BAKERSFIELD
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ASCENT

PUBLIC REVIEW DRAFT

CITY OF BAKERSFIELD

Climate Action Plan

JULY 2023

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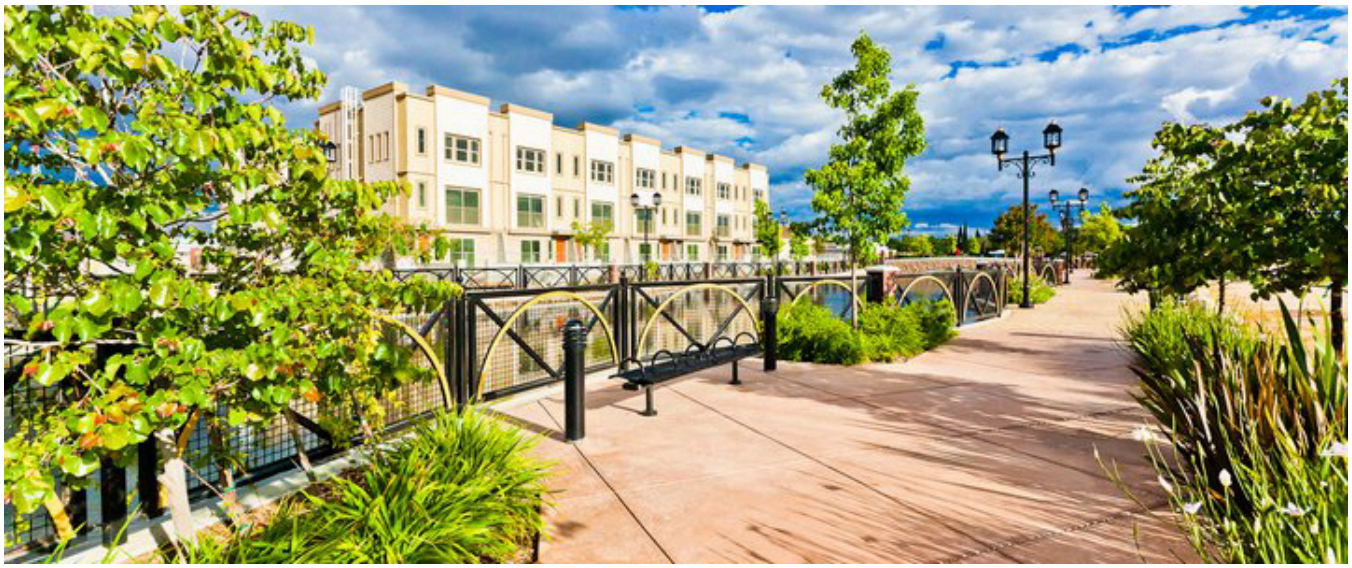
ABBREVIATIONS

°C ..... degrees Celsius
°F ..... degrees Fahrenheit
2008 Scoping Plan ..... *Climate Change Scoping Plan: A Framework for Change*
2017 Scoping Plan ..... *California's 2017 Climate Change Scoping Plan Update*
2022 Scoping Plan ..... California Air Resources Board 2022 *Scoping Plan for Achieving Carbon Neutrality*
AB ..... Assembly Bill
AIM ..... American Innovation and Manufacturing
APG ..... *California Adaptation Planning Guide*
BAU ..... business-as-usual"
BFD ..... Bakersfield Fire Department
CalOES ..... California Governor's Office of Emergency Services
CAP ..... Climate Action Plan
CARB ..... California Air Resources Board
CH_4 ..... methane
City ..... City of Bakersfield
CNRA ..... California Natural Resource Agency
CO_2 ..... carbon dioxide
CO_2e ..... carbon dioxide equivalent
EO ..... Executive Order
EPA ..... US Environmental Protection Agency
FHSZ ..... Fire Hazard Severity Zones
GHG ..... greenhouse gas
GSP ..... Groundwater Sustainability Plan
GWP ..... global warming potential
HFC ..... hydrofluorocarbon
ICLEI ..... ICLEI–Local Governments for Sustainability
IIJA ..... Infrastructure Investment and Jobs Act
IPCC ..... Intergovernmental Panel on Climate Change
IRA ..... Inflation Reduction Act
KRGSA ..... Kern River Groundwater Sustainability Agency
MJHMP ..... Multi-Jurisdiction Hazard Mitigation Plan
$MTCO_2e$ ..... metric tons of CO_2e
N_2O ..... nitrous oxide
NEPA ..... National Environmental Policy Act
OPR ..... California Governor's Office of Planning and Research
RCP ..... Representative Concentration Pathway
RFS ..... Renewable Fuel Standard
RTP ..... 2022 Regional Transportation Plan
SB ..... Senate Bill
UWMP ..... *2020 Urban Water Management Plan, Bakersfield District*
VA ..... Vulnerability Assessment
WUI ..... wildland-urban interface


Executive
Summary

EXECUTIVE SUMMARY

The City of Bakersfield (hereafter referred to as "City") is located at the heart of Kern County, roughly 110 miles north of Los Angele, and serves as the southern gateway to California's Central Valley. The City covers an area of approximately 143 square miles, extending east to the Sequoia National Forest at the base of the Greenhorn Mountain Range, and also located north of the Tehachapi Mountains and to the east of the Temblor Range. The local and regional economy is primarily centered around energy and agriculture, though the City also serves as a hub for healthcare, distribution, and government, among other industries. The City's climate is historically characterized by relatively little precipitation and temperatures ranging from mild to hot, depending on the season. However, in the context of climate change, these conditions are already becoming more extreme (e.g., rising temperatures, changing precipitation patterns) while exacerbating other hazards, such as extreme heat, flooding, drought, and wildfire. The City has a history of successfully addressing difficult challenges, but climate change presents new challenges that threaten the City's populations, built environment, and community functions, among other assets.



While climate change is a global issue, local governments have an essential role in both reducing greenhouse gas (GHG) emissions, the primary driver of climate change, and building community resilience to the adverse impacts of climate change. The City of Bakersfield government understands this and in response to the great challenges that climate change presents, has prepared this Climate Action Plan (CAP)—the City's first. The CAP complements an array of ongoing City and regional efforts that are intended to create a more sustainable City. It is consistent with State climate legislation and regulatory mandates and aligns with the State's and the region's approach to addressing climate change at the local level. Additionally, it is a product of engagement with residents, businesses, local government, and other organizations and stakeholders.

There are two overarching goals of the CAP: (1) to reduce GHG emissions from local activities to achieve GHG emissions reduction targets, and (2) to build community resilience by preparing for and adapting to the impacts of climate change. As part of the CAP development process, four technical memoranda were prepared to inform the climate action strategies presented in the CAP, which are intended to achieve both of the CAP's overarching goals when implemented, but also result in additional environmental, economic, and social "co-benefits" to residents, workers, and visitors. The climate action strategies are organized into eight focus areas: (1) Buildings; (2) Infrastructure; (3) Land Use and Mobility; (4) Materials and Waste; (5) Health and Resiliency; (6) Natural and Urban

Bakersfield's first Climate Action Plan includes eight focus areas: Buildings, Infrastructure, Land Use and Mobility, Materials and Waste, Health and Resiliency, Natural and Urban Landscapes, Green Economy, and Education and Monitoring.

Landscapes; (7) Green Economy; and (8) Education and Monitoring. The strategies presented within each of these focus areas serve as the foundation for reducing GHG emissions in the City and building resilience to climate impacts and are outlined in the "Plan-at-a-Glance" section below.

PLAN-AT-A-GLANCE

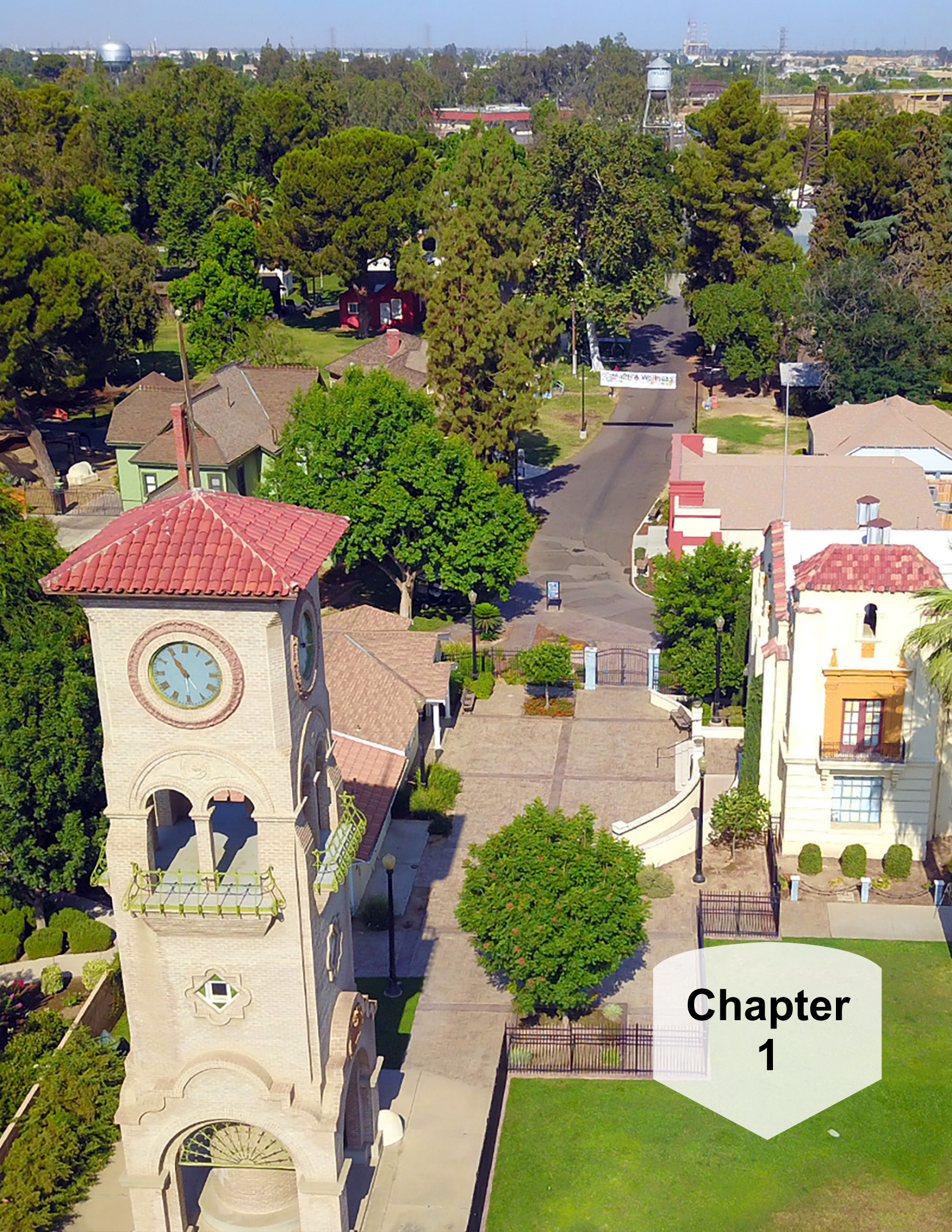
The following table provides a summary of the climate action strategies, along with their associated measures, developed for each of the CAP's eight focus areas. Additional details regarding the strategies and measures are provided in Chapter 5, and specific implementation actions in Chapter 6.

STRATEGY		MEASURE
BUILDINGS		
Clean and Renewable Energy		**Measure BE-1.1:** Decarbonize existing residential and nonresidential buildings.
		Measure BE-1.2: Decarbonize new residential and nonresidential buildings.
Energy Efficiency and Reliability		**Measure BE-2.1:** Improve energy efficiency in existing residential and nonresidential buildings.
		Measure BE-2.2: Reduce plug loads in existing residential and nonresidential buildings.
Resilient Buildings		**Measure BE-3.1:** Improve resilience of residential and nonresidential buildings to natural hazards.
INFRASTRUCTURE		
Clean and Reliable Energy		**Measure IN-1.1:** Transition to 100 percent clean electricity.
		Measure IN-1.2: Increase decentralized clean energy resources.
		Measure IN-1.3: Develop innovative approaches to energy generation, distribution, and storage.
		Measure IN-1.4: Install clean emergency backup generators for critical facilities and essential services.
Low- and Zero-Emission Vehicles		**Measure IN-2.1:** Increase EV charging infrastructure.
		Measure IN-2.2: Increase EV and low-carbon vehicle adoption.
Low- and Zero-Emission Equipment		**Measure IN-3.1:** Increase use of electricity and alternative fuels in construction equipment.
		Measure IN-3.2: Transition to electric-powered landscaping equipment.
		Measure IN-3.3: Transition to electric or alternatively fueled agricultural equipment.
		Measure IN-3.4: Transition to zero-emission or low-carbon irrigation pumps.

STRATEGY		MEASURE
Water Conservation		**Measure IN-4.1:** Reduce water consumption in buildings.
		Measure IN-4.2: Reduce water consumption for irrigation and landscaping.
		Measure IN-4.3: Increase the capture and use of recycled water.
Wastewater		**Measure IN-5.1:** Establish methane recovery in wastewater treatment facilities.
Resilient and Equitable Infrastructure		**Measure IN-6.1:** improve energy sector resilience.
		Measure IN-6.2: Improve water and wastewater sector resilience.
		Measure IN-6.3: Protect vulnerable transportation infrastructure, services, and systems from hazards exacerbated by climate change.
LAND USE AND MOBILITY		
Safe, Accessible, and Reliable Active Transportation		**Measure LU-1.1:** Improve pedestrian and biking infrastructure, prioritizing investments in disadvantaged communities.
		Measure LU-1.2: Improve safety for pedestrians and cyclists.
		Measure LU-1.3: Improve access to bicycling through support services.
Safe, Accessible, and Reliable Transportation		**Measure LU-2.1:** Improve reliability and convenience of transit services through increased frequency, expanded service areas, extended service hours, and better facilities. Prioritize improvements in disadvantaged communities.
		Measure LU-2.2: Identify alternate routes for transit in case of hazard-related closures.
Equitable Shared Mobility		**Measure LU-3.1:** Develop programs and incentives that promote shared mobility in disadvantaged communities and increase access to health services, food, education, and employment.
Sustainable Land Use Planning		**Measure LU-4.1:** Increase residential density near transit, prioritizing affordable housing development.
		Measure LU-4.2: Increase implementation of transportation demand management strategies.
Smart Mobility		**Measure LU-5.1:** Increase smart mobility throughout the City.
Parking		**Measure LU-6.1:** Strategically evaluate the parking needs of the community and consider repurposing underutilized and vacant lots.

STRATEGY		MEASURE
MATERIALS AND WASTE		
Inorganic Waste Management and Reduction		**Measure MW-1.1:** Increase recycling citywide.
		Measure MW-1.2: Reduce the generation of construction and demolition waste.
		Measure MW-1.3: Promote a circular economy.
Organic Waste Management and Reduction		**Measure MW-2.1:** Increase organic waste diversion citywide.
		Measure MW-2.2: Increase edible food recovery.
Zero- and Low-Carbon Development		**Measure MW-3.1:** Increase sustainable materials used in construction.
HEALTH AND RESILIENCY		
Resilient Communities		**Measure HR-1.1:** Establish community resilience hubs.
		Measure HR-1.2: Embed climate resiliency and adaptation across planning efforts.
		Measure HR-1.3: Ensure basic needs are met for vulnerable populations.
		Measure HR-1.4: Support local food production and improve food security.
Education, Outreach, and Coordination		**Measure HR-2.1:** Develop an array of accessible outreach programs that emphasize natural hazard preparedness.
		Measure HR-2.2: Prioritize community-based solutions to improve climate resilience.
Robust Emergency Services		**Measure HR-3.1:** Ensure accessibility and adequate capacity of emergency services.
NATURAL AND URBAN LANDSCAPES		
Expanded Vegetation		**Measure NU-1.1:** Increase urban tree canopy and green spaces to reduce heat island effect and improve air quality.
		Measure NU-1.2: Implement widespread hazard-resistant vegetation.
Local Parks		**Measure NU-2.1:** Make parks more accessible and comfortable for all.
Green Infrastructure		**Measure NU-3.1:** Utilize green infrastructure to reduce the impacts of natural hazards and improve community resiliency.

STRATEGY		MEASURE
GREEN ECONOMY		
High-Road, Green Workforce Development		**Measure GE-1.1:** Develop training programs and pathways to employment in quality green jobs that target workers experiencing barriers to employment.
Green Businesses		**Measure GE-2.1:** Support the development of green businesses and the transition to a clean economy.
EDUCATION AND MONITORING		
Climate Action Education		**Measure EM-1.1:** Increase public awareness of climate-friendly actions that can be taken by residents and businesses.
Climate Action Monitoring		**Measure EM-2.1:** Monitor implementation of cap actions to reduce GHG emissions and enhance resiliency in Bakersfield.



Chapter 1

1 INTRODUCTION

The City of Bakersfield (hereafter referred to as "City") is the 9th most populous city in California with just over 400,000 residents—and is still growing. The City and surrounding area are widely recognized as one of the fastest-growing regions in the state and nation. Located at the heart of Kern County near the southern end of the San Joaquin Valley, the City serves as the southern gateway to California's Central Valley, extending east to the Sequoia National Forest at the base of the Greenhorn Mountain Range and oriented to the north of the Tehachapi Mountains and to the east of the Temblor Range. The local and regional economy has historically been rooted in energy and agriculture, but also currently serves as a hub for other industries. As the City and local economy continue to experience significant growth, and as climate change presents new challenges and exacerbates existing challenges, it presents an opportunity for the City of Bakersfield government (hereafter referred to as "City government") to build a more sustainable future through the development of this Climate Action Plan (CAP).

The CAP serves as a comprehensive roadmap that outlines opportunities to address the risks posed by climate change. The overarching objectives of the CAP are two-fold: (1) to reduce GHG emissions from local activities to achieve GHG reduction targets, in line with State goals for 2030 and beyond; and (2) to build community resilience by preparing for and adapting to the impacts of climate change. The CAP is consistent with and complementary to statewide legislation and regulatory mandates and aligns with the State's and region's approach to addressing climate change at the local level. Ultimately, the CAP establishes locally based strategies, measures, and actions that will serve to achieve its objectives, while simultaneously enhancing the quality of life of residents, workers, and visitors to the City.

1.1 CLIMATE ACTION PLANNING OVERVIEW

As California continues to experience rising average temperatures, increasingly severe storms, and intense drought, it has become evident that the effects of global climate change are already occurring. The impacts of climate change in California vary across the state due to its diverse biophysical setting, climate, and community characteristics. While projections do not show a consensus on the overall trend for annual precipitation in California, they do show increasing variability in precipitation, and even modest changes could have significant effects on the state's ecosystems (OPR, CEC, and CNRA 2018a). At a regional level, the average annual temperature in the San Joaquin Valley is projected to continue to increase steadily over time, and precipitation patterns and events are expected to become increasingly volatile (OPR, CEC, and CNRA 2018b). These changes are anticipated to influence many of the hazards that the City faces, including extreme heat, extreme precipitation and flooding, wildfire, and drought, which can all result in adverse effects on human health and safety, economic prosperity, infrastructure, and provision of public services in the City.

Climate change is a global issue, but local governments play an important role in reducing GHG emissions and preparing for the impacts of climate change in their communities. To help achieve these objectives, public agencies develop climate action plans, which serve as long-term strategic planning frameworks that outline specific strategies, measures, and actions an agency can take to mitigate GHG emissions and strengthen resilience to climate change impacts. Climate action plans also contain specific guidance for governments to effectively implement emissions reduction measures and monitor progress over time. The City is joining hundreds of other communities across the nation through the development and implementation of this CAP to address the challenges associated with climate change.

1.2 PURPOSE AND OBJECTIVES

The City government has developed this CAP to achieve GHG emission reduction targets and minimize contributions to climate change while building resilience to climate change impacts. For climate change mitigation, this involves:

- establishing a baseline inventory of GHG emissions in the City,
- projecting future GHG emissions,
- setting GHG emissions reduction targets, and
- identifying strategies, measures, and actions to reduce GHG emissions.

For climate change adaptation, this involves preparing a vulnerability assessment and adaptation strategies, which consists of:

- evaluating the City's exposure to climate change-related hazards,
- analyzing sensitivity to these hazards and identifying vunerabilities and potential impacts,
- determining the City's existing adaptive capacity to prepare for and adapt to the impacts, and
- developing adaptation strategies to improve community resilience.

Each of these planning processes are illustrated in Figure 1.1 below. The CAP also includes an implementation strategy, which will be key to achieving the City government's goals. As part of CAP implementation, GHG reduction and adaptation efforts will be tracked and monitored over time to ensure the City government is making progress toward achieving its GHG reduction targets and climate resilience objectives. Additionally, the CAP will serve as a living document that will require periodic updates, including reporting on the status of implementation and conducting updates to the GHG emissions inventory, vulnerability assessment, and climate action strategies, as needed. These updates will help ensure that this CAP is being effectively implemented and supporting the City government in addressing climate change.

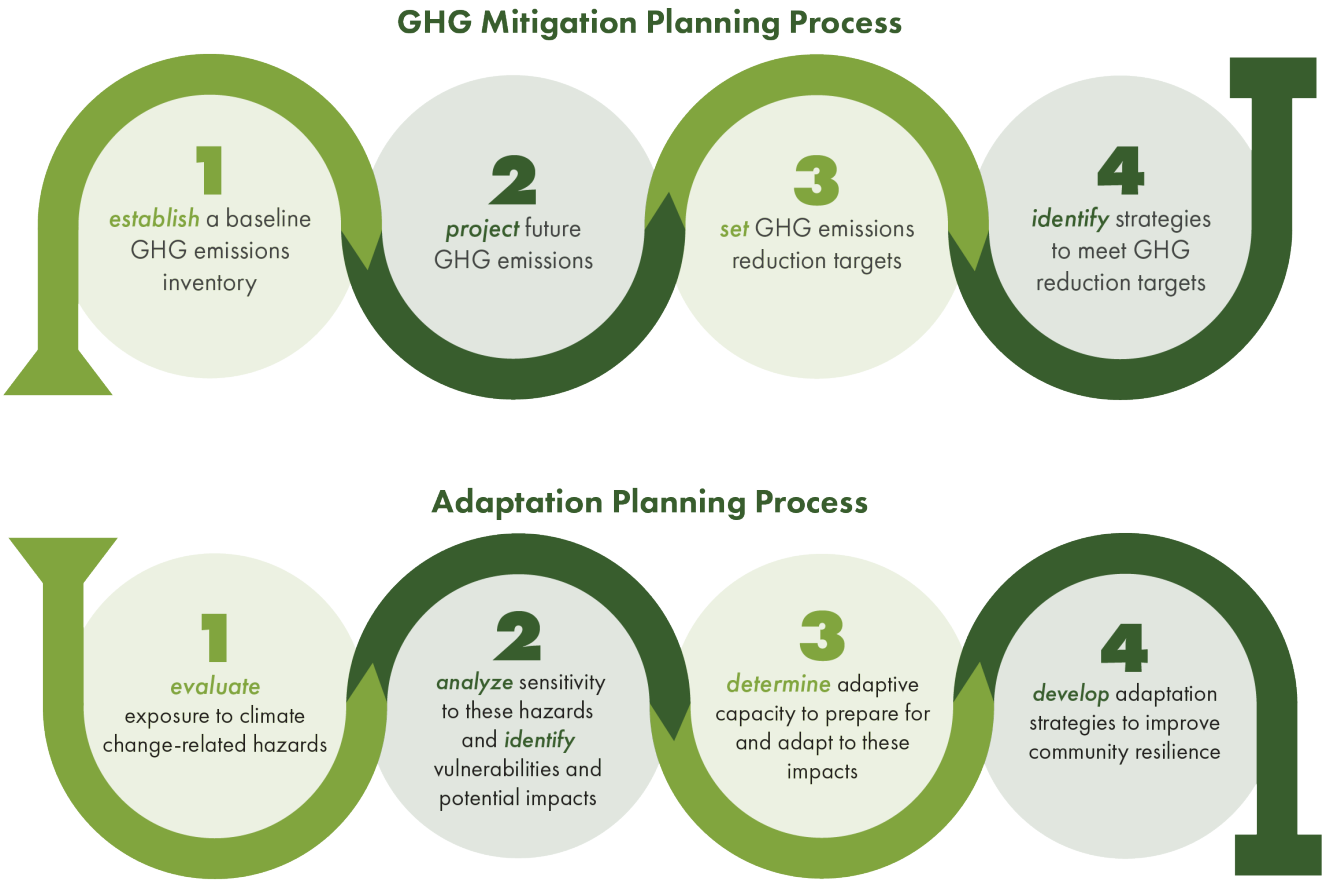


Figure 1.1 Climate Mitigation and Adaptation Planning Processes

Source: Prepared by Ascent in 2023.

1.3 CO-BENEFITS

While the CAP is primarily geared toward reducing GHG emissions and addressing climate change-related vulnerabilities within the City, it will also result in numerous environmental, economic, and social "co-benefits" to residents, workers, and visitors. Co-benefits result from the implementation of CAP actions and are additional valuable outcomes that are not the primary intent of climate change mitigation or adaptation actions, such as improvements to local air quality and water supply, increases in local green jobs and cost savings, and benefits to public health and improved mobility options. For example, in addition to reducing GHG emissions, implementation of measures related to reductions in motor vehicle use and associated fuel combustion will result in fewer toxic air contaminants, leading to better air quality and improved health for everyone.

Co-benefits identified in this CAP include benefits to renters, improved equity, air pollution prevention, benefits to health and well-being, increased reliability of critical infrastructure and services, community prioritization, job development, and resource preservation.

1.4 CLIMATE ACTION PLAN DEVELOPMENT PROCESS

The development of the CAP was driven by the City government's efforts to align the document with the Bakersfield General Plan, a Housing Element update, and a Municipal Services/Sphere of Influence Review so that they all complement each other. The combination of these efforts will create a comprehensive pathway for the City government to accommodate anticipated growth in an economically, environmentally, and socially responsible way. The key climate change initiatives identified and developed for the CAP will be incorporated into the Bakersfield General Plan policy document to ensure consistency. The timeline to develop this CAP is displayed in Figure 1.2 below.

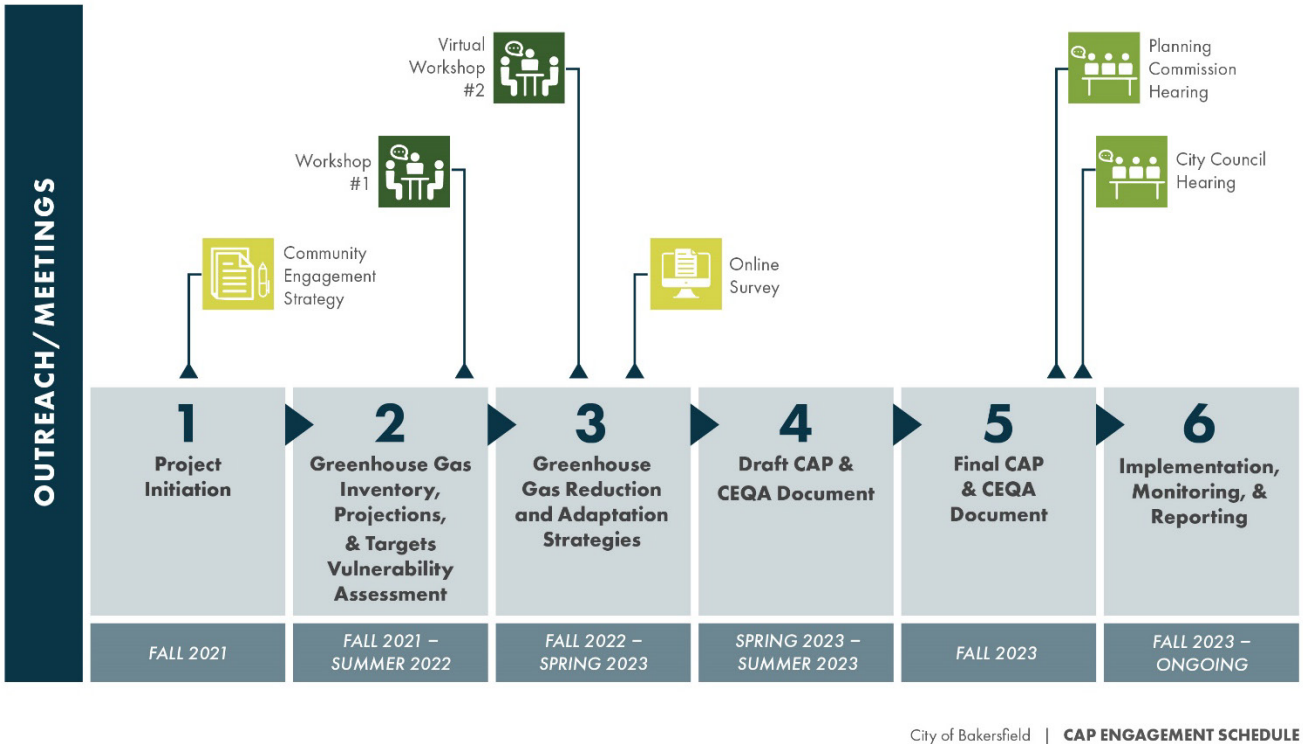


Figure 1.2 Project Timeline

Source: Prepared by Ascent in 2023.

Engagement with City staff, members of the public, government officials, and other stakeholders was conducted throughout the entirety of the project. Outreach and engagement efforts are described in the following section.

1.5 COMMUNITY ENGAGEMENT AND PUBLIC OUTREACH

Local community engagement and participation in climate action efforts is an essential element of the planning and development process. Local action on climate change cannot be achieved solely by one agency; it requires active and ongoing partnerships between residents, businesses, local government, and other organizations and stakeholders. By meaningfully engaging a cross-section of the community, the City government has strengthened its ability to effectively implement local climate change solutions.

The City government hosted a series of public workshops to engage stakeholders, residents, and other interested organizations and individuals. These workshops provided an opportunity for the community to participate in the CAP planning process. The first public workshop discussed key hazards and identified community vulnerabilities and strengths. The second workshop presented the GHG inventory and forecast, the results of the vulnerability assessment, and discussed how to prioritize the GHG emissions reduction and adaptation measures for implementation. At each public workshop, the public provided feedback and comments that were incorporated into the CAP. Additionally, the City government hosted an online forum for individuals to prioritize and comment on each proposed climate action strategy, which was available after the second workshop. Summaries of the two public workshops and the results of the online forum can be found in Appendix C.

1.6 HOW TO READ THIS PLAN

1.6.1 Organization

This CAP is organized into six chapters. This chapter, **Chapter 1**, introduces the City, outlines the context and purpose of the CAP, then describes the development of the CAP and the community outreach conducted. **Chapter 2** discusses the background of climate change science, local climate impacts, and existing legislation and efforts aimed at addressing climate change. The City's GHG emissions inventory, forecast of future emissions in the City, and GHG reduction targets are included in **Chapter 3**. **Chapter 4** presents an overview of the climate adaptation planning process and a summary of the City's climate change vulnerability assessment. Climate action (i.e., GHG emissions reduction and climate adaptation) strategies, measures, and actions are included in **Chapter 5**, organized into eight focus areas: Buildings, Infrastructure, Land Use and Mobility, Materials and Waste, Health and Resilience, Natural and Urban Landscapes, Green Economy, and Education and Monitoring. Lastly, **Chapter 6** provides a framework for implementing and monitoring the CAP and includes guidance for future climate action planning efforts.

1.6.2 Climate Action Framework

The climate action strategies presented in **Chapter 5** focus on GHG emissions reduction and climate adaptation and resilience**.** Strategies serve as the foundation for addressing how GHG emissions can be reduced and resilience can be improved in the City. Within each strategy are one or more measures that represent specific expressions of the broad strategies. Each measure includes actions that define the specific activities, projects, programs, or policies the City can implement or support to reduce GHG emissions and strengthen resilience. The actions identified as the highest priority to be implemented upon CAP adoption are underscored in **Chapter 6**. This framework underscoring the hierarchy of strategies, measures, and actions is presented in **Figure 1.3**.

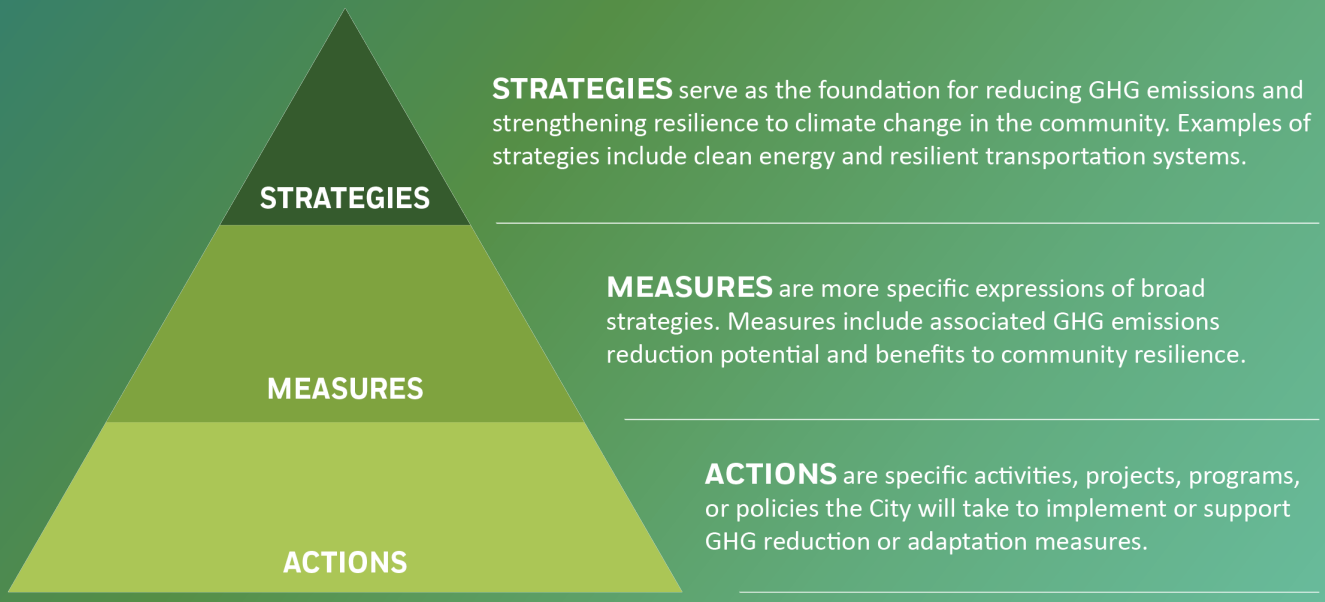


Figure 1.3 Climate Action Framework

Source: Prepared by Ascent in 2023.

Chapter 2

2 BACKGROUND

This chapter provides a background of climate change science and climate-related impacts to the City. The concepts of climate change mitigation and adaptation are explained. Additionally, existing federal, state, and regional regulatory measures to mitigate climate change and adapt to its impacts are outlined.

2.1 CLIMATE CHANGE SCIENCE

The greenhouse effect, illustrated in Figure 2.1, is a natural process that insulates the Earth and helps to regulate its temperature. After absorbing sunlight, the Earth emits heat in the form of infrared radiation. This radiation is then absorbed by naturally occurring atmospheric gases called greenhouse gases (GHGs). These gases, which mainly consist of methane (CH_4), carbon dioxide (CO_2), water vapor, and nitrous oxide (N_2O), all act as effective global insulators by absorbing some of the infrared radiation that is emitted by Earth and re-emitting it back down toward the planet. This process, where some heat is prevented from escaping out of the atmosphere, is what keeps temperatures on Earth conducive to life. Without the greenhouse effect, Earth would not be able to support life as we know it.

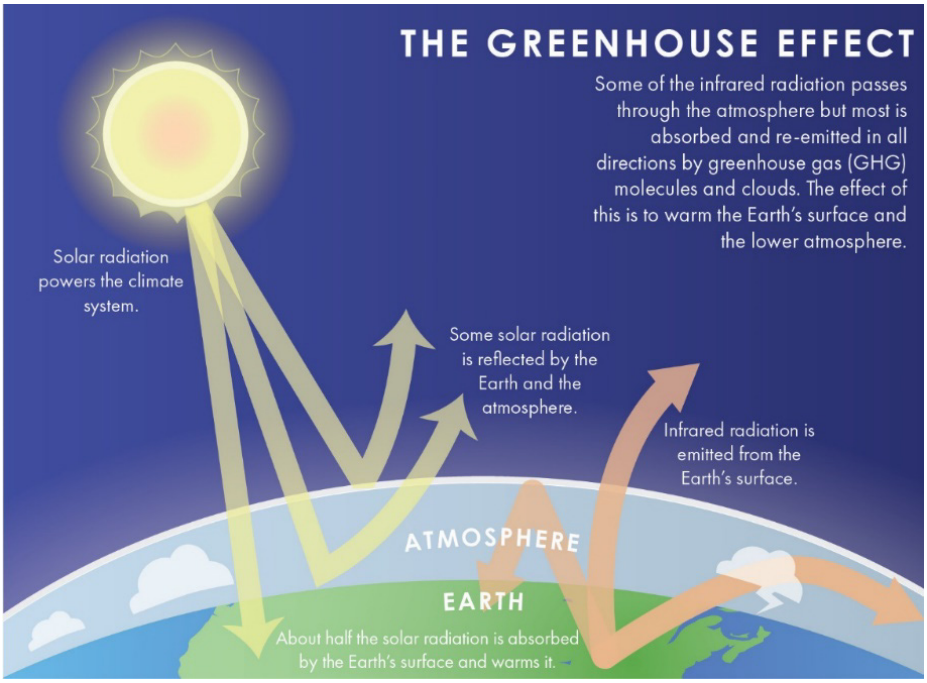


Figure 2.1 The Greenhouse Effect

Source: Prepared by Ascent in 2022.

The combustion of fossil fuels and other anthropogenic (i.e., human-caused) activities since the Industrial Revolution in the 19th century have introduced GHGs into the atmosphere at an increasingly accelerated rate. These significantly elevated levels of GHGs above natural ambient concentrations have intensified the greenhouse effect, causing the Earth to warm at an unprecedented and unnatural rate. This effect, known as climate change, is the driver behind changes in other phenomena, including more extreme weather patterns, rapid melting of the polar ice caps, rising sea levels, and other impacts on biological resources and humans.

There is scientific evidence that observed increases in atmospheric GHG concentrations and the consequential warming of Earth's atmosphere, oceans, and land are linked to human activities and influence. Human activities are estimated to have caused approximately 2 degrees Fahrenheit (°F) of warming across the globe compared to pre-industrial era levels (i.e., before the year 1900), and the global average temperature is expected to increase by up to approximately 8 °F by the end of the century unless additional efforts to reduce GHG emissions are made (IPCC 2021). The GHG emissions that have created this warming—those released between the pre-industrial era and the present—will persist for hundreds to thousands of years and create further long-term impacts to the climate system (IPCC 2018).

2.1.1 Climate Change Mitigation and Adaptation

Addressing climate change requires an integrated approach that targets both the sources of GHG emissions and impacts due to changing climate systems. Efforts that focus on reducing the sources of climate change are commonly known as climate change mitigation or GHG mitigation. The focus of climate change mitigation planning is to reduce communities' generation of GHG emissions and minimize contributions to climate change. Climate adaptation or climate resilience efforts are those that serve to prepare for and reduce harm from existing and future effects of a changing climate. Climate adaptation planning aims to enhance the resilience of communities to climate change impacts through analyzing the climate-related vulnerabilities specific to a jurisdiction and developing strategies to respond to and prepare for impacts. Figure 2.2 illustrates the relationship between these two facets of climate change planning. State law requires communities to address climate change mitigation in local planning and environmental review processes. Climate change adaptation is required to be addressed in local long-range planning processes, such as general plans (CalOES 2020).

Although mitigation and adaptation can often be separate planning efforts, it is important to consider both components within the overall climate action planning process. Many initiatives that focus on climate mitigation and reducing GHG emissions include co-benefits for adaptation, and vice versa. For example, renewable energy installations combined with battery storage systems will reduce reliance on fossil fuel-generated grid electricity and thus reduce GHG emissions and will also improve energy independence and resilience in the face of climate hazards that threaten energy infrastructure. Consequently, this initiative would yield adaptation benefits as well as GHG emissions reductions. Conversely, increasing urban tree canopy will help combat extreme heat events and decrease risks to humans of heat-related illnesses, and will also reduce buildings' cooling demands and thus reduce GHG emissions through energy savings. This dynamic has contributed to the increasingly common approach of combining climate change mitigation and adaptation in the climate action planning process. Recognizing the importance and benefits of this relationship, the City's Climate Action Plan (CAP) focuses on both mitigation and adaptation to address climate change.

Figure 2.2 Relationship between Climate Change Mitigation and Adaptation

Source: CalOES 2020; adapted by Ascent in 2022.

2.2 LOCAL CLIMATE CHANGE IMPACTS

Similar to other jurisdictions across the San Joaquin Valley, Bakersfield is at risk of hazards such as extreme heat, extreme precipitation and flooding, wildfires, and drought – all of which are exacerbated or influenced by climate change in some way. Regarding increased temperatures and extreme heat, average annual temperatures in the City are projected to rise between 5 and 8 °F by the end of the century, depending on the level of future GHG emissions (CEC 2022a). This increase in average annual temperatures correlates to a significant projected increase in the number of extreme heat events (e.g., extreme heat days, heat waves) the City will face, which will be further worsened by the urban heat island effect in areas of the City with dense development, such as downtown. Additionally, though the City does not receive much precipitation, with annual precipitation averaging less than 7 inches per year and future projections showing minimal fluctuation, extreme precipitation events still pose a potentially increasing risk in the City (CEC 2022a). In general, precipitation patterns across the state alternate between extremely dry and extremely wet periods, with both expected to have increased frequency as a result of climate change. This is especially relevant to the City's critical facilities and over 50,000 residents that reside within or near the 100- and 500-year floodplains (County of Kern 2021a).

Wildfires will continue to threaten the City both directly and indirectly because of climate change. Several facilities, such as fire stations and schools, and roughly 79,000 residents are at direct risk of wildfires in the City as they are located within a "Moderate" or "High" Fire Hazard Severity Zone (County of Kern 2021a). Though Kern County, where the City is located, is not expected to see an increase in average annual area burned across all timescales through the end of the century, the state as a whole is expected to see significant increases in average annual area burned (CEC 2022b). Because of that, one of the major wildfire concerns in the City is not wildfires themselves, but rather, wildfire smoke from surrounding regions that settles and remains stagnant within City limits, which can be a severe health hazard and degrade the City's air quality.

Drought is a hazard that is difficult to predict, but recent research suggests that extended drought occurrences could become more pervasive in future decades (CEC 2022c). This is important to note, as the City's water supplies are primarily dependent on groundwater resources and snowmelt runoff from the mountains and can be directly threatened by drought (County of Kern 2021b). The potential impacts from these hazards on the City's populations, built environment, and community functions are significant, which are discussed more in Chapter 4 and Appendix B.

2.3 REGULATORY BACKGROUND

In response to the increase in anthropogenic GHG emissions and the threat of global climate change, federal, State, regional, and local governments and other agencies have already taken several steps to reduce GHG emissions and build resilience to climate change impacts. These efforts, and the legislative background summarized in the following sections, provide important policy direction and context for this CAP.

2.3.1 Federal Climate Legislation

AMERICAN INNOVATION AND MANUFACTURING ACT

The American Innovation and Manufacturing (AIM) Act of 2020 was enacted by the US Environmental Protection Agency (EPA) on December 27, 2020 as part of the Consolidated Appropriations Act 2021 (including coronavirus stimulus and relief). The goal of AIM is to create jobs, drive innovation and economic growth by requiring the reduction of hydrofluorocarbons (HFCs) in phasing down production and consumption, maximizing reclamation, minimizing releases from equipment, and facilitating the transition to next-generation technologies through sector-based restrictions. The goal of AIM is to phase down HFCs by 85 percent in the US by 2036.

EXECUTIVE ORDER ON PROTECTING PUBLIC HEALTH AND THE ENVIRONMENT AND RESTORING SCIENCE TO TACKLE THE CLIMATE CRISIS

On January 20, 2021, President Biden issued Executive Order (EO) 13990 "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis." The order stated the position of the current Administration to listen to science, improve public health, protect the environment, ensure access to clean air and water, limit exposure to dangerous chemicals and pesticides, hold sources of pollution accountable (including those that disproportionately harm communities of color and low-income communities), bolster resilience to the impacts of climate change, restore and expand national treasures and monuments, and prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver on these goals. The order directs all executive departments and agencies to immediately take action to review federal regulations and other actions from the past 4 years that conflict with these national objectives, and immediately commence work to confront the climate crisis.

Following EO 13990, EO 14008 "Tackling the Climate Crisis at Home and Abroad" was signed on January 27, 2021. The purpose of this executive order was to put the climate crisis at the forefront of the nation's foreign policy and national security planning, which included rejoining the Paris Agreement. Both EOs 13990 and 14008 ensure full and fair public involvement in the National Environmental Policy Act (NEPA) processes, provide regulatory certainty to stakeholders, and promote better decision-making consistent with NEPA's statutes.

THE INFRASTRUCTURE INVESTMENT AND JOBS ACT

The Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Act, was passed by Congress on November 15, 2021 to provide a once-in-a-generation bipartisan infrastructure bill. IIJA is the largest long-term investment to rebuild roads, bridges, and railways; expand access to high-speed internet; tackle the climate crisis; advance environmental justice; and invest in underrepresented communities. By investing in transportation and public transit, GHG emissions will be reduced and clean, zero-emission vehicles will be incentivized.

CORPORATE AVERAGE FUEL ECONOMY STANDARDS

On April 1, 2022, the US Department of Transportation updated its Corporate Average Fuel Economy standards to apply to mileage standards for passenger cars and light trucks. The standards apply to model years 2024 and 2026, requiring an industry-wide fuel economy average of approximately 49 miles per gallon for passenger cars and light trucks for model year 2026. The new standards will increase fuel efficiency 8 percent annually for model years 2024 to 2025, and 10 percent for model year 2026.

INFLATION REDUCTION ACT

The Inflation Reduction Act (IRA) was signed into law by President Biden on August 16, 2022. It will address climate pollution by investing in GHG reduction strategies. It will make a historic down payment on deficit reduction to fight inflation, invest in domestic energy production and manufacturing, and reduce carbon emissions by roughly 40 percent below 2005 levels by 2030. It builds on the opportunities passed into law by the IIJA through supporting projects across electric vehicle charging, power infrastructure and climate resilience.

Examples include supporting US manufacturing of solar panels, wind turbines, batteries, and critical materials by expanding production tax credits; providing direct incentives for American families to decarbonize their homes; and establishing the Greenhouse Gas Reduction Fund to support rapid deployment of low- to zero- emission technologies to benefit disadvantaged communities.

RENEWABLE FUEL STANDARD PROGRAM

The Renewable Fuel Standard (RFS) program was created under the Energy Policy Act of 2005 and further expanded by the Energy Independence and Security Act of 2007, which amended the Clean Air Act. On June 3, 2022, the EPA finalized a package of regulatory changes to set biofuel volumes for 2020, 2021, and 2022 to reach the objectives of the RFS. The goals are to increase the amounts of renewable fuels to be blended into transportation fuel in increasing amounts each year. The renewable fuels in the RFS program must emit lower levels of GHGs relative to the petroleum fuel it replaces.

2.3.2 California Climate Legislation

MITIGATION LEGISLATION

- EO S-3-05 was signed in 2005, which directed California to reduce statewide GHG emissions to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050. A year later, the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) was passed, establishing regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions. AB 32 put a cap on GHGs and set a target of reducing statewide emissions to 1990 levels by 2020. In 2008, the California Air Resources Board (CARB) developed the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan) as part of its role in implementing AB 32 and EO S-3-05 (CARB 2008). The 2008 Scoping Plan, along with its update in 2014, described the approach California would take to reduce GHG emissions to achieve reduction targets and goals. In 2016, California achieved the AB 32 target of reducing GHG emissions to 1990 levels, 4 years ahead of schedule, based on its reported statewide 2016 inventory (CARB 2020). The annual statewide GHG inventories for 2017-2020 have shown that the state continues to achieve the AB 32 target.
- In September 2016, Senate Bill (SB) 32 codified into statute the midterm 2030 target of 40 percent below 1990 levels by 2030. In November 2017, CARB published *California's 2017 Climate Change Scoping Plan Update* (2017 Scoping Plan) (CARB 2017), which lays out the framework for achieving the 2030 target as established in SB 32. The 2017 Scoping Plan identifies GHG reductions by emissions sector to achieve a statewide emissions level that is 40 percent below 1990 levels by 2030.
- The California Climate Crisis Act (AB 1279), signed in September 2022, further established the State's GHG emissions reduction targets to 85 percent reduction in anthropogenic emissions below 1990 levels by 2045 and net zero GHG emissions by 2045.
- Pursuant to AB 1279, CARB's 2022 *Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) reports statewide GHG emissions for eight sectors: agriculture, residential and commercial, electric power, high global warming potential gases, industrial, recycling and waste, transportation, and Cap-and-Trade (CARB 2022). The 2022 Scoping Plan reports the 1990 emission levels and ranges of reductions needed to meet the goals of AB 1279.

ADAPTATION LEGISLATION

- In 2009, the State released its first climate adaptation strategy, *Safeguarding California.* The passing of AB 1482 in 2015 required the California Natural Resource Agency (CNRA) to update the State's climate adaptation strategy by July 1, 2017, and every 3 years thereafter. The most recent update of the strategy, now called the *Safeguarding California Plan,* contains implementation measures and specific actions and responsibilities for State agencies to carry out those policies. AB 1482 also required CNRA, in collaboration with the Strategic Growth Council, to oversee and coordinate these State agency adaptation actions.

- SB 246, signed in 2015, directed the California Governor's Office of Planning and Research (OPR) to establish the Integrated Climate Adaptation and Resilience Program. The program has two components: the State Adaptation Clearinghouse and the Technical Advisory Council. The goal of these initiatives is to coordinate regional and local efforts with State climate adaptation strategies to improve resilience to the impacts of climate change across California. This bill also required OPR to review and update, as needed, the *California Adaptation Planning Guide*.
- Also adopted in 2015, SB 379 requires cities and counties within California to integrate climate change vulnerability, adaptation strategies, and emergency response strategies into the safety element of their general plans. The bill requires the preparation of a vulnerability assessment, which must identify the risk from climate change impacts, using federal, state, regional, and local climate vulnerability documentation. Adaptation policies, goals, and objectives are to be developed based on findings from the vulnerability assessment, and jurisdictions are required to create a set of feasible implementation measures to reduce climate change impacts on new or proposed land uses. Lastly, SB 379 states that jurisdictions that have adopted a CAP or climate adaptation plan separate from the general plan may reference that document to comply with SB 379 requirements if that document meets the requirements outlined in the legislation.

2.3.3 Regional Climate Planning Efforts

KERN MULTI-JURISDICTION HAZARD MITIGATION PLAN

Kern County's Office of Emergency Services updated its Multi-Jurisdiction Hazard Mitigation Plan (MJHMP) in 2020. The MJHMP aims to reduce losses resulting from natural disasters by providing hazard mitigation. Hazard mitigation is the use of sustained, long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. The MJHMP is intended to enhance public awareness and understanding, create a decision tool for management, promote compliance with State and federal program requirements, enhance local policies for hazard mitigation, provide inter-jurisdictional coordination of mitigation-related programming, and achieve regulatory compliance. It includes an assessment of risk and vulnerability associated with an array of hazards, including those exacerbated by climate change, such as extreme heat, flooding, wildfire, and drought.

KERN COUNCIL OF GOVERNMENTS 2022 REGIONAL TRANSPORTATION PLAN

The 2022 Regional Transportation Plan (RTP) is a 24-year blueprint that establishes a set of regional transportation goals, policies, and actions intended to guide development of the planned multimodal transportation systems in Kern County by the Kern Council of Governments. The goals of the RTP are mobility, accessibility, reliability, efficiency, livability, sustainability, and equity. Additionally, the RTP includes a Sustainable Communities Strategy, which includes land use planning strategies and policies to reduce GHG emissions to meet targets for the region set by CARB.

Chapter 3

3 GREENHOUSE GAS EMISSIONS INVENTORY, FORECASTS, AND TARGETS

This chapter summarizes an accounting of greenhouse gas (GHG) emissions generated by activities within the City. It presents the City's baseline GHG emissions levels in 2019 and the anticipated increase in emissions if no local actions are taken through the year 2045. Additionally, this chapter establishes targets for reducing GHG emissions consistent with statewide GHG reduction targets and goals for the years 2030, 2040, and 2045.

3.1 WHY PREPARE A GREENHOUSE GAS EMISSIONS INVENTORY?

The first critical step in the overall climate action planning process is to prepare a GHG emissions inventory. To develop and implement a CAP that will effectively reduce GHG emissions, local governments must first have a comprehensive understanding of the emissions that are generated by activities within their jurisdictions. GHG emissions inventories not only serve to provide this knowledge, but they also act as the basis for measuring progress and provide agencies with a framework to track emissions over time and assess the effectiveness of CAP implementation.

The standard GHG emissions inventory used in the climate action planning process, known as a "production-based" inventory, estimates GHG emissions generated within a defined geographic boundary during a single year. It identifies the sources, activities, and sectors that are producing emissions and the relative contributions of each, while also providing a baseline used to forecast emissions trends into the future. The information in the GHG inventory is used to set reduction targets that are consistent with State objectives and then to create solutions for reducing GHG emissions locally through the creation of a climate action plan.

3.2 BASELINE INVENTORY

A greenhouse gas inventory identifies the sources, activites, and sectors that are producing emissions and the relative contributions of each.

The 2019 GHG emissions inventory provides a detailed accounting of the sources and quantities of GHG emissions generated from activities within the City. The GHG inventory was prepared with the ICLEI–Local Governments for Sustainability (ICLEI) protocols for local-scale accounting of emissions. This protocol reflects refinements in the planning process that have resulted from research in the field and shared knowledge from local governments engaged in climate action planning. The most recent guidance for community-scale emissions is ICLEI's *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (Community Protocol), Version 1.2 (ICLEI 2019). State agencies, such as the Governor's Office of Planning and Research and the California Air Resources Board (CARB), recommend that GHG emission inventories are prepared consistent with the guidelines in the Community Protocol.

Three primary GHGs are quantified: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Emissions of these gases are converted to a comparable unit by multiplying each non-CO_2 gas by their global warming potential (GWP), enabling the reporting of emissions in terms of carbon dioxide equivalent (CO_2e). This conversion allows consideration of all gases in comparable terms and makes it easier to communicate how various sources and types of GHG emissions contribute to climate change. Emissions are reported in metric tons of CO_2e ($MTCO_2e$), the standard measurement for the amounts of GHG emissions created and released into the atmosphere. GWP values for CH_4 and N_2O included in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report were used for calculating emissions estimates (IPCC 2021). The 2019 inventory estimates citywide emissions in eight sectors: residential building energy, nonresidential building energy, on-road transportation, off-road vehicles and equipment, solid waste, water supply, wastewater treatment, and agriculture. Table 3.1 describes each GHG emissions sector.

Table 3.1 Greenhouse Gas Emissions Sectors

Emissions Sectors	Description
Residential Building Energy	Residential building energy emissions are associated with the consumption of electricity and onsite combustion of natural gas in homes within the City.
Nonresidential Building Energy	Nonresidential building energy emissions are associated with the consumption of electricity, liquid propane gas, natural gas, and diesel in nonresidential buildings within the City.
On-Road Transportation	On-road transportation emissions are associated with vehicle miles traveled and Kern County-specific emission factors.
Off-Road Vehicles and Equipment	Off-road emissions are associated with gasoline and diesel fuel use in construction, entertainment, industrial, lawn and garden, commercial, oil drilling, and recreation equipment, as well as pleasure craft, railyard operations, transportation refrigeration units, and portable equipment.
Solid Waste	Solid waste emissions are associated with the decomposition of community-generated mixed and organic waste in landfills
Water Supply	Water emissions are associated with the electricity used to supply, convey, treat, and distribute water in the City.
Wastewater Treatment	Wastewater treatment emissions are associated with the combustion of digester gas treatment process(es), population served, biological oxygen demand load, and daily nitrogen load from the City's two centralized wastewater treatment plants.
Agriculture	Agriculture emissions are associated with livestock (i.e., enteric fermentation, manure management), fertilizer application, open burning, and the use of agricultural equipment.

Source: Prepared by Ascent in 2022.

The basic calculation for estimating GHG emissions involves two primary inputs: activity data and emissions factors. Activity data refers to the relevant measurement of a community's activity resulting in emissions, and emissions factors represent the amount of a GHG emitted on a per unit of activity basis. Emissions factors are applied to activity data (i.e., the two values are multiplied) to estimate GHG emissions. An overview of activity data and emissions factors for each emissions sector, along with data sources, is shown in Table 3.2. Additional information on the methodology to calculate the baseline inventory can be found in Appendix A.

Table 3.2 Summary of Activity Data and Emissions Factors

Sector/Source	Input Type	Description and Data Sources
Building Energy		
Electricity	Activity Data	Electricity consumption data from PG&E and SoCalGas
	Emissions Factor	Utility-specific emissions factors from TCR and EPA
Natural Gas	Activity Data	Natural gas consumption data from PG&E and SoCalGas
	Emissions Factor	Average emissions factors from TCR
Backup Generators	Activity Data	Fuel consumption data from SJVAPCD
	Emissions Factor	Average emissions factor from TCR
On-Road Transportation		
On-Road Transportation	Activity Data	VMT data from the Kern Council of Governments Travel Model
	Emissions Factor	Kern County-specific factors from CARB
Off-Road Vehicles and Equipment		
Off-Road Vehicles and Equipment	Activity Data	Wastewater generation and process-related data from the City
	Emissions Factor	Emissions factor based on treatment processes from the City and ICLEI

Sector/Source	Input Type	Description and Data Sources
Solid Waste		
Community-Generated Solid Waste	Activity Data	Waste disposal data from the California Department of Resources Recycling and Recovery
	Emissions Factor	Mixed municipal solid waste emissions factor from EPA
Composting	Activity Data	Composted yard trimmings data from the City
	Emissions Factor	Compost emissions factors from CARB
Water Supply		
Water Supply	Activity Data	Water consumption and associated electricity data from the City's Water Resources Department, California Water Service Company, Greenfield County Water District, and Vaughn Water Company
	Emissions Factor	Electricity emissions factors from PG&E
Wastewater Treatment		
Wastewater Treatment	Activity Data	Wastewater generation and process-related data from the City
	Emissions Factor	Emissions factor based on treatment processes from the City and ICLEI
Agriculture		
Fertilizer Application	Activity Data	California Department of Food and Agriculture 2019 Fertilizer Tonnage Report
	Emissions Factor	Fertilizer emissions factors from CARB
Agricultural Equipment- Off-Road Vehicles and Equipment	Activity Data	Off-road vehicles and equipment activity data and emissions factors from CARB
	Emissions Factor	
Agricultural Equipment- Irrigation Pumps	Activity Data	Diesel- and natural gas-powered irrigation pumps data from the SJVAPCD
	Emissions Factor	Emissions factors from PG&E and TCR
Open Burning	Activity Data	Data provided by SJVAPCD
	Emissions Factor	Emissions factors from the National Wildfire Coordinating Group

Notes: CARB = California Air Resources Board; EPA = US Environmental Protection Agency; ICLEI = ICLEI—Local Government for Sustainability; PG&E = Pacific Gas and Electric Company; SJVAPCD = San Joaquin Valley Air Pollution Control District; SoCalGas = Southern California Gas Company; TCR = The Climate Registry; VMT = vehicle miles traveled.

Source: Prepared by Ascent in 2022.

The 2019 baseline inventory estimated that the community emissions were approximately 2,551,100 $MTCO_2e$ (**Table 3.3**). Emissions from on-road transportation, which included emissions from fossil fuel (e.g., gasoline and diesel) combustion in vehicles, accounted for approximately 63 percent of community emissions. The second-largest sector, residential building energy, contributed approximately 13 percent of community GHG emissions in 2019, and the solid waste sector generated 10 percent of the City's emissions. Nonresidential building energy and off-road vehicles and equipment accounted for 9 percent and 6 percent, respectively, and wastewater treatment contributed 1 percent of the total emissions. Agriculture and water supply each contributed less than 1 percent of the total emissions. The City's GHG emissions by sector in 2019 are displayed in **Figure 3.1** and summarized in **Table 3.3**.

Table 3.3 Greenhouse Gas Emissions Inventory

Sector	GHG emissions ($MTCO_2e$)	Percent of Total
On-Road Transportation	1,597,941	63%
Residential Building Energy	320,315	13%
Solid Waste	244,383	10%
Nonresidential Building Energy	222,659	9%
Off-Road Vehicles and Equipment	141,272	6%
Wastewater Treatment	13,407	1%
Agriculture	7,808	<1%
Water Supply	3,302	<1%
Total	**2,551,089**	**100%**

Notes: Totals may not sum exactly due to independent rounding. $MTCO_2e$ = metric tons of carbon dioxide.

Source: Prepared by Ascent in 2022.

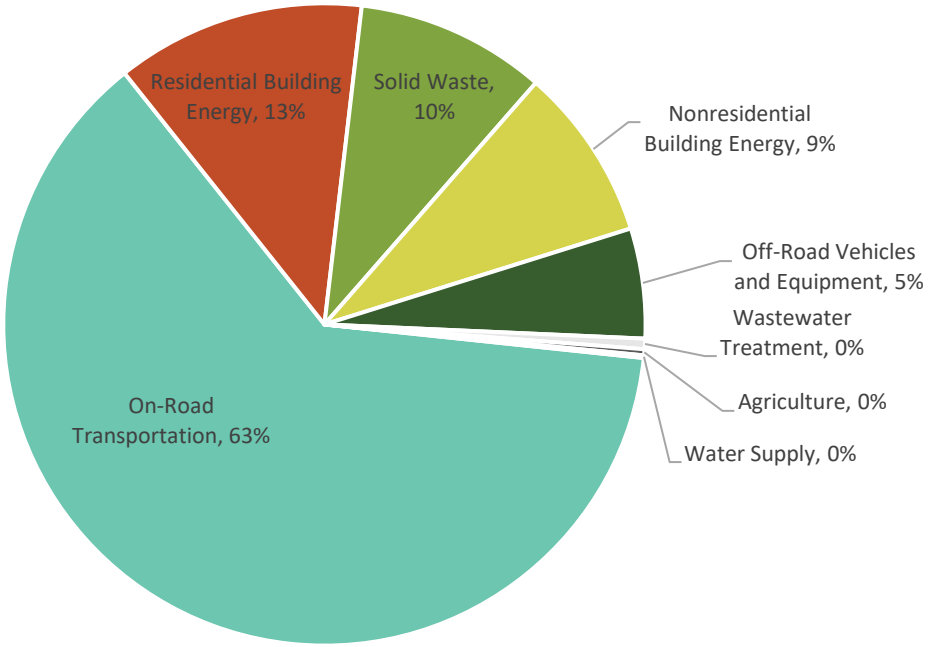


Figure 3.1 2019 Community Greenhouse Gas Emissions Inventory

Source: Prepared by Ascent in 2022.

As shown in **Figure 3.2**, citywide emissions in 2019 of 2,551,089 $MTCO_2e$ are equivalent to combusting 290 million gallons of gasoline, or the total combustion from 550,000 passenger vehicles driving continuously for 1 year. It is also equivalent to 126,000 garbage trucks of waste recycled instead of landfilled and 500,000 homes' electricity use for 1 year (EPA 2021).

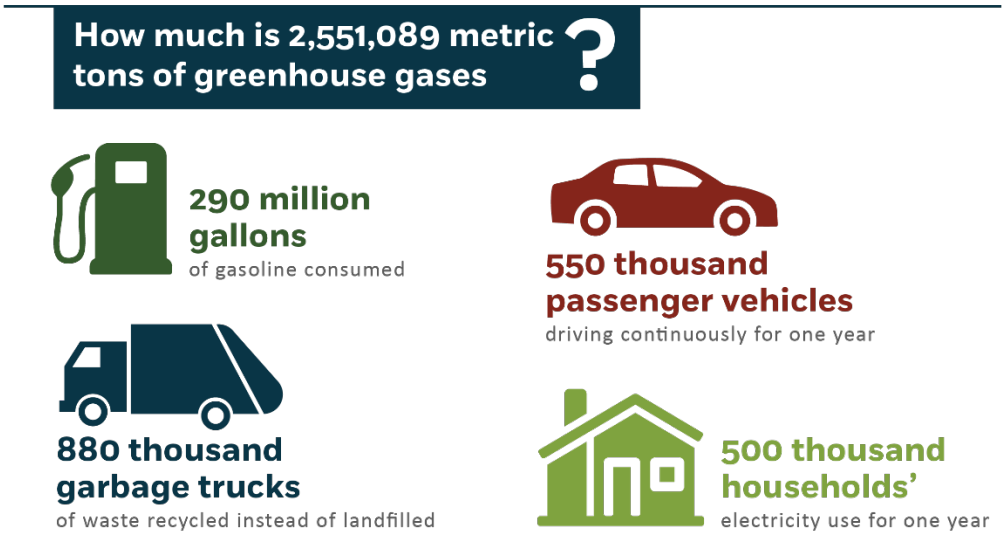


Figure 3.2 2019 Greenhouse Gas Emissions Equivalency

Source: EPA 2021; adapted by Ascent in 2023.

3.3 EMISSIONS FORECASTS

GHG emissions forecasts provide a modeled estimate of future GHG levels based on a continuation of trends in activity, population, and job growth. The forecasts also account for known regulatory actions by State and federal agencies (i.e., "legislative" actions) that are expected to reduce emissions in the future. Emissions forecasts provide insights into the scale of local reductions needed to achieve GHG emissions reduction targets after applying anticipated reductions from regulatory actions.

This CAP includes two forecast scenarios: a "business-as-usual" (BAU) scenario, and a legislative-adjusted BAU scenario. The BAU scenario is based on a variety of scaling factors for each sector (or activities that occur within the sector[s]) in the City and assumes no additional State or federal actions will occur after 2019 (the updated baseline inventory year). In the legislative-adjusted BAU scenario, the BAU forecast is "adjusted" to account for the effects of State and federal laws and regulatory actions on the City's forecasted emissions. The forecasts estimate emissions for the years 2030, 2040, and 2045, which align with the State's GHG reduction target years established in key legislation and policies, including Senate Bill (SB) 32 and Assembly Bill (AB) 1279, as well as an interim target to align with the Bakersfield General Plan horizon year.

3.3.1 Business-As-Usual Forecast

The BAU forecast estimates GHG emissions based on an assessment of how emissions generated by community activities will change over time without federal, State, regional, or local action. The BAU forecast includes population and employment changes in the future. Based on 2019 GHG emissions levels, the BAU forecast estimates annual GHG emissions in the City to increase steadily and rise by approximately 71 percent in 2045 (Figure 3.3). This projected increase in BAU emissions is due to anticipated growth in demographics and vehicle activity within the City, consistent with the growth contemplated in the Bakersfield General Plan.

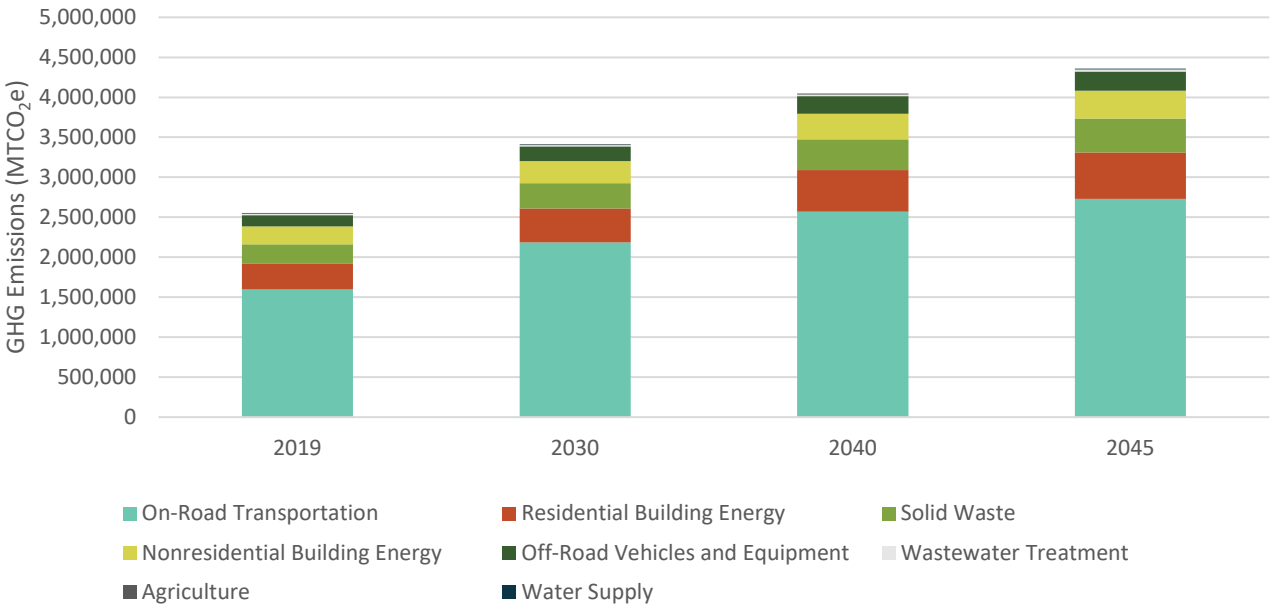


Figure 3.3 Business-as-Usual Greenhouse Gas Emissions Forecasts

Source: Prepared by Ascent in 2022.

3.3.2 Legislative-Adjusted Business-As-Usual Forecast

Legislative-adjusted BAU emissions forecast evaluates how the City's GHG emissions would change over time accounting for legislative actions at the federal and State levels, such as regulatory requirements to increase vehicle fuel efficiency. This forecast provides the City with the information needed to focus efforts on certain emissions sectors and sources that have the most GHG reduction opportunities. A summary of the legislative reductions applied is provided in Table 3.4.

Table 3.4 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
State	Renewable Energy and Zero-Carbon Electricity Requirements (SB 1020 and SB 100)	Requires California energy utilities to procure 60 percent of electricity from eligible renewable and zero-carbon sources by 2030, 90 percent by 2035, 95 percent by 2040, and 100 percent by 2045.	Building Energy
State	California's Building Energy Efficiency Standards (2019 and 2022 Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by CEC. Accounts for the energy efficiency gains in new residential and nonresidential buildings.	Building Energy
State	Advanced Clean Car I Regulations	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Vehicles
State	Advanced Clean Cars II Regulations	Establishes a target for all new passenger cars, trucks, and SUVs sold in California to be 100 percent zero-emission vehicles by 2035.	On-Road Vehicles
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Vehicles
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Vehicles
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles and Equipment

Notes: CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = US Environmental Protection Agency; GHG= greenhouse gas; SB = Senate Bill.

Source: Prepared by Ascent in 2022.

Accounting for the reductions outlined above, the City's forecasted legislative-adjusted emissions are expected to increase by 14 percent in 2030 and 20 percent in 2045 from 2019 levels. **Table 3.5** and **Figure 3.4** below illustrate the anticipated gradual increase in GHG emissions through 2045, and **Figure 3.4** also shows the emissions trend that would occur without legislative reductions (i.e., BAU emissions).

Table 3.5 Legislative-Adjusted Business-as-Usual Greenhouse Gas Emissions Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	1,597,941	1,766,784	1,774,462	1,828,205
Residential Building Energy	320,315	376,457	380,338	356,199
Solid Waste	244,383	317,430	384,852	426,167
Nonresidential Building Energy	222,659	250,489	221,999	182,192
Off-Road Vehicles and Equipment	141,272	179,283	216,530	238,847
Wastewater Treatment	13,407	17,415	21,114	23,380
Agriculture	7,808	5,944	4,542	3,891
Water Supply	3,302	3,555	1,928	0
Total	**2,551,089**	**2,917,356**	**3,005,765**	**3,058,881**
Percent Change from 2019 Levels	—	*14%*	*18%*	*20%*
BAU Emissions (without legislative adjustments)	**2,551,089**	**3,412,360**	**4,046,043**	**4,357,020**

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide.

Source: Prepared by Ascent in 2022.

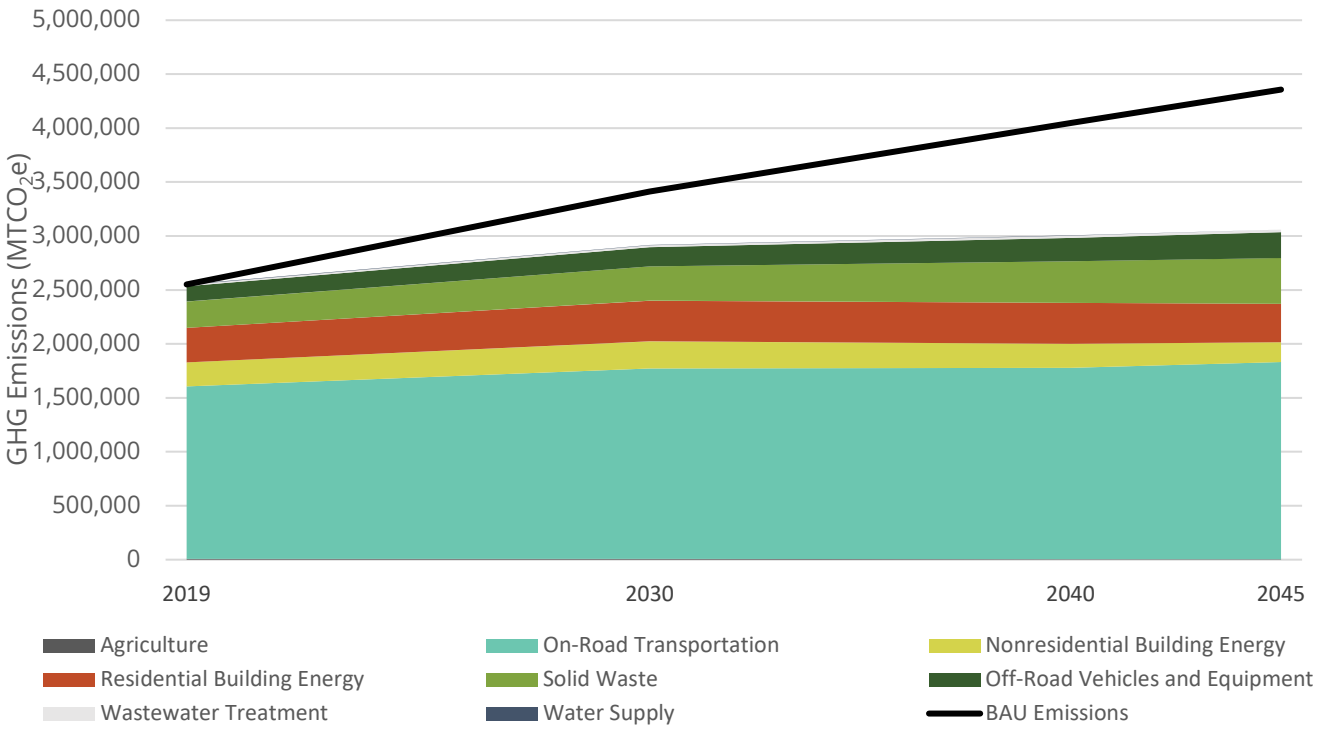


Figure 3.4 Legislative-Adjusted Business-as-Usual Greenhouse Gas Emissions Forecasts

Source: Prepared by Ascent in 2022.

3.4 REDUCTION TARGETS

The emissions reduction targets in this CAP have been established to be consistent with statewide GHG emissions targets. As directed in SB 32 and AB 1279, the State aims to reduce annual GHG emissions to:

- 40 percent below 1990 levels by 2030,
- 85 percent below 1990 levels by 2045, and
- Net zero GHG emissions by 2045.

The State's targets are in line with the scientifically established levels needed to limit the rise in global temperature to no more than 2 degrees Celsius (°C), equivalent to 3.6 degrees Farenheit [°F], the warming threshold at which major climate disruptions, such as mega-droughts, are projected. These targets also pursue efforts to limit the global temperature increase even further to no more than 1.5 °C, equivalent to 2.5 °F (United Nations 2015:3).

The City aims to reduce GHG emissions in proportion to the State's targets and goals. Community emissions levels from 1990 are not available, which is the case for most local jurisdictions in California. Therefore, community GHG reduction targets for the City's CAP were developed relative to the City's emissions in 2019 and established in proportion with statewide reduction for all emissions sectors relevant to the City's jurisdiction, consistent with CARB guidance. Estimating equivalent reductions needed from the 2019 baseline, the City aims to reduce emissions to:

- 27 percent below 2019 levels by 2030,
- 61 percent below 2019 levels by 2040, and
- 79 percent below 2019 levels by 2045.

The City's 2030 target requires GHG emissions to be reduced to 1,872,480 $MTCO_2e$ in 2030. The 2040 target, which the City has set based on the trajectory necessary to meet the 2045 goal, requires that community emissions be reduced to 988,751 $MTCO_2e$ in 2040. In 2045, GHG emissions will need to be reduced to 546,886 $MTCO_2e$. Achievement of the 2045 target will require significant investments at the State level to transform the transportation and energy sectors to low- and zero-carbon, as well as improvements in and deployment of carbon removal technologies.

3.5 LOCAL EMISSIONS GAP

State and federal regulations alone will not be sufficient to achieve the City's GHG emissions reduction targets. The City needs to implement additional actions to close the remaining "local emissions gap" and achieve its reduction targets. Table 3.6 and Figure 3.5 display the City's forecasted emissions, targets, and the local emissions gap.

Table 3.6 Greenhouse Gas Local Emissions Gap ($MTCO_2e$)

Emissions Sector	2019	2030	2040	2045
Business-as-Usual Emissions	2,551,089	3,412,360	4,046,043	4,357,020
Legislative-Adjusted Business-as-Usual Emissions	2,551,089	2,917,356	3,005,765	3,058,881
Target Percent Reduction below 2019 Levels	---	27%	61%	79%
Target Annual Emissions	---	1,872,480	988,751	546,886
Local Emissions Gap	---	1,044,875	2,017,014	2,511,995

Notes: $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Prepared by Ascent in 2022 based on data from CARB 2022.

This CAP is primarily focused on achieving the 2030 target and making substantial progress toward the longer-term post-2030 targets. Achievement of the 2030 target and the 2040 and 2045 targets will require the implementation of locally enacted GHG reduction measures, along with updates to CARB's Scoping Plan and future State and federal actions.

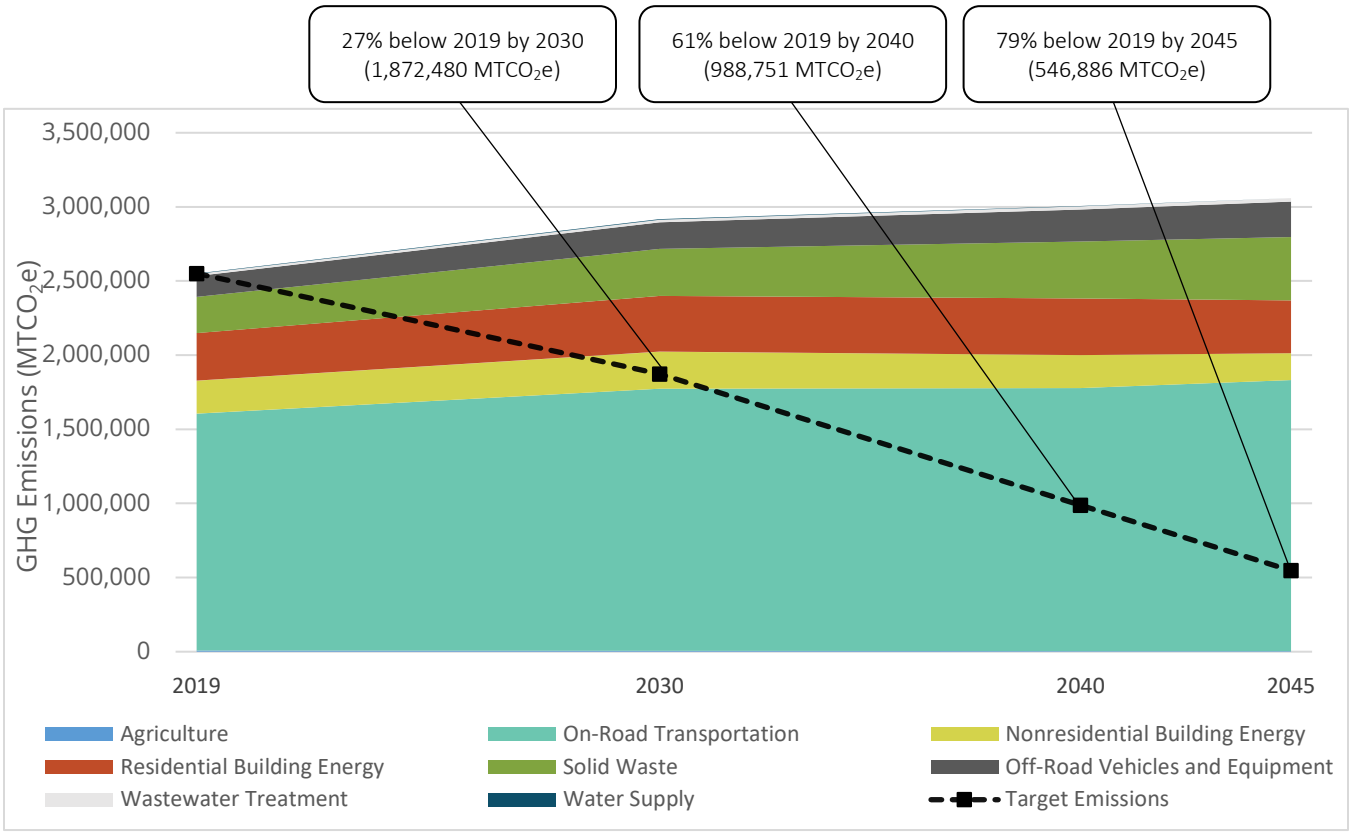


Figure 3.5 Local Emissions Gap

Source: Prepared by Ascent in 2022.

Chapter 4

4 CLIMATE CHANGE ADAPTATION AND RESILIENCE

This chapter describes the context of climate change adaptation and resilience for the City. It outlines the climate change adaptation planning process; summarizes the City's exposure to existing hazards, sensitivity to these hazards and potential climate-related impacts, and existing adaptive capacity to address these impacts; and introduces the next steps to strengthen local climate change resilience. This chapter serves as a summary of the Vulnerability Assessment (VA) conducted by the City government, which was developed in preparation for the Climate Action Plan (CAP). The VA, which includes additional information, data, and methodologies can be found in Appendix B.

4.1 CLIMATE CHANGE ADAPTATION AND RESILIENCE OVERVIEW

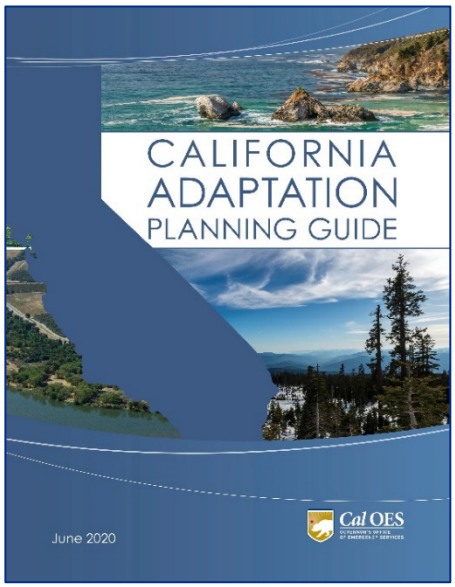
The effects of climate change are already occurring at global, regional, and local scales and will continue to worsen existing hazards in the City. The primary effects of climate change include increased temperatures and changes in precipitation patterns. Alterations to these climate variables are expected to heighten and exacerbate risks posed by secondary climate change effects, including extreme heat events, extreme precipitation and flooding, wildfire, and drought. While these hazards have existed historically in the City and surrounding regions, the frequency and intensity of many of these hazards are projected to increase or change as a result of global climate change. The level of impact from these climate-related hazards will vary across the City and the region due to variations in physical, social, and economic characteristics.

While it remains imperative that global greenhouse gas (GHG) emissions be reduced to combat climate change, it is equally important for communities to prepare for the impacts of climate change and improve resilience through adaptation planning. Regional and local efforts are critical in building climate resilience—the capacity of a community to prepare for disruptions, recover from shocks and stresses, and adapt and grow from a disruptive experience related to climate change—and can lead to a greater understanding of climate risks and strategies to reduce their impacts.

There are many plans, policies, and programs in place already at the local and regional levels that address existing hazards. In some cases, these may be sufficient to address the potential for climate change to worsen existing hazards. In other cases, significant gaps exist, and new policies are needed. This CAP aims to identify and address those gaps.

4.2 ADAPTATION PLANNING PROCESS

The goal of the adaptation planning process is to improve community resilience in the context of climate change. A resilient community is one that is prepared for current and future hazards and experiences minimal harm when they occur. Resilient communities can recover from hazards more quickly and rebuild in a manner that accounts for continued capacity for adapting to climate change. Under Senate Bill (SB) 379, the State requires local governments to proactively plan for adapting to climate change (described further in Chapter 1).



To assist local governments with SB 379 compliance, the California Governor's Office of Emergency Services (CalOES) prepared the *California Adaptation Planning Guide* (APG), which provides communities with vulnerability assessment and adaptation planning guidance. Most recently updated in June 2020, the APG includes a step-by-step process that communities may use to help plan for the impacts of climate change. The APG provides a framework for communities to identify potential

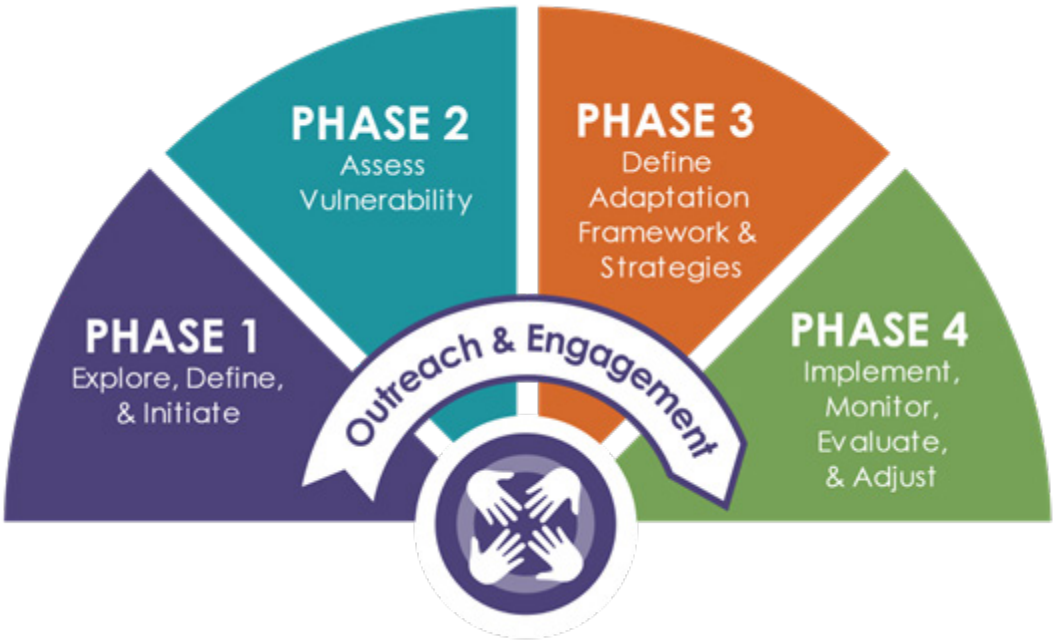
climate change effects and important physical, social, and natural assets; create adaptation strategies to address climate change impacts; and develop a monitoring and implementation framework for climate change adaptation. The APG served as the formal guidance document for preparing the adaptation components of this CAP (CalOES 2020).

This guide includes a four-phase process, illustrated in **Figure 4.1**, which allows communities to assess their specific climate vulnerabilities and provides a menu of strategies for communities to reduce climate-related risks and prepare for current and future impacts of climate change.

- **Phase 1, "Explore, Define, and Initiate,"** includes scoping and defining the adaptation planning effort. This involves identifying key stakeholders, potential climate change effects, and important populations and assets in the community.
- **Phase 2, "Assess Vulnerability,"** includes an analysis of the potential impacts and adaptive capacity associated with climate change hazards to determine the vulnerability of populations and community assets. The vulnerability assessment is composed of four steps: exposure, sensitivity and potential impacts, adaptive capacity, and vulnerability scoring.
- **Phase 3, "Define Adaptation Framework and Strategies,"** focuses on developing adaptation strategies to address the risks posed by climate change hazards based on the results of the vulnerability assessment.
- In **Phase 4, "Implement, Monitor, Evaluate, and Adjust,"** the adaptation framework is implemented, consistently monitored and evaluated, and adjusted based on continual learning, feedback, or triggers.

The following sections provide an overview and summary of the VA, which was used to develop adaptation and resilience strategies for the CAP, presented in **Chapter 5**.

Figure 4.1 Adaptation Planning Process



Source : CalOES 2020; adapted by Ascent in 2022.

4.3 VULNERABILITY ASSESSMENT OVERVIEW

The City's VA provides a comprehensive analysis of community vulnerabilities to climate change. It identifies and characterizes projected climate change effects and associated hazards that are anticipated to impact the community. The VA follows the steps in Phase 2 of the APG and aims to answer the following questions:

- **Exposure:** what climate change effects will the City experience?
- **Sensitivity and Potential Impacts:** what aspects of the community (i.e., populations, built environment, community functions) will be affected? How will climate change affect the points of sensitivity?
- **Adaptive Capacity:** what is currently being done and what ability does the City government have to address the impacts?
- **Vulnerability Scoring:** how vulnerable is the City to each climate change effect?

The VA was conducted consistent with APG guidance using the steps described above. For the exposure analysis, Cal-Adapt, a tool developed by the California Energy Commission and the University of California, Berkeley that uses downscaled global climate model data, was used to assess potential climate change effects that may impact the City over time. The severity of future climate impacts on the City's populations, built environment, and community functions will depend on future global emissions. Two future emissions scenarios, known as Representative Concentration Pathways (RCPs), were used in the VA: the RCP 8.5 scenario, which represents a higher GHG emissions scenario, and the RCP 4.5 scenario, which represents a lower GHG emissions scenario. The geographic boundary of the City was used as the study area for this analysis unless noted otherwise.

In the exposure analysis, primary climate change effects identified and evaluated include increased temperatures and changes in precipitation patterns. The secondary effects, which can occur because of individual changes or a combination of changes in the primary effects, include changes to extreme heat events, wildfire risk, extreme precipitation and flooding, and drought. Climate change effects were evaluated for changes to occur by near-term (Current–2050), midterm (2040–2069), and long-term (2070–2099) timescales.

In addition to Cal-Adapt, several existing resources were reviewed to obtain information about climate-related hazard risks that may threaten the City due to climate change. Information from *California's Fourth Climate Change Assessment* (OPR, CEC, and CNRA 2018a) and the *San Joaquin Valley Region Report* (OPR, CEC, and CNRA 2018b), along with a variety of additional resources (see **Appendix B**), were reviewed to assess the various potential effects climate change could have within the City. The effects identified were consistent with the climate model projections included in the Cal-Adapt tool.

4.4 VULNERABILITY ASSESSMENT SUMMARY

The VA was prepared to help the City government understand which climate vulnerabilities in the community are most urgent and necessary to be prioritized during the adaptation strategy development process. The results were also used to prioritize strategy implementation. The full VA, including detailed data, additional information, and references, can be found in **Appendix B**.

4.4.1 Exposure, Sensitivity, and Impacts

The following sections summarize the projected exposures and associated sensitivities of and impacts to the City's populations, built environment, and community functions. Populations include residents, visitors, and segments of the population that are particularly vulnerable to climate change impacts, such as children, pregnant people, the elderly, communities of color, low-income individuals, individuals with access or functional needs, individuals with preexisting health issues, individuals experiencing homelessness, and outdoor workers, among others. The built environment consists of a set of assets that are essential to the health and welfare of residents and visitors and are especially important during and proceeding climate-related hazard events. This includes residential and commercial buildings; critical facilities (e.g., City Hall, hospitals and medical facilities, fire stations, libraries, schools); transportation infrastructure (e.g., roadways, bridges, railroads); and utility infrastructure (i.e., energy, communications, water and wastewater). Community functions are the resources, assets, operations, economic sectors, and services that are created or influenced by the interaction between populations and the built environment, are essential to public health and welfare, and allow day-to-day activities to continue in the City and the region. The priority community functions that have been identified include transportation and mobility;

essential services (e.g., grocery stores); emergency services (e.g., hospitals, first responders); energy delivery and other utility operations (e.g., communications); agriculture; and recreation.

INCREASED TEMPERATURES AND EXTREME HEAT

Average annual maximum temperature in the City is projected to rise between 4.8 and 7.8 °F by the end of the century depending on future GHG emissions, with average annual minimum temperature following a similar trend (CEC 2022a). Increased temperatures, a primary climate change effect, will lead to increases in extreme heat events, a secondary climate change effect. Extreme heat events refer to the number of extreme heat days, heat waves, and the number of days in the longest stretch of consecutive extreme heat days, which are all projected to increase substantially through the end of the century. For the City, an extreme heat day is defined as a day when the maximum temperature is above the extreme heat threshold of 106.6 °F, which is notably high compared to other regions of the state. Heat waves refer to a period of four or more consecutive extreme heat days (CEC 2022b). Table 4.1 displays historic data and future projections for increased temperatures and extreme heat in the City across each timescale through the end of the century.

Extreme heat temperature thresholds are unique to any location. Bakersfield's threshold is 106.6 °F, which means that 98% of daily maximum temperatures in the City between the months of April and October from 1961 to 1990 were below this temperature.

Table 4.1 Changes in Average Annual Temperature and Extreme Heat in Bakersfield

Annual Averages	Historic (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Average Annual Temperature					
Maximum Temperature (°F)	78.4	81.4	83.5	83.2	86.2
Minimum Temperature (°F)	53.7	56.1	57.8	57.5	60.8
Extreme Heat Events					
Number of Extreme Heat Days[2]	4.2	16.8	26.8	25.4	46.8
Number of Heat Waves[3]	0.3	2.1	4.1	3.7	8.4
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.3	6.4	9.7	8.4	18.0

Notes: °F = degrees Fahrenheit; RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

[2] The threshold for an extreme heat day in Bakersfield is 106.6 °F.

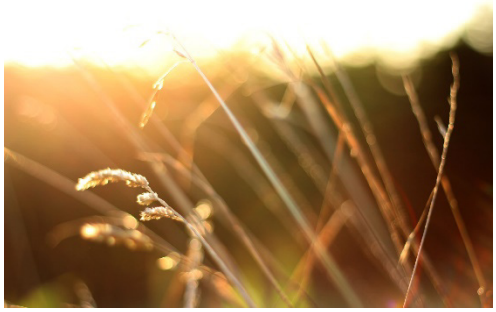
[3] A heat wave is characterized as a period of sustained extreme heat and is defined by Cal-Adapt as four or more consecutive extreme heat days.

Source: CEC 2022a; 2022b.

Increased temperatures and extreme heat are one of the main health concerns in the City and across the San Joaquin Valley. An increase in extreme heat events can increase the frequency and severity of heat-related illnesses, including heat cramps, heat exhaustion, and heat stroke. Certain vulnerable populations are especially at risk from heat-related illnesses. For example, elderly persons, children, those taking certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to adverse reactions during heat waves (County of Kern 2021a). Additionally, those with little to no access to air conditioning or cooling facilities during times of extreme heat may disproportionately feel the impacts of increased temperatures and extreme heat, including individuals with access and functional needs, socially isolated individuals, individuals experiencing homelessness, and low-income individuals (OPR, CEC, and CNRA 2018b). Outdoor workers, which make up a significant portion of the City's labor force, are also especially vulnerable to extreme heat. Further, aside from extreme heat itself, higher temperatures will also likely lead to further degradation of the City's air quality, which

can negatively impact the health of populations within the City, especially those with chronic underlying health conditions (Cal EPA and CDPH 2013).

Regarding the City's built environment, increased temperatures and extreme heat will put additional stress on buildings and other infrastructure. Buildings will primarily be affected through changes in energy use, where the City is projected to see a substantial increase in cooling demand proportionate to the projected increase in temperatures and extreme heat events. The increased use of air conditioning during the summertime is a risk to electricity reliability, and the potential loss of energy to homes and critical facilities during heat waves has major public health and safety implications. The performance of transportation infrastructure may begin to decline as the severity of extreme heat exceeds historical ranges, including the deformation and buckling of paved roads and rail tracks, and the cracking and crushing of bridge roadway decks. This will also lead to increased maintenance costs (Transportation Research Board and National Research Council 2008).



Several of the City's community functions are vulnerable to increased temperatures and extreme heat. The agricultural sector in the City and surrounding region is threatened as higher temperatures decrease photosynthesis, increase evapotranspiration rates, and change environmental conditions such as pollination, pest spread, and other crop stressors. These impacts will likely increase water demand for crop irrigation and ultimately lead to a decline in crop yields and crop profitability, as well as increased consumer costs (OPR, CEC, and CNRA 2018b). Further, extreme heat has a history of causing power outages in the City and around the state. According to Pacific Gas and Electric Company, increased temperatures can cause extensive equipment-related damage resulting in an increase in the frequency and duration of power outages (Cox 2021a). Power outages and extreme heat can lead to adverse effects on an array of other community functions, including essential and emergency services.

EXTREME PRECIPITATION AND FLOODING

Similar to extreme heat thresholds, extreme precipitation thresholds are unique to every location. Bakersfield's threshold is 0.5 inches of precipitation over a 2-day period.

The historic average annual precipitation in the City is 6.9 inches. As shown in Table 4.2, the average annual precipitation in the City is projected to minimally fluctuate through the end of the century (CEC 2022a). Similarly, the average annual number of extreme precipitation events is projected to minimally fluctuate through the end of the century, where the threshold for an extreme precipitation event in the City is 0.5 inches over a 2-day period (CEC 2022c). While average annual precipitation and the number of extreme precipitation events in the City are projected to fluctuate only slightly in future years, a key point to be made is that precipitation patterns are expected to become more volatile, with potentially less frequent but more intense storms and above-average amounts of precipitation. Precipitation patterns in California also oscillate between extremely dry and wet periods, and in the next several decades dry years are likely to become even drier with increased frequency, while wet years will likely become even wetter with increased frequency (OPR, CEC, and CNRA 2018b). Like other California regions, the high year-to-year variability of precipitation in the City is severely affected by the meteorological phenomenon known as an atmospheric river, which accumulates moisture from tropical regions in the Pacific and moves water vapor toward California (OPR, CEC, and CNRA 2018b). In California, atmospheric rivers vary in intensity; some are beneficial for water supply and replenish snowpack that naturally melts during the summer, serving as the water supply for people and agriculture, while others are responsible for destructive floods and landslides (NOAA 2021). As a result of more volatility and variability in precipitation, the City may experience an increase in the frequency and intensity of flood events, though the exact frequency, intensity, and duration of these events will vary annually.

Changes in the magnitude and frequency of flood events may adversely affect populations in the City through both direct impacts and several secondary hazards. A notable portion of the City's existing communities lie within or directly adjacent to the 100-year and 500-year floodplains. In total, almost 30,000 residents live within or near the

boundaries of the 100-year floodplain, and an additional 23,400 residents live within or near the 500-year floodplain (County of Kern 2021b). State Route 99, a major highway in the City, and many local roadways are susceptible to flood impacts and may become impassable during flood events, disrupting evacuation or emergency response routes. Limited routes, combined with potential damage to transportation and communication infrastructure, increase the risk associated with flooding and have the potential to result in injuries and loss of life. Stagnant flood pools can become breeding grounds for vector-borne diseases, and buildings that have experienced inundation may produce mold and mildew, which can impact all populations, and is most likely to cause acute respiratory illness in children and the elderly. Vulnerable population groups will likely face disproportionate negative impacts associated with flooding, largely due to inadequate basic infrastructure (e.g., sidewalks, storm drains) or other conditions (e.g., access and functional needs, homelessness) (OPR, CEC, and CNRA 2018b).

Table 4.2 Changes in Average Annual Precipitation and Extreme Precipitation in Bakersfield

Annual Averages	Historic (1961-1990)	Near-Term[1] (Current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Average Annual Precipitation					
Average Annual Precipitation (inches)	6.9	7.2	6.5	6.7	7.2
Extreme Precipitation					
Average Annual Number of Extreme Precipitation Events[2]	1.5	1.4	1.3	1.3	1.8

Note: RCP = Representative Concentration Pathway.

[1] Projections for the near-term and midterm timescales are based on RCP 8.5.

[2] The threshold for an extreme precipitation event in Bakersfield is 0.5 inches over a 2-day period.

Source: CEC 2022a; 2022c.

There is a broad array of assets in the City's built environment that are at risk during extreme precipitation or flooding events, including the City's residential and commercial buildings, critical facilities, and transportation and utility infrastructure. There are four high potential loss facilities within the 100-year floodplain, including two healthcare facilities, one home care organization, and one dam, and there are 21 transportation and lifeline assets within the 100-year floodplain, including 11 bridges and 10 transmission line towers (County of Kern 2021b). Most notably, the City's water and sewer systems can be severely affected by these events. Floodwaters can back up stormwater drainage systems, causing localized flooding where pooling of water can cause significant damage to buildings. Floodwaters can also infiltrate drinking water supplies, causing contamination. Sewer systems can be backed up, causing wastewater to spill into homes, neighborhoods, and local water bodies (County of Kern 2021a). Transportation assets can be severely and adversely impacted by heavy precipitation in a variety of ways, including inundation and flooding, landslides, washouts, or structural damage (Caltrans 2018). Additionally, energy infrastructure (e.g., natural gas distribution infrastructure) within the City is also vulnerable to flooding, as these events can result in fractures, corrosion, and loss of structural integrity due to erosion and scouring.

Aside from direct damage to buildings, infrastructure, and other resources and assets, extreme precipitation and flood events may impact the local and regional economy through losses in agricultural products. Flooding can result in unwanted submergence and/or excessive soil saturation of cropland, impacts that can inhibit the ability to revive affected agricultural operations once floodwaters recede (CDFA 2013). Flooding may have economic impacts on businesses and public agency budgets in other ways. Increased direct and indirect costs associated with flood mitigation services, clean-up operations, and maintenance and replacement of damaged structures and infrastructure

could put considerable strain on local and regional government budgets. If floods cause sustained closures of major roadways, in addition to limited transportation and mobility, there is an array of community functions that may have limited access, including access to essential services (e.g., grocery stores). Additionally, recreation destinations and activities could be limited. The potential for floods to damage roads creates considerable risk to emergency services. The need for emergency response may be required during or immediately after a significant flooding event, and this response could be inhibited by damaged roads. However, these impacts can also persist, especially if funding for maintenance and repair is limited. This risk may be exacerbated if floods result in electric power outages or other impacts to energy resources.

WILDFIRE RISK

Primary climate change effects, including increased temperatures and changes to precipitation patterns, will exacerbate many of the factors that contribute to wildfire risk across the state. Future variability in precipitation may lead to wetter winters and increased vegetative growth in the spring, and longer and hotter summer periods will lead to the drying of vegetative growth and ultimately result in a greater amount of fuel for wildfires. This has already been seen across the state in recent years, with the area burned by wildfires increasing in parallel with rising air temperatures (OEHHA 2018). These factors, combined with intense wind conditions, cause fires to spread rapidly and irregularly, making it difficult to predict fires' paths and effectively deploy fire suppression forces. Relative humidity is also an important fire-related weather factor; as humidity levels drop, the dry air causes vegetation moisture levels to decrease, which consequently increases the likelihood that plant material will ignite and burn. With an increase in hotter and drier landscapes, humidity levels may continue to drop and result in higher fuel levels, increasing the risk of wildfire (Schwartz et al. 2015).

Wildfire behavior is largely determined by three factors: topography, fuel (e.g., vegetation), and weather.

Table 4.3 displays historic data along with future projections of the average annual area burned by wildfire in Kern County and California. As shown, the state is projected to see an increase in the average annual area burned across all timescales, unlike Kern County, which sees a projected increase of over 400 hectares burned annually through 2050 from its historic baseline, but a decrease in the midterm and long-term timescales. These decreases may be due to several reasons including increased development, especially within the City itself. Despite the projected decrease across these timescales and the fact that the City is primarily urban/suburban with dense development, wildfire still poses a risk for several reasons. First, the near-term projected increase in the average annual area burned in Kern County should not be overlooked, and Fire Hazard Severity Zones (FHSZs), or areas of significant fire hazards, will still exist within City boundaries, regardless of future projections. Additionally, wildfires that burn in surrounding areas and regions, which are projected to consistently increase through the end of the century, can cause indirect impacts in the City.

Table 4.3 Changes in Average Annual Burned in Kern County and California

Annual Averages	Modeled[1] Historic (1961-1990)	Near-Term[2] (Current-2050)	Midterm[2] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5	RCP 8.5
Kern County					
Average Annual Area Burned (hectares)	7,065	7,488	6,637	6,696	6,230
California					
Average Annual Area Burned (hectares)	171,072	212,183	249,933	241,279	302,903

Note: RCP = Representative Concentration Pathway.

[1] Observed historical average annual area burned data were not available from Cal-Adapt; the modeled historical average annual area burned data under RCP 4.5 was available and used as proxy data.

[2] Projections for the near-term and midterm timescales are based on RCP 8.5.

Source: CEC 2022d.

Although wildfire risk within the City's urban environment may be less than in more rural areas in Kern County, populations within the City still face significant potential impacts from wildfire. There are approximately 79,000 residents that live within "Moderate" and "High" FHSZs in the City, particularly in wildland-urban interface (WUI) areas (County of Kern 2021b). Wildfires pose a particularly severe and direct threat to individuals that live or work in these areas. Aside from the direct risks of wildfires on populations, wildfires also have indirect risks. Smoke from wildfires, whether they are burning within City limits, Kern County, or surrounding regions, is perhaps the most significant wildfire-related concern for the City's populations. In general, smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, such as people with asthma or other respiratory and cardiovascular diseases. Public health impacts associated with wildfire include difficulty in breathing, odor, reduction in visibility, and lung irritations, as well as more serious impacts such as asthma attacks, bronchitis, and premature death (CLSCEQ 2015). Strong winds can spread smoke plumes over large distances, bringing smoke from wildfires in the surrounding mountains into more densely populated areas, such as downtown. The effect wildfire smoke has on air quality in the City is cumulative in areas of the City that already experience comparatively poor air quality. Wildfires can also result in Public Safety Power Shutoff (PSPS) events to minimize wildfire risk, which can result in communities without grid electricity for multiple days and prevent vulnerable populations from using prescribed medications and treatments that rely on electricity or refrigeration. For wildfires resulting in evacuations, specific populations, such as linguistically isolated households, elderly residents, and individuals with disabilities or those experiencing homelessness, are particularly vulnerable. Some impacts affecting these populations include the inability to access, receive, or understand warning messages and evacuation notices and limited ability to evacuate due to lack of mobility.

In addition to impacts on populations, wildfires pose risks to the City's built environment. Within the City's FHSZs, there are four essential facilities at direct risk of wildfire, including two fire stations, one sheriff facility, and one emergency operations center. Additionally, there are 79 high-potential loss facilities, including 29 special needs facilities, 15 childcare centers, 12 schools, and seven adult care facilities (County of Kern 2021b). In the areas in and around the City that are forested, wildfires can lead to road overwashing and damage to culverts due to post-fire debris flows and landslides (OPR, CEC, and CNRA 2018b). Additionally, wildfires threaten transportation infrastructure, along with energy generation and transmission infrastructure, and have the capacity to damage facilities, contribute to unforeseen maintenance costs, and reduce transmission line efficiency. Water delivery infrastructure, such as open water convergence ditches, flumes, tanks, ponds, reservoirs, and pumping facilities also face risk from wildfires.

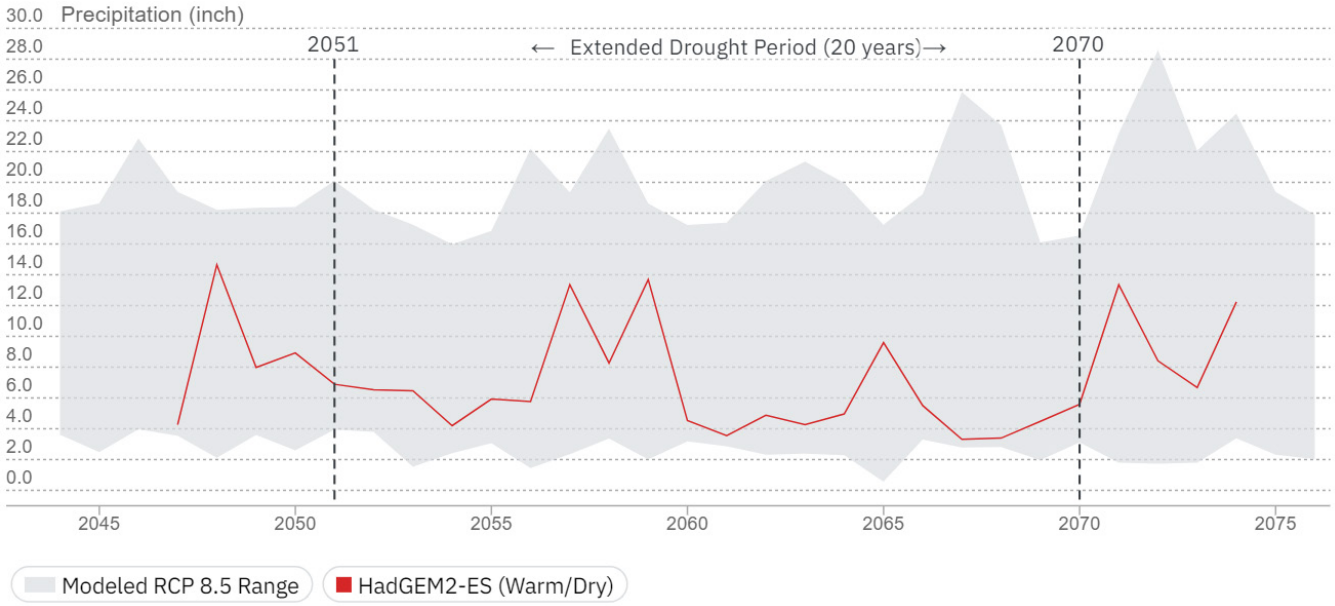
Wildfires in and around the City can cause direct economic losses in the reduction of harvestable timber and indirect economic losses in reduced tourism and commerce (County of Kern 2021a). Wildfires can also diminish the available energy resources within the City, as smoke plumes can cast shade on solar arrays, decreasing their electric generation capabilities (OPR, CEC, and CNRA 2018b). Urban water supplies are threatened if wildfires burn within vital watersheds. Forests that have been burned by wildfires have a reduced ability to retain rainfall and chemicals such as nitrate, dissolved organic carbon, and certain metals. Subsequent precipitation events can trigger erosion and wash these unwanted chemicals, in addition to general ash and debris, into streams. These contaminants take time and resources to clean out from water supply reserves (OPR, CEC, and CNRA 2018b). Damages to transportation infrastructure caused by wildfires, with reduced visibility from wildfire smoke, lead to a disruption in normal transportation networks and accessibility. Congestion that starts during a mass evacuation can lead to additional traffic management problems, which is expected to result in delays to emergency response, evacuation, and logistical support and can isolate residents. PSPS events triggered by conditions favorable for wildfire ignition and spread would have adverse impacts on certain community functions that are widely needed, most notably energy delivery and communications.

DROUGHT AND WATER SUPPLY

Bakersfield's water supplies are primarily dependent on groundwater resources and snowmelt runoff from the surrounding mountains.

The City and state have a highly variable climate that is susceptible to prolonged periods of drought, and recent research suggests that extended drought occurrences (a "mega-drought") could become more pervasive in future decades (CEC 2022e). Under a modeled drought scenario between 2051 and 2070, Kern County's average annual precipitation would fall to 6.3 inches, a roughly 33 percent decrease from its observed historical average, as shown in **Figure 4.2**. The county as whole, rather than the City, was selected for this climate change effect because drought typically is not hyper-localized; it affects areas at broad spatial scales. It should be noted that the actual occurrence and duration of droughts are difficult to predict, but Kern County, inclusive of the City, is predicted to experience extended drought periods like this due to climate change. Because the City's water supplies are primarily dependent on groundwater resources and snowmelt runoff from the mountains, the City is very likely to experience water supply issues in the future as a result of drought, and the probability of future drought occurring in the City and surrounding areas is nearly certain (County of Kern 2021a).

Figure 4.2 Projected Average Annual Precipitation in Bakersfield During an Extended Drought Scenario between 2051 and 2070



Source: CEC 2022e.

All populations and communities are sensitive to drought and related water supply issues. However, water shortages and drought-related vulnerabilities are more likely to affect disadvantaged populations that may not have access to financial or other resources that would enable them to cope with associated impacts. For example, drinking water wells in vulnerable communities are highly threatened by deepening water tables and degraded quality as droughts increase in frequency and intensity. The 2012 to 2016 drought left hundreds of wells across the San Joaquin Valley dry and others with excessively high nitrate and arsenic levels, and these impacts are likely to become more common in the future (OPR, CEC, and CNRA 2018b). Groundwater wells that are most threatened are disproportionately in Latino communities where residents are the most vulnerable to water insecurity. While this may be more relevant in other areas of the San Joaquin Valley, it is still important to note for the City. In addition to the impacts of drought on water supply, dry and dusty conditions associated with drought in the City can lead to infectious diseases and vector-borne diseases like Coccidioidomycosis, also known as Valley Fever. Valley Fever is most prevalent in the San Joaquin Valley region of California (OPR, CEC, and CNRA 2018b). Droughts can also degrade air quality through several means, including increased wind erosion and increased

wildfire risk in surrounding areas causing smoke to settle in the City (County of Kern 2021a). Poor air quality can lead to numerous health problems, especially for vulnerable populations.

While increasingly frequent and prolonged droughts directly threaten residents of the City, the built environment will not experience substantial direct impacts associated with this climate-related hazard. However, these conditions have the potential to cause secondary impacts. Heavy precipitation during drought conditions can cause intense flooding, debris flows, landslides, and mudslides, which pose risks to the City's built environment. Additionally, the City's infrastructure, including roads and railways, may be dramatically affected by groundwater over-extraction during times of drought, and canals can lose their capacity due to land subsidence. Levees protecting floodplains, cities, and farmlands will become more unstable due to prolonged droughts that promote water filtration through the soil, soil cracking, erosion, and land subsidence (OPR, CEC, and CNRA 2018b). Increased risk of wildfire stemming from drought especially threatens any structures in WUI areas (County of Kern 2021a).

Drought has intensified the issue of water distribution in the City and made it increasingly more complex. When it comes to the natural environment and recreation, one of the City's most prominent resources is the Kern River. However, the Kern River near the heart of the City has been depleted over the years, largely because of drought and the diversion of water to irrigate local farmlands (Lee 2021). The dry riverbed also exacerbates other issues, such as poor air quality. Having flowing water and riparian trees and vegetation would improve the historically poor air quality in the area, but drought conditions have contributed to challenges in fostering this type of environment locally. Dwindling water supplies stemming from drought also threaten the future of the San Joaquin Valley agricultural industry, which employs a large number of the City's residents. Changes in groundwater regulations may lead to a decrease in cultivated areas and the need to transition to less water-intensive crops (OPR, CEC, and CNRA 2018b). Crop yields may be significantly and adversely impacted during times of drought, especially when coupled with extreme heat, which can lead to greater food prices in the City and across the region. Drought and extreme heat can also worsen algal blooms in reservoirs used to store urban water supplies. Less water in times of drought means there will be less water to dilute algal toxins, which increases the need for water treatment before it is suitable for human use and could lead to water reliability challenges (OPR, CEC, and CNRA 2018b).

SUMMARY OF SENSITIVITY AND POTENTIAL IMPACTS

Based on guidance from the APG, potential impacts from each climate change effect are rated on a qualitative scale of Low, Medium, and High. A description of each qualitative rating for potential impacts is provided in Table 4.4.

Table 4.4 Potential Impact Scoring

Score	Potential Impact Scoring Description
Low	Impact is unlikely based on projected exposure; would result in minor consequences to public health, safety, and/or other metrics of concern.
Medium	Impact is somewhat likely based on projected exposure; would result in some consequences to public health, safety, and/or other metrics of concern.
High	Impact is highly likely based on projected exposure; would result in substantial consequences to public health, safety, and/or other metrics of concern.

Source: CalOES 2020.

The climate change effects anticipated to impact the City are ranked for a potential impacts score in Table 4.5. This evaluation is based on the exposure analysis and analysis of sensitivities and impacts.

Table 4.5 Potential Impact Summary for Bakersfield

Climate Change Effect	Potential Impact Score
Increased Temperatures and Extreme Heat	High
Extreme Precipitation and Flooding	Low/Medium
Wildfire Risk	Medium
Drought and Water Supply	High

Source: Prepared by Ascent in 2022.

4.4.2 Adaptive Capacity

The third step in the vulnerability assessment process is to evaluate the adaptive capacity of the City's populations, built environment, and community functions to address the impacts of climate change. Adaptive capacity refers to a community's current and future ability to address climate-related impacts.

A review of the City government's existing policies, plans, programs, and resources, as well as those from relevant regional and State agencies and organizations, provides an assessment of the City's current ability to reduce vulnerability to hazards and adapt to climate change over the long-term. Table 4.6 shows a summary of existing plans and reports that contribute to the City's adaptive capacity to address the anticipated impacts of climate change effects.

Table 4.6 Summary of Existing Plans and Reports

Plan or Report	Climate Change Effect			
	Increased Temperatures and Extreme Heat	Extreme Precipitation and Flooding	Wildfire Risk	Drought and Water Supply
California's Fourth Climate Change Assessment, San Joaquin Valley Region Report	✓	✓	✓	✓
Kern County Multi-Jurisdictional Hazard Mitigation Plan	✓	✓	✓	✓
Kern County Emergency Operations Plan	✓	✓	✓	
Climate Change and Health Profile Report, Kern County	✓	✓	✓	✓
Metropolitan Bakersfield General Plan	✓	✓	✓	✓
City of Bakersfield Transformative Climate Communities Plan	✓	✓	✓	✓
2020 Urban Water Management Plan, Bakersfield District				✓
Caltrans Climate Change Vulnerability Assessments, District 6 Technical Report	✓	✓	✓	✓
2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards, San Joaquin Valley			✓	✓

Source: Prepared by Ascent in 2022.

The City government has already taken a number of actions to address climate change impacts on the community. The *Kern County Multi-Jurisdictional Hazard Mitigation Plan* (MJHMP) and the City's Participating Jurisdiction Annex to the MJHMP both serve as overarching, foundational documents to assess hazards facing the City, including those that may be exacerbated by climate change, and to improve the City's resilience to those

hazards. Aside from the MJHMP and the City's Participating Jurisdiction Annex, the City government has an array of adaptive efforts in place to address climate-related hazards.

Regarding increased temperatures and extreme heat, the City government coordinates with the Kern County Parks and Recreation Department to oversee cooling centers for use by local populations during the hot summer months and coordinates with Kern County's Department of Aging and Adult Services and local transit agencies to provide free travel to and from cooling centers (Cox 2021b). Chapter 17.58 of the City's Municipal Code, "Parking and Loading Standards," prioritizes a reduction in the amount of parking area within the City's urban setting to help reduce the urban heat island effect, which is projected to intensify because of increased temperatures and extreme heat. The *Metropolitan Bakersfield General Plan* encourages the use of reflective roofing materials and other measures that reduce the urban heat island effect (City of Bakersfield 2002). Further, the City government has proposed or implemented several urban greening initiatives, also with the intention of reducing the urban heat island effect. Most recently and notably, the City government completed its Kentucky Street Urban Greening Project in the summer of 2021. This project was funded through a grant from the California Natural Resources Agency to demonstrate the City government's commitment to revitalizing and protecting many of its communities in disadvantaged neighborhoods. It included a new sidewalk that was lined with 120 drought-tolerant trees, shrubs, and 28 solar-powered streetlights, along with a Class II bike lane (Bennett 2021). Several other projects that address extreme heat or the urban heat island effect have been proposed in the City's *Transformative Climate Communities Plan* which relies heavily on input from the community (City of Bakersfield 2022a).

When it comes to storms or extreme precipitation events, the City government provides residents with contact information on the appropriate City government department or utility company to report storm-related issues, and periodic storm updates may be provided on the City government's website or social media platforms so residents can prepare accordingly (City of Bakersfield 2022b). Additionally, the City's Fire Department provides official guidance on what to do during and after an extreme precipitation or flooding event, primarily aimed at safety and survival. The City government also has a variety of existing flood-related plans and policies. The City government, along with the Kern County government, has undertaken a Storm Water Management Plan, which was last updated in October 2015. One of the identified goals of this comprehensive plan is to reduce flood damage within the City, and the City government's Department of Water Resources is required to perform emergency repairs and flood fighting on its facilities (City of Bakersfield and County of Kern 2015). Chapter 15.74 of the City's Municipal Code, "Flood Damage Prevention," serves to promote public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas. Its provisions are designed to protect human life and health, minimize expenditures of public money for costly flood control projects, minimize the need for rescue and relief efforts associated with flooding, and minimize damage to public facilities and utilities such as water and gas mains, electric, telephone, and sewer lines, and streets and bridges located in areas of special flood hazards, among other items. According to the MJHMP, the City government is required to update building codes to meet the minimum standards of the California Building Code, which provide some of the safest construction standards in the world and are meant to reduce risk from a variety of hazards, including flooding (County of Kern 2021b). The City government aims to maintain these standards and has implemented mitigation measures in recent years, such as installing new backup generators for stormwater pumps and adding storm drains and rehabilitated pump stations, which have proven to significantly reduce flooding within their vicinities (Wright 2021). Further, the City government is currently in good standing with the provisions of the National Flood Insurance Program (NFIP), in which it has participated since 1985. Compliance with the NFIP is monitored by the Federal Emergency Management Agency, and maintaining compliance is an important component of flood risk reduction. Because of the existence of the Isabella Dam, which was constructed in 1953 and is located northeast of the City, potential hazards resulting from a 100-year flood have been substantially reduced (City of Bakersfield 2002).

The City is designated as a Local Responsibility Area, which means that the City's local fire department, the Bakersfield Fire Department (BFD), is responsible for suppressing any wildfires that burn within City limits. BFD is a multi-dimensional public safety organization and includes an "all-risk" approach in its emergency service delivery

system, so although it is not solely a wildfire-focused fire department, its services still encompass wildfire suppression. With 240 sworn, support, and reserve personnel operating from 14 fire stations across the City, the City government has adequate capacity to respond to wildfire events and related emergencies. The Fire Prevention Division within BFD conducts an average of 8,000 fire and life safety inspections on an annual basis, which reduces the possibility of wildfire ignition, and implements policies and procedures that reduce the magnitude of emergencies and prevents or minimizes the loss of life, property, and damage to the environment. The Community Services Office within BFD assists the community in various forums to provide fire safety public education, public information, tours and demonstrations, and other public safety interfaces, including general disaster preparedness. Though direct wildfire risk throughout most of the City is relatively low, aside from a few areas, the City government has an array of measures in place to help keep that risk at a minimum, and the BFD has the capacity to respond to any wildfire that may ignite. In addition to wildfires themselves, wildfire smoke is perhaps the most prevalent effect of wildfires that impacts the City. Most of the efforts in the City pertaining to mitigating the impacts of wildfire smoke, and poor air quality in general, are conducted by the San Joaquin Valley Air Pollution Control District.

Recent severe and prolonged drought conditions have highlighted the importance for the City government to prepare for future droughts that may affect water supply availability and result in other cascading effects. According to the *2020 Urban Water Management Plan, Bakersfield District* (UWMP), which encompasses the City, the Bakersfield District has purchased water and groundwater supplies that are expected to be sufficient to meet demands in all hydrologic conditions, including an extended 5-year drought scenario. Climate change is accounted for in the Bakersfield District's demand projections and the analysis of near- and long-term reliability of the City's groundwater supply source. Additionally, the UWMP also includes a Water Shortage Contingency Plan, which serves to be engaged in the case of a water shortage event (City of Bakersfield 2021). Further, the City government, along with the Kern Delta Water District and Improvement District No. 4 of the Kern County Water Agency, have formed the Kern River Groundwater Sustainability Agency (KRGSA). The KRGSA adopted a Groundwater Sustainability Plan (GSP) in 2019, and the purposes of the GSP are to bring groundwater basins into balanced levels of pumping and recharge and to reach sustainability within 20 years of implementing the plan. The GSP, like the UWMP, specifically addresses climate change projections and incorporates climate change adaptation strategies. The UWMP and GSP are coupled with additional measures being taken by the City government to conserve water, especially during times of drought. For one, the City government's existing water use regulations generally require all water users to follow all State-mandated water regulations, including the prohibition of potable water use to wash sidewalks and driveways, the prohibition of runoff when irrigating with potable water, and the prohibition of using hoses with no shutoff nozzles to wash cars, among other regulations (City of Bakersfield 2022c). The City government is engaged in an array of additional measures to conserve water, including, but not limited to, installing "smart" irrigation controllers in all City parks, reducing the time and frequency of irrigating City parks and streetscapes, installing artificial turf at various City government facilities and in new City government-constructed medians, offering City residents free water conservation kits, and implementing water education, conservation, and rebate programs through the City government's Water Resources Department (City of Bakersfield 2022d).

SUMMARY OF ADAPTIVE CAPACITY

Based on a combination of the adaptation initiatives outlined in existing documents and resources and additional adaptive efforts that have been pursued (see Appendix B for details), the City's adaptive capacity for each climate change effect can be scored low, medium, or high. High adaptive capacity indicates that sufficient measures are already in place to address the points of sensitivity and impacts associated with climate change, while a low score indicates a community is unprepared and requires major changes to address hazards. Adaptive capacity scoring descriptions are described in Table 4.7.

Table 4.7 Adaptive Capacity Scoring

Score	Adaptive Capacity Scoring Description
Low	The City lacks capacity to manage climate change effect; major changes would be required.
Medium	The City has some capacity to manage climate change effect; some changes would be required.
High	The City has high capacity to manage climate change effect; minimal to no changes are required.

Source: CalOES 2020.

Table 4.8 summarizes the City's adaptive capacity regarding each climate change effect. Like the potential impacts scoring evaluation, the scoring of adaptive capacity allows the City government to understand priority areas where there are gaps in preparing for and adapting to climate change.

Table 4.8 Adaptive Capacity Summary for the City of Bakersfield

Climate Change Effect	Adaptive Capacity Score
Increased Temperatures and Extreme Heat	Low
Extreme Precipitation and Flooding	Medium
Wildfire Risk	Low/Medium
Drought and Water Supply	Medium

Source: Prepared by Ascent in 2022.

4.4.3 Vulnerability Scoring

The final step in the vulnerability assessment process is to characterize the vulnerability to each climate change effect. The City's vulnerability to each identified impact is assessed based on the magnitude of risk to and potential impacts on populations, the built environment, and community functions while considering the current adaptive capacity in place to mitigate these impacts. Based on the scores of potential impacts and adaptive capacity, an overall vulnerability score can be determined for each climate change effect. This scoring can help the City government understand which effects pose the greatest threats and should be prioritized in future planning efforts. Table 4.9 presents the rubric used to determine overall vulnerability scores based on the ratings for potential impacts and adaptive capacity.

Table 4.9 Vulnerability Scoring

Vulnerability Score				
Adaptive Capacity	Low	3	4	5
	Medium	2	3	4
	High	1	2	3
		Low	Medium	High
		Potential Impacts		

Source: CalOES 2020; adapted by Ascent in 2022.

Vulnerability scoring for each climate change effect is included in Table 4.10 below. The table shows that increased temperatures and extreme heat are assigned a vulnerability rating of 5 and therefore should be a very high priority for the City government. Drought and water supply are assigned a vulnerability score of 4, which means they should also be prioritized in the City government's adaptation and related planning efforts. These climate change effects are likely to have significant impacts on the City's populations, built environment, and community functions in the near-term to midterm, and although a variety of adaptive efforts related to both climate change effects are in place and underway, the magnitude of the risks posed by these hazards contributes

to high vulnerability in the City. Wildfire risk is characterized as having a vulnerability rating of 3-4. This climate change effect is concerning largely due to the impact of wildfire smoke on local air quality and should be prioritized and planned for accordingly. Extreme precipitation and flooding are characterized as having a vulnerability rating of 2-3. This climate change effect is currently being addressed adequately based on existing conditions, but additional adaptation and resilience planning will be required in the future to mitigate impacts and protect the City.

Table 4.10 Vulnerability Scoring Summary for the City of Bakersfield

Climate Change Effect	Vulnerability Score		
	Adaptive Capacity	Potential Impacts	Vulnerability
Increased Temperatures and Extreme Heat	Low	High	5
Extreme Precipitation and Flooding	Medium	Low/Medium	2-3
Wildfire Risk	Low/Medium	Medium	3-4
Drought and Water Supply	Medium	High	4

Source: Prepared by Ascent in 2022.

4.5 NEXT STEPS FOR ADAPTATION AND RESILIENCE

The City government, regional and State agencies, and other stakeholder groups have already implemented a variety of initiatives to address climate change in the City through existing policies, programs, and actions. As climate change continues to exacerbate risks and impacts from extreme heat, flooding, wildfires, and drought, it is critical that the City government continues to develop and implement adaptation strategies to plan for and mitigate these risks. Chapter 5 includes climate action strategies and measures that are intended to both reduce GHG emissions and/or build resilience to the impacts of climate change. These climate action strategies and measures were developed in part based on the findings of the VA. These initiatives serve to address the climate-related hazards identified throughout the adaptation planning process and prioritize strategies that will be effective, feasible, cost-appropriate, and include co-benefits.

Chapter 5

5 CLIMATE ACTION STRATEGIES AND MEASURES

This chapter presents the strategies and measures that the City government will implement to reduce greenhouse gas (GHG) emissions and build resilience to the impacts of climate change. These locally based initiatives are organized under eight focus areas and include descriptions of actions that can be taken for implementation.

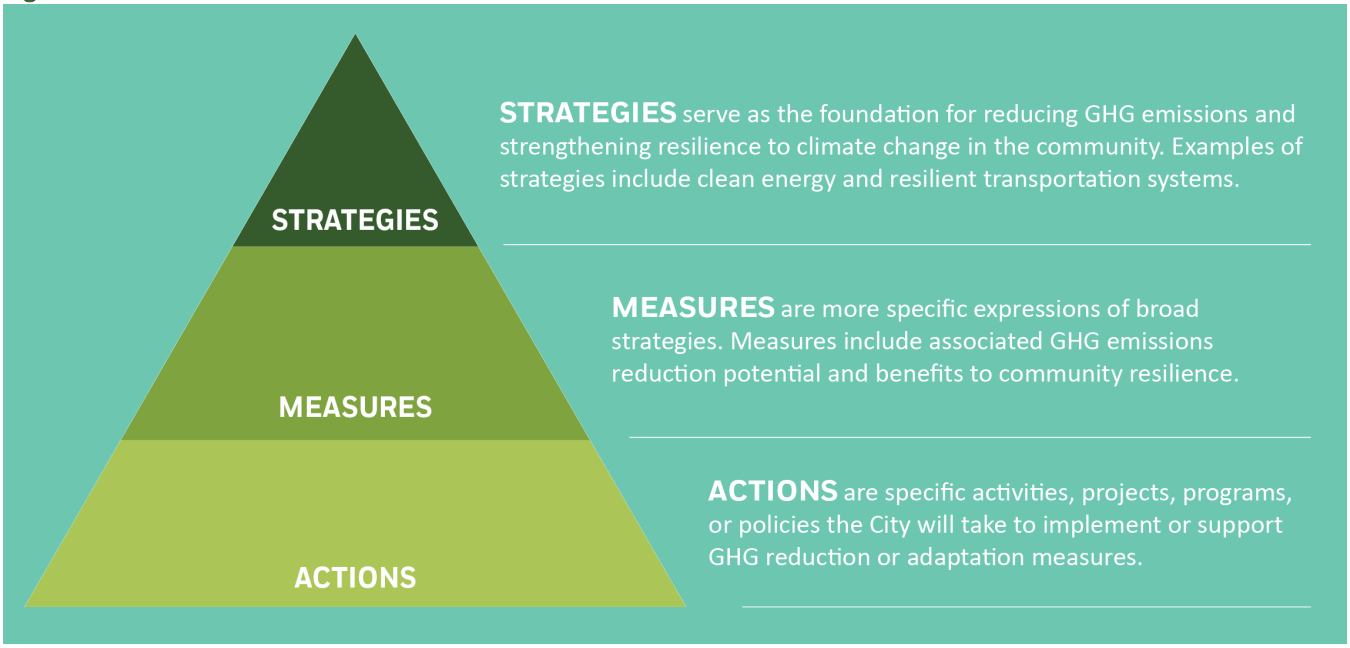
5.1 OVERVIEW

This Climate Action Plan (CAP) includes **28 strategies** and **53 measures** that will reduce GHG emissions and/or build resilience to climate impacts in the community (i.e., climate action strategies). The climate action strategies are organized into eight focus areas: (1) Buildings; (2) Infrastructure; (3) Land Use and Mobility; (4) Materials and Waste; (5) Health and Resiliency; (6) Natural and Urban Landscapes; (7) Green Economy; and (8) Education and Monitoring. These climate action strategies serve as the foundation for reducing GHG emissions and building resilience to climate change in the City of Bakersfield (City). Within each strategy are one or more measures that serve as more specific expressions of the overarching strategies. Measures are further evaluated with specific actions that define activities, programs, policies, or projects that the City government will implement or support to achieve CAP goals. While the initiatives included in this chapter are primarily intended to reduce GHG emissions and build community resilience, many of them will also result in co-benefits, such as air pollution prevention, health and well-being improvements, and resource preservation.

Climate action strategies serve as the foundation for reducing GHG emissions and building resilience to climate change in Bakersfield.

The strategies and measures discussed in this chapter were developed based on a combination of factors, including the results of both the City's GHG emissions inventory and forecast and the Vulnerability Assessment, engagement with the public and stakeholders, feedback from City government staff, and the best available climate action planning guidance. **Figure 5.1** describes the hierarchy and provides definitions for strategies, measures, and actions developed for the CAP.

Figure 5.1 Climate Action Framework



Source: Prepared by Ascent in 2023.

5.2 GHG EMISSIONS REDUCTION QUANTIFICATION ANALYSIS

In preparation of the CAP, the City government conducted a GHG quantification analysis to estimate potential emissions reductions associated with all measures. The total estimated GHG emissions reductions from all community measures quantified would be 1,068,757 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2030; 1,736,549 $MTCO_2e$ in 2040; and 2,193,466 $MTCO_2e$ in 2045. The total estimated reductions from all GHG reduction measures would be sufficient to meet the 2030 target. The results of the quantification analysis are shown in Table 5.1 below.

Table 5.1 Bakersfield Greenhouse Gas Emissions Quantification Analysis

Emissions	2019	2030	2040	2045
Legislative-Adjusted Business-as-Usual Emissions ($MTCO_2e$)	2,551,089	2,917,356	3,005,765	3,058,881
Target Percent Reduction below 2019 Levels	-	27%	61%	79%
Reduction Needed to Meet Target ($MTCO_2e$)	-	1,044,875	2,017,014	2,511,995
Total Reductions from Measures ($MTCO_2e$)	-	**1,068,757**	**1,736,549**	**2,193,466**
Remaining Gap to Target ($MTCO_2e$)	-	(23,881)[1]	280,465	318,529
Target Met?	-	**Yes**	**No**	**No**

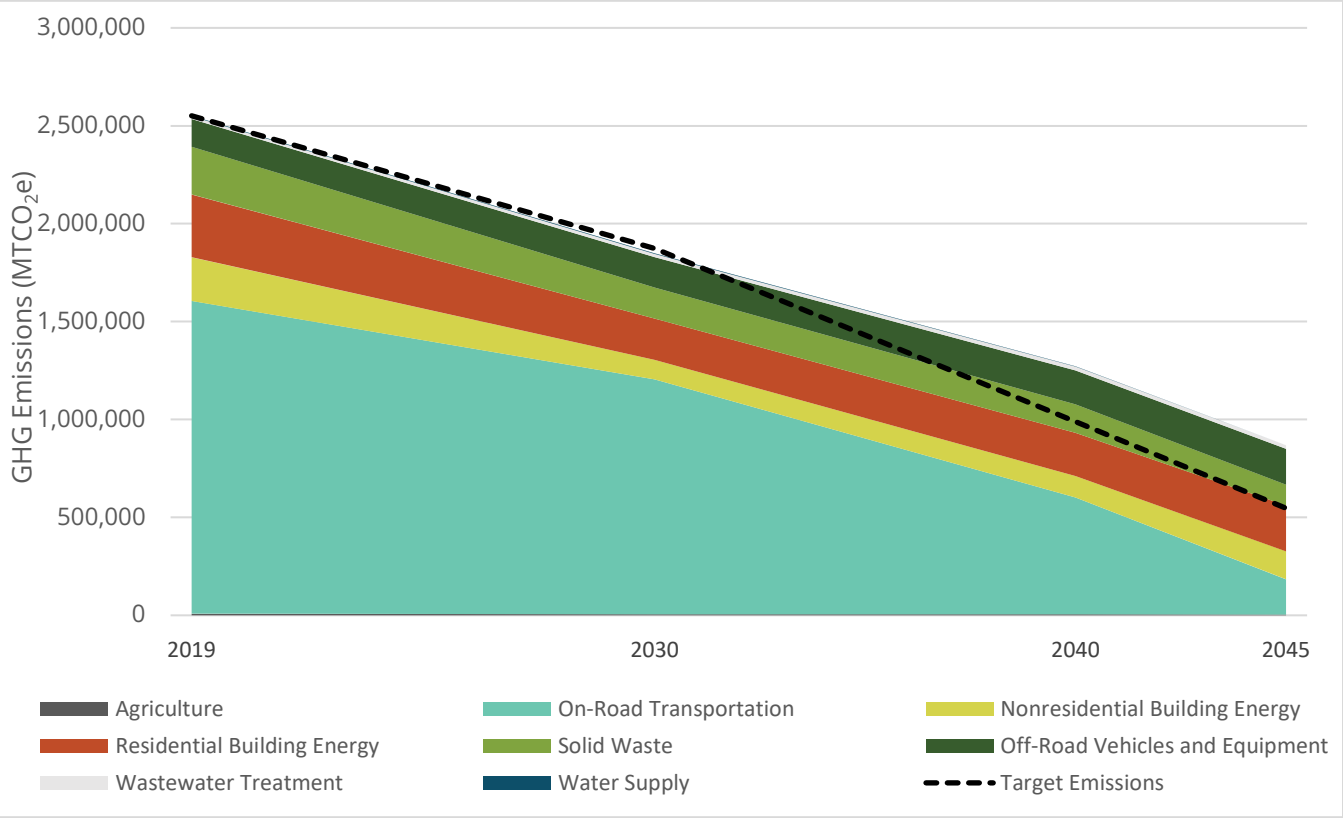
Notes: Totals may not sum exactly due to independent rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.

[1] Indicates target has been achieved with a surplus of reductions.

Source: Prepared by Ascent in 2023.

The scale of reductions required to achieve the 2040 and 2045 targets would require significant improvements in the availability and/or cost of near-zero- and zero-emission technologies, as well as potential increased reductions from ongoing State and federal legislative actions that are currently unknown. Progress toward meeting future targets that could be set by the State would be part of the ongoing monitoring and updates to the CAP as new legislation or future updates to the State's Climate Change Scoping Plan are adopted. Figure 5.2 shows the GHG reductions achieved by CAP measures, organized by the sectors used for the inventories and forecasts. Additionally, the figure displays the City's achievement of the 2030 target with the GHG reduction measures and demonstrates progress towards the 2040 and 2045 targets.

Figure 5.2 Bakersfield Greenhouse Gas Emissions Reduction Measure Analysis



Source: Prepared by Ascent in 2023.

5.3 DETAILED STRATEGIES AND MEASURES

The following sections provide background information and context for each focus area and present the climate action strategies and measures. Many of the measures include the GHG quantification assumptions (i.e., performance indicators) and resulting GHG reduction estimates for the target years of 2030, 2040, and 2045. Measures that were not quantified for GHG reductions for any reason (e.g., lack of methodologies, avoidance of double-counting GHG emissions reductions) do not include performance indicators. Further details on GHG quantification can be found in Appendix A.

Buildings

STRATEGY BE-1
Clean and Renewable Energy

STRATEGY BE-2
Energy Efficiency and Reliability

STRATEGY BE-3
Resilient Buildings

Strategies and Measures

The **Buildings** focus area is a critical component of this CAP. Buildings offer an opportunity to significantly reduce GHG emissions, as energy consumption in buildings is one of the largest sources of GHG emissions (e.g., energy used for heating, cooling, and lighting). Additionally, buildings also represent an area to enhance resilience to the impacts of climate change, both for the buildings themselves and also to improve the safety and comfort of their occupants. This focus area is divided into overarching building strategies: **BE-1) Clean and Renewable Energy**; **BE-2) Energy Efficiency and Reliability**, and **BE-3) Resilient Buildings**. These strategies, presented below, are further broken down by measures, which each consist of several, more specific actions to implement the measure.

BE-1: Clean and Renewable Energy

Noting that energy consumption in buildings is a major source of GHG emissions, decarbonizing existing buildings by deploying clean and renewable energy is critical to having healthy homes and businesses. Removing natural gas and other fossil fuels from being combusted inside buildings improves indoor air quality. It is also crucial to ensure that new buildings operate without fossil fuel infrastructure so that future decarbonization of those buildings is not needed.

MEASURE BE-1.1: Decarbonize existing residential and nonresidential buildings.

2030 Target	2040 Target	2045 Target
7% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric	10% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric	15% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric
7% of Existing Commercial Buildings are Retrofitted to All-Electric	10% of Existing Commercial Buildings are Retrofitted to All-Electric	15% of Existing Commercial Buildings are Retrofitted to All-Electric
7% of Fossil Fuel-Powered Backup Generators in Existing Development are Converted to Battery-Powered Backup Systems	10% of Fossil Fuel-Powered Backup Generators in Existing Development are Converted to Battery-Powered Backup Systems	15% of Fossil Fuel-Powered Backup Generators in Existing Development are Converted to Battery-Powered Backup Systems
15,253 $MTCO_2e$	**27,487 $MTCO_2e$**	**48,130 $MTCO_2e$**

- **Action BE-1.1.1**: Develop a comprehensive energy retrofit plan to transition mixed-fuel residential and nonresidential buildings to all-electric, prioritizing designated disadvantaged communities.
- **Action BE-1.1.2**: Establish electrification retrofit requirements for commercial buildings at the time of building retrofit/renovation or equipment replacement. Where electrification is infeasible, encourage renewable gas.
- **Action BE-1.1.3**: Support the Homeowner and Rental Rehabilitation Program identified in the Transformative Climate Communities Plan, focusing on retrofitting older homes that serve as generational dwellings with significant deterioration.
- **Action BE-1.1.4**: Eliminate the provision of fossil fuel-powered backup generator permits for existing nonresidential development (except for emergency facilities such as hospitals and building types not subject to the California Building Energy Efficiency Standards that provide essential services) by 2030.
- **Action BE-1.1.5**: Evaluate the feasibility of requiring electric service upgrades during major retrofits.

- Action BE-1.1.6: Add filters to the Pick Bakersfield website so that prospective businesses can filter locations by those that align with sustainable business values, such as electric vehicle (EV) charging infrastructure, onsite solar and battery storage, and other green building features.

MEASURE BE-1.2: Decarbonize new residential and nonresidential buildings.

2030 Target	2040 Target	2045 Target
100% All-Electric New Residential and Commercial Development (Built in 2026 or Later) 75% of New Nonresidential Buildings Include Battery or Zero-Emission Backup Power Sources (Starting in 2026) 15,073 $MTCO_2e$	Continuation of 100% All-Electric New Residential and Commercial Development 80% of New Nonresidential Buildings Include Battery or Zero-Emission Backup Power Sources 67,823 $MTCO_2e$	Continuation of 100% All-Electric New Residential and Commercial Development 90% of New Nonresidential Buildings Include Battery or Zero-Emission Backup Power Sources 114,024 $MTCO_2e$

- Action BE-1.2.1: Adopt a reach code for the 2026 California Building Energy Efficiency Standards code cycle that prohibits the installation of natural gas infrastructure in new development (residential and nonresidential).
- Action BE-1.2.2: Adopt a reach code that requires electric-ready design in new industrial construction and that requires non-core industrial operations (e.g., space heating and cooling, domestic hot water) to be all-electric.
- Action BE-1.2.3: Create a Green Building Program within the City's Building Division to expedite building permitting and provide additional incentives for retrofits and new development that meet or exceed adopted reach codes or California Green Building Standards Code (CALGreen) building standards.
- Action BE-1.2.4: Provide development incentives such as expedited permitting for industrial sites that achieve green certifications such as US Green Building Council's Leadership in Energy and Environmental Design (LEED) standards.
- Action BE-1.2.5: Encourage the Bakersfield City School District and other academic institutions to meet green building standards such as LEED standards upon remodeling school facilities or construction of new schools.

BE-2: Energy Efficiency and Reliability

The second strategy within the Buildings focus area is to implement measures that improve energy efficiency and reliability within existing buildings in Bakersfield. Though new development will account for a modest proportion of the City's building stock, most of the City's building stock consists primarily of buildings that are already operational. Increasing energy efficiency and reliability will reduce GHG emissions and eliminate additional stress and demand on the electrical grid.

MEASURE BE-2.1: Improve energy efficiency in existing residential and nonresidential buildings.

- Action BE-2.1.1: Work with Pacific Gas and Electric Company (PG&E) and community-based organizations to provide free energy audits of existing buildings, prioritizing low-income neighborhoods.

- Action BE-2.1.2: Utilize state and federal funding programs, such as Community Development Block Grant programs, to achieve energy efficiency improvements in existing and new buildings, with a particular focus on affordable housing.
- Action BE-2.1.3: Work with local organizations such as Rebuilding Kern County to expand repair programs to include energy efficiency improvements and water efficiency improvements in existing residences.

MEASURE BE-2.2: Reduce plug loads in existing residential and nonresidential buildings.

- Action BE-2.2.1: Promote appliance upgrades to energy-efficient technologies and products through campaigns targeted at residents and local businesses (e.g., ENERGY STAR® appliance change-out programs, and incentives).
- Action BE-2.2.2: Facilitate the adoption of smart grid and other peak load reduction technologies such as building energy management systems and smart appliances.

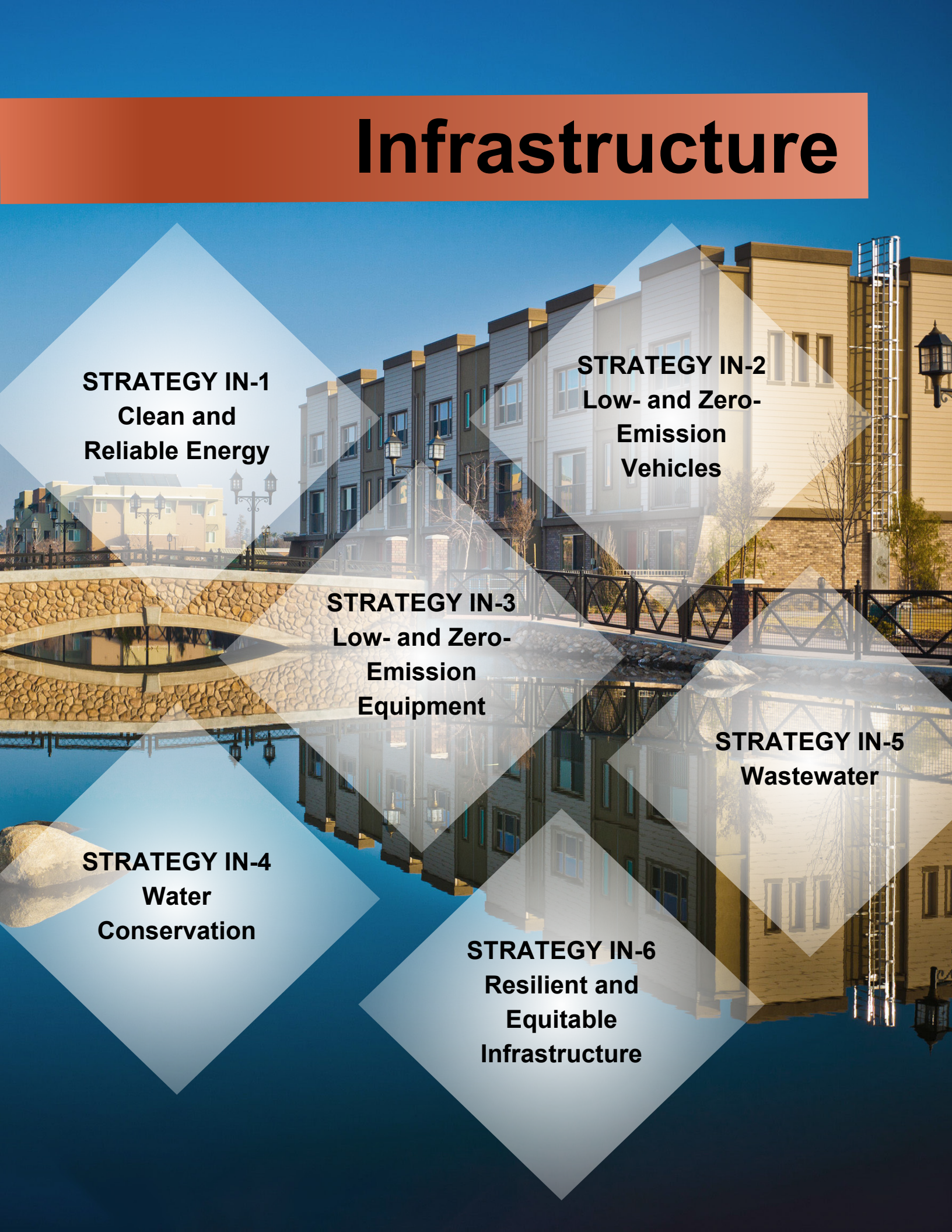
BE-3: Resilient Buildings

The third strategy within the Buildings focus area involves improving the resilience of buildings within the City. Climate change is already worsening the risk of natural hazards in the City, such as extreme heat, flooding, and wildfire. These hazards have the ability to adversely affect or influence a wide array of assets, including buildings. To prevent or minimize any potential damages from climate change, buildings within the City must adapt to improve and ensure their long-term resilience.

MEASURE BE-3.1: Improve resilience of residential and nonresidential buildings to natural hazards.

- Action BE-3.1.1: Adopt building and maintenance standards that reflect best practices in reducing the urban heat island effect.
- Action BE-3.1.2: Require structural hardening retrofits when existing buildings in the Moderate and High Fire Hazard Severity Zone are retrofitted more than 50 percent of the floor area.
- Action BE-3.1.3: Encourage raising mechanical equipment in all homes and buildings within the 100- and 500-year floodplains.
- Action BE-3.1.4: Implement a fuels reduction program around City-owned critical facilities to reduce wildfire risk.
- Action BE-3.1.5: Continue to implement sound floodplain management practices through participation in the National Flood Insurance Program.

Infrastructure



Strategies and Measures

Infrastructure encompasses a wide array of assets, including those related to energy, transportation, water, wastewater, agriculture, and industrial equipment, among others. Much of the City's infrastructure can be classified as critical that populations rely on to help maintain their quality of life. Because of that, the Infrastructure focus area in this CAP presents a set of opportunities for the City to mitigate and adapt to climate change, and ultimately, build a more sustainable, resilient future. This focus area consists of six overarching infrastructure strategies: IN-1) Clean and Reliable Energy; IN-2) Low- and Zero-Emission Vehicles; IN-3) Low- and Zero-Emission Equipment; IN-4) Water Conservation; IN-5) Wastewater; and IN-6) Resilient and Equitable Infrastructure. These strategies and their respective measures and actions are outlined below.

IN-1: Clean and Reliable Energy

The first strategy within the Infrastructure focus area involves deploying and upgrading public infrastructure that supports the distribution and use of—and improves the reliability of—clean energy. Electricity generated by fossil fuels releases GHGs into the atmosphere. Reducing the reliance on fossil fuels for electricity generation and use will reduce GHG emissions in the City, and improving the reliability and redundancy of clean energy systems will build resilience to the effects of climate change.

MEASURE IN-1.1: Transition to 100 percent clean electricity.

2030 Target	2040 Target	2045 Target
100% Carbon-Free Electricity 280,307 $MTCO_2e$	Continuation of 100% Carbon-Free Electricity 169,160 $MTCO_2e$	Continuation of 100% Carbon-Free Electricity 0 $MTCO_2e$

- Action IN-1.1.1: Adopt a reach code with the 2026 code cycle that requires all new residential and nonresidential buildings to generate on-site, renewable energy to meet the anticipated energy consumption of the building, as feasible.
- Action IN-1.1.2: Work with Kern County, local cities, and the California Community Choice Association to develop a local community choice aggregation program that provides locally sourced clean electricity for all Bakersfield residents and businesses to opt into.
- Action IN-1.1.3: Eliminate local regulatory barriers to the installation of distributed renewable energy systems, such as wind and solar, through revisions to the zoning code and other relevant City policies.
- Action IN-1.1.4: Provide guidelines for the permit application process for renewable energy generation installation (e.g., solar photovoltaics) in residential and nonresidential development.
- Action IN-1.1.5: Collaborate with PG&E to make key upgrades to transmission and distribution systems, substations, and other equipment to enable electrification and renewable energy integration into the electricity grid.

MEASURE IN-1.2: Increase decentralized clean energy resources.

- Action IN-1.2.1: Encourage the installation of battery storage in conjunction with renewable energy generation projects within new and existing buildings through engagement campaigns and state incentives.
- Action IN-1.2.2: Require all newly built parking structures to have solar-ready generation capabilities.
- Action IN-1.2.3: Require the installation of solar heaters for all new swimming pools.
- Action IN-1.2.4: Provide incentives for replacing existing swimming pool heaters with solar versions.
- Action IN-1.2.5: Encourage the installation of solar canopies on surface parking lots.

MEASURE IN-1.3: Develop innovative approaches to energy generation, distribution, and storage.

- Action IN-1.3.1: Develop renewable microgrids at City fire and police stations and other emergency facilities.
- Action IN-1.3.2: Encourage non-municipal public service facilities (e.g., hospitals) to develop renewable microgrids.
- Action IN-1.3.3: Require battery storage readiness design in new nonresidential construction.
- Action IN-1.3.4: Evaluate opportunities for integrating battery storage readiness in existing homes and businesses at the time of retrofit and/or in conjunction with renewable energy generation installations.

MEASURE IN-1.4: Install clean emergency backup generators for critical facilities and essential services.

- Action IN-1.4.1: Encourage the installation of zero-emission backup energy sources in all critical facility development by 2030.
- Action IN-1.4.2: Ensure critical facilities have onsite backup power with priority given to facilities in areas vulnerable to climate hazards and those that service vulnerable populations. Install clean backup power sources at critical facilities where feasible.

IN-2: Low- and Zero Emission Vehicles

Deploying measures that promote the accessibility of EVs is the second strategy within the Infrastructure focus area. The combustion of fossil fuels (i.e., gasoline, diesel) in vehicles produces GHG emissions, which can negatively impact local air quality and human health, among other impacts. Transitioning to EVs and other alternative low-emission vehicles through expanding EV charging infrastructure and supporting their adoption can significantly reduce GHG emissions, but also result in an array of co-benefits.

MEASURE IN-2.1: Increase EV charging infrastructure.

2030 Target	2040 Target	2045 Target
30% of Total Passenger Vehicles are EVs 30% Increase in Medium- and Heavy-Duty EVs 383,212 $MTCO_2e$	75% of Total Passenger Vehicles are EVs 102% Increase in Medium- and Heavy-Duty EVs 963,710 $MTCO_2e$	90% of Total Passenger Vehicles are EVs 127% Increase in Medium- and Heavy-Duty EVs 1,412,309 $MTCO_2e$

- Action IN-2.1.1: Adopt an EV charging reach code with the 2026 code cycle to increase levels of EV readiness in new residential and nonresidential development beyond the minimum mandatory levels established in CALGreen.
- Action IN-2.1.2: Install EV charging infrastructure throughout the City consistent with the deployment schedule in the Kern County Electric Vehicle Charging Station Blueprint.
- Action IN-2.1.3: Ensure EV charging stations are encouraged and allowed through land use designations that currently permit gas fueling stations.
- Action IN-2.1.4: Install EV charging stations and preferred parking for EVs at public facilities, parks, and other high-use parking areas throughout the City.
- Action IN-2.1.5: Provide guidelines for the permit application process for EV charging infrastructure installation in residential and nonresidential development.
- Action IN-2.1.6: Promote the San Joaquin Valley Air Pollution Control District's (SJVAPCD's) Charge Up! Program, which provides incentives for public agencies, businesses, and multi-family residential property owners to install EV chargers.
- Action IN-2.1.7: Require all nonresidential development with loading docks to supply sufficient electrical power for delivery trucks and associated equipment to reduce idling when making deliveries.
- Action IN-2.1.8: Promote SJVAPCD's Clean Vehicle Fueling Infrastructure Program, which provides incentives for clean vehicle fueling stations for heavy-duty vehicles.

MEASURE IN-2.2: Increase EV and low-carbon vehicle adoption.

- Action IN-2.2.1: Promote awareness of local, regional, and State incentives for low- and zero-emission vehicles, such as those provided by SJVAPCD's Drive Clean in the San Joaquin website.
- Action IN-2.2.2: Support the development of a regional EV collaborative, led by the Kern Council of Governments (Kern COG), to share lessons learned and best practices, and track metrics.
- Action IN-2.2.3: Add EV charging filters to the Pick Bakersfield website so that prospective businesses can filter locations by those that already have EV charging infrastructure available for employees and visitors.

IN-3: Low- and Zero-Emission Equipment

Similar to the previous strategy, the third strategy within the Infrastructure focus area involves deploying measures intended to promote the use of low- and zero-emission equipment, rather than vehicles. The fuel burned to operate construction equipment, landscaping equipment, agricultural equipment, and irrigation pumps releases GHG emissions and can negatively impact human health and degrade air quality. Reducing the use of fossil fuels, and electrifying equipment where feasible, can reduce GHG emissions and result in additional co-benefits.

MEASURE IN-3.1: Increase use of electricity and alternative fuels in construction equipment.

2030 Target	2040 Target	2045 Target
50% of Diesel-Powered Construction Equipment is Powered by Renewable Diesel or Other Alternative Fuels 7% of Construction Equipment is Electrified **22,316 $MTCO_2e$**	75% of Diesel-Powered Construction Equipment is Powered by Renewable Diesel or Other Alternative Fuels 15% of Construction Equipment is Electrified **39,129 $MTCO_2e$**	80% of Diesel-Powered Construction Equipment is Powered by Renewable Diesel or Other Alternative Fuels 19% of Construction Equipment is Electrified **50,637 $MTCO_2e$**

- Action BE-3.1.1: Require all construction projects starting in 2024 and later to use renewable diesel in diesel-powered construction equipment.
- Action BE-3.1.2: Encourage the use of electric-powered construction equipment in all discretionary projects.
- Action BE-3.1.3: Prohibit the use of fossil fuel-powered generators at construction sites in all discretionary projects.

MEASURE IN-3.2: Transition to electric-powered landscaping equipment.

2030 Target	2040 Target	2045 Target
12% of Existing Landscaping Equipment is Replaced with Zero-Emission Alternatives **619 $MTCO_2e$**	30% of Existing Landscaping Equipment is Replaced with Zero-Emission Alternatives **2,448 $MTCO_2e$**	39% of Existing Landscaping Equipment is Replaced with Zero-Emission Alternatives **4,190 $MTCO_2e$**

- Action IN-3.2.1: Encourage business owners (including landscaping businesses) and homeowners to convert or replace their gasoline-powered gardening equipment, such as lawn mowers, leaf blowers, and hedge trimmers, with electric equipment.
- Action IN-3.2.2: Require all new development to install sufficient exterior electrical outlets to charge electric-powered landscaping equipment.
- Action IN-3.2.3: Promote SJVAPCD's Clean Green Yard Machines programs, which provide incentives to replace gas-powered landscape equipment with zero-emission alternatives.

MEASURE IN-3.3: Transition to electric or alternatively fueled agricultural equipment.

2030 Target	2040 Target	2045 Target
50% of Diesel-Powered Agricultural Equipment is Powered by Renewable Diesel or Other Alternative Fuels 2% of Agricultural Equipment is Electrified 540 $MTCO_2e$	75% of Diesel-Powered Agricultural Equipment is Powered by Renewable Diesel or Other Alternative Fuels 15% of Agricultural Equipment is Electrified 725 $MTCO_2e$	80% of Diesel-Powered Agricultural Equipment is Powered by Renewable Diesel or Other Alternative Fuels 19% of Agricultural Equipment is Electrified 697 $MTCO_2e$

- Action IN-3.3.1: Encourage the use of electric-powered agricultural equipment where feasible. Encourage the use of renewable diesel in diesel-powered agricultural equipment where electrification is infeasible.
- Action IN-3.3.2: Promote SJVAPCD's Agricultural Tractor Replacement and Agricultural Tractor Trade-Up Programs, which provide incentives to replace tractors with lower-emission or zero-emission alternatives.

MEASURE IN-3.4: Transition to zero-emission or low-carbon irrigation pumps.

2030 Target	2040 Target	2045 Target
10% of Diesel- and Natural Gas-Powered Irrigation Pumps are Replaced with Electric Versions 18 $MTCO_2e$	20% of Diesel- and Natural Gas-Powered Irrigation Pumps are Replaced with Electric Versions 37 $MTCO_2e$	22% of Diesel- and Natural Gas-Powered Irrigation Pumps are Replaced with Electric Versions 42 $MTCO_2e$

- Action IN-3.4.1: Encourage the replacement of diesel- and natural gas-powered irrigation pumps with electric-powered alternatives where feasible. Encourage the use of renewable diesel or renewable natural gas where electrification is infeasible.
- Action IN-3.4.2: Promote SJVAPCD's Agricultural Pump Replacement Programs, which provide incentives to replace irrigation pumps and motors with lower-emission or zero-emission alternatives.

IN-4: Water Conservation

The fourth strategy within the Infrastructure focus area is related to water conservation. Water is a vital resource in the community, and strategic water management that reduces the amount of water used for landscaping, irrigation, and other potable and non-potable uses will both reduce GHG emissions and improve resilience to future occurrences of prolonged droughts, to which the City and state are highly susceptible.

MEASURE IN-4.1: Reduce water consumption in buildings.

2030 Target	2040 Target	2045 Target
5% Reduction in Per Capita Water Consumption	10% Reduction in Per Capita Water Consumption	15% Reduction in Per Capita Water Consumption
6,066 $MTCO_2e$	6,580 $MTCO_2e$	0 $MTCO_2e$

- Action IN-4.1.1: Continue to promote water conservation incentives such as appliance and plumbing rebates and water conservation kits in partnership with California Water Services.
- Action IN-4.1.2: Continue to facilitate and respond to reports of water waste and violations of local water use restrictions.
- Action IN-4.1.3: Require ultra-low-flow fixtures in new development to reduce water consumption.
- Action IN-4.1.4: Establish ultra-low-flow water fixture retrofit-upon-sale requirements for residential and commercial buildings.

MEASURE IN-4.2: Reduce water consumption for irrigation and landscaping.

- Action IN-4.2.1: Require drought-tolerant, water-conserving, and/or native landscaping in new development and redevelopment projects.
- Action IN-4.2.2: Continue to promote landscape water conservation incentives in partnership with California Water Services.
- Action IN-4.2.3: Reduce consumption of water, electricity, and fossil fuels in the construction, operations, and maintenance of parks and recreation facilities where possible through the use of artificial turf, drought-tolerant landscaping, water conservation technology, and use of recycled water.
- Action IN-4.2.4: Install drought-tolerant landscaping in the public right of way and City-owned buildings and facilities.

MEASURE IN-4.3: Increase the capture and use of recycled water.

- Action IN-4.3.1: Adopt a drought-ready ordinance to require greywater readiness in new residential construction and alterations.
- Action IN-4.3.2: Encourage the use of onsite rainwater harvesting and recycled water systems, consistent with all applicable environmental, health, and safety regulations and requirements.
- Action IN-4.3.3: Encourage the use of rainwater capture and onsite recycled water for landscaping use.

IN-5: Wastewater

The fifth strategy in the Infrastructure focus area is related to wastewater—specifically, establishing methane recovery at the City government's wastewater treatment facilities. Methane is a potent, heat-trapping GHG that accelerates climate change, and thus capturing methane from these facilities for other uses can help reduce GHG emissions.

MEASURE IN-5.1: Establish methane recovery in wastewater treatment facilities.

2030 Target	2040 Target	2045 Target
5% Increase in Methane Recovery at Wastewater Treatment Facilities	10% Increase in Methane Recovery at Wastewater Treatment Facilities	20% Increase in Methane Recovery at Wastewater Treatment Facilities
871 $MTCO_2e$	2,111 $MTCO_2e$	4,676 $MTCO_2e$

- Action IN-5.1.1: Evaluate the feasibility of biogas generation through methane recovery at the City's wastewater treatment plants.

IN-6: Resilient and Equitable Infrastructure

The sixth and final strategy of the Infrastructure focus area involves implementing measures that will improve the resilience of the variety of infrastructure types within the City, particularly related to the energy, water and wastewater, and transportation sectors. Though many of the measures and associated actions within this strategy are not intended to reduce GHG emissions, building resilience is an equally important goal for the CAP, which includes protecting and strengthening infrastructure within the City that so many residents and visitors rely on.

MEASURE IN-6.1: Improve energy sector resilience.

- Action IN-6.1.1: Ensure adequate utility system redundancy and backup power is available to maintain critical facilities where not already installed.
- Action IN-6.1.2: Integrate energy assurance actions into citywide planning processes to decrease vulnerability to grid outages during hazard events.
- Action IN-6.1.3: Partner with PG&E to identify and protect critical energy infrastructure in City from climate hazards.

MEASURE IN-6.2: Improve water and wastewater sector resilience.

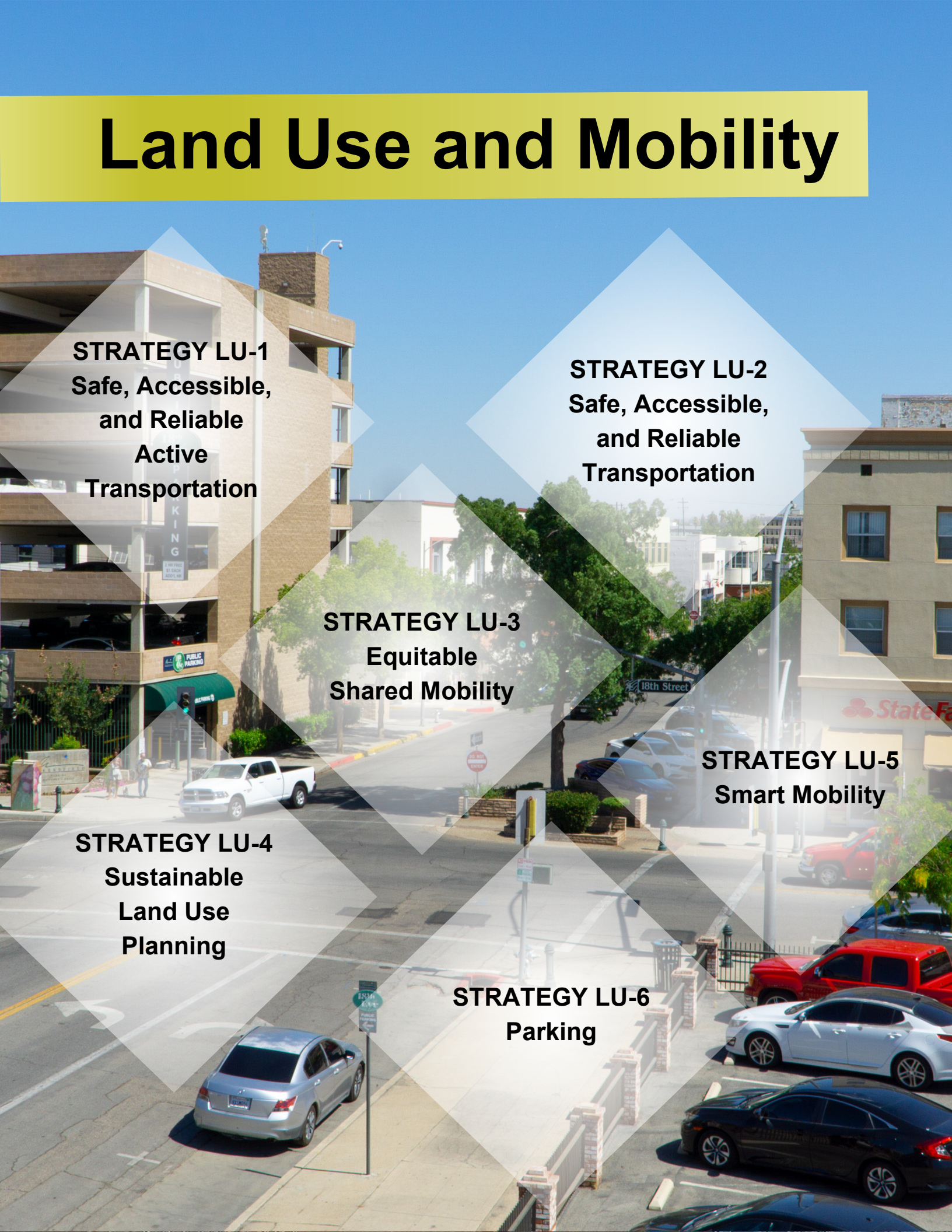
- Action IN-6.2.1: Collaborate with relevant local and regional agencies to protect vulnerable water and wastewater facilities to ensure an adequate clean water supply during emergencies and disaster recovery.
- Action IN-6.2.2: Upgrade water and wastewater systems to accommodate projected changes in water quality and availability such as intake systems that are too shallow, higher levels of water contaminants, and the potential need for greater water storage capacity.

- Action IN-6.2.3: Reduce reliance on external water supplies by shifting towards local sources of water such as greywater, rainwater, air conditioning condensate, and foundation drainage.
- Action IN-6.2.4: Inventory all sewer pump stations in the 100- and 500-year floodplain and identify priority facilities to upgrade to become more flood-resilient.
- Action IN-6.2.5: Incorporate the supervisory control and data acquisition (SCADA) system mechanism for pump lift stations.
- Action IN-6.2.6: Install backup generators for stormwater pump stations at critical locations throughout the City, including along highway construction projects and locations adjacent to residential neighborhoods.

MEASURE IN-6.3: Protect vulnerable transportation infrastructure, services, and systems from hazards exacerbated by climate change.

- Action IN-6.3.1: Coordinate with Kern COG, Golden Empire Transit, community-based organizations, and private entities to identify and protect local and regional transportation, transit, and active transportation corridors that are at risk from climate change impacts. Use the best available science and resilient design features to improve resiliency in transportation infrastructure.
- Action IN-6.3.2: Update transportation system maintenance protocols to incorporate climate vulnerabilities.
- Action IN-6.3.3: Pilot cool pavement initiatives and evaluate effectiveness post-implementation.

Land Use and Mobility



Strategies and Measures

The **Land Use and Mobility** focus area is a pivotal piece of this CAP. Decisions regarding the way land within the City is used and how people get around the City (i.e., mobility) provide significant opportunities for the City to build a more sustainable future and improve the quality of life of its residents. This focus area is divided into six overarching climate action strategies: **LU-1) Safe, Accessible, and Reliable Active Transportation**, **LU-2) Safe, Accessible, and Reliable Public Transportation**, **LU-3) Equitable Shared Mobility**, **LU-4) Sustainable Land Use Planning**, **LU-5) Smart Mobility**, and **LU-6) Parking**. These strategies and their respective measures and actions are outlined below.

LU-1: Safe, Accessible, and Reliable Active Transportation

The first strategy of the Land Use and Mobility focus area is related to improving the safety, accessibility, and reliability of active transportation options within the City. Active transportation refers to any form of human-powered transportation, such as walking, running, or even using any form of mobility assistance devices (e.g., bicycles, wheelchairs, scooters, skateboards). Investing in and prioritizing the betterment of active transportation systems and infrastructure could greatly reduce GHG emissions by making it more attractive for people to get around the City using these methods. Additionally, active transportation could result in a variety of co-benefits, such as air pollution prevention, advancing health equity, and improving quality of life, among others.

MEASURE LU-1.1: Improve pedestrian and biking infrastructure, prioritizing investments in disadvantaged communities.

2030 Target	2040 Target	2045 Target
7.6% Reduction in Existing Passenger Vehicle Miles Traveled (VMT)	Continuation of 7.6% Reduction in Existing Passenger VMT	Continuation of 7.6% Reduction in Existing Passenger VMT
53,535 $MTCO_2e$	52,842 $MTCO_2e$	53,223 $MTCO_2e$

- **Action LU-1.1.1**: Implement specific recommendations for improving pedestrian infrastructure included in the Downtown Bakersfield Pedestrian Access to Transit Plan.
- **Action LU-1.1.2**: Implement the recommended bike network projects identified in the Bakersfield Low Stress Bike Network Plan in coordination with Kern COG and Kern County.
- **Action LU-1.1.3**: Work with the California High-Speed Rail Authority to implement the three projects identified in the Downtown Bakersfield High-Speed Rail Station Area Plan that would create a "green loop" that forms a continuous active transportation network around downtown Bakersfield.
- **Action LU-1.1.4**: Adopt a Downtown Walkability Plan that identifies enhancements to the public realm, parking strategies, and wayfinding of the City, consistent with the Making Downtown Bakersfield Plan prior to the High-Speed Rail station opening.

MEASURE LU-1.2: Improve safety for pedestrians and cyclists.

- **Action LU-1.2.1**: Implement sidewalk improvements, high-visibility crosswalks, crossing improvements, and corridor improvements as specified in the Downtown Bakersfield Pedestrian Access to Transit Plan.

- Action LU-1.2.2: Work with Bike Bakersfield and Bakersfield City School District to initiate a local Safe Routes to School program to create safe, convenient, and fun opportunities for children to bicycle and walk to and from schools.
- Action LU-1.2.3: Work with Kern COG, local cities, school districts, and community-based organizations to launch a Vision Zero program for the region.
- Action LU-1.2.4: Create a wayfinding program, consistent with the Transformative Climate Communities Plan, to guide people who walk and bike through safe and improved routes to major destinations.
- Action LU-1.2.5: Adopt a Walkability Plan and/or Pedestrian Design Guidelines, consistent with the Transformative Climate Communities Plan, that seeks to improve street lighting, safer crosswalks, ADA compliance, and signage.
- Action LU-1.2.6: Implement projects that improve street safety identified in the City's Bicycle & Pedestrian Safety Plan, prioritizing improvements near schools and those serving students.

MEASURE LU-1.3: Improve access to bicycling through support services.

- Action LU-1.3.1: Install bicycle parking facilities at all public facilities including libraries and hospitals.
- Action LU-1.3.2: Work with SJVAPCD to develop a rebate program for e-bikes.
- Action LU-1.3.3: Support the development of the 4th Street Bike Kitchen, a publicly accessible bike shop with tools and trained staff to complete minor bike repairs.
- Action LU-1.3.4: Work with Bakersfield City School District to install secure bicycle parking at all elementary, middle, and high schools.

LU-2: Safe, Accessible, and Reliable Public Transportation

The second strategy in the Land Use and Mobility focus area, similar to the previous strategy, pertains to improving the safety, accessibility, and reliability of public transportation (rather than active transportation). Public transportation refers to forms of transportation, such as buses and trains, that are government-funded, charge set fares, run on fixed routes, and are available to the public. Utilizing public transportation options to get around, as opposed to driving personal vehicles, can significantly reduce GHG emissions. Prioritizing public transportation can help build a more sustainable future.

MEASURE LU-2.1: Improve reliability and convenience of transit services through increased frequency, expanded service areas, extended service hours, and better facilities. Prioritize improvements in disadvantaged communities.

2030 Target	2040 Target	2045 Target
15% Reduction in Existing Passenger VMT 77,621 $MTCO_2e$	Continuation of 15% Reduction in Existing Passenger VMT 65,984 $MTCO_2e$	Continuation of 15% Reduction in Existing Passenger VMT 63,987 $MTCO_2e$

- Action LU-2.1.1: Partner with Golden Empire Transit to expand the Downtown Golden Empire Transit Central Station with ridership upgrades and the addition of a customer service counter.
- Action LU-2.1.2: Work with Golden Empire Transit to expand on-demand service to underserved areas of the City.
- Action LU-2.1.3: Create a circulator shuttle service that provides bi-directional frequent, free, or low-cost connections between the High-Speed Rail station and downtown destinations as a supplement to regular Golden Empire Transit and Kern Transit bus service.
- Action LU-2.1.4: Work with Kern COG and Golden Empire Transit to develop Bus Rapid Transit corridors on Chester and California Avenues.
- Action LU-2.1.5: Work with Kern COG and transit agencies to develop a new Southeast Transit Center.
- Action LU-2.1.6: Evaluate the feasibility of developing a light rail system that connects disadvantaged communities to higher education and improved employment opportunities.
- Action LU-2.1.7: Collaborate with regional transit providers to increase shading and heat-mitigating materials at transit stops.
- Action LU-2.1.8: Add transit filters to the Pick Bakersfield website so that prospective businesses can filter locations by those that have easily accessible transit for employee commutes.

MEASURE LU-2.2: Identify alternate routes for transit in case of hazard-related closures.

- Action LU-2.2.1: Develop an online tool for riders to report hazards, potholes, and other issues for local jurisdictions to address as noted in the Kern County Active Transportation Plan.

LU-3: Equitable Shared Mobility

Equitable shared mobility, the third strategy in the Land Use and Mobility focus area, refers to improving shared-use vehicle or micro transit (e.g., scooters, bicycles) options in the City, prioritizing disadvantaged communities. Providing more shared mobility options will add redundancy to the various ways that people choose to get around the City, potentially increasing the accessibility of health services, food, education, and employment for residents that would not otherwise have a realistic way to get around efficiently. Additionally, increased use of shared mobility options will result in GHG emissions reductions.

MEASURE LU-3.1: Develop programs and incentives that promote shared mobility in disadvantaged communities and increase access to health services, food, education, and employment.

- Action LU-3.1.1: Work with Golden Empire Transit to explore expanding on-demand micro-transit services to underserved areas of the City.
- Action LU-3.1.2: Explore programs and funding to provide an EV car share program for underserved areas of the City that are not well served by transit.
- Action LU-3.1.3: Expand bike and scooter share services throughout the City.

LU-4: Sustainable Land Use Planning

Sustainable land use planning is the fourth strategy in the Land Use and Mobility focus area. Land use planning is driven by the need for improved management and a different pattern of land use, as dictated by changing circumstances. In the context of this CAP, sustainable land use planning refers to increasing residential density, prioritizing affordable housing development, and increasing the implementation of transportation demand strategies. Prioritizing these types of transit- and equity-focused measures will result in significant VMT and GHG reductions, and improve the long-term sustainability and resilience of the community.

MEASURE LU-4.1: Increase residential density near transit, prioritizing affordable housing development.

2030 Target	2040 Target	2045 Target
15% Reduction in New Passenger and Commercial VMT **54,086 $MTCO_2e$**	Continuation of 15% Reduction in New Passenger and Commercial VMT **95,326 $MTCO_2e$**	Continuation of 15% Reduction in New Passenger and Commercial VMT **118,386 $MTCO_2e$**

- Action LU-4.1.1: Spread awareness through public outreach to homeowners about the City's Accessory Dwelling Unit (ADU) incentive program that will offer grants and loans for the construction of ADUs.
- Action LU-4.1.2: Streamlining the permitting process and reducing parking requirements for affordable housing as an incentive, as outlined in the Transformative Climate Communities Plan.
- Action LU-4.1.3: Modify zoning to allow for denser, transit-oriented development near transit.

MEASURE LU-4.2: Increase implementation of transportation demand management strategies.

- Action LU-4.2.1: Develop downtown incentive zoning for the inclusion of shared mobility and other transportation demand management measures. Incentive zoning could include parking reduction or substitution, greater floor-to-area ratios, increased dwelling units, and greater height allowances.
- Action LU-4.2.2: Partner with Kern COG to promote vanpools by creating community vanpool programs that target workers at major job centers, including farmworker vanpools, employer-sponsored shuttles, and rural vanpool programs.
- Action LU-4.2.3: Work with Kern COG to support transportation demand management strategies such as subsidized transit passes for employees, parking cash-out programs, and guaranteed ride home programs.
- Action LU-4.2.4: Encourage ridesharing and voluntary employer-based incentives (programs such as Commute Kern's Guaranteed Ride Home program and SJVAPCD's Rule 9410 – eTRIP).
- Action LU-4.2.5: Create an incentive program for new development that provides destination facilities including, but not limited to, bike racks, public water stations, bike repair, and stroller parking.

LU-5: Smart Mobility

The fifth strategy of the Land Use and Mobility focus area is smart mobility. Reimagining transportation infrastructure used in everyone's daily lives to connect various elements of technology and mobility could help create a more sustainable City. Smart mobility emphasizes convenient and safe multimodal travel, speed suitability, accessibility, and efficient use of land. Additionally, it directly addresses climate change through VMT and GHG reduction, can advance social equity, and supports economic and community development.

MEASURE LU-5.1: Increase smart mobility throughout the City.

- Action LU-5.1.1: Develop and implement a Smart Mobility Strategic Plan that addresses ways in which smart mobility could be incorporated into the existing transportation system and existing economic base and targeted industries, as specified in the Bakersfield Economic Development Strategic Plan.
- Action LU-5.1.2: Develop a Smart Cities plan in conjunction with relevant stakeholders to leverage information and communication technologies and data to more intelligently and efficiently deliver City services, as identified in the Making Downtown Bakersfield Plan.
- Action LU-5.1.3: Continue efforts to implement smart mobility technologies to signals, parking, and shared vehicles (cars, bikes, scooters).
- Action LU-5.1.4: Seek creative solutions and opportunities to partner with other agencies and the private sector for on-demand shuttle services (including autonomous shuttles).

LU-6: Parking

The sixth and final strategy of the Land Use and Mobility focus area is related to parking. Surface parking lots, inherently, take up a lot of space and promote the utilization of passenger vehicles, rather than transit. Carefully and strategically evaluating the parking needs of the community to repurpose parking lots, especially ones that are underutilized or vacant, and to limit surface parking (e.g., around planned transit improvement areas) could encourage more sustainable ways of getting around the City.

MEASURE LU-6.1: Strategically evaluate the parking needs of the community and consider repurposing underutilized and vacant lots.

- Action LU-6.1.1: Create a downtown parking plan that limits surface parking, particularly around planned transit improvement areas.
- Action LU-6.1.2: Adopt a Shared Parking Ordinance to consolidate surface parking lots and prepare surplus sites for future development.
- Action LU-6.1.3: Form an agreement with the California High Speed Rail Authority to limit parking near the planned High Speed Rail Station.

Materials and Waste

Strategies and Measures

Materials and Waste serves as one of the focus areas of this CAP. The materials used in development, as well as reducing and managing waste in smarter ways, provide great opportunities for the City to meet its sustainability goals, while also promoting social equity and reducing GHG emissions. The three overarching climate action strategies within this focus area include: MW-1) Inorganic Waste Management and Reduction, MW-2) Organic Waste Management and Reduction, and MW-3) Zero- and Low-Carbon Development.

MW-1: Inorganic Waste Management and Reduction

The first strategy of the Materials and Waste focus area involves managing and reducing inorganic waste. Inorganic waste includes waste that does not contain organic compounds and thus is difficult to decompose (e.g., glass, aluminum, plastic). Additionally, the production and incineration of inorganic waste uses natural resources (e.g., water, fuel), which results in GHG emissions. Implementing measures that will increase recycling, reduce the generation of construction and demolition waste, and promote a circular economy can ensure that inorganic waste is reduced and managed more efficiently, and also helps achieve GHG emissions reductions from upstream production processes.

MEASURE MW-1.1: Increase recycling citywide.

- Action MW-1.1.1: Adopt an ordinance that requires recycling and composting services, the use of only recyclable and compostable materials by vendors, and adequate staff to ensure proper disposal and recycling at events that require a City-issued permit.
- Action MW-1.1.2: Partner with waste haulers to expand the diversion of non-food, non-construction, and non-demolition solid waste.
- Action MW-1.1.3: Continue to increase participation in, while simultaneously reducing contamination of, curbside and drop-off recycling programs for all residential, commercial, industrial, and institutional uses. Identify new drop-off opportunities and additional items that can be recycled curbside.
- Action MW-1.1.4: Provide education, audits, and other technical assistance to increase waste diversion rates. Develop waste reduction and diversion behavior campaigns in partnership with local organizations for residential, multifamily property managers, and commercial sectors.

MEASURE MW-1.2: Reduce the generation of construction and demolition waste.

- Action MW-1.2.1: Adopt a comprehensive construction and demolition ordinance to reach a 75 percent diversion rate.

MEASURE MW-1.3: Promote a circular economy.

- Action MW-1.3.1: Evaluate the feasibility of creating a reuse facility that makes building materials available to customers and acts as an outlet for reusable items otherwise destined for the landfill.
- Action MW-1.3.2: Create and support “fix-it clinics” at Parks and Recreation facilities and other City facilities that can build skills among local businesses and residents in innovation, repair, and reuse.

MW-2: Organic Waste Management and Reduction

Managing and reducing organic waste is the second strategy in the Materials and Waste focus area. Unlike inorganic waste, organic waste consists of any material that comes from a plant or animal, and thus, is biodegradable. Implementing measures related to increasing organic waste diversion across the City, as well as increasing edible food recovery, provide opportunities that would greatly reduce GHG emissions, as well as support disadvantaged communities that experience food insecurity.

MEASURE MW-2.1: Increase organic waste diversion citywide.

2030 Target	2040 Target	2045 Target
80% Waste Diversion Rate	85% Waste Diversion Rate	90% Waste Diversion Rate
158,715 $MTCO_2e$	240,532 $MTCO_2e$	319,625 $MTCO_2e$

- Action MW-2.1.1: Implement and enforce the requirements of Senate Bill 1383 and eliminate the disposal of compostable organic materials to landfills.
- Action MW-2.1.2: Expand existing organic waste collection routes and drop-off sites to improve composting services for interested residents and businesses.
- Action MW-2.1.3: Seek partnerships with schools to develop school composting programs and education.

MEASURE MW-2.2: Increase edible food recovery.

- Action MW-2.2.1: Partner with Kern County Public Health's Waste Hunger, Not Food program to redistribute food waste to disadvantaged communities.
- Action MW-2.2.2: Adopt an ordinance to ensure edible food generators, food recovery services, and food recovery organizations increase recovery rates of edible food. Work with local food security groups on ordinance design and implementation.

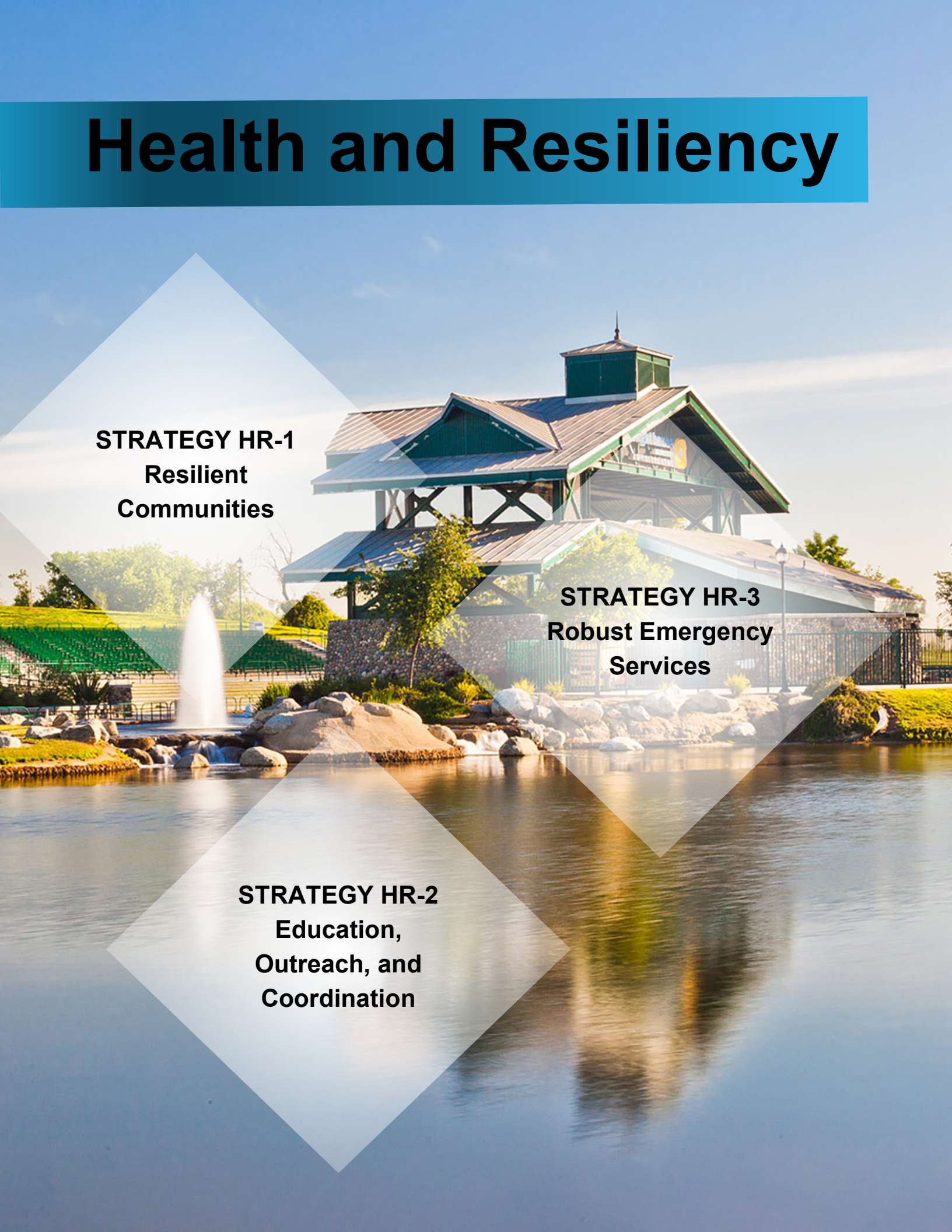
MW-3: Zero- and Low-Carbon Development

The third and final strategy of the Materials and Waste focus area is related to zero- and low-carbon development. Assuming the City's population grows over time, development is inevitably going to increase, and associated with it, GHG emissions. However, increasing the amount of sustainable materials (i.e., materials with lower carbon footprints) used in the construction of new development, such as low-carbon concrete, steel, and other key impact materials, can indirectly reduce GHG emissions.

MEASURE MW-3.1: Increase sustainable materials used in construction.

- Action MW-3.1.1: Adopt a reach code with the 2026 code cycle that requires new residential and nonresidential construction to use low-carbon concrete, steel, and other key impact materials.

Health and Resiliency



STRATEGY HR-1
Resilient Communities

STRATEGY HR-3
Robust Emergency Services

STRATEGY HR-2
Education, Outreach, and Coordination

Strategies and Measures

While promoting better public health outcomes and building community resilience are integrated throughout the CAP, embedded within strategies and measures that are primarily intended to reduce GHG emissions, these ideals are directly addressed within the Health and Resiliency focus area. This focus area is divided into three overarching climate action strategies: HR-1) Resilient Communities; HR-2) Education, Outreach, and Coordination; and HR-3) Robust Emergency Services. These strategies, along with their respective measures and actions, are outlined below.

HR-1: Resilient Communities

Establishing and building holistic community resilience, the first strategy in the Health and Resiliency focus area can help make sure that all populations within the City effectively adapt to climate change, but also promote equity and reaffirm the commitment to prioritizing the protection and prosperity of historically disadvantaged populations. Implementing measures related to establishing community resilience hubs, embedding climate resiliency and adaptation across planning efforts, ensuring basic needs are met for vulnerable populations, supporting local food production, and improving food security are key to achieving the goals of this strategy.

MEASURE HR-1.1: Establish community resilience hubs.

- Action HR-1.1.1: Pursue funding to establish resilience hubs in disadvantaged communities. Resilience hubs should be community centers that provide disaster preparation, cooling centers, evacuation centers, and resource resources.
- Action HR-1.1.2: Coordinate with Kern County to make cooling centers more accessible through expanded and flexible dates and hours, and a greater number of locations.

MEASURE HR-1.2: Embed climate resiliency and adaptation across planning efforts.

- Action HR-1.2.1: Integrate climate resiliency throughout long-term planning and current development projects.
- Action HR-1.2.2: Work with Kern County and surrounding jurisdictions to create a regional climate adaptation collaborative with support from the Alliance of Regional Collaboratives for Climate Adaptation.

MEASURE HR-1.3: Ensure basic needs are met for vulnerable populations.

- Action HR-1.3.1: Pursue grant funding to provide water refill stations at public facilities, parks, and bus shelters.
- Action HR-1.3.2: Explore opportunities to construct additional community facilities in underserved areas of the City.
- Action HR-1.3.3: Coordinate with local homeless services to ensure that emergency shelters are available during high hazard conditions.
- Action HR-1.3.4: Support healthcare facilities and services that assist underserved populations.

MEASURE HR-1.4: Support local food production and improve food security.

- Action HR-1.4.1: Support the Community Action Partnership of Kern to establish a food campus for businesses, food production, and food retail that would bring innovative approaches to food access and quality.
- Action HR-1.4.2: Support the development of community gardens in locations that will create access to fresh, healthy foods that would otherwise not be easily available to residents in Southeast Bakersfield.
- Action HR-1.4.3: Support the Salt and Pepper Farm Food Co-op to develop a cooperatively owned and operated farm, commissary kitchen, and grocery market in Southeast Bakersfield.
- Action HR-1.4.4: Support further development of farmers markets and other venues where locally grown produce and fresh foods can be sold in food-insecure areas of the City.

HR-2: Education, Outreach, and Coordination

The second strategy of the Health and Resiliency focus area is related to education, outreach, and coordination. Providing education and outreach programs to community members that emphasize preparedness to natural hazards (e.g., extreme heat, wildfire, flooding), and coordinating with the community to prioritize and implement community-driven solutions, especially in disadvantaged communities, can help improve overall community resilience in the context of climate change.

MEASURE HR-2.1: Develop an array of accessible outreach programs that emphasize natural hazard preparedness.

- Action HR-2.1.1: Develop a public outreach program for residents in wilderness-urban interface areas of the City to improve preparedness and reduce the risk of wildfires including improved website content and targeted outreach.
- Action HR-2.1.2: Develop neighborhood readiness plans and promote flood preparedness education.
- Action HR-2.1.3: Develop targeted outreach materials to raise awareness about risks associated with increased temperatures and extreme heat and ensure information is available in both English and non-English languages.

MEASURE HR-2.2: Prioritize community-based solutions to improve climate resilience.

- Action HR-2.2.1: Increase grant funding for community-driven project proposals, such as those outlined in the Transformative Climate Communities Plan, to improve overall community resiliency, with a focus on disadvantaged communities.

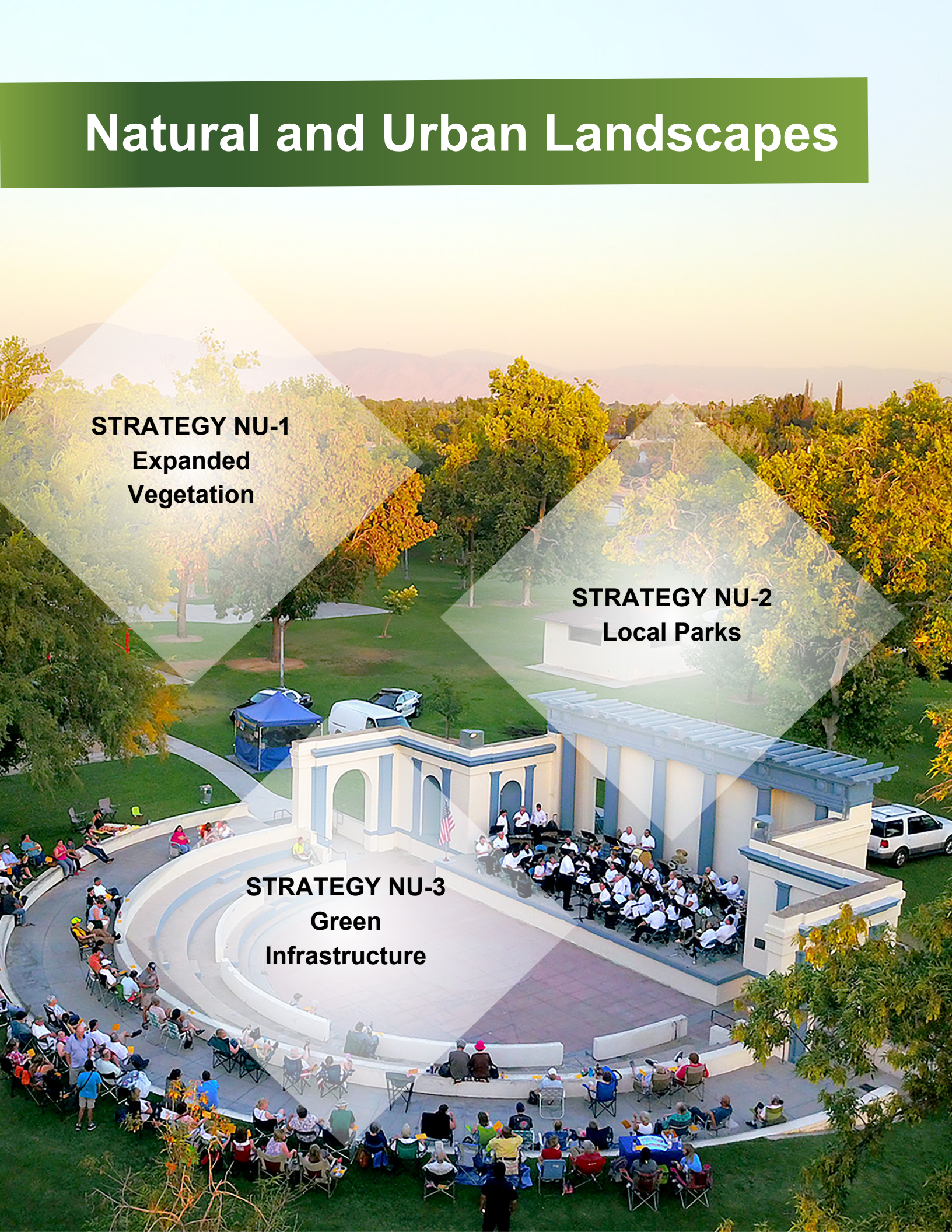
HR-3: Robust Emergency Services

The third and final strategy of the Health and Resiliency focus area is about ensuring the robustness of emergency services by ensuring their accessibility and adequate capacity. Emergency services are critical to the functionality and resilience of any community, especially in the context of climate change, which may worsen existing hazards or present new hazards completely.

MEASURE HR-3.1: Ensure accessibility and adequate capacity of emergency services.

- Action HR-3.1.1: Revise emergency management plans, programs, and activities to account for changing hazard profiles and their associated impacts.
- Action HR-3.1.2: Prioritize making emergency services more accessible, especially for vulnerable populations.
- Action HR-3.1.3: Encourage residents to register with the ReadyKern emergency notification system.
- Action HR-3.1.4: Maintain up-to-date emergency preparedness and evacuation plans and procedures in coordination with appropriate state, regional, county, and local agencies and departments.
- Action HR-3.1.5: Develop disaster documentation program to include tracking disasters affecting Bakersfield and tracking via photos of damage incurred during and after disaster events. This data can be used for tracking and trending, and ultimately mitigation planning.
- Action HR-3.1.6: Promote the Community Emergency Response Team (CERT) training program through the Kern County Fire Department to improve disaster preparedness and disaster response skills among City residents.

Natural and Urban Landscapes



Strategies and Measures

There are numerous benefits of trees, green space, and vegetation, especially in the context of a community. Whether its trees capturing and storing carbon from the atmosphere or providing shade on hot days, vegetation (e.g., bioswales) filtering stormwater and acting as a barrier for pollution, or open green spaces, such as parks, serving as a place for community members to meet and recreate, the benefits are numerous. These benefits serve as the foundation of the **Natural and Urban Landscapes** focus area, which is divided into three overarching climate action strategies: **NU-1) Expanded Vegetation**; **NU-2) Local Parks**; and **NU-3) Green Infrastructure.** These strategies and their respective measures and actions are presented below.

NU-1: Expanded Vegetation

The first strategy of the Natural and Urban Landscapes focus area is related to expanding vegetation. Whether it's trees or other forms, expanded vegetation can provide unique and notable benefits that would address both climate change mitigation and adaptation, along with furthering the broader sustainability goals of the community.

MEASURE NU-1.1: Increase urban tree canopy and green spaces to reduce heat island effect and improve air quality.

2030 Target	2040 Target	2045 Target
5,000 Trees Planted Annually	5,000 Trees Planted Annually	5,000 Trees Planted Annually
885 $MTCO_2e$	2,655 $MTCO_2e$	3,540 $MTCO_2e$

- **Action NU-1.1.1**: Partner with Tree Foundation of Kern and Tree Care Economics to create an Urban Tree Management Plan, including a tree inventory and maintenance plan. Assess the current composition and distribution of the City's trees and include information about tree characteristics, maintenance history, and management needs. Assess community needs for new trees for an enhanced urban tree canopy to ensure adequate shade and air pollution buffers.
- **Action NU-1.1.2**: Amend the zoning code to create tree planting standards for new and renovated development; require the planting of two trees in single-family development in the front, side, or rear yard as feasible; and create lineal landscaping standards for commercial development that identify a minimum number of tree plantings based on lineal frontage length.
- **Action NU-1.1.3**: Maximize tree potential in parking lot standards by amending the City's Landscaping Standards to be one tree to every 4 parking spaces when possible.
- **Action NU-1.1.4**: Develop a free residential yard tree program that prioritizes homes in disadvantaged communities.
- **Action NU-1.1.5**: Establish and implement a residential tree planting and replacement program for single-family homeowners.
- **Action NU-1.1.6**: Reduce heat gain from surface parking lots in new development for a minimum of 50 percent of the site's hardscape. Develop standards to provide shade from the existing tree canopy or from appropriately selected new trees that complement site characteristics and maximize drought tolerance.

- Action NU-1.1.7: Require new development to use high-albedo materials for walls, surfaces, driveways, parking lots, walkways, patios, and roofs.
- Action NU-1.1.8: Support the creation of community gardens on public and private lands by community groups by amending the zoning code to allow for urban agricultural uses.
- Action NU-1.1.9: Use tools such as CalEnviroScreen to determine priority pollution-burdened areas of the City that may benefit most from vegetative barriers and plant drought-tolerant vegetative barriers in these areas.

MEASURE NU-1.2: Implement widespread hazard-resistant vegetation.

- Action NU-1.3.1: Build bioswales and other vegetative stormwater treatment features for stormwater filtration and flood prevention.
- Action NU-1.3.2: Work with FEMA to update the City's flood zone map and use that information to decide where to add more parks or open space.
- Action NU-1.3.3: Increase the ability of plantings (e.g., natural areas, restoration sites, street and park trees, green streets, Eco roofs) to withstand drought conditions. Research and experiment with different plant palettes as appropriate.

NU-2: Local Parks

The second strategy of the Natural and Urban Landscapes focus area pertains to local parks. Parks provide spaces that all residents and visitors can enjoy, assuming that they are accessible and comfortable to all. Implementing actions related to improving the accessibility and comfort of parks would serve to better the quality of life of populations, protect and expand natural resources, and build community resilience.

MEASURE NU-2.1: Make parks more accessible and comfortable for all.

- Action NU-2.1.1: Require that the site planning, construction, and maintenance of new development preserve existing healthy trees and native vegetation on-site to the maximum extent feasible. Replace trees and vegetation not able to be saved.
- Action NU-2.1.2: Promote connectedness between communities and parks by improving transition points.
- Action NU-2.1.3: Provide more shade in local parks.
- Action NU-2.1.4: Revitalize and invest in parks near disadvantaged communities.
- Action NU-2.1.5: Increase the number of parks citywide, especially in disadvantaged communities.

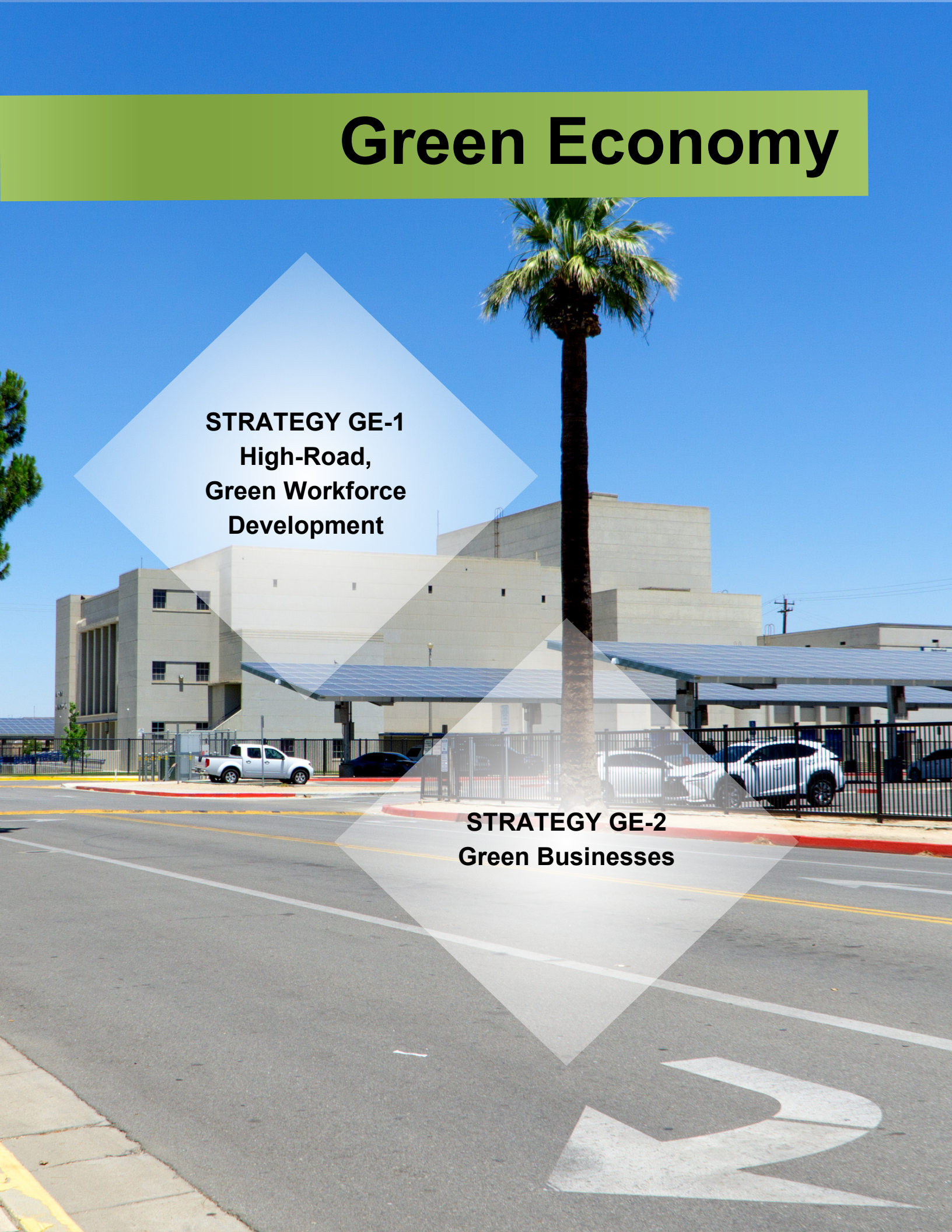
NU-3: Green Infrastructure

The third and final strategy in the Natural and Urban Landscapes focus area is about green infrastructure. Green infrastructure, as an alternative to "gray infrastructure" (e.g., manmade gutters, drains, pipes, and retention basins) which is often aging in many areas, refers to the range of measures that use plant or soil systems, permeable surfaces of substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or surface waters. Green infrastructure can help bolster community resilience and can provide additional environmental, social, and economic benefits.

MEASURE NU-3.1: Utilize green infrastructure to reduce the impacts of natural hazards and improve community resiliency.

- Action NU-3.1.1: Identify funding opportunities to support and implement a green infrastructure program to improve stormwater management, support biodiversity, reduce air pollution exposure, and increase access to natural spaces.
- Action NU-3.1.2: Develop permitting guidelines and best practices for green and vegetative roofs.
- Action NU-3.1.3: Support the use of green roofs to reduce runoff flow rates and volume, absorb and filter pollutants, supply green habitat and nesting areas, and help lower the urban heat island effect.
- Action NU-3.1.4: Fund and implement a green infrastructure program for the installation and maintenance of projects and existing civic resources such as the parks system and public spaces, to improve stormwater management, support biodiversity, reduce air pollution exposure, and increase access to natural spaces, including trees.

Green Economy



STRATEGY GE-1
High-Road, Green Workforce Development

STRATEGY GE-2
Green Businesses

Strategies and Measures

The Green Economy focus area is another critical component of this CAP. Though this focus area does not address climate mitigation or adaptation in the traditional sense, it does touch on each of them, perhaps indirectly, while also promoting equity, breaking down employment barriers, and seeking to advance economic development opportunities in a way that includes green jobs and supports a just transition. This focus area includes two overarching climate action strategies: GE-1) High-Road, Green Workforce Development; and GE-2) Green Businesses. These strategies, along with their associated measures, are presented below.

GE-1: High-Road, Green Workforce Development

The first strategy of the Green Economy focus area is related to green workforce development, specifically through developing training programs and pathways to employment in quality green jobs that prioritize people who have historically experienced barriers to employment. While this strategy is not directly related to reducing GHG emissions or climate adaptation, it does improve overall community resilience and aligns with longer-term sustainability goals and objectives.

MEASURE GE-1.1: Develop training programs and pathways to employment in quality green jobs that target workers experiencing barriers to employment.

- Action GE-1.1.1: Support California State University, Bakersfield (CSUB) in expanding the sustainability entrepreneurship training to include emerging clean technologies.
- Action GE-1.1.2: Support the Community Action Partnership of Kern to create an in-person and on-demand energy workforce training program.
- Action GE-1.1.3: Promote Kern Employment Training Resources that provide on-the-job training, work experience (including paid apprenticeships), educational programs, job search skills, job club, vocational training, career/ technical programs, job retainment for up to 90 days post-employment, and provide supportive services.
- Action GE-1.1.4: Partner with regional energy agencies to support contractor training and resident education on electric appliances and their installation and maintenance.

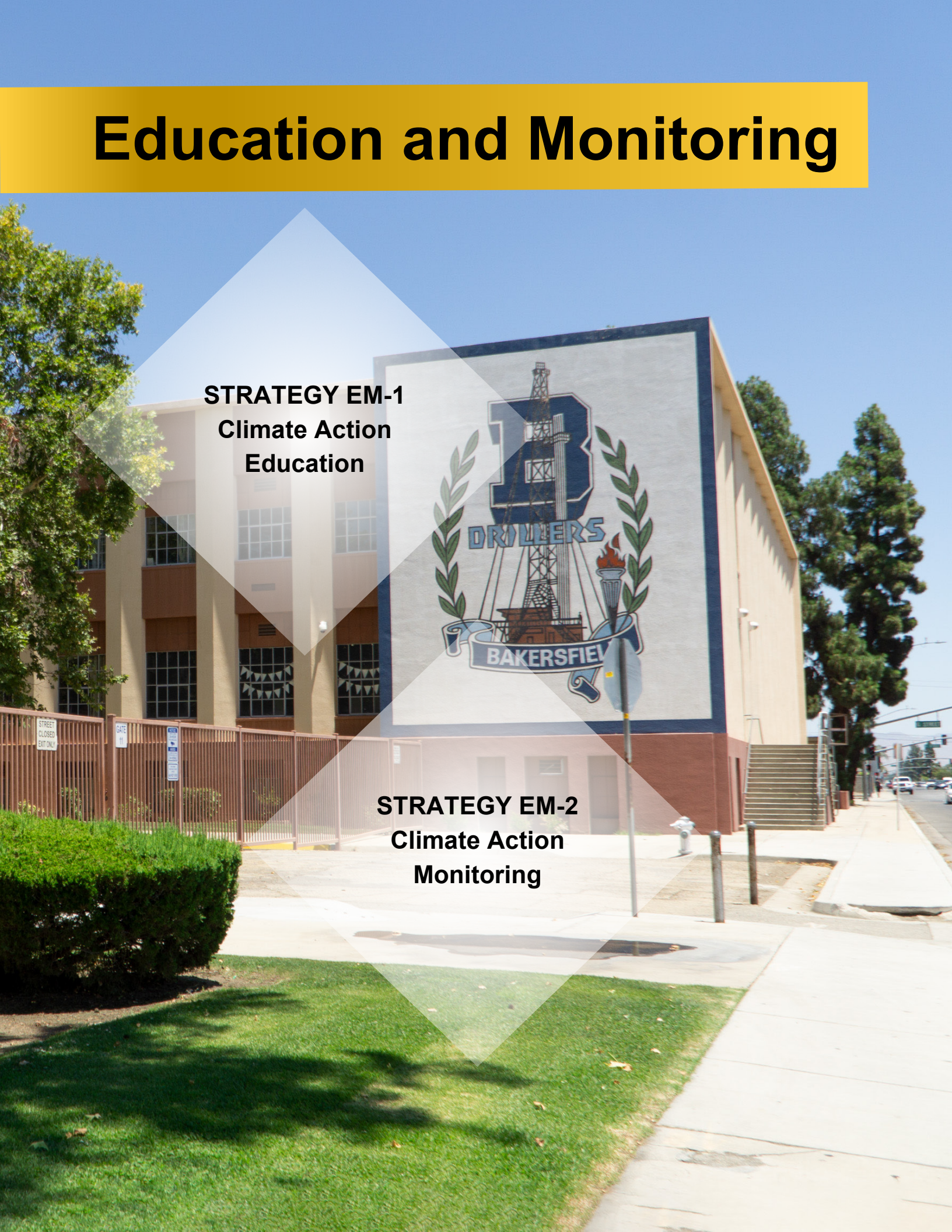
GE-2: Green Businesses

The second, and final, strategy of the Green Economy focus area pertains to supporting the development of green businesses and the transition to a clean economy. The City has many pre-existing, legacy strengths related to local jobs, particularly in the energy sector. However, as fossil fuels become increasingly phased out over time due to scarcity, new laws and regulations, or otherwise, the City has an opportunity to lead and innovate on a clean economy through renewable/alternative energy production and development, carbon capture and storage, and attracting other green businesses.

MEASURE GE-2.1: Support the development of green businesses and the transition to a clean economy.

- Action GE-2.1.1: Attract green industries through tax incentives, low-cost loan and grant programs, and regulatory guidance in coordination with B3K Prosperity.
- Action GE-2.1.2: Partner with CSUB and private sector partners to coordinate the planning and development of a technology park to serve as a focal point for clean technologies such as mobility innovation, renewable energy development, and carbon management.
- Action GE-2.1.3: Leverage the region's legacy oil and gas strengths by promoting opportunities to develop renewable biofuels and alternative energy production.
- Action GE-2.1.4: Support the development and deployment of carbon capture and storage technologies in industrial uses throughout the City.

Education and Monitoring



STRATEGY EM-1
Climate Action
Education

STRATEGY EM-2
Climate Action
Monitoring

Strategies and Measures

The final focus area of this CAP is **Education and Monitoring**. This focus area does not directly result in GHG emissions reductions but may lead to GHG emissions reductions through educating residents about various programs, incentives, and other opportunities intended to build a more sustainable and resilient community. Additionally, monitoring the implementation of the strategies, measures, and actions presented in this CAP, and providing updates to the citywide GHG emissions inventory, is crucial in determining what may or may not be working, in terms of reducing GHG emissions and/or building community resilience in the context of climate change. The two overarching climate action strategies within this focus area are: **EM-1) Climate Action Education**; and **EM-2) Climate Action Monitoring**. These strategies and their associated measures and actions are outlined below.

EM-1: Climate Action Education

The first strategy within the Education and Monitoring focus area is related to climate action education. This refers to increasing public awareness of climate-friendly actions that may be taken by residents and businesses to reduce GHG emissions and/or build resilience to climate change.

Measure EM-1.1: Increase public awareness of climate-friendly actions that can be taken by residents and businesses.

- **Action EM-1.1.1**: Develop community awareness and education programs around shared mobility, prioritizing proactive outreach to disadvantaged communities.
- **Action EM-1.1.2**: Develop community education programs around energy efficiency best practices and cost savings opportunities, prioritizing outreach to disadvantaged communities.
- **Action EM-1.1.3**: Promote energy efficiency incentives and opportunities, such as the City's Property Assessed Clean Energy program, through a newly created Green Building Program hosted by the City's Building Division.
- **Action EM-1.1.4**: Support Kern COG in conducting a public outreach campaign to educate the residents on the environmental and financial benefits of EVs.
- **Action EM-1.1.5**: Educate residents about the federal Affordable Connectivity Program.
- **Action EM-1.1.6**: Enhance awareness of local and regional recycling opportunities. Educate residents and business owners about opportunities (e.g., drop-off services) to properly dispose of, or recycle, electronic waste (e-waste).
- **Action EM-1.1.7**: Develop programs to educate the community on composting best practices to increase the use of curbside green organic recycling bins.

EM-2: Climate Action Monitoring

The second, and final, strategy of the Education and Monitoring focus area is related to monitoring the implementation of CAP actions and conducting updates to the citywide GHG emissions inventory every three years to measure progress. These activities will not directly reduce GHG emissions or improve community resilience to climate change, but they will provide useful insights as to what may or may not be working regarding implementation. Identifying strengths and gaps will allow for the City government to continue implementing actions that are achieving their goals, but also to revise and/or replace actions that are not meeting their expectations.

Measure EM-2.1: Monitor implementation of CAP actions to reduce GHG emissions and enhance resiliency in Bakersfield.

- Action EM-2.1.1: Conduct updates of the citywide GHG emissions inventory every three years to monitor the progress of GHG-reducing actions.
- Action EM-2.1.2: Provide annual progress reports to the Bakersfield City Council on the implementation of CAP actions.


LOCAL HOSPITALS SUPPORT
KEEP OUR CITY OPEN
WASH YOUR HANDS OFTEN
AT WORK | AT PLAY
25 TH ST
1500
CHESTER AVE
2500

Chapter 6

6 IMPLEMENTATION AND MONITORING

This chapter outlines actions that the City government will take to implement Climate Action Plan (CAP) strategies and measures, and it describes the process for assessing and monitoring progress over time to ensure the CAP is effective in reducing emissions and improving resilience to climate change. This chapter also discusses the application of the CAP for future development projects and provides potential funding resources to support implementation.

6.1 IMPLEMENTATION STRATEGY

Effective implementation of the CAP will require ongoing management and oversight. To gauge progress over time, it will also require updates to the greenhouse gas (GHG) emissions inventory and Vulnerability Assessment conducted by the City government. Ensuring that the measures identified in the CAP result in emissions reductions and resilience improvements is central to the success of the CAP. Achieving these goals will require investments and long-term commitments from the City government as well as participation from staff. The success of CAP implementation will also depend on the participation of residents, businesses, and other stakeholders in the City of Bakersfield (City) and region.

To help guide the implementation of CAP actions, the City government developed a prioritization matrix. Each action was evaluated in the prioritization matrix to generate a prioritization score based on a variety of criteria. These criteria included GHG reduction potential, climate resilience potential, cost-effectiveness, technological feasibility, consistency with current policies or ordinances, jurisdictional control/ease of implementation, timeframe of implementation, and associated co-benefits. Each of these criteria is described in further detail below. After CAP adoption, the prioritization matrix and scores will help City government staff determine which actions should be implemented and when, which will contribute to the effectiveness of the CAP.

6.1.1 Prioritization Evaluation Factors

The following criteria were used to develop a prioritization score for each CAP action.

- GHG Reduction Potential was evaluated quantitatively for each emissions reduction action using the results of the City government's GHG emissions reduction quantification analysis, which was conducted in preparation of the CAP (see Appendix A for more details). Each action was assigned a score of 4, 6, or 8, which correspond to a small, medium, or high GHG reduction potential, respectively. A score of 4 (small) was assigned to actions that would result in a 0 to 2 percent reduction in community emissions in 2030. A score of 6 (medium) was assigned to actions that would reduce emissions by 3 to 5 percent in 2030, and a score of 8 (high) was assigned to actions that would result in at least a 5 percent reduction in community emissions in 2030. It is important to note that the scores associated with this criterion are higher than those used for other criteria; this decision was made to increase the weight (i.e., importance) of each action's GHG reduction potential relative to other criteria in the prioritization process. Lastly, emissions reductions in the quantification analysis were evaluated at the measure level, rather than for each action, to capture the cumulative impact of multiple complementary actions and/or because some measures only include one action. Therefore, the GHG emissions reduction potential score for a measure was applied to each action under that measure.
- Climate Resilience Potential was evaluated qualitatively, and each action was assigned a score of 0 or 1. A score of 0 was assigned to actions that either do not impact the resilience of the City, people, and/or ecosystems to climate-related disruptions or it is unclear whether the action will have an impact on resilience. A score of 1 was assigned to actions that increase the resilience of the City, people, and ecosystems to climate-related disruptions. For example, Action NU-3.1.3, which scored 1, supports the use of green roofs for the purpose of lowering the urban heat island effect, among other intents, which can help make the City's populations and buildings more resilient to extreme heat, a hazard that will continue to be exacerbated by climate change.
- Cost-Effectiveness was evaluated qualitatively, and each action received a score of -2, -1, 0, 1, or 2 for City government cost-effectiveness, or a score of -2, 0, or 2 for residential and business cost-effectiveness. For City cost-effectiveness, a score of -2 or -1 was assigned to an action if implementation costs significantly or slightly outweigh, respectively, the long-term financial benefits to the City government; a score of 0 was assigned to an action if the long-term financial benefits match implementation costs to the City government or the overall cost-effectiveness is unclear; and a score of 1 or 2 was assigned to an action if long-term financial benefits slightly or significantly outweigh, respectively, implementation costs to the City government. The same scoring criteria were applied to residential and business cost-effectiveness, but with scores of -2, 0, or 2.
- Technological Feasibility scoring was determined for each action based on the availability of necessary technology or other resources (e.g., funding) for successful implementation and achievement of the action's intended goal. Actions received a score of -2, 0, or 2. A score of -2 was assigned to actions where technology or resources needed for implementation are not readily available and are not on track to be deployed in the specified timeframe. For example, Action GE-2.1.4, which involves the development and deployment of carbon capture and storage technologies for industrial uses throughout the City, received a score of -2. A score of 0 was assigned to actions where technology or resources needed for implementation are either on track to be deployed in the specified timeframe, are in pilot stages, or the status of technology or resources is unclear. For example, Action IN-1.3.2, which encourages non-municipal public service facilities, such as hospitals, to develop renewable microgrids, received a score of 0. A score of 2 was assigned to actions where technology or resources currently exist and have already been deployed at a broad scale; the vast majority of actions received this score.
- Current Policies or Ordinances considered whether existing City government policies or ordinances that would support the implementation of an action are currently in place. If City government policies or ordinances currently exist that would prohibit an action, a score of -2 was assigned. If City government policies or ordinances would need to be developed to support an action, or it was unknown whether City government

policies or ordinances currently exist to support an action, a score of 0 was assigned. If City government policies or ordinances currently exist to support an action, a score of 2 was assigned. Where City government policies or ordinances did not exist, but either other City initiatives (e.g., established programs) or State regulations did exist, these actions also received a score of 2. For example, Action LU-1.2.6, which involves implementing projects that improve street safety identified in the City's Bicycle & Pedestrian Safety Plan, prioritizing improvements near schools and those serving students, received a score of 2.

- Jurisdictional Control / Ease of Implementation was rated on a scale of 1 to 3 and represents the City government's ability to achieve the overall objective of an action. A score of 1 was assigned to actions where the City government would only be able to influence—through encouragement, support, or similar effort—the success of the intended goal. Under Action BE-2.1.1, for example, the City government would work with the Pacific Gas and Electric Company (PG&E) and community-based organizations to provide free energy audits of existing buildings, prioritizing low-income neighborhoods, so this action received a score of 1 due to the City government's influencing role. When the City government could require the desired outcome of an action through regulation and/or enforcement, a score of 2 was assigned. Actions that involved the City government developing a program, creating a partnership, or engaging in a similar initiative also received a score of 2, such as Action EM-1.1.7, which involves the City government developing programs to educate the community on composting best practices to increase the use of curbside organic recycling bins. Lastly, a score of 3 was given to actions where the City government would be the primary actor and would have direct authority over the implementation and success of the action. For example, Action HR-2.1.3, which involves developing targeted outreach materials to raise awareness about risks associated with increased temperatures and extreme heat and ensuring information is available in multiple languages, received a score of 3 due to the City government's role as the primary actor.
- Implementation Timeframe evaluated the amount of time that it would take for an action to be initiated (not necessarily operational). This criterion was scored on a scale of 0 to 2, with the scoring favoring actions that could be initiated quickly. Actions that would take at least 6 years to initiate received a score of 0, while actions that would be initiated in 3 to 5 years received a score of 1. Actions that could be initiated in 1 to 2 years were assigned a score of 2. Actions that involve the City government encouraging or supporting initiatives received a score of 2 because of the ease of implementation, while those that would require the City government to create and implement a program, develop an ordinance, or install infrastructure received a score of 1.
- Co-benefits include benefits to renters, improved equity, air pollution prevention, health and well-being benefits, increased reliability of critical infrastructure and services, community prioritization, job development, and resource preservation. Each co-benefit was scored on slightly different scales. For example, equity was scored as either a 0 or a 2—0 if the action neither enhances nor decreases health and racial equity, and 2 if the action does enhance health and racial equity. Other co-benefits, such as air pollution prevention, scored on a scale of -1 to 1. Some other scoring scales were also used. A full breakdown of the prioritization framework and the scoring systems used for each criterion can be found in Appendix A.

6.2 PRIORITIZATION MATRIX

Based on the prioritization evaluation approach described above, the maximum score for each action was 32. To enable the City government to focus on and feasibly implement high-priority actions, a minimum score of 22 was chosen as the threshold for the inclusion of an action in the CAP. The 30 actions with scores equal to or greater than 22 are included in the summarized prioritization matrix below, which presents each action's overall prioritization score and the City government department responsible for implementation. The full prioritization matrix with all factor scores can be found in Appendix A. Details regarding monitoring, ongoing engagement, and potential funding sources are included in the sections following the matrix.

Though not all focus areas of the CAP are represented in the matrix below, the ultimate success of the CAP will depend on holistic implementation of actions, inclusive of ones not presented here.

Measure	Action	Prioritization Score	Implementing Department
BUILDINGS			
STRATEGY BE-1 CLEAN AND RENEWABLE ENERGY			
Measure BE-1.2: Decarbonize existing residential and nonresidential buildings.	**Action BE-1.2.1:** Adopt a reach code for the 2026 California Building Energy Efficiency Standards code cycle that prohibits the installation of natural gas infrastructure in new development (residential and nonresidential).	22	Building Division
INFRASTRUCTURE			
STRATEGY IN-1 CLEAN AND RELIABLE ENERGY			
Measure IN-1.1: Transition to 100 percent clean electricity.	**Action IN-1.1.1:** Adopt a reach code with the 2026 code cycle that requires all new residential and nonresidential buildings to generate on-site, renewable energy to meet anticipated energy consumption of the building, as feasible.	28	Building Division
	Action IN-1.1.2: Work with Kern County, local cities, and the California Community Choice Association to develop a local community choice aggregation program that provides locally sourced clean electricity for all Bakersfield residents and businesses to opt into.	27	City Manager's Office, Economic & Community Development
	Action IN-1.1.3: Eliminate local regulatory barriers to installation of distributed renewable energy systems, such as wind and solar, through revisions to the zoning code and other relevant City policies.	23	Planning Division
	Action IN-1.1.4: Provide guidelines for the permit application process for renewable energy generation installation (e.g., solar photovoltaics) in residential and nonresidential development.	22	Planning Division, Building Division

Measure	Action	Prioritization Score	Implementing Department
STRATEGY IN-2 LOW- AND ZERO-EMISSION VEHICLES			
Measure IN-2.1: Increase electric vehicle (EV) charging infrastructure.	**Action IN-2.1.1:** Adopt an EV charging reach code with the 2026 code cycle to increase levels of EV readiness in new residential and nonresidential development beyond the minimum mandatory levels established in CALGreen.	25	Building Division
	Action IN-2.1.2: Install EV charging infrastructure throughout the City consistent with the deployment schedule in the Kern County Electric Vehicle Charging Station Blueprint.	27	Public Works
	Action IN-2.1.4: Install EV charging stations and preferred parking for EVs at public facilities, parks, and other high-use parking areas throughout the City.	25	Public Works
STRATEGY IN-4 WATER CONSERVATION			
Measure IN-4.1: Reduce water consumption in buildings.	**Action IN-4.1.1:** Continue to promote water conservation incentives such as appliance and plumbing rebates and water conservation kits in partnership with California Water Services.	22	Water Resources
LAND USE AND MOBILITY			
STRATEGY LU-1 SAFE, ACCESSIBLE, AND RELIABLE ACTIVE TRANSPORTATION			
Measure LU-1.1: Improve pedestrian and biking infrastructure, prioritizing investments in disadvantaged communities.	**Action LU-1.1.1:** Implement specific recommendations for improving pedestrian infrastructure included in the Downtown Bakersfield Pedestrian Access to Transit Plan.	27	Public Works
	Action LU-1.1.2: Implement the recommended bike network projects identified in the Bakersfield Low Stress Bike Network Plan in coordination with Kern COG and Kern County.	27	Public Works
	Action LU-1.1.3: Work with the California High-Speed Rail Authority to implement the three projects identified in the Downtown Bakersfield High-Speed Rail Station Area Plan that would create a “green loop” that forms a continuous active transportation network around downtown Bakersfield.	26	Economic & Community Development, Planning Division, City Manager’s Office
	Action LU-1.1.4: Adopt a Downtown Walkability Plan that identifies enhancements to the public realm, parking strategies, and wayfinding of the City, consistent with the Making Downtown Bakersfield Plan prior to the High-Speed Rail station opening.	24	Planning Division

Measure	Action	Prioritization Score	Implementing Department
Measure LU-1.2: Improve safety for pedestrians and cyclists.	**Action LU-1.2.1:** Implement sidewalk improvements, high-visibility crosswalks, crossing improvements, and corridor improvements as specified in the Downtown Bakersfield Pedestrian Access to Transit Plan.	23	Public Works
	Action LU-1.2.6: Implement projects that improve street safety identified in the City's Bicycle & Pedestrian Safety Plan, prioritizing improvements near schools and those serving students.	22	Public Works
STRATEGY LU-2 SAFE, ACCESSIBLE, AND RELIABLE TRANSPORTATION			
Measure LU-2.1: Improve reliability and convenience of transit services through increased frequency, expanded service areas, extended service hours, and better facilities. Prioritize improvements in disadvantaged communities.	**Action LU-2.1.1:** Partner with Golden Empire Transit to expand the Downtown Golden Empire Transit Central Station with ridership upgrades and the addition of a customer service counter.	24	Planning Division, Economic & Community Development
	Action LU-2.1.2: Work with Golden Empire Transit to expand on-demand service to underserved areas of the City.	23	Economic & Community Development, City Manager's Office
	Action LU-2.1.3: Create a circulator shuttle service that provides bi-directional frequent, free, or low-cost connections between the High-Speed Rail station and downtown destinations as a supplement to regular Golden Empire Transit and Kern Transit bus service.	23	Planning Division, Economic & Community Development
	Action LU-2.1.4: Work with Kern COG and Golden Empire Transit to develop Bus Rapid Transit corridors on Chester and California Avenues.	23	Planning Division, Public Works
	Action LU-2.1.5: Work with Kern COG and transit agencies to develop a new Southeast Transit Center.	23	Planning Division, Economic & Community Development
STRATEGY LU-4 SUSTAINABLE LAND USE PLANNING			
Measure LU-4.1: Increase residential density near transit, prioritizing affordable housing development.	**Action LU-4.1.1:** Spread awareness through public outreach to homeowners about the City's ADU incentive program that will offer grants and loans for the construction of ADUs.	22	Economic & Community Development
	Action LU-4.1.2: Streamlining the permitting process and reducing parking requirements for affordable housing as an incentive, as outlined in the Transformative Climate Communities Plan.	23	Building Division
	Action LU-4.1.3: Modify zoning to allow for denser, transit-oriented development near transit.	23	Planning Division

Measure	Action	Prioritization Score	Implementing Department
Measure LU-4.2: Increase implementation of transportation demand management strategies.	**Action LU-4.2.1:** Develop downtown incentive zoning for the inclusion of shared mobility and other transportation demand management measures. Incentive zoning could include parking reduction or substitution, greater floor-to-area ratios, increased dwelling units, and greater height allowances.	22	Planning Division
STRATEGY LU-5 SMART MOBILITY			
Measure LU-5.1: Increase smart mobility throughout the City.	**Action LU-5.1.1:** Develop and implement a Smart Mobility Strategic Plan that addresses ways in which smart mobility could be incorporated into the existing transportation system and existing economic base and targeted industries, as specified in the Bakersfield Economic Development Strategic Plan.	22	Economic & Community Development
MATERIALS AND WASTE			
STRATEGY MW-2 ORGANIC WASTE MANAGEMENT AND REDUCTION			
Measure MW-2.1: Increase organic waste diversion citywide.	**Action MW-2.1.1:** Implement and enforce the requirements of SB 1383 and eliminate disposal of compostable organic materials to landfills.	23	Public Works
	Action MW-2.1.2: Expand existing organic waste collection routes and drop-off sites to improve composting services for interested residents and businesses.	24	Public Works
NATURAL AND URBAN LANDSCAPES			
STRATEGY NU-1 EXPANDED VEGETATION			
Measure NU-1.1: Increase urban tree canopy and green spaces to reduce heat island effect and improve air quality.	**Action NU-1.1.3:** Maximize tree potential in parking lot standards by amending the City's Landscaping Standards to be one tree to every 4 parking spaces when possible.	23	Planning Division
	Action NU-1.1.4: Develop a free residential yard tree program that prioritizes homes in disadvantaged communities.	22	Public Works, Economic & Community Development
	Action NU-1.1.5: Establish and implement a residential tree planting and replacement program for single-family homeowners.	22	Public Works, Economic & Community Development

6.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT

Implementation of the CAP will require that new development is constructed with more sustainable and low-carbon features than existing development. New development projects that are consistent with the growth projections and applicable GHG reduction measures in the CAP are eligible for California Environmental Quality Act (CEQA) streamlining, per the provisions of State CEQA Guidelines Section 15183.5. Under these provisions, a project that is subject to discretionary review and is consistent with the City government's 2045 General Plan Update growth projections can show consistency with applicable GHG reduction measures in the CAP, and the level of analysis for the project required under CEQA can be streamlined. Furthermore, a project's incremental contribution to cumulative GHG emissions may be determined not to be cumulatively considerable in such cases.

The "qualified" CAP will allow project-specific environmental documents, if eligible, to tier from and/or incorporate by reference the CAP's programmatic review of GHG impacts in their cumulative impact analyses. The CAP meets the requirements under Section 15183.5 of the State CEQA Guidelines as a qualified plan for the reduction of GHG emissions for use in cumulative impact analysis pertaining to new development projects. Details on how projects can demonstrate consistency with the CAP will be provided on the City government's website, with guidelines and a consistency review checklist.

The consistency review checklist is the mechanism that is used to demonstrate consistency with the CAP and contains GHG reduction measures applicable to development projects that are required to be implemented on a project-by-project basis to ensure that the specified emissions targets identified in the CAP are achieved. New development projects will need to incorporate all applicable CAP measures to demonstrate consistency with the CAP. These measures will be enforced as conditions of approval for ensuring that compliance can be confirmed before the project can be implemented.

6.4 MONITORING AND UPDATES

The City government will begin implementing CAP measures and actions upon adoption, and data tracking will begin in the year following. As measures are implemented, the effects on emissions trends and climate resilience in the City will necessitate CAP maintenance and updates to ensure relevancy and effectiveness. Therefore, City government staff will need to evaluate and monitor CAP performance over time and alter or amend the plan if it is not achieving the desired outcomes. This will include conducting periodic GHG emissions inventories and vulnerability assessment updates, as well as analyzing individual action performance.

City government staff will evaluate the performance of each action that has been implemented. This entails monitoring the level of community participation, costs, benefits, effectiveness, and barriers to implementation, as well as actual reductions in GHG emissions and/or resilience-related improvements in the community. By evaluating whether the implementation of an action is on track to achieve its objective, the City government can identify successful actions and reevaluate or replace underperforming measures.

City government staff will prepare a monitoring report annually and a GHG emissions inventory and vulnerability assessment update every 3 years. This report will provide updates on CAP progress, including the status of actions implemented to achieve GHG reductions and/or improve resilience, as well as other important milestones in the CAP implementation process. As technologies and markets change and the City government implements the actions in the CAP, these reports will be used to track progress and identify actions that need to be improved, adjusted, or removed. The report will also be used for periodic presentations to the City Council about implementation progress on actions and overall progress towards CAP objectives. The report would also serve to provide transparency and promote engagement with the public for CAP implementation.

Finally, the City government will prepare an update to the plan every 5 years, beginning in 2028. Updates would reflect the findings and recommendations of the monitoring reports and inventory updates. Future updates are necessary to account for any new State or federal legislation that may affect the CAP and to focus on measures and actions that may have been difficult to implement previously due to a lack of available technologies or high upfront implementation costs.

6.5 ONGOING ENGAGEMENT

Continued engagement with and active participation by the community is critical for successful implementation of the CAP. As the City government implements and monitors CAP actions, involvement with residents and businesses, community organizations, developers, property owners, and other local, regional, and State agencies will ultimately guide the City government's action implementation and promote achievement of CAP objectives. While a handful of actions will be led solely by the City government, many will require partnerships and collaboration.

Effective and long-term climate action and resilience building in the community depends on efforts that continue to change the way individuals interact with the environment. Numerous measures require participation from residents and visitors to fully implement, and the City government is committed to continuing its outreach efforts through CAP implementation, monitoring, and future plan updates. Many of the measures in Chapter 5 are focused on increasing community awareness and participation in existing programs and connecting the community with new information, tools, funding, or resources.

Vulnerable populations typically experience disproportionate impacts of climate change relative to the rest of the community. Following CAP adoption, addressing some of these climate inequities in the form of more prominent engagement with vulnerable communities will be a high priority. The City government is committed to overcoming the barriers of engagement with frontline communities, such as lack of access to technology and language barriers, to ensure a more equitable implementation process.

6.6 FUNDING AND FINANCING OPPORTUNITIES

The City government will incur costs to implement some of the measures and actions included in the CAP. These include initial start-up, ongoing administration, staffing, and enforcement costs. Capital improvement, investment, and increased operation and maintenance costs will be required for successful CAP implementation. While some measures will only require funding from the City government and other public entities, others would result in cost impacts for businesses, developers, and residents. However, in general, implementation of CAP measures and actions will result in substantial cost savings for the City government, residents, and business owners in the long term.

Noting that the City government will incur some costs related to CAP implementation, there are other funding options available from a variety of sources, including regional and State agencies and organizations. A summary of some common funding and financial mechanisms, along with respective potential opportunities, is presented in Table 6.1. It is important to note that the potential opportunities listed below are subject to change, are not all-encompassing, and should serve as examples of the types of opportunities that the City government can seek related to funding CAP actions. Aside from these potential opportunities, the City government will be proactive in seeking additional cost-effective implementation and strategic funding opportunities. For example, the State's Climate Change Funding Wizard website, which provides the most up-to-date information on funding opportunities for projects related to climate change mitigation and adaptation, serves as an excellent tool the City government can use to search for new funding sources.

Table 6.1 Implementation Funding and Financial Mechanisms and Potential Opportunities

Funding/Financial Mechanism Description	Potential Opportunities
Grants	
Grants can provide a substantial source of repayment-free capital if jurisdictions have the staff capacity to invest in grant management. Grants make the most sense for jurisdictions with the necessary staff capacity to track grant opportunities, craft meaningful proposals that link to the goals and mission of the donors, submit applications, and track results required for ongoing reporting.	▶ California Governor's Office of Planning and Research Integrated Climate Adaptation and Resiliency Program Grants ▶ California Department of Resources, Recycling, and Recovery (CalRecycle) Grants ▶ State Transportation Grants ▶ US Department of Energy Energy Efficiency and Conservation Block Grant Program
Partnerships	
Partnerships often tap resources and secure capital from non-governmental and corporate actors, which can spread the cost of a project across multiple public, private, and/or nonprofit entities. Partnerships allow the city government to share ownership of an action put forth in the CAP, while also sharing possible cost savings and revenue generation with a third party.	▶ Golden Empire Transit District ▶ Pacific Gas and Electric Company ▶ Kern Council of Governments ▶ Tree Foundation of Kern ▶ California State University, Bakersfield
Loans	
Loans give cities access to upfront capital, whose principal and interest must be repaid over the duration of the loan. While the city government should first consider grants and private partners that can provide repayment-free capital for implementation of CAP actions, when those pathways are unavailable, loans are a dependable alternative. In many cases, municipal borrowers and impact-driven projects can find financing with low-interest rates.	▶ Infrastructure State Revolving Fund Program Loans ▶ Energy Conservation Assistance Act Low-Interest Loans ▶ Affordable Housing and Sustainable Communities Program Loans ▶ State Water Resources Control Board Loans
Bonds	
Bonds provide dependable, predictable financing for cities looking to capitalize large infrastructure projects ranging from millions to billions of dollars. A city can issue a bond directly or apply for funds from a state bonding program. These bonds can be backed either by general city funds, or specific revenue sources. There are multiple types of bond structures including general obligation, revenue, and conduit bonds, as well as certifications like "green" bonds for climate and sustainability that communicate what types of projects bond proceeds are being used for.	
Budget	
Budget refers to using money in the city government's general fund to capitalize projects. Every year, cities collect tax revenue and other fees to populate their general funds, portions of which are appropriated to new capital projects and infrastructure investments. However, financial mechanisms beyond budget must begin covering a larger share of the load, and other financial mechanisms should be fully explored before cities turn to budget funding. There are also opportunities for climate action to take higher priority in cities' budgeting processes and for city budgets to fund appropriate climate-related expenditures. If using city budget is an option, well-suited projects tend to have total costs that are small enough to fit into 1 to 3 years of the city's budget, and/or have costs incurred in a dispersed manner, ideally evenly distributed over a number of years or decades, like the costs of staffing for a new program.	
Taxes and Fees	
Taxes and fees, as well as cost savings and other revenues, can create flows of capital to fund climate action. Most often, however, ongoing revenue generation is not earmarked for a particular project and is accumulated in a savings account. Rather, new revenue flows are funneled into cities' general funds, or leveraged through financing, as is the case with revenue bonds. Revenue generation via taxes and fees makes sense for cities that have not significantly raised taxes or fees on residents in the past year or two, for projects that do not need immediate upfront capital, or for cities pursuing a revenue bond that needs a source of project-based revenues.	

Source: data provided by Ascent in 2023.

Chapter 7

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CHAPTER 6 – IMPLEMENTATION AND MONITORING

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