EV charging stations will serve to encourage EV adoption rates among City residents and increase convenience for EV owners. This measure assumes 10 new EV charging stations will be installed at public facilities and commercial land uses by 2020, 100 by 2030, and 200 by 2050. The measure also assumes 459 EV charging stations will be installed in multi-family residential and office land uses by 2030 and 907 by 2050. The measure assumes an average of 3 hours per day of charging per EV charger connection for public facilities and commercial land uses, 6 hours per day of charging per EV charger connection for multi-family units, and 4 hours per day of charging per EV charger connection for multi-family unit.

Sources

EV Fuel Economy Estimates:

- <https://www.driveclean.ca.gov/pev/Charging.php>
- <http://www.fueleconomy.gov/feg/download.shtml>

Charging Behavior:

- Idaho National Laboratory. 2015. Plugged In: How Americans Charge Their Electric Vehicles Findings from the largest plug-in electric vehicle infrastructure demonstration in the world. Available: <https://avt.inl.gov/sites/default/files/pdf/arra/PluggedInSummaryReport.pdf>

EV Charging Requirements:

- City of Carlsbad Residential Electric Vehicle Ordinance. Available. <http://www.carlsbadca.gov/services/depts/pw/environment/cap/evres.asp>
- City of Palo Alto EV Requirements. Available https://www.cityofpaloalto.org/gov/depts/utl/residents/sustainablehome/electric_vehicles/ev_chargers_for_homes/installing_an_ev_charger.asp
- CALGreen 2016 Building Standards Code. Available. <http://www.bsc.ca.gov/Home/CALGreen.aspx>

Additional Performance Summary

- Average miles per gallon of vehicles replaced with EVs: 29 in 2020, 42 in 2030 and 2050