PUBLIC REVIEW DRAFT

ALAMEDA COUNTY
Community Development Agency

OCTOBER 2023

ALAMEDA COUNTY

Community Climate Action Plan

Ten years after adopting Alameda County's 2014 Community Climate Action Plan (CCAP), the County can be proud of its commitment to climate action and its progress in decreasing local greenhouse gas (GHG) emissions. Successful implementation of the 2014 CCAP reduced Alameda County's unincorporated community GHG emissions to 15 percent below 2005 levels by 2020 and set the County on a path toward achieving 80 percent emissions reduction from 1990 levels by 2050.

The past decade has also brought unpredictable weather and flooding, worsening wildfire and wildfire smoke, and extreme heat to the San Francisco Bay Area – impacts of climate change that Alameda County residents are now experiencing first-hand. And while climate change threatens us all, it does not impact everyone equally. As a result of historic and ongoing environmental and social inequities, BIPOC (Black, Indigenous, and People of Color) communities, low-income people, people with disabilities, unhoused residents, and other frontline communities often experience the "first and worst" impacts of climate change.

In response to the ongoing global climate crisis and its direct impacts on the unincorporated communities, this updated CCAP reaffirms the County's commitment to continued community-level GHG reductions and expands the focus of the County's climate action to include climate adaptation and resilience. The actions outlined in this updated CCAP seek to decrease local climate impacts and increase community resilience for current and future generations through equitable, achievable, and implementable actions that benefit all unincorporated area residents.

The Community Climate Action Plan (CCAP) is the result of the hard work and persistence of many people (see list below), including staff from various County agencies (Community Development Agency, General Services Agency, Public Works Agency, Health Care Services Agency), consultants, and reviewers. They spent many hours researching, writing, and reviewing the CCAP. In particular, Hannah Kornfeld, Honey Walters, and the team from Ascent Environmental were major contributors. Ivy Morrison and the team from Circlepoint led a stellar community engagement and participation process; and the Tiburcio Vasquez Health Center Promotores team provided invaluable outreach expertise to help the County engage frontline communities.

A special thanks to the Associate of Bay Area Governments (ABAG) for providing funding through a suballocation of the California Department of Housing and Community Development Regional Early Action Planning (REAP) grant to support the preparation of the updated CCAP.

Thank you to Albert Lopez, Planning Director, and Elizabeth McElligott, Assistant Planning Director, for their leadership and support in managing the CCAP process, and to Ali Abbors, Planner III for her diligent work on the project. Finally, thanks to the Alameda County Board of

Supervisors for their continued vision, commitment, and leadership: taking bold steps to reduce greenhouse gas emissions; preparing frontline communities for the impacts of climate change; requiring an interagency approach for meeting the County's emission reduction targets and adaptation goals; and calling for an integration of climate protection into the County's planning, budgetary, and other processes. In recognition and honor, the County dedicates the CCAP to family, friends, and children, and present and future generations of unincorporated Alameda County who will be the beneficiaries of our successes.

Sandra Rivera, Director, Community Development Agency

Acknowledgements

Land Acknowledgement

Alameda County acknowledges the original indigenous stewards of this land, whose connection to the land still exists, who still live in our communities, and to whom this land belongs.

The unincorporated communities of Alameda County sit on the unceded ancestral homelands of the Ohlone, Bay Miwok, and Northern Valley Yokuts peoples, who are the original inhabitants of the region. These diverse groups of people prospered in the greater San Francisco Bay Area for millennia prior to European contact, using traditional land management practices to purposefully shape the region's ecosystems. Ohlone, Bay Miwok, and Northern Valley Yokuts people, and Indigenous peoples from many nations, continue to make their home in Alameda County today.

The County is committed to a holistic vision of climate action that: recognizes the history of this land and its deep and ongoing relationship to Indigenous peoples; decreases local climate impacts; empowers and builds resilience among frontline communities; and ensures climate equity for current and future generations.

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Alameda County CCAP Project Team

Sandra Rivera, Director, Community Development Agency (CDA)

Albert Lopez, Director, CDA Planning Department

Liz McElligott, Assistant Planning Director, CDA Planning Department

Ali Abbors, CDA Planning Department

Rob Bennaton, CDA Planning Department

Olivia Ortiz, CDA Planning Department

Alameda County Climate Action Team

Hank Ackerman, Alameda County Flood Control and Water Conservation District

Tuere Anderson, Health Care Services Agency (HCSA)

Larry Brooks, CDA - Healthy Homes Department

Sarah Church, General Services Agency Office of Sustainability

Eileen Dalton, CDA Economic & Civic Development Department

Sandi Galvez, HCSA Public Health Department

Roxanna Guide, HCSA Public Health Department, Community Assessment Planning & Evaluation (CAPE) Unit

Amber Lo, Public Works Agency (PWA)

Andrew Nelsen, HCSA Public Health Department

Eileen Ng, Health Care Services Agency

Tram Nguyen, HCSA Public Health Department

Ryan Nishimoto, Alameda County Fire Department

Cathy Roache, CDA Agriculture / Weights & Measures

Alan Tam, PWA Building Department

Bonnie Terra, Alameda County Fire Department

Daniel Woldesenbet, Public Works Agency

Ascent

Honey Walters, Principal-in-Charge

Hannah Kornfeld, AICP, Project Manager

John Steponick, Climate Adaptation Analyst

Lisa Fenton, Climate Action Analyst

Zachary Miller, AICP, Senior Transportation Planner

Paul Kronser, Planner

Lisa Merry, GIS Specialist

Corey Alling, Graphics Specialist

Gayiety Lane, Publishing Specialist

Circlepoint

Ivy Morrison, Principal

Regina Merrill, Project Manager

Joaquin Carrig, Project Associate

Simon Stahl, Art Director

Nicole Schmidt, Project Associate

Tiburcio Vasquez Health Center

Sandra Rodriguez, ASW

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Abbreviations and Glossary

°C	degrees Celsius
°F	degrees Fahrenheit
AB	Assembly Bill
ACFCD	Alameda County Flood Control and Water Conservation District
ACRCD	Alameda County Resource Conservation District
Adaptive capacity	The ability of a (human) system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.
ADU	accessory dwelling unit
Anthropogenic	Originating from human activities
APG	California Adaptation Planning Guide
Ava	Ava Community Energy (formerly East Bay Community Energy)
BAAQMD	Bay Area Air Quality Management District
Baseline	The first year an annual greenhouse gas inventory is completed; a calculated level of annual emissions against which future inventories can be compared.
Battery storage	One way to help balance fluctuations in electricity supply and demand is to store electricity during periods of relatively high production and low demand, then release it back to the electric power grid during periods of lower production or higher demand.
BAU	business-as-usual
Bay Area	San Francisco Bay Area
BayCAN	Bay Area Climate Adaptation Network
Bioswale	Bioswales are vegetated, shallow, landscaped depressions designed to capture, treat, and infiltrate stormwater runoff as it moves downstream.
BIPOC	Black, Indigenous, and People of Color
Built environment	The human-made or modified structures that provide people with living, working, and recreational spaces. Creating all these spaces and systems requires enormous quantities of materials.
Business-as-usual	A business-as-usual scenario is one in which no greenhouse gas reductions from actions taken by local, regional, State, or federal agencies are accounted.
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy

CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Governor's Office of Emergency Services
CARB	California Air Resources Board
Carbon dioxide equivalent	A way to equalize the different warming potencies of the six internationally recognized greenhouse gases (i.e., carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, and hydrofluorocarbons).
Carbon footprint	The amount of greenhouse gases and specifically carbon dioxide emitted by something (such as a person's activities or a product's manufacture and transport) during a given period.
Carbon neutrality	All greenhouse gas emissions emitted into the atmosphere balanced in equal measure by greenhouse gases that are removed from the atmosphere, either through carbon sinks or carbon capture and storage technologies.
Carbon sequestration	Process of capturing, securing, and storing carbon from the atmosphere, for example in vegetation such as grasslands or forest, as well as in soils and oceans.
CAT	Alameda County Climate Action Team
CBEI	consumption-based emissions inventory
CCAP	Alameda County Community Climate Action Plan
CEC	California Energy Commission
Census tract	A geographic area populated by about 1,200 to 8,000 people; this classification system, established by the US Census Bureau, provides a means to present and compare population data between areas of similar size.
CERT	Community Emergency Response Team
CH_4	methane
CHARG	Coastal Hazards Adaptation Resiliency Group
Circular economy	An economic system based on the reuse and regeneration of materials or products, especially as a means of continuing production in a sustainable or environmentally friendly way.
Climate change adaptation	Adjustments in ecological, social, or economic systems in response to the current or expected effects of climate change.
Climate change mitigation	Reduction or removal of greenhouse gas emissions from the atmosphere to prevent the planet from warming to more extreme temperatures.
Climate effects	Changes in climate caused by greenhouse gas emissions.
Climate equity	Ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change.

Climate hazard	The result from climate effects, like extreme weather or natural disasters.
Climate impacts	Climate impacts are caused by climate hazards, this includes things such as public health effects, structural damage, ecosystem degradation, water quality, and smoke and ash.
CNRA	California Natural Resources Agency
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Co-benefit	Positive effects that a policy or measure aimed at one objective might have on other objectives.
County	Alameda County government
Decarbonization	The reduction or elimination of carbon dioxide emissions from a process such as manufacturing or the production of energy.
Defensible space	Defensible space is the buffer between your structure and the surrounding area. This is the first line of defense against wildfire.
Disproportionate impact	Causing more intense or frequent impacts to certain places, people, or assets.
EBCE	East Bay Community Energy (now Ava Community Energy)
EJ Element	Alameda County Environmental Justice Element
Electrification	The process of replacing systems that use fossil fuels (coal, oil, and natural gas) with ones that use electricity as a source of power.
Environmental justice	The basic right of people to live, work, go to school, and pray in a healthy and clean environment, regardless of race, gender, sexual orientation, age, culture, ability, nationality, or income (defined by California Environmental Justice Alliance).
EPA	US Environmental Protection Agency
EO	executive order
Equity	Equity means that everyone, regardless of identity, has fair and equal access to the resources, opportunities, and outcomes that enable them to attain their full potential for health and well-being. Equity differs from equality, in which everyone is treated the same way, regardless of need, individual difference, context, or outcome.
EV	electric vehicle
Exposure	The frequency and degree to which a community or person experiences a stressor or hazard. This is often not distributed evenly across an area.
FHSZ	Fire Hazard Severity Zone
Food insecurity	A lack of consistent access to food for every person in a household to live an active, healthy life.

Frontline communities	Historically marginalized communities that experience the first and worst consequences of climate change and other injustices (California Strategic Growth Council 2023).
GHG	greenhouse gas
Global warming potential	The relative potency of various greenhouse gases when compared to carbon dioxide. For example, methane has 28 times the potency of carbon dioxide; therefore, 28 metric tons carbon dioxide equivalent could be 28 metric tons of carbon dioxide or 1 metric ton of methane. The global warming potential for various greenhouse gases are used to calculate the total carbon dioxide equivalent from emissions sources for use in greenhouse gas inventories.
GOCAP	Alameda County Climate Action Plan for Government Services and Operations, a project of the Alameda County General Services Agency Office of Sustainability
Green economy	A green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services. (UN Environment Programme N.d.)
Greenhouse gas	A gas within the atmosphere which absorbs and emits radiant energy in the thermal infrared range. The most prevalent greenhouse gases in the atmosphere include water vapor, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, and hydrofluorocarbons.
Greenhouse gas inventory	A list of emission sources and the associated emissions quantified using standardized methods.
GWP	global warming potential
ICLEI	ICLEI–Local Governments for Sustainability
IIJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
IRWMP	San Francisco Bay Area Integrated Regional Water Management Plan
Legislative-adjusted BAU	A legislative-adjusted business-as-usual scenario reflects policy or regulatory actions enacted by regional, State, or federal agencies, without considering any local actions to reduce greenhouse emissions.
LHMP	2021 Alameda County Local Hazard Mitigation Plan
Lifecycle emissions	A method used to evaluate the environmental impact over the course of an entire lifecycle of a product, material, process, or other measurable activity. The stages of a life cycle include 1) raw material sourcing and extraction, 2) manufacturing, processing, and assembly, 3) packaging, transportation and distribution, 4) usage and retail, and 5) waste disposal, recycling, and resource recovery.

MAC	Municipal Advisory Council
MEHKO	Microenterprise Home Kitchen Operation
Microgrid	A local electrical grid with defined electrical boundaries, acting as a single and controllable entity, and with the ability to operate in grid-connected and in island mode.
Microtransit	Any small, low-speed, human- or electric-powered transportation device, including bicycles, scooters, electric-assist bicycles, electric scooters (e-scooters), and other small, lightweight, wheeled conveyances.
$MTCO_2e$	metric tons of carbon dioxide equivalent
N_2O	nitrous oxide
NEPA	National Environmental Policy Act
Net zero emissions	Net zero means cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance.
Open space	Open space includes land that is used for recreation, farm land, and land that is not developed.
OPR	California Governor's Office of Planning and Research
Organic waste	Solid wastes containing material originated from living organisms and their metabolic waste products, including but not limited to food, green waste, landscape and pruning waste, applicable textiles and carpets, wood, lumber, fiber, manure, biosolids, digestate and sludges.
OWTS	onsite wastewater treatment system
Particulate matter ($PM_{2.5}$)	Particulate matter that has a diameter of 2.5 micrometers or less and often come from emissions from the combustion of gasoline, oil, or diesel fuel.
PG&E	Pacific Gas and Electric Company
Priority Communities	Census tracts in the unincorporated county identified in the Alameda County Environmental Justice Element as low-income census tracts that have been historically and disproportionately burdened by environmental factors.
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathway
Recovery	Includes restoring community functions and usually corresponds to mitigation. This could include rebuilding community buildings to the most updated fire and flood codes.
Redlining	A discriminatory practice that consists of the systematic denial of services such as mortgages, insurance loans, and other financial services to residents of certain areas, based on their race or ethnicity.

Renewable energy	Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed.
Resilience	The ability to anticipate, prepare for, respond to, and recover from hazardous events, trends, or disturbances related to climate.
Resilience hub	A community-serving facility augmented to support residents and coordinate resource distribution and services before, during, or after a natural hazard event.
RFS	Renewable Fuel Standard
RPP	Alameda and Contra Costa County Regional Wildfire Prevention Plan
SB	Senate Bill
Sensitivity	The degree to which a community or person is impacted by a stressor or hazard. Sensitivity to climate change impacts can be in the form of health, societal, or economic stressors.
Solid waste	Any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities.
Sustainability	Policies, projects and investments that provide benefits today without sacrificing environmental, social and personal health in the future.
Transportation demand management	Transportation demand management or travel demand management (both TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), traffic congestion, or to redistribute this demand in space or in time.
TVHC	Tiburcio Vasquez Health Center
UC Berkeley	University of California, Berkeley
Heat island effect	A term describing a measurable increase in ambient air temperature in urbanized areas caused by combination of heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators) and the absence of vegetation (which provides evaporative cooling). Trees, green roofs, and vegetation can help reduce the heat island effect by shading building surfaces, deflecting radiation from the sun, and releasing moisture into the atmosphere.
VA	Vulnerability Assessment
Vehicle miles traveled	A measurement for quantifying the number of on-road passenger vehicle or other vehicle miles traveled by an individual or a community over a certain period, often quantified by day or year.
VMT	vehicle miles traveled
Vulnerability	The overall degree to which people, ecosystems, or infrastructure are susceptible to climate change; vulnerability is a function of climate impacts and the adaptive capacity of a system.

Vulnerability assessment	An assessment designed to provide communities with localized climate risks and hazards, projection data, and technical support to undertake climate planning and priority-project identification.
Vulnerable populations	Vulnerability in this document is not meant to be a projection of victimhood or judgment, but rather an acknowledgment that the system has been and currently is deficient for certain people, communities, and structures. Vulnerability is a fluid term, and aspects such as health indicators, historic community disinvestment, and exposure to pollution can contribute to it.
WUI	wildland-urban interface
Zero-emission vehicle	A vehicle which produces zero exhaust emissions of any criteria pollutant (or precursor pollutant) under all possible operational modes and conditions.

Executive Summary

Executive Summary

The unincorporated areas of Alameda County (unincorporated county) encompass approximately 425 square miles of beautiful and diverse landscapes, ranging from urbanized areas to rolling open spaces and densely vegetated hillsides with lakes and streams. Some notable features of the unincorporated county include Livermore Valley, which lies in the eastern portion of the unincorporated county; Amador Valley, which abuts the western edge of the Livermore Valley and continues west to the Pleasanton Ridge; and the diverse urban and suburban communities of the Eden Area, Fairview, and Castro Valley closer to San Francisco Bay, with their mild, coastal climate and central location adjacent to both regional open spaces and employment centers.

The Alameda County government (County) has a longstanding commitment to enhancing community resilience and promoting sustainability. Recognizing the threats posed by climate change and the responsibility to act, the County adopted its first Community Climate Action Plan (CCAP) on February 4, 2014 to reduce communitywide greenhouse gas (GHG) emissions generated by activities within the unincorporated county. In response to the unprecedented risks to safety, quality of life, and prosperity in the unincorporated county posed by the acceleration of climate change, the County has developed this updated CCAP. The updated CCAP serves as a comprehensive roadmap to reduce GHG emissions (i.e., climate change mitigation) and build resilience to climate impacts (i.e., climate change adaptation) through equitable, achievable, and implementable actions that equally benefit all unincorporated residents. This CCAP is consistent with and complementary to State climate legislation and regulatory mandates and aligns with the State's and region's approach to addressing climate change at the local level. The CCAP is separate from, but complementary to, the 2022 Alameda County General Services Agency's Climate Action Plan for Government Operations, which addresses resilient service delivery and emissions reductions in the County's operations countywide.

The development of the CCAP is the product of extensive and ongoing engagement with County agencies, unincorporated-area residents, businesses, and other organizations and stakeholders. The County hosted community workshops to engage residents, stakeholders, and other interested organizations and individuals and provide an opportunity to participate in the CCAP planning process. To ensure that frontline communities in Alameda County participated in the CCAP development process, the County partnered with the Tiburcio Vasquez Health Center (TVHC) to support on-the-ground outreach. TVHC's "Promotores de Salud," peer health educators, conducted CCAP outreach to TVHC patients and community members during food distribution days and at health centers that serve low-income residents of the unincorporated communities. The County provided community members with additional opportunity to prioritize and comment on proposed CCAP strategies, and propose new strategies, via community meetings, interactive posters at local libraries, and through the online platform, Consider.it. A Climate Action Team, made up of County staff from across agencies, provided crucial guidance on CCAP development.

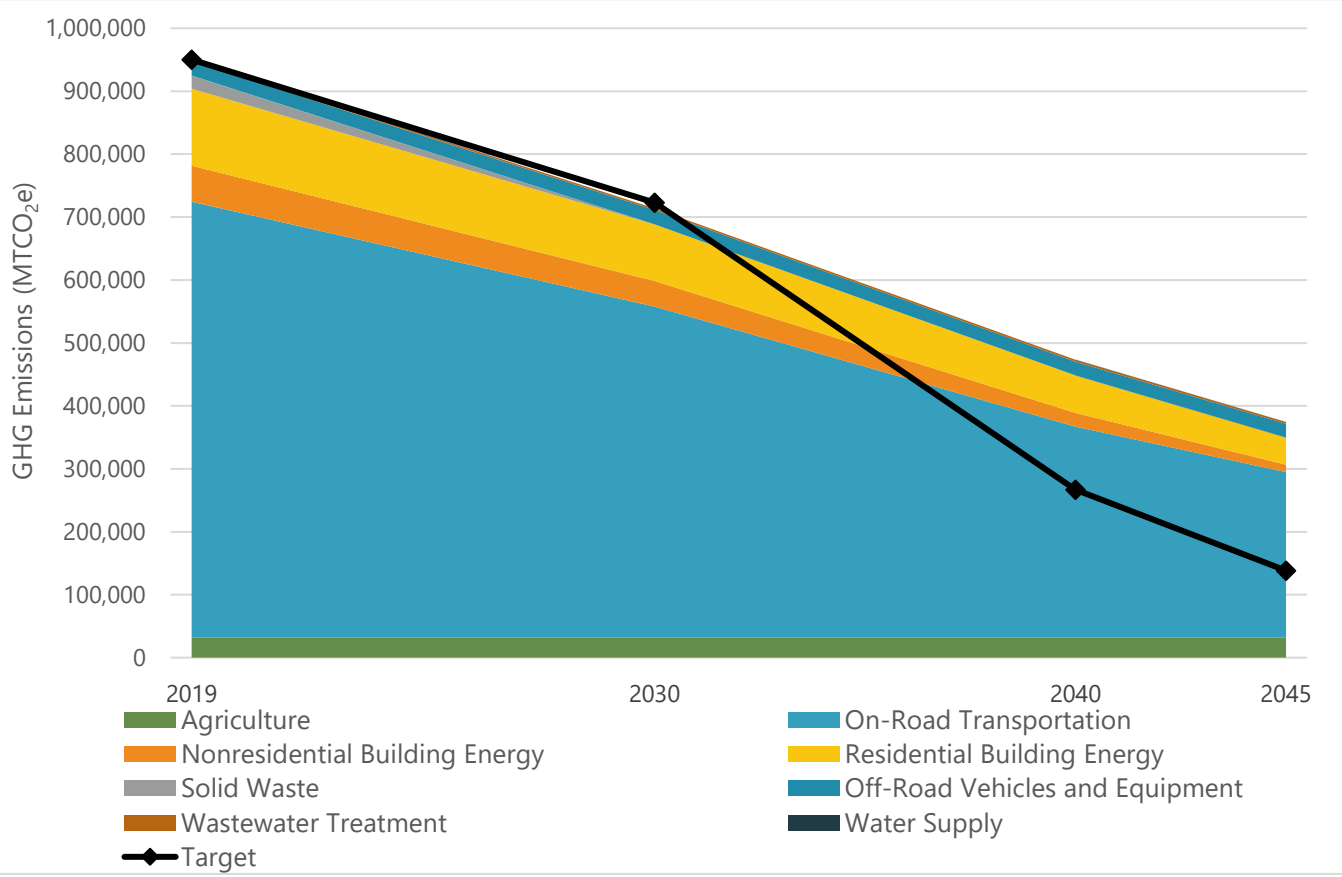
These community engagement efforts have resulted in locally based and context-specific strategies, measures, and actions designed to achieve the County's climate objectives while enhancing the quality of life for the residents, workers, and visitors of the unincorporated county. While the CCAP is primarily geared toward reducing GHG emissions and building community resilience to climate change impacts within the unincorporated county, it will also result in numerous environmental, economic, and social "co-benefits" to residents, workers, and visitors. Co-benefits result from the implementation of CCAP actions and are additional valuable outcomes that are not the primary intent of climate change

mitigation or adaptation actions. Co-benefits identified in this CCAP include benefits to renters (e.g., energy cost savings), air pollution prevention, benefits to health and well-being, increased reliability of critical infrastructure and services, community prioritization, job development, and resource preservation.

The CCAP also includes an implementation strategy, which will be key to achieving the County's goals and ensuring equity in the design and execution of specific actions in the plan. As part of CCAP implementation, the County will track and monitor GHG reduction and adaptation efforts over time to ensure progress towards achieving its GHG reduction and climate resilience goals.

Figure ES.1 shows emissions for the unincorporated county in 2019 and the GHG reductions achieved by CCAP measures, organized by the sectors used for the inventories and forecasts. Additionally, the figure displays the County's achievement of the 2030 target with the GHG reduction measures and demonstrates progress towards a 2045 carbon neutrality target to align with State of California policy objectives.

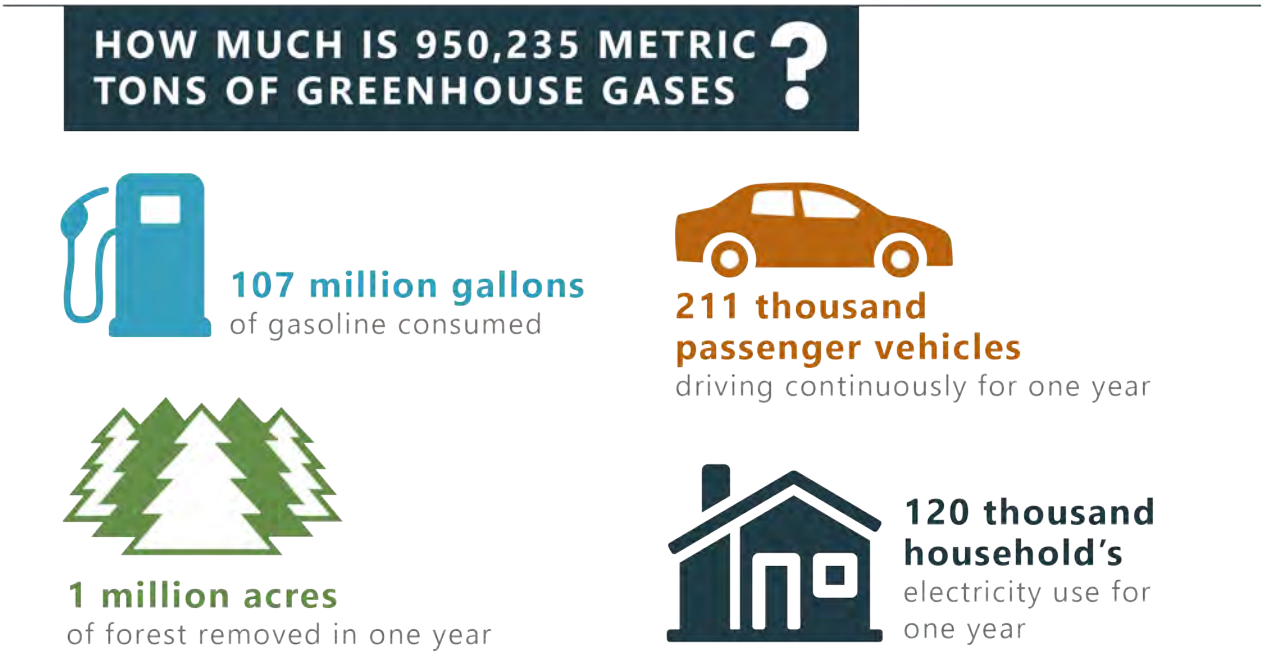
Figure ES.1 Unincorporated Alameda County GHG Emissions Reduction Measure Analysis



Source: **Prepared by Ascent in 2023.**

As Figure ES.1 shows above, the unincorporated county emitted 950,235 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2019. As shown in Figure ES.2, this is equivalent to combusting 107 million gallons of gasoline, or the total combustion from 211,000 passenger vehicles driving continuously for one year. It is also equivalent to removing 1 million acres of forest in a year and 120,000 homes' energy use for one year (EPA 2023).

Figure ES.2 2019 Greenhouse Gas Emissions Equivalency



Source: EPA 2023; adapted by Ascent in 2023.

What Can One Person Do?

Collective action at the local, state, and national levels is essential to addressing climate change. While individuals did not cause the climate crisis and individual action alone cannot solve it, everyone can play a part by raising their voice, sharing solutions, and advocating for change. A great way to make a difference is to support efforts happening where you live. Here are some ideas to get you started.

✓	**VOTE AND CONTACT YOUR REPRESENTATIVES** Before you vote, learn about the candidates' positions on climate actions. Contact your representatives about issues that concern you.
	GET INVOLVED AND VOLUNTEER Unincorporated Alameda County and the greater Bay Area have many local sustainability, climate, and environmental justice organizations.
	TALK TO OTHERS AND BUILD COMMUNITY Talk to your friends, family, and colleagues about climate action. Consider support networks like the Good Grief Network if you feel overwhelmed.
	LEARN MORE ABOUT YOUR LOCAL ENVIRONMENT Get to know your local ecosystem by walking outside and visiting local parks. Take a free course on climate change, such as those available through the California State Library on Coursera.

	**BE PREPARED** Assemble supplies you may need for climate emergencies, such as N95 masks for smoky air or fans and washcloths to stay cool in heat waves.
	**TRAVEL EFFICIENTLY** Take and support sustainable transportation, including BART and buses. Bike and walk. When you need to drive, try to combine trips, use a car-sharing program, or carpool.
	**UPGRADE YOUR HOME'S ENERGY EFFICIENCY** Use energy-efficient light bulbs. When replacing appliances like laundry machines and dishwashers, look for Energy Star–rated appliances. If your electricity provider offers it, consider choosing 100 percent renewable electricity. If you own your home, weatherize to decrease heating and cooling needs.
	**CONSERVE WATER** Install low-flow toilets and water conservation devices on older taps. Put an hourglass timer in your shower to remind you to shorten shower times. If you have a yard, landscape with native and drought-resistant plants.
	**USE ENERGY, WATER, AND WASTE INCENTIVES** You may be eligible for rebates for energy-efficient and water-efficient products from your local utilities.
	**CHOOSE CLIMATE-FRIENDLY FOODS** Consider reducing how often you eat products with higher climate impacts, such as beef, dairy, out-of-season fruits, and heavily processed items. When possible, purchase food grown regionally, such as from farmers' markets.
	**REDUCE FOOD WASTE** Plan ahead to use your fruits and vegetables. Compost scraps and peels.
	**BUY LESS STUFF** Purchase items secondhand, join a Buy Nothing group, share items with friends and neighbors, and donate gently used household goods and clothes. Find out how to reuse, repair, recycle, or safely dispose of specific types of items locally.

Source: Modified from Alameda County Climate Action Plan for Government Services and Operations Through 2026.

Plan-At-A-Glance

Climate action (i.e., GHG emissions reduction and climate adaptation) strategies, measures, and actions are organized into seven focus areas: Land Use and Mobility, Buildings, Infrastructure, Waste, Agriculture and Vegetation, Health and Resiliency, and Community Engagement and Monitoring. The following table provides a summary of the climate action strategies, along with their associated measures, developed for each of the CCAP's seven focus areas. Additional details regarding the strategies and measures are provided in **Chapter 5**, and specific implementation actions in **Chapter 6**.

STRATEGY		MEASURE
LAND USE AND MOBILITY		
Safe, Accessible, and Reliable Active Transportation		**MEASURE LU-1.1:** Develop and maintain a safe, connected, and continuous bicycle and pedestrian network.
		MEASURE LU-1.2: Increase and improve access to walking and bicycling throughout the unincorporated county.
Safe, Accessible, and Reliable Public Transportation		**MEASURE LU-2.1:** Continue to partner with transit agencies to improve reliability, affordability, and convenience of existing transit services through increased frequency, expanded service areas, extended service hours, and better facilities. Prioritize improvements in disadvantaged communities.
Equitable Shared Mobility		**MEASURE LU-3.1:** Develop programs and incentives that promote shared mobility (e.g., car sharing, bike sharing, and scooter sharing) in under-resourced communities and that increase access to health services, food, education, and employment.
Sustainable Land Use Planning		**MEASURE LU-4.1:** Increase residential and commercial density in urban areas located near transit.
		MEASURE LU-4.2: Promote and ensure land uses that support walking and bicycling.
Parking		**MEASURE LU-5.1:** Reduce minimum parking requirements and strategically evaluate the parking needs of the community.
BUILDINGS		
Building Decarbonization		**MEASURE BE-1.1:** Decarbonize existing residential and nonresidential buildings (e.g., replace gas infrastructure and appliances with electric alternatives).
		MEASURE BE-1.2: Require new buildings, and significant remodels or additions, to be all-electric.
		MEASURE BE-1.3: Encourage and support the use of electricity and alternative fuels in construction equipment.
Clean and Renewable Energy		**MEASURE BE-2.1:** Install additional renewable energy-generating technologies (e.g., solar panels) in existing residential and nonresidential buildings.
		MEASURE BE-2.2: Install renewable energy-generating technologies (e.g., solar panels) beyond minimum State requirements in new residential and nonresidential development.

STRATEGY		MEASURE
Energy Efficiency and Reliability		**MEASURE BE-3.1:** Connect owners/occupants of existing residential and nonresidential buildings to energy audit and weatherization programs and resources.
		MEASURE BE-3.2: Retrofit existing residential and nonresidential buildings to improve energy efficiency.
		MEASURE BE-3.3: Reduce plug loads (i.e., energy used by equipment that is plugged into an outlet) in existing residential and nonresidential buildings.
Resilient and Sustainable Buildings		**MEASURE BE-4.1:** Improve resilience of existing residential and nonresidential buildings to climate hazards.
		MEASURE BE-4.2: Enhance resilience of new residential and nonresidential buildings to climate hazards.
		MEASURE BE-4.3: Increase the use of low-carbon concrete and other types of sustainable materials in new construction and renovations.
INFRASTRUCTURE		
Clean and Reliable Energy		**MEASURE IN-1.1:** Transition the community to 100 percent clean energy.
		MEASURE IN-1.2: Increase the use of battery storage technologies (i.e., decentralized clean energy resources).
		MEASURE IN-1.3: Support the development of innovative approaches to energy generation, distribution, and storage. For example: energy recapture (in-conduit hydro, co-generation), developing clean microgrids for schools, hospitals, or neighborhoods.
		MEASURE IN-1.4: Encourage the increase of smart grid integration throughout the county.
		MEASURE IN-1.5: Evaluate the potential for district energy systems (multi-building heating and cooling systems) in urban areas of the county, and develop an implementation plan for cost-effective systems.
Low- and Zero-Emission Vehicles		**MEASURE IN-2.1:** Increase electric vehicle (EV) charging infrastructure.
		MEASURE IN-2.2: Encourage public EV and low-carbon vehicle adoption.
Low- and Zero-Emission Equipment		**MEASURE IN-3.1:** Transition to electric landscaping equipment.
		MEASURE IN-3.2: Encourage the use of electric or alternatively fueled agricultural equipment.
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:** Foster best management practices and innovative strategies for Onsite Wastewater Treatment System management for the protection of groundwater and surface water bodies.

STRATEGY		MEASURE
Resilient Infrastructure		**MEASURE IN-6.1:** Improve energy sector resilience.
		MEASURE IN-6.2: Improve resilience of water and wastewater systems.
		MEASURE IN-6.3: Protect vulnerable transportation infrastructure, services, and systems from climate hazards.
WASTE		
Inorganic Waste Management and Reduction		**MEASURE WR-1.1:** Increase recycling in the unincorporated areas of the county.
		MEASURE WR-1.2: Reduce solid waste generation.
Organic Waste Management and Reduction		**MEASURE WR-2.1:** Continue to educate the community on composting best practices and increase onsite/home composting and use of curbside green organic recycling bins.
AGRICULTURE AND VEGETATION		
Climate-Resilient Agricultural and Working Lands		**MEASURE AG-1.1:** Encourage best practices in agricultural and working lands that improve resilience to climate impacts.
		MEASURE AG-1.2: Increase soil organic matter and soil carbon content in working lands.
Nature-Based Solutions		**MEASURE AG-2.1:** Increase and improve urban tree canopy and green spaces.
		MEASURE AG-2.2: Utilize nature-based solutions to reduce the impacts of climate hazards and improve community resilience.
HEALTH AND RESILIENCY		
Resilient Communities, Equity, and Environmental Justice		**MEASURE HR-1.1:** Support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services before, during, and after climate-related hazard events.
		MEASURE HR-1.2: Embed climate resiliency and adaptation across planning efforts.
		MEASURE HR-1.3: Ensure essential services are available for community members most at risk.
		MEASURE HR-1.4: Support local food production and improve food security.
		MEASURE HR-1.5: Prioritize measures and investments that protect frontline community residents and small businesses from displacement.
Emergency Preparedness and Disaster Response		**MEASURE HR-2.1:** Ensure that emergency and critical service providers have adequate capacity to address increased demand due to potential impacts of climate hazards.
		MEASURE HR-2.2: Prioritize making emergency services more accessible and equitable, especially for community members most at risk.

STRATEGY		MEASURE
Hazard-Specific Resilience		**MEASURE HR-3.1:** Build resilience to flooding across the county, along with sea level rise in San Lorenzo.
		MEASURE HR-3.2: Build resilience to wildfires across the county.
		MEASURE HR-3.3: Build resilience to extreme heat across the county.
High-Road, Green Workforce and Business Development		**MEASURE HR-4.1:** Improve the quality of green jobs, ensuring jobs have fair labor practices, living wages, benefits, and worker protection.
		MEASURE HR-4.2: Incentivize and promote green business practices.
COMMUNITY ENGAGEMENT AND MONITORING		
Ongoing Equitable Community Engagement		**MEASURE CE-1.1:** Foster ongoing and deep community engagement with frontline communities.
		MEASURE CE-1.2: Develop an array of accessible outreach programs with multilingual capacity for widely spoken languages that emphasize preparedness to climate hazards.
		MEASURE CE-1.3: Prioritize community-based solutions to improve climate resilience.
Climate Action Monitoring		**MEASURE CE-2.1:** Monitor implementation of CCAP actions to reduce GHG emissions and enhance resilience in unincorporated Alameda County.

CHAPTER 1

Introduction

1 Introduction

Alameda County is located on the unceded ancestral homelands of the Ohlone, Bay Miwok, and Northern Valley Yokuts peoples, who are the original inhabitants of the region. These diverse groups of people prospered in the greater San Francisco Bay Area for millennia prior to European contact, using traditional land management practices to purposefully shape the region's ecosystems. Ohlone, Bay Miwok, and Northern Valley Yokuts people, and Indigenous peoples from many nations, continue to make their home in Alameda County today.

Source: **Alameda County Community Development Agency**

View of Lake Chabot in Alameda County

Modern-day Alameda County is situated on the east side of the San Francisco Bay, where it is bounded by Contra Costa County to the north, San Joaquin County to the east, and Santa Clara County to the south. In fact, when Alameda County was founded in 1853, it was carved out of territory from previously established Contra Costa County and Santa Clara County. The unincorporated areas of Alameda County (unincorporated county) encompass approximately 425 square miles of beautiful and diverse landscapes, ranging from urbanized areas to rolling open spaces and densely vegetated hillsides with lakes and streams. Some notable features of the unincorporated county include Livermore Valley, which lies in the eastern portion of the unincorporated county; Amador Valley, which abuts the western edge of the Livermore Valley and continues west to the Pleasanton Ridge; and the diverse urban and suburban communities of the Eden Area, Fairview, and Castro Valley closer to San Francisco Bay, with their mild, coastal climate and central location adjacent to both regional open spaces and employment centers.

The Alameda County government (County) has a longstanding commitment to enhancing community resilience and promoting sustainability in the unincorporated county. Recognizing the threats posed by climate change and the responsibility to act, the County adopted its first Community Climate Action Plan (CCAP) on February 4, 2014 to reduce communitywide greenhouse gas (GHG) emissions generated by activities within the unincorporated county. Successful implementation of the County's first CCAP reduced GHG emissions to 15 percent below 2005 levels by 2020 and set the County on a path toward achieving 80 percent emissions reduction from 1990 levels by 2050, as directed by State legislation. In addition to implementation of the CCAP, the County has been involved in several other resilience- and sustainability-related initiatives, including the recent completion of the Alameda County Climate Action Plan for Government Services and Operations (GOCAP). Though both the GOCAP and CCAP are County documents, the GOCAP addresses resilient service delivery and emissions reductions in the County's operations, while the CCAP is an element of the County's General Plan that focuses on community-level climate mitigation and resilience in the unincorporated communities.

These efforts have allowed the County and the unincorporated communities to reduce their contributions to climate change while preparing for its impacts, but the acceleration of climate change is rapidly presenting unprecedented risks to safety, quality of life, and prosperity in the unincorporated county. In response to these risks, the County has developed this updated CCAP to serve as a comprehensive roadmap to continue to reduce GHG emissions while also promoting climate adaptation and resilience, which were not directly addressed in the first CCAP. This CCAP is consistent with and complementary to 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.

1.1 Climate Action Planning Overview

Though climate change is historically perceived by many as a distant issue, people across the country are increasingly, and rightfully, perceiving it as an imminent threat. In Alameda County alone, risk perceptions of climate change are among the highest in California and are well above the national average. **Table 1.1** below displays the estimated percentage of adults in both Alameda County and California who agree with various statements crafted to gage climate change risk perceptions (YPCCC 2023).

Table 1.1 Climate Change Risk Perceptions in Alameda County and California

Estimated percentage (%) of adults who:			
...are worried about climate change.	**...believe climate change is already harming people in the US now or will within the next 10 years.**	**...believe climate change will harm them personally.**	**...have personally experienced the effects of climate change.**
Alameda County[1]			
81	73	60	62
California			
73	66	54	53

Note: US = United States.

[1] Due to the inherent nature of this data, the percentages presented in this table for Alameda County are meant to represent the entire adult population of Alameda County, rather than just the unincorporated county.

Source: **YPCCC 2023**.

These high climate change risk perceptions in Alameda County are warranted and justified. As California continues to experience rising temperatures, destructive wildfires, intense periods of drought, and increasingly volatile winter storms, among other hazards, it has become evident that climate change is already occurring. The impacts of climate change in California vary across the state due to its diverse biophysical setting, climate, and community characteristics. This is evident in the unincorporated county, which experiences its own unique sets of climate risks that can affect populations, the built and natural environment, and community functions differently throughout the unincorporated county's diverse geographies.

Climate change is a global issue, but local governments play an important role in reducing GHG emissions and ensuring that all residents are equally prepared for the impacts of climate change. To help achieve these objectives, local governments develop climate action plans, which serve as long-term strategic planning frameworks that outline broad strategies, tailored measures, and specific

actions that can be taken to reduce GHG emissions and strengthen resilience to climate impacts. Climate action plans also contain specific guidance to implement the strategies, measures, and actions underscored in the plan and to monitor progress over time. Through this updated CCAP, the County reaffirms its commitment to address the challenges that climate change presents so that current and future residents of the unincorporated county can benefit and thrive.

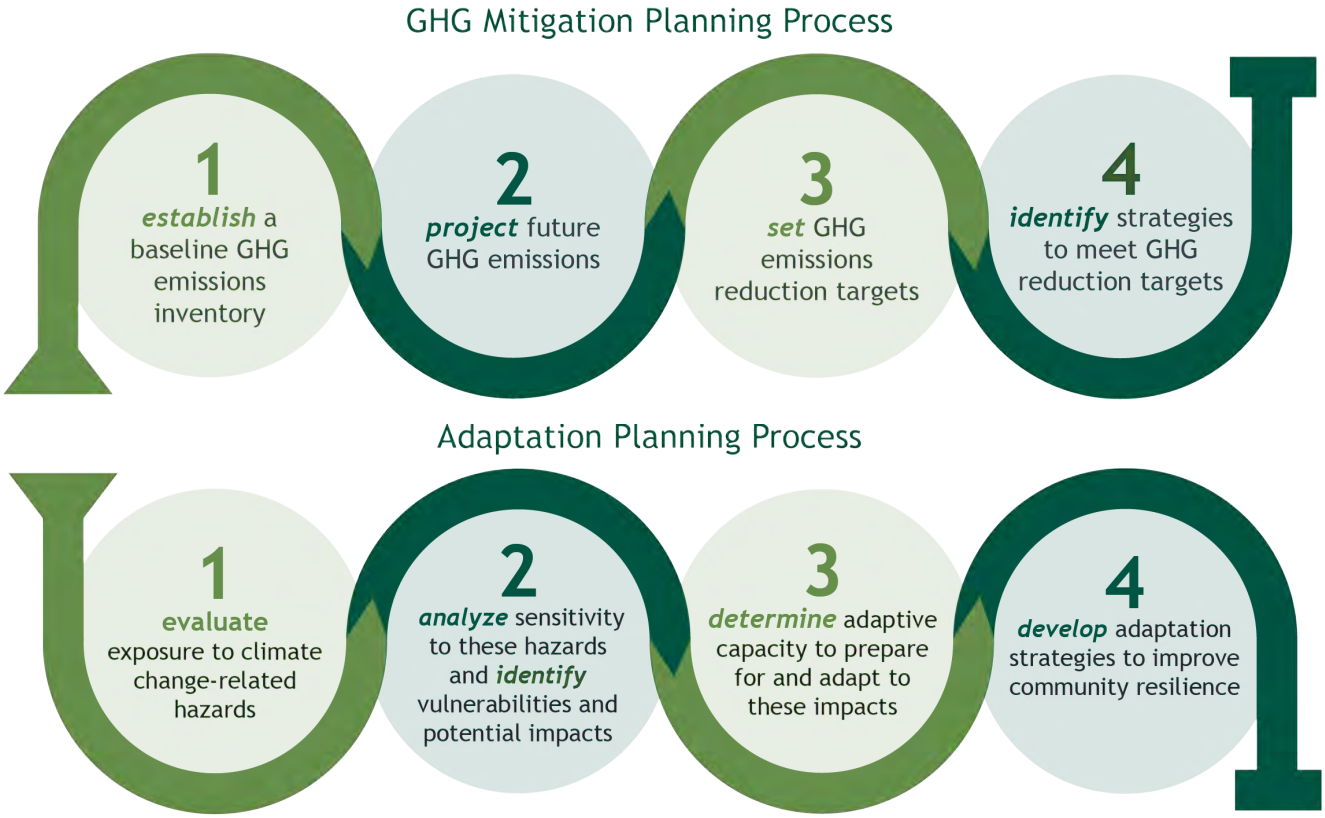
1.2 Purpose and Objectives

The County has developed this CCAP for the purposes of establishing and achieving GHG emissions reduction targets and minimizing contributions to climate change (i.e., climate change mitigation) while also building community resilience to climate impacts (i.e., climate change adaptation) through equitable, achievable, and implementable actions that equally benefit all unincorporated residents. The climate change mitigation and climate change adaptation planning processes, together, underscore a set of specific objectives that are sought to be achieved in preparation of the CCAP. These objectives include:

- Centering equity and the needs of frontline communities in plan development and implementation,
- Establishing a baseline inventory of GHG emissions in the unincorporated county,
- Projecting future GHG emissions,
- Setting GHG emissions reduction targets,
- Identifying strategies to reduce GHG emissions,
- Evaluating the unincorporated county's exposure to climate hazards,
- Analyzing sensitivity to these hazards and identifying vulnerabilities and potential impacts,
- Determining the County's adaptive capacity to prepare for and adapt to the impacts, and
- Developing adaptation strategies to improve community resilience.

The climate change mitigation and adaptation planning process are illustrated in **Figure 1.1** below. It should be noted that for this CCAP, the GHG reduction and adaptation strategies that have been developed are presented as overarching "climate action strategies." The CCAP also includes an implementation strategy, which will be key to achieving the County's goals. As part of CCAP implementation, GHG reduction and adaptation efforts will be tracked and monitored over time to ensure the County is making progress towards achieving its GHG reduction targets and building climate resilience. Ongoing community and stakeholder engagement will also be central to successful implementation of the CCAP. Additionally, the CCAP 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 the CCAP is being implemented and supporting the County in effectively and equitably addressing climate change.

Figure 1.1 Climate Change Mitigation and Adaptation Planning Processes

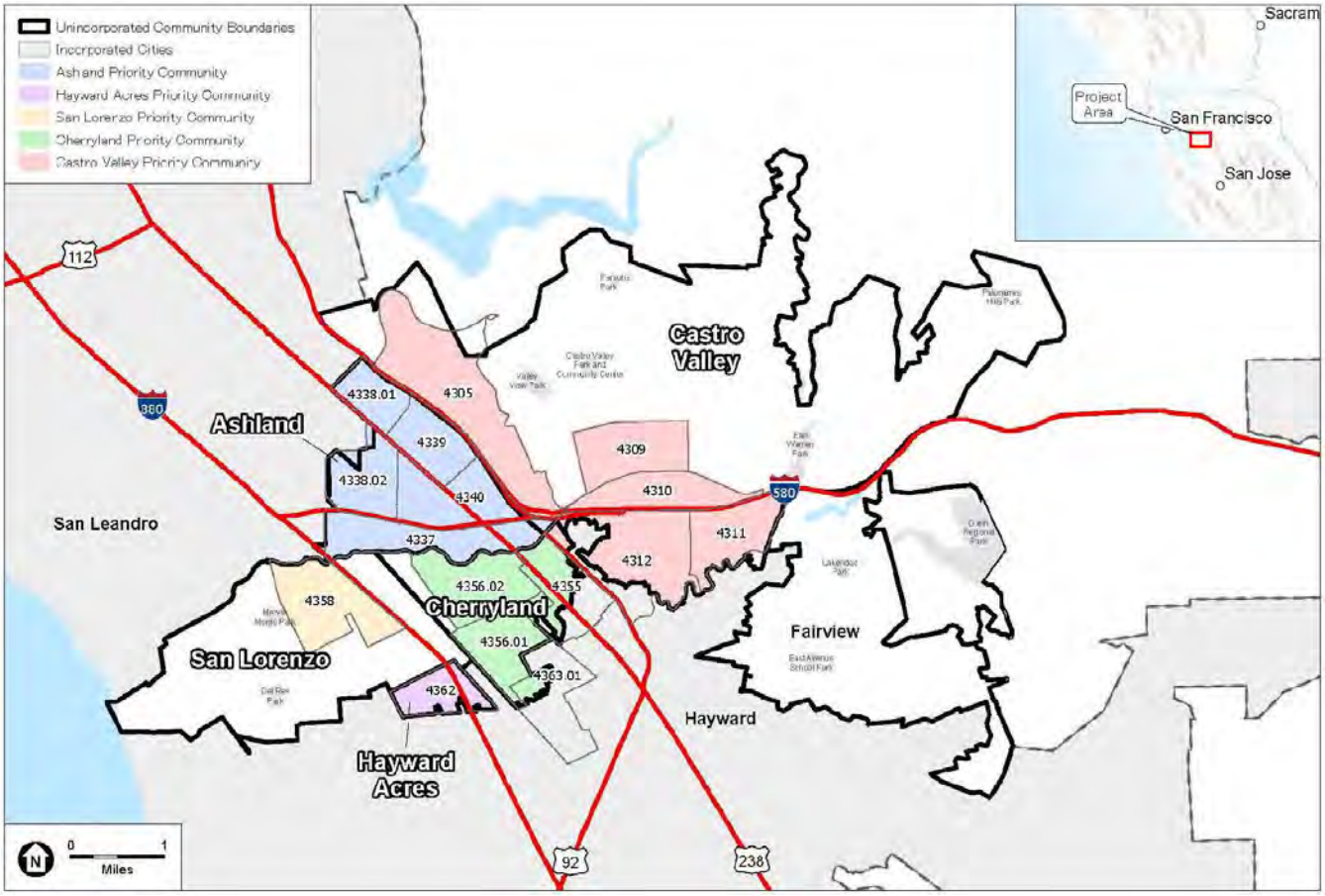


Source: **Developed by Ascent in 2023**.

1.3 Centering Equity

Climate change does not impact all people equally. Discriminatory systems and policies over the years (e.g., chronic disinvestment, redlining, and resource deprivation) have created socioeconomic, environmental, and health inequalities that make some communities disproportionately more vulnerable to climate change impacts. It is essential to center equity throughout the climate mitigation and adaptation planning processes to address these unequal burdens and ensure these inequalities do not become further entrenched. The CCAP seeks to center equity and the needs of frontline communities in both plan development and implementation. The five Priority Communities of the unincorporated county identified in the County's Draft Environmental Justice Element are shown in Figure 1.2 below.

Figure 1.2 Priority Communities



Source: **Adapted from ESA 2023**

1.4 Co-Benefits

While the CCAP is primarily geared toward reducing GHG emissions and building community resilience to climate change impacts within the unincorporated county, equity-focused implementation of the CCAP will also result in numerous environmental, economic, and social "co-benefits" beyond climate mitigation and adaptation. Potential for co-benefits, such as improvements to local air quality and water supply, increases in local green jobs, cost savings, public health improvements, and improved mobility options, can help the County make equity-centered decisions about how it prioritizes implementation of the measures in the CCAP. For example, Black, Indigenous, and People of Color (BIPOC) and low-income residents are more likely to live in neighborhoods with low rates of urban tree canopy, and this inequitable distribution of trees and their benefits negatively impacts local ecosystems, public health, and community resilience to climate change. Investing in urban tree canopy in frontline communities can lower energy use by shading buildings (climate mitigation) and cool communities during extreme heat events (climate adaptation), while providing residents with a suite of co-benefits related to healthier, safer, and more livable communities.

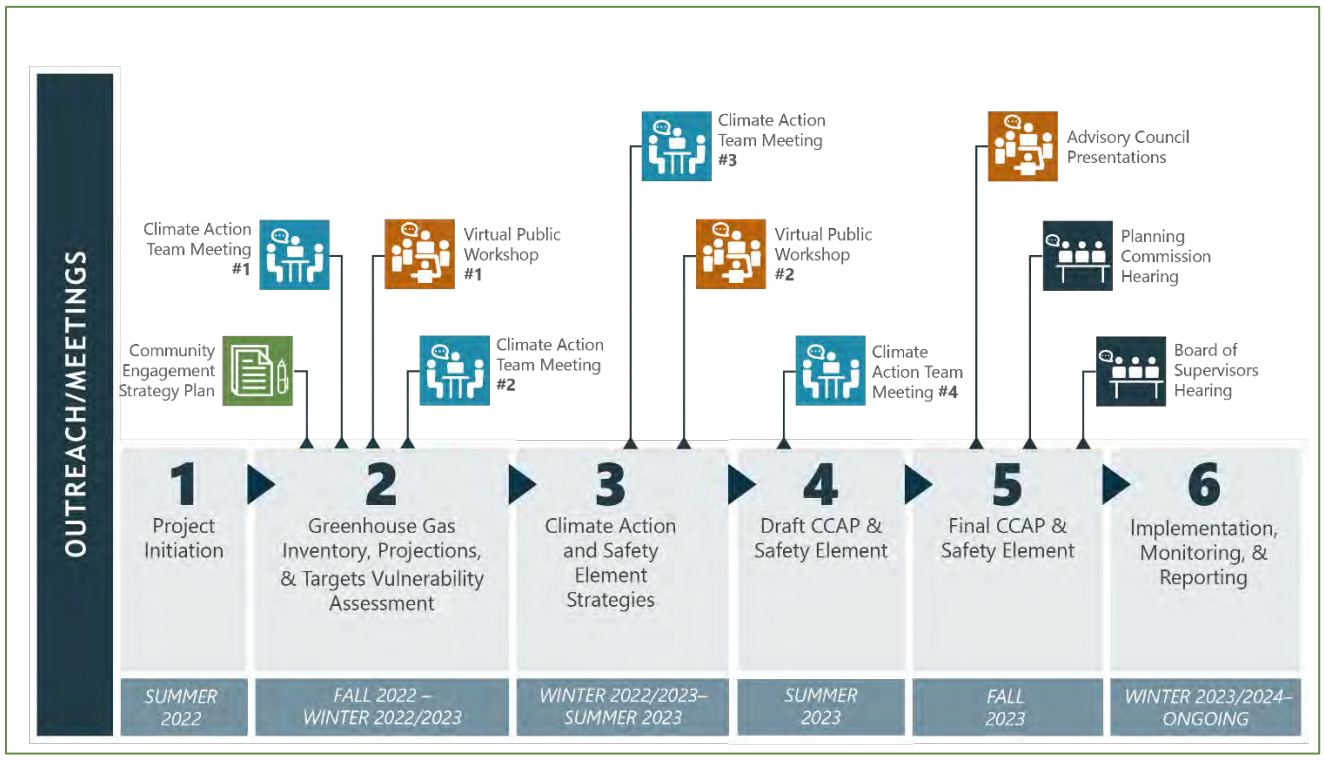
Co-benefits identified in this CCAP include benefits to renters (e.g., energy cost savings), improved equity, air pollution prevention, benefits to health and well-being, increased reliability of critical infrastructure and services, community prioritization, job development, and resource preservation.

1.5 Community Climate Action Plan Development Process

In 2014, the County Board of Supervisors approved the unincorporated county's first CCAP as an element of the County General Plan. It was a culmination of work by County staff from various agencies and departments and involved an extensive public consultation process. Additionally, it identified that climate change represents the greatest challenge to the future well-being of society and committed the County to a course of action to reduce communitywide GHG emissions generated within the unincorporated areas. This updated CCAP builds upon the first CCAP by assessing GHG reduction progress since its adoption, setting new GHG reduction targets, directly incorporating climate change adaptation through the adaptation planning process (see **Figure 1.1** above), and developing a suite of new equitable climate action strategies that are intended to further reduce GHG emissions and bolster community resilience.

The CCAP development process has six distinct phases, which are underscored in **Figure 1.3** below, along with the project timeline. As shown, engagement with County staff, members of the public, government officials, and other stakeholders was conducted throughout the entirety of the project. Further outreach and engagement details are described in the following section.

Figure 1.3 CCAP Project Timeline



Source: **Developed by Ascent in 2023**.

1.6 Community and Stakeholder Engagement

While climate change is a global challenge, community and stakeholder engagement and participation with climate action and adaptation efforts at the local level are critical components of the solution and an essential element of the planning and development process. Local action on climate change cannot be achieved solely by individual action, or by one entity; 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 County strengthened its ability to effectively implement equitable local climate change solutions. The following sections summarize the engagement efforts for the CCAP.

Community Workshops

The County hosted community workshops to engage residents, stakeholders, and other interested organizations and individuals and provide them an opportunity to participate in the CCAP planning process. Workshops were held virtually via Zoom and were conducted to accommodate both English and Spanish speakers. Further details on both workshops are discussed further below.

Source: **Alameda County Community Development Agency**

CCAP Outreach at the May 2023 Ashland/Cherryland Spring FamFest

Workshop #1

The first community workshop was held on February 16, 2023, and included a presentation component and a "breakout group" activity. The presentation component provided attendees with an overview of the CCAP, which included the CCAP's purpose and objectives, described the project area, and defined key terms. Additionally, the presentation component included poll questions to gauge how attendees were feeling about climate change and to understand how its impacts were being experienced. After the main portion of the presentation component concluded, attendees were split up into smaller groups for the breakout group activity to have more intimate discussions around how prepared or unprepared they were feeling for different climate hazards, including extreme heat, flooding, wildfire, and drought. All workshop materials (i.e., Zoom recording, slide deck, poll results, breakout group feedback, workshop flyers) can be found on the County's website and in **Appendix C**.

Workshop #2

The purpose of the second public workshop, which took place on June 15, 2023, was to gain feedback on proposed climate action strategies to include in the CCAP. Similar to the first workshop, this workshop began with a brief presentation to orient attendees and provided an overview of the CCAP. Following the presentation, the project team guided attendees to the County's online platform, where attendees could rank each proposed climate action strategy on a scale of "Low Priority" to "High Priority" and provide further justifications or opinions, where desired. Attendees were encouraged to engage in discussion with the project team throughout the workshop if they had any comments, questions, concerns, or otherwise on any of the proposed strategies. Though the online platform was used for the workshop, it remained open for workshop attendees and all other County residents, stakeholders, and other interested organizations and individuals until July 21, 2023. Feedback received through the platform was used to prioritize near-term actions (**Chapter 6**). All workshop materials and the feedback received on the platform can be found on the County's website and in **Appendix C**.

Community Meetings and Events

In addition to community workshops, the County also presented at community meetings and events to engage residents, stakeholders, and other interested organizations and individuals in the CCAP planning process. These included presentations to the Castro Valley Municipal Advisory Council (MAC), Eden Area MAC, Fairview MAC, Sunol Citizens' Advisory Council, and Agricultural Advisory Committee, as well as participating in community events such as the Ashland/Cherryland Spring FamFest and a Cherryland Elementary School Resource Fair. Engagement also included interactive posters at the Cherryland Community Center and Castro Valley and San Lorenzo libraries, and outreach to the Ashland Community Association, Cherryland Community Association, San Lorenzo Village Homes Association, and Padres Unidos de Cherryland. The County brought the preliminary CCAP strategies to the community through these different outlets to engage and connect with the community and provide multiple inroads to participation.

Environmental Justice Outreach

The County has also been in the process of preparing an Environmental Justice Element (EJ Element) for their General Plan. The community outreach that was done in preparation of the development of the EJ Element also helped inform the County's equity approach and climate action measures of particular concern to the Priority Communities of Ashland, Cherryland, Hayward Acres, San Lorenzo, and Castro Valley.

Climate Action Team

The Climate Action Team (CAT) consists of County staff members from various departments and partner agency staff, including those from the Public Works Agency, Alameda County Flood Control District, Community Development Agency, General Services Agency, Health Care Services Agency, and the Alameda County Fire Department. Engagement with these internal County stakeholders was crucial to provide guidance on CCAP development and to build the County's internal staff capacity to analyze and address climate change impacts and gain a deeper understanding of the systems that will be affected by climate change. Engagement with the CAT during the development of the CCAP included a series of virtual meetings with the goal of fostering a clear understanding of why the County is preparing the CCAP, providing updates on the CCAP's technical components, soliciting feedback on potential climate action strategies, and preparing for implementation of the CCAP. The CAT will continue to play an active role during implementation of the CCAP.

Promotores de Salud

The County partnered with the Tiburcio Vasquez Health Center (TVHC) during the CCAP development process to support equitable engagement of historically underrepresented unincorporated Alameda County communities. With locations in the unincorporated communities of Ashland and Hayward Acres, TVHC is a provider of multicultural and linguistically appropriate health care and related services in central and southern Alameda County. Through TVHC's Promotores de Salud program, a team of trained peer educators, or Promotores/as, conducted paid CCAP outreach to TVHC patients and community members during food distribution days and at health centers that serve low-income, unincorporated county communities. The Promotores provided information about the CCAP and helped interested participants complete the online survey (described below). The Promotores

provided translation as needed and distributed gift cards to patients and community members who completed the online survey.

Online Engagement

The County posted all project materials to the Community Development Agency's website, where community members could learn about upcoming events, review materials from previous events, and connect to the online survey. The website will continue to serve as a repository for all CCAP materials and updates.

The County provided community members with an opportunity to prioritize and comment on all proposed strategies in the CCAP through the online platform, Consider.it. Visitors to the site could vote on strategies in terms of low to high priority, provide comments on proposed strategies, or propose new strategies not yet considered. The platform was open from May 15, 2023 through July 21, 2023. Feedback received on the platform can be found on the County's website and in **Appendix C.**

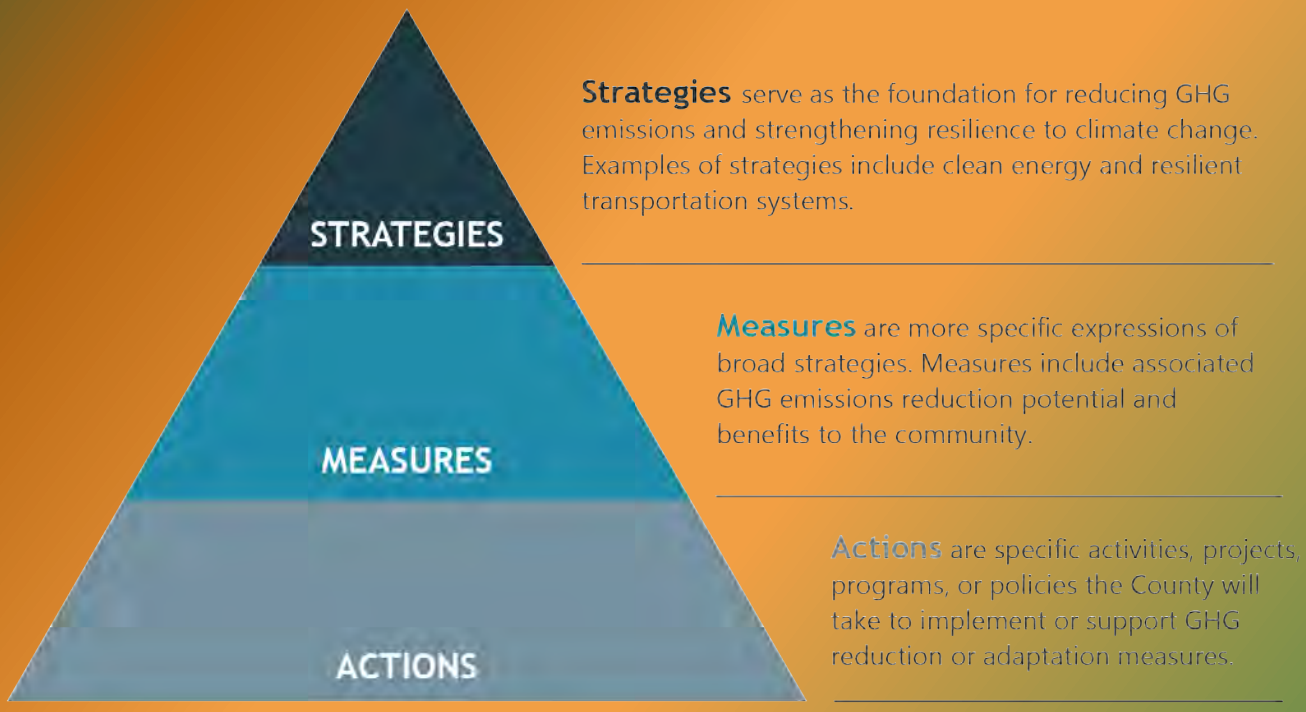
1.7 How to Read This Plan

Organization

This CCAP is organized into six chapters. This chapter, **Chapter 1**, outlines the context and purpose of the CCAP, then describes the development of the CCAP and the engagement and 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 unincorporated county's GHG emissions inventory, forecast of future GHG emissions, 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 unincorporated county's vulnerability assessment. Climate action (i.e., GHG emissions reduction and climate adaptation) strategies, measures, and actions are included in **Chapter 5**, organized into seven focus areas: Buildings, Infrastructure, Land Use and Mobility, Waste, Health and Resilience, Agriculture and Vegetation, and Green Economy. Lastly, **Chapter 6** provides a framework for implementing and monitoring the CCAP and includes guidance for future climate action planning efforts.

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 equitably reducing GHG emissions and improving resilience in the unincorporated county. Within each strategy are measures that represent specific steps toward achieving the broad strategies. Each measure includes actions that define the specific activities, projects, programs, or policies the County can implement or support to equitably reduce GHG emissions and strengthen resilience in the unincorporated communities. Implementation and monitoring of CCAP actions are underscored in **Chapter 6**. This framework underscoring the hierarchy of strategies, measures, and actions is presented in **Figure 1.3.**



CHAPTER 2

Background

2 Background

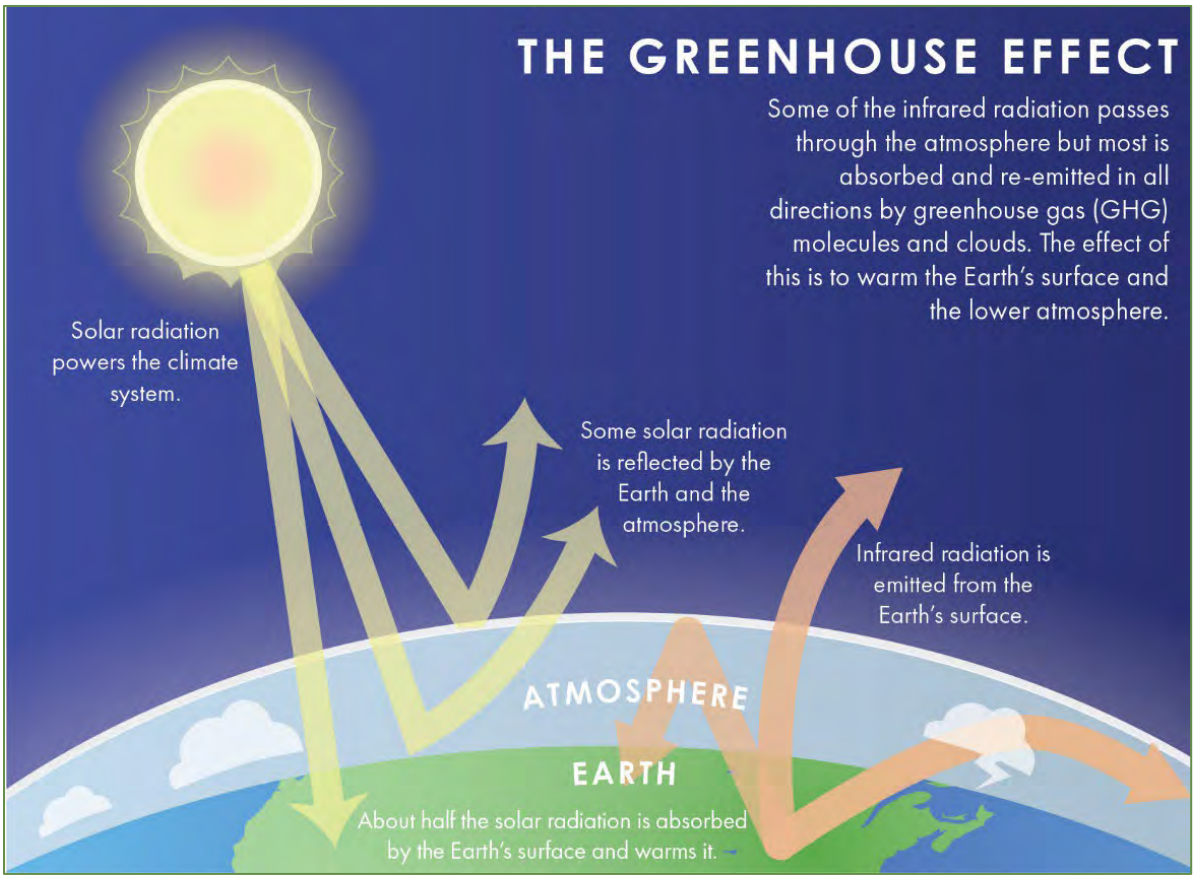
This chapter presents background information that serves to provide additional context for the Community Climate Action Plan (CCAP). Specifically, it provides an overview of climate change science, climate change mitigation and adaptation, local climate change impacts, and regulatory background, which includes a snapshot of Federal, State, and local climate initiatives.

2.1 Climate Change Science

The greenhouse effect is a necessary and natural process to sustain life on Earth. However, due to human activities, this process has intensified and led to an increased and unprecedented rate of warming.

The greenhouse effect, illustrated in **Figure 2.1**, is a natural process that insulates the Earth and helps regulate its temperature. After absorbing sunlight, the Earth emits heat in the form of infrared radiation. This radiation is then absorbed by a collection of naturally occurring atmospheric gases called greenhouse gases (GHGs). These gases, which consist mainly of water vapor, carbon dioxide, methane, and nitrous oxide, all act as effective global insulators by absorbing some of the infrared radiation that is emitted by Earth and re-emitting it back down towards 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: **Developed by Ascent in 2023.**

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's climate to warm at an unprecedented and unnatural rate. This effect, known as climate change, is the driver behind changes in more extreme weather patterns, the rapid melting of the polar ice caps, rising sea levels, and other impacts on humans, the natural environment, and the ecosystem services and human-made assets essential to environmental and human health and well-being.

There is overwhelming scientific agreement 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., prior to the year 1900), and 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).

2.2 Climate Change Mitigation and Adaptation

Addressing climate change requires an integrated approach that targets both its sources and impacts.

- Efforts that focus on reducing the sources of climate change are commonly known as climate change mitigation. The focus of climate change mitigation planning is to reduce communities' generation of GHG emissions and minimize contributions to climate change.
- Efforts that serve to prepare for and minimize harm from the impacts of climate change are known as climate change adaptation. Climate change 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 below 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 and climate adaptation in local long-range planning processes, such as general plans (Cal OES 2020).

Figure 2.2 Relationship between Climate Change Mitigation and Adaptation

Source: **Cal OES 2020; adapted by Ascent in 2023.**

Climate change mitigation and adaptation are both crucial components of comprehensive climate action planning. Although mitigation and adaptation can often be separate planning efforts, it is important to consider both components within the overall 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. Consequently, this initiative would yield adaptation benefits as well by improving energy independence and resilience in the face of climate hazards that threaten energy infrastructure. Conversely, increasing urban tree canopy can help combat extreme heat events and the risk of populations experiencing heat-related illnesses, but may also help minimize GHG emissions through reducing the cooling demands of nearby buildings. 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, this CCAP focuses on both mitigation and adaptation to address climate change.

2.3 Local Climate Change Impacts

Similar to other jurisdictions throughout the San Francisco Bay Area, the unincorporated county is at risk of hazards such as wildfire, increased temperatures and extreme heat, extreme precipitation and flooding, and drought—all of which are exacerbated or influenced by climate change in some way, and of particular risk to frontline communities. Regarding increased temperatures and extreme heat,

average annual temperatures in Alameda County are projected to rise between 5 and 8 °F by the end of the century, depending on the level of current and future GHG emissions (CEC 2022a). This increase in average annual temperatures is associated with a significant projected increase in the number of extreme heat events (e.g., extreme heat days, heat waves) the unincorporated county will face (CEC 2022b). Additionally, though average annual precipitation and the number of extreme precipitation events can vary greatly on a year-to-year basis, both are projected to increase in Alameda County over time (CEC 2022a; 2022c). Because of this and coupled with sea level rise that would most directly affect San Lorenzo, the unincorporated county may experience changes in the frequency, intensity, and duration of flood events.

In general, the entire San Francisco Bay Area exhibits "booms and busts," which refers to the existence of both very wet years and very dry years. Consequently, Alameda County is also susceptible to prolonged periods of drought, and recent research suggests that extended drought occurrences (or "mega-droughts") could become more pervasive in future decades, resulting in major impacts on the unincorporated county's water supplies and other secondary impacts (CEC 2022d). Lastly, wildfire risk is projected to increase over time. As climate change progresses, conditions are increasing opportunities for wildfire ignition and spread. This is reflected by future average annual area burned projections, which are greater at any modeled timescales in the future compared to now (CEC 2022e). Wildfires can affect the unincorporated county directly—especially for assets and populations that may fall within a Fire Hazard Severity Zone (FHSZ) or at the wildland-urban interface (WUI)—and indirectly through smoke- and air pollution-related impacts.

Each of these hazards and their associated potential impacts on the unincorporated county's populations, built environment, and community functions are discussed further in **Chapter 4** and in the vulnerability assessment, which is attached in **Appendix B**.

2.4 Regulatory Background

In response to the increase in anthropogenic GHG emissions and the risks posed by climate change, both the federal and State governments 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, which are intended to serve as a snapshot, provide important policy direction and context for this CCAP.

This section, Section 2.4, is not meant to be comprehensive or all-encompassing, but rather, serves to provide some legislative background and examples of federal, State, and local climate efforts.

Federal Climate Efforts

Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

- On January 20, 2021, **Executive Order (EO) 13990** "Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis" was issued. 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 BIPOC 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 previous four years that conflict with these national objectives, and immediately commence work to confront the climate crisis.

Executive Order on Tackling the Climate Crisis at Home and Abroad

- Following EO 13990, **EO 14008** "Tackling the Climate Crisis at Home and Abroad" was signed on January 27, 2021. The purpose of this 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 Climate Agreement. Both EOs 13990 and 14008 ensure full and fair public involvement in National Environmental Policy Act (NEPA) processes, provide regulatory certainty to stakeholders, and promote better decision-making consistent with NEPA's statutes.

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 can 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** (CAFE) 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 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 in IIJA by 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 (CAA). This program was intended to reduce GHG emissions and expand the nation's renewable fuels sector while reducing reliance on imported oil. On June 3, 2022, the US Environmental Protection Agency finalized a package of regulatory changes to set biofuel volumes for 2020, 2021, and 2022 to reach the objectives of the RFS program. These biofuels are blended in transportation fuels and must emit lower levels of GHGs relative to the petroleum fuel they replace.

California Climate Efforts

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**, also known as **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. 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. 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), 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**, also known as **AB 1279**, was signed in September 2022 and 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 (GWP) gases, industrial, recycling and waste, transportation, and Cap-and-Trade. The 2022 Scoping Plan reports the 1990 emission levels and ranges of reductions needed to meet the goals of AB 1279.

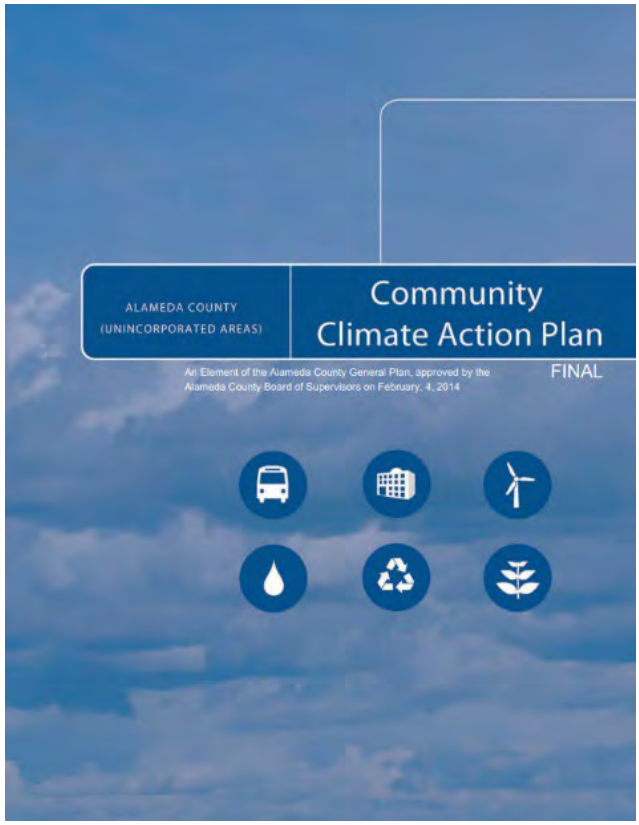
Adaptation Legislation

- 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 from 2021, known simply as the **California Climate Adaptation Strategy**, builds on the successes and lessons learned since the initial strategy was released and integrates

key elements of the latest sector-specific plans, such as the Natural and Working Lands Climate Smart Strategy, Wildfire and Forest Resilience Action Plan, Climate Action Plan for Transportation Infrastructure, and the Water Resilience Portfolio. Additionally, it contains implementation measures and specific actions and responsibilities for State agencies to achieve the strategy's goals.

- **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: (1) the State Adaptation Clearinghouse; and (2) 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 climate action and/or 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.

Local and Regional Climate Efforts



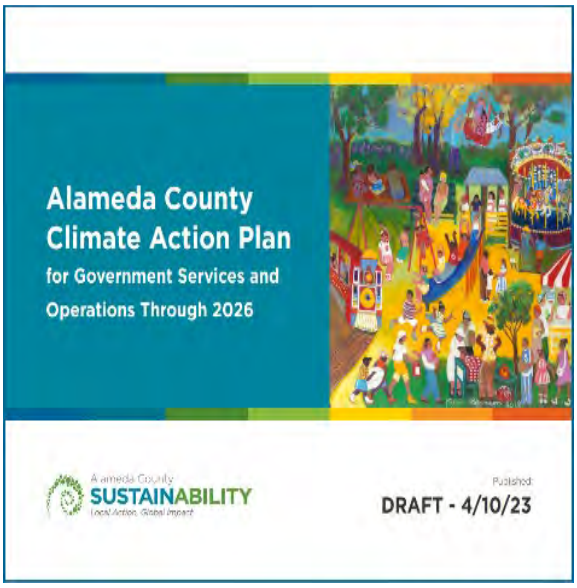
Alameda County Community Climate Action Plan (2014)

Alameda County Community Climate Action Plan (2014)

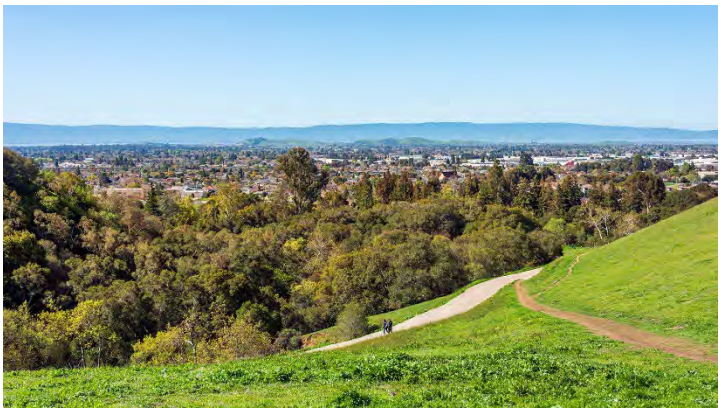
The development of this CCAP builds directly upon the original CCAP, which was adopted by the Alameda County Board of Supervisors on February 4, 2014 as an element of the General Plan. The original CCAP outlined a course of action to reduce communitywide GHG emissions generated within the unincorporated county and met its targets of reducing emissions to 15 percent below 2005 levels by 2020 and 80 percent below 1990 levels by 2050. The original CCAP did not have a specific adaptation or resilience component to it, though successful implementation of the plan did result in resilience-related co-benefits.

Alameda County Climate Action Plan for Government Services and Operations Through 2026

Adopted in May 2023, the *Alameda County Climate Action Plan for Government Services and Operations Through 2026* (GOCAP) builds upon the original GOCAP that was adopted in 2010. The GOCAP addresses resilient service delivery and emissions reductions in the County's operations countywide, and is distinct from but complementary to the CCAP, which focuses on community-level climate mitigation and resilience in the unincorporated communities. The 2010 version set a path for County operations to achieve a minimum GHG emissions reduction of 15 percent and a stretch target of 30 percent by 2020 from a 2003 baseline. The plan also set a long-term target of an 80 percent reduction in GHG emissions in County services and operations by 2050. County efforts exceeded the 2020 stretch target by achieving a 31 percent reduction in operational emissions. The new version of the GOCAP sets a target for County services and operations that exceeds the County's earlier 2050 target and aligns with California's target of carbon neutrality by 2045. It establishes a series of steps the County needs to take between 2023 and 2026 to move towards that goal, but also to protect the community from climate change impacts and protect County assets and services.

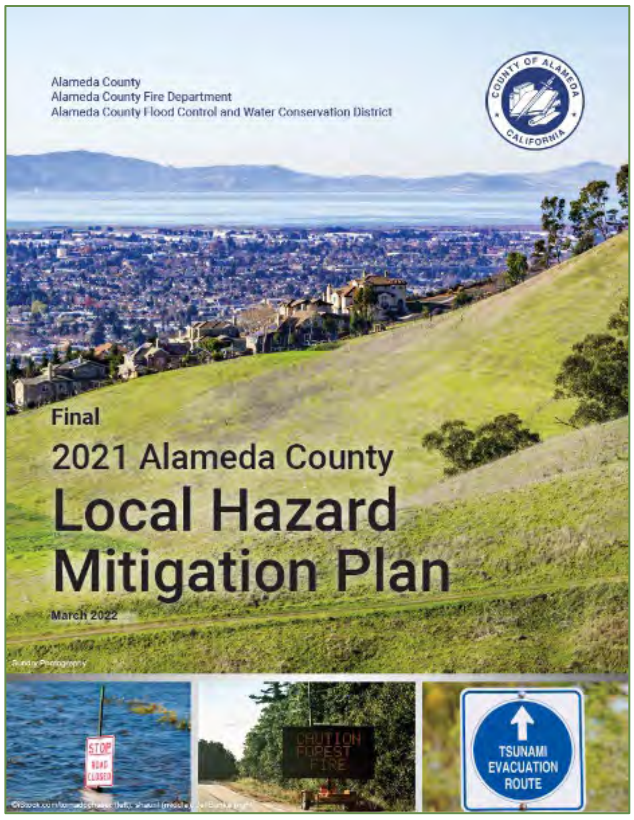


Alameda County Climate Action Plan for Government Services and Operations Through 2026



Alameda County Climate Emergency Declaration

The Alameda County Board of Supervisors adopted Resolution 2019-375 in October 2019 declaring that global climate change caused by human activities has resulted in a climate emergency and that the County reaffirms its commitment to mitigate GHG emissions and adapt to the effects of climate change. The resolution further called for new GHG reduction targets to be developed and to leverage regional collaboration to transition to a carbon-free economy in an equitable manner.



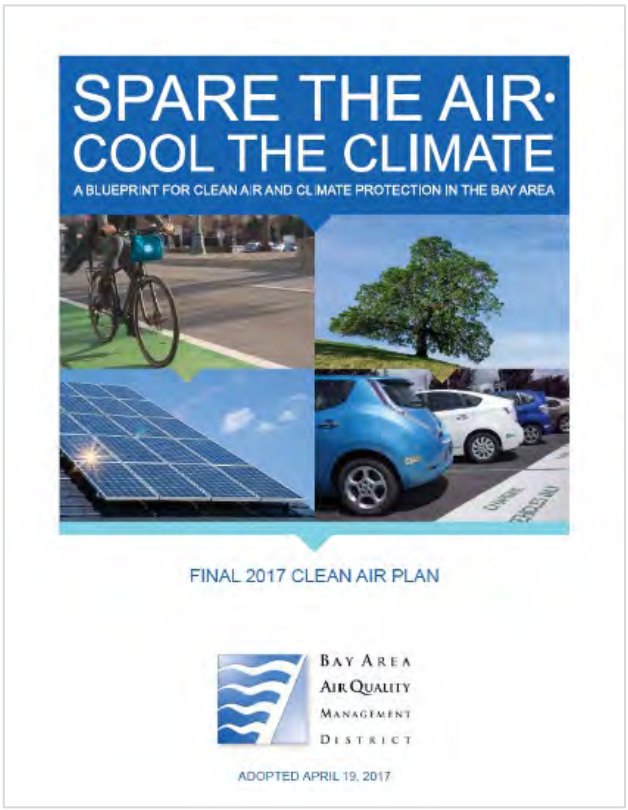
2021 Alameda County Local Hazard Mitigation Plan

Alameda County Local Hazard Mitigation Plan

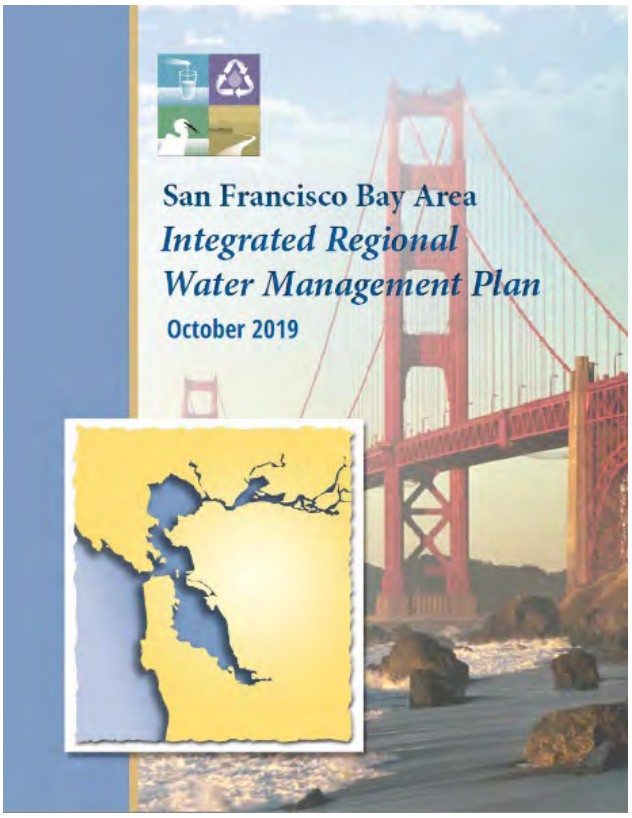
The development of the *2021 Alameda County Local Hazard Mitigation Plan* (LHMP) was a collaborative effort by the County, the Alameda County Fire Department, and the Alameda County Flood Control and Water Conservation District (ACFCD). The goal of the LHMP was to identify and profile the broad array of hazards, including those examined by the vulnerability assessment conducted for this CCAP, that faces the entire county (inclusive of the unincorporated county), assess risks posed by those hazards, and to develop prioritized strategies to reduce those risks. The LHMP serves as an update to the 2016 version of the LHMP and meets the requirements of the Disaster Management Act of 2000.

2017 Clean Air Plan: Spare the Air, Cool the Climate

Prepared by the Bay Area Air Quality Management District and adopted in 2017, the *2017 Clean Air Plan: Spare the Air, Cool the Climate* (Clean Air Plan) encompasses the entire San Francisco Bay Area, inclusive of Alameda County, and focuses on two closely related goals, which includes protecting public health and protecting the climate. The Clean Air Plan describes a multi-pollutant strategy to simultaneously reduce emissions and ambient concentrations of ozone, particulate matter, toxic air contaminants, as well as GHGs that contribute to climate change. Additionally, it describes a vision for a thriving region with clean air, a stable climate, a robust natural environment, and a prosperous and sustainable economy.



2017 Clean Air Plan: Spare the Air, Cool the Climate



San Francisco Bay Area Integrated Regional Water Management Plan

San Francisco Bay Area Integrated Regional Water Management Plan

The San Francisco Bay Area Integrated Regional Water Management Plan (IRWMP), most recently updated in October 2019, represents an outgrowth of a collaborative process that began in 2004, when regional and local organizations in the San Francisco Bay Area signed a Letter of Mutual Understandings to develop the IRWMP. This nine-county effort aims to improve water supply reliability, protect water quality, manage flood protection, and protect habitat and watershed resources across the region, inclusive of the unincorporated county. Though this plan is broadly related to water resources and management, it is crucial to climate change adaptation and resilience.

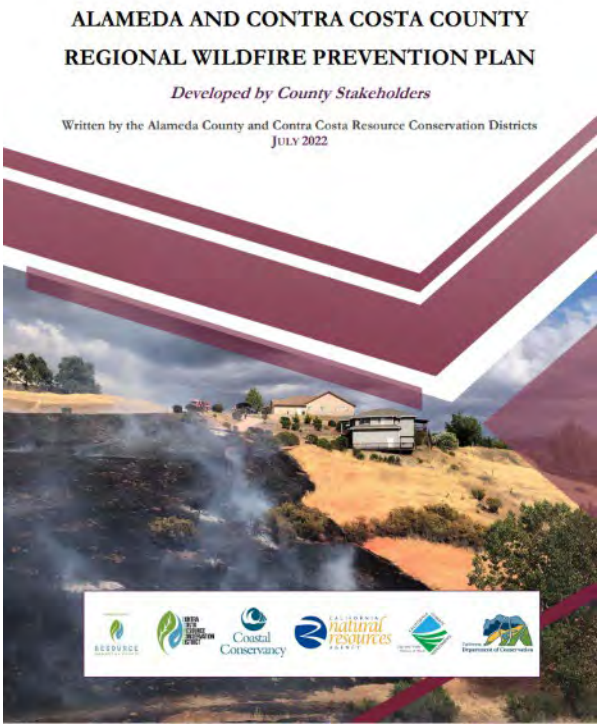
Bay Area Climate Adaptation Network

The Bay Area Climate Adaptation Network (BayCAN) is a collaborative network of local governments and partnering organizations working to help the Bay Area respond effectively and equitably to the impacts of climate change on human health, infrastructure, and natural systems. The County is a member of BayCAN.

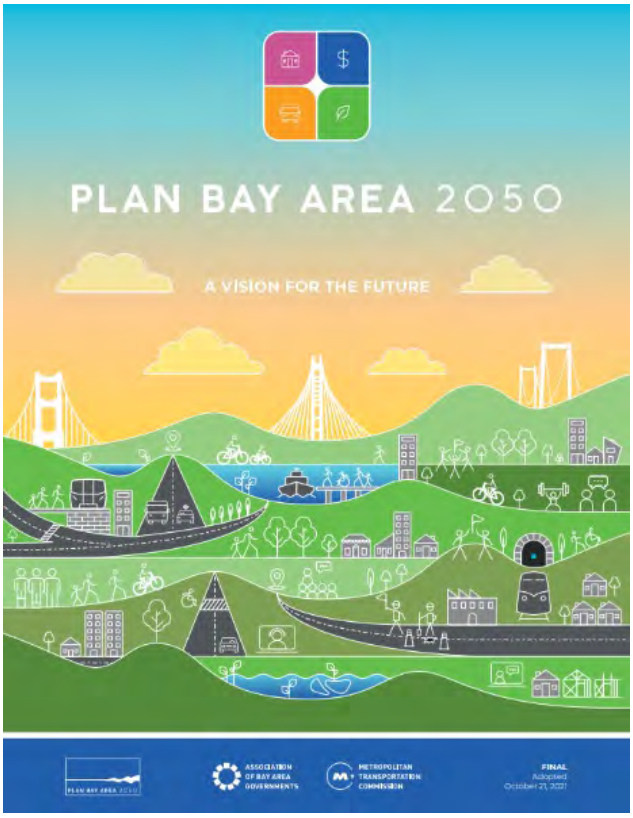
BayCAN
BAY AREA CLIMATE ADAPTATION NETWORK

Alameda and Contra Costa County Regional Wildfire Prevention Plan

The focus of the *Alameda and Contra Costa County Regional Wildfire Prevention Plan* (RPP), developed in conjunction with the Alameda County Resource Conservation District and the Contra Costa Resource Conservation District with funding from the California State Coastal Conservancy, is to identify and prioritize projects at the landscape- or watershed-level to address forest health and wildfire risks in the region. The RPP is intended to complement other existing fire planning documents covering Alameda County and was informed by consultation and collaboration with over 160 stakeholders, including local governments, private businesses, nonprofit organizations, and community members.



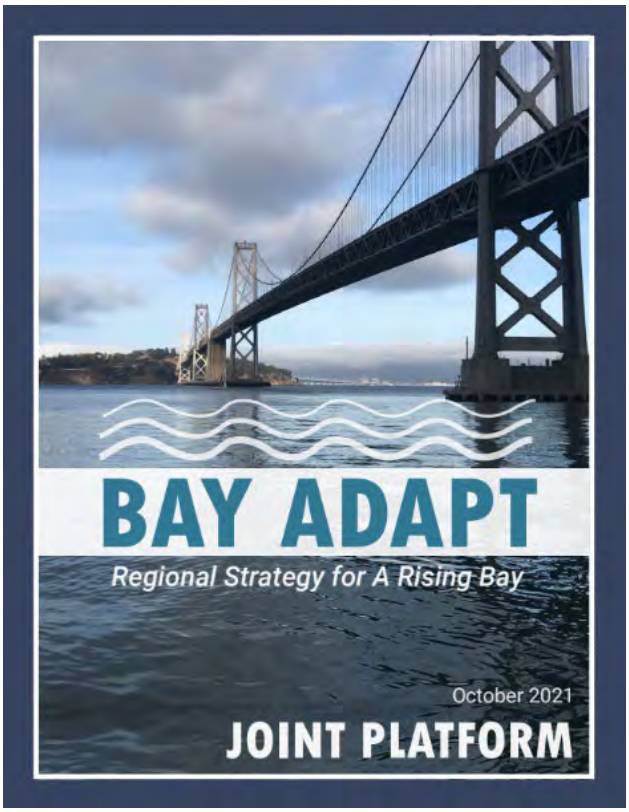
Alameda and Contra Costa County Regional Wildfire Prevention Plan



Plan Bay Area 2050

Plan Bay Area 2050

Plan Bay Area 2050, adopted in October 2021, is the latest iteration of the regional long-range plan for housing, economic development, transportation, and environmental resilience and charts the course for the future of the nine-county San Francisco Bay Area. Guided by input from more than 20,000 Bay Area residents, Plan Bay Area 2050 is defined by strategies crafted to make the Bay Area more resilient and equitable over the next 30 years or so. These strategies are public policies or investments that can be implemented in the Bay Area at the city, county, regional, or State level, with equity interwoven into each. This plan is the first long-range regional plan for the Bay Area to explore strategies in uncertain futures rather than focusing on predicting the future. Though this is not a plan directly related to climate action, many of the strategies and focal points in the plan directly complement or overlap with climate action.



Bay Adapt: Regional Strategy for a Rising Bay, Joint Point Platform

Bay Adapt: Regional Strategy for a Rising Bay

Bay Adapt is an initiative to establish regional agreement on the actions necessary to protect people and the natural and built environment from rising sea levels. It is convened by the San Francisco Bay Conservation and Development Commission in partnership with a broad range of Bay Area leaders. Outreach and participation occurred through dozens of expert working groups, public forums, community and stakeholder focus groups, presentations, an environmental justice caucus, and led by a Leadership Advisory Group. Through collaboration, the Bay Adapt Joint Platform presents nine key actions to achieve faster, better, and more equitable adaptation to a rising Bay, which includes: (1) collaborate on a "One Bay" vision to adapt to rising sea levels; (2) elevate communities to lead; (3) broaden public understanding of climate change science and impacts; (4) base plans and projects on the best science, data, and knowledge; (5) align local and regional plans into a unified adaptation approach; (6) figure out how to fund adaptation; (7) refine and accelerate regulatory approvals processes; (8) fund and facilitate faster adaptation projects; and (9) track and report progress to guide future actions.

CHAPTER 3

Greenhouse Gas Emissions Inventory, Forecasts, and Targets

3 Greenhouse Gas Emissions Inventory, Forecasts, and Targets

This chapter outlines a summary of greenhouse gas (GHG) emissions generated by activities within the unincorporated county. The chapter provides the unincorporated county's baseline GHG emission levels in 2019. Additionally, the chapter includes the anticipated increase in emissions if no local action is taken through the year 2045. Further, targets for reducing GHG emissions, consistent with the State's GHG reduction targets, for the years 2030, 2040, and 2045, are included in this chapter.

3.1 Why Prepare a Greenhouse Gas Emissions Inventory?

It is imperative that the first step in the overall climate action planning process is to prepare a GHG emissions inventory. To develop and implement a CCAP that will effectively reduce GHG emissions, local governments must have a comprehensive understanding of the emissions in their jurisdiction and the activities that generate them. GHG inventories provide this knowledge to local governments. GHG inventories also act as the basis for measuring progress and providing agencies with a framework to monitor emissions over time and assess the effectiveness of climate action 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 activities, sources, and sectors that are generating these emissions and the relative contributions of each, while also providing a baseline used to forecast emissions trends into the future. This information is used to set reduction targets that are consistent with State objectives. Further, the GHG inventory provides the basis for creating solutions for reducing GHG emissions locally through the creation of a climate action plan.

In addition to traditional production-based emissions inventories, it is becoming increasingly common for local governments to prepare a "consumption-based" emissions inventory (CBEI). A CBEI evaluates the GHG emissions generated by the production, use, and disposal of goods and services consumed by residents of a community within a given year. While there is some overlap with the production-based inventory, the CBEI evaluates emissions that are not accounted for in the traditional approach, so this additional lens through which to view community-generated GHG emissions provides further opportunities for a community to reduce its contribution to climate change (e.g., purchasing decisions). Additional information regarding consumption-based emissions and the unincorporated county's CBEI are presented in Section 3.6 of this chapter.

Throughout this CCAP, references to the unincorporated county's GHG emissions refer to the production-based methodology and data.

3.2 Baseline Production-Based Inventory

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

The 2019 emissions inventory quantifies three primary GHGs: 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's Sixth Assessment Report were used for calculating emissions estimates (IPCC 2021). The 2019 inventory estimates unincorporated county emissions in six sectors: 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

Sector	Description
On-Road Transportation	Emissions from all vehicle miles traveled associated with vehicle registered in the unincorporated county.
Building Energy	Emissions associated with the consumption of electricity, onsite combustion of natural gas, and backup generators creating energy in buildings in the unincorporated county.
Off-Road Vehicles and Equipment	Emissions associated with vehicles and equipment within the unincorporated areas of the county, including agricultural off-road vehicles.
Solid Waste	Emissions from all waste generated within the unincorporated areas of the county.
Water Supply	Emissions associated with water use within the unincorporated areas of the county.
Wastewater Treatment	Emissions associated with wastewater generated within the unincorporated areas of the county.
Agriculture	Emissions associated with livestock (i.e., enteric fermentation, manure management) and fertilizer application.

The basic calculations for estimating GHG emissions involve activity data and emissions factors. Activity data refers to the relevant measurement of a community's activity resulting in emissions, and emissions factors are 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**.

Table 3.2 2019 Unincorporated Alameda County Summary of Activity Data and Emissions Factors

Sector/Source	Input Type	Description and Data Sources
On-Road Transportation		
On-Road Transportation	Activity Data	VMT associated with vehicles registered in unincorporated Alameda County
	Emissions Factor	Alameda County-specific emissions factors from CARB
Building Energy		
Electricity	Activity Data	Electricity consumption data from PG&E and Ava
	Emissions Factor	Utility-specific emissions factors from TCR and EPA
Natural Gas	Activity Data	Natural gas consumption data from PG&E
	Emissions Factor	Average emissions factors from TCR
Backup Generators	Activity Data	Fuel consumption data from BAAQMD
	Emissions Factor	Average emissions factors from TCR
Solid Waste		
Community-Generated Solid Waste	Activity Data	Waste disposal data from CalRecycle
	Emissions Factor	Mixed municipal solid waste emissions factor from EPA
Off-Road Vehicles and Equipment		
Off-Road Vehicles and Equipment	Activity Data	Off-road vehicles and equipment activity and emissions factors data from CARB
	Emissions Factor	
Wastewater Treatment		
Wastewater Treatment	Activity Data	Wastewater generation and process-related data from the County and Castro Valley/Oro Loma Wastewater Treatment Plant
	Emissions Factor	Emissions factors based on treatment processes from the County and ICLEI
Water Supply		
Water Supply	Activity Data	Water consumption and associated electricity data from the County, EBMUD, and SFPUC
	Emissions Factor	Electricity emissions factors from Ava
Agriculture		
Fertilizer Application	Activity Data	California Department of Food and Agriculture 2019 Fertilizer Tonnage Report
	Emissions Factor	Fertilizer emissions factors from CARB
Livestock	Activity Data	Alameda County 2019 Crop Report and USDA's 2017 Census of Agriculture
	Emissions Factor	Emissions factors for livestock were obtained from the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2018, Annex 3 and CARB's statewide GHG inventory

Notes: BAAQMD = Bay Area Air Quality Management District; CalRecycle = California Department of Resources Recycling and Recovery; CARB = California Air Resources Board; Ava = Ava Community Energy (formerly East Bay Community Energy); EBMUD = East Bay Municipal Utility District; EPA = US Environmental Protection Agency; ICLEI = ICLEI – Local Governments for Sustainability; IPCC = Intergovernmental Panel on Climate Change; PG&E = Pacific Gas and Electric Company; SFPUC = San Francisco Public Utilities District; TCR = The Climate Registry; VMT = vehicle miles traveled.

Source: **Prepared by Ascent in 2023**.

The 2019 baseline inventory estimated that the community emissions were approximately 950,235 $MTCO_2e$ (**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 73 percent of community emissions. The second largest sector, building energy, contributes approximately 19 percent of community GHG emissions in 2019. Agriculture accounted for 3 percent, and off-road vehicles and equipment and solid waste each contributed 3 percent of total emissions. The unincorporated county's GHG emissions by sector in 2019 are displayed in **Figure 3.1** and summarized in **Table 3.3**.

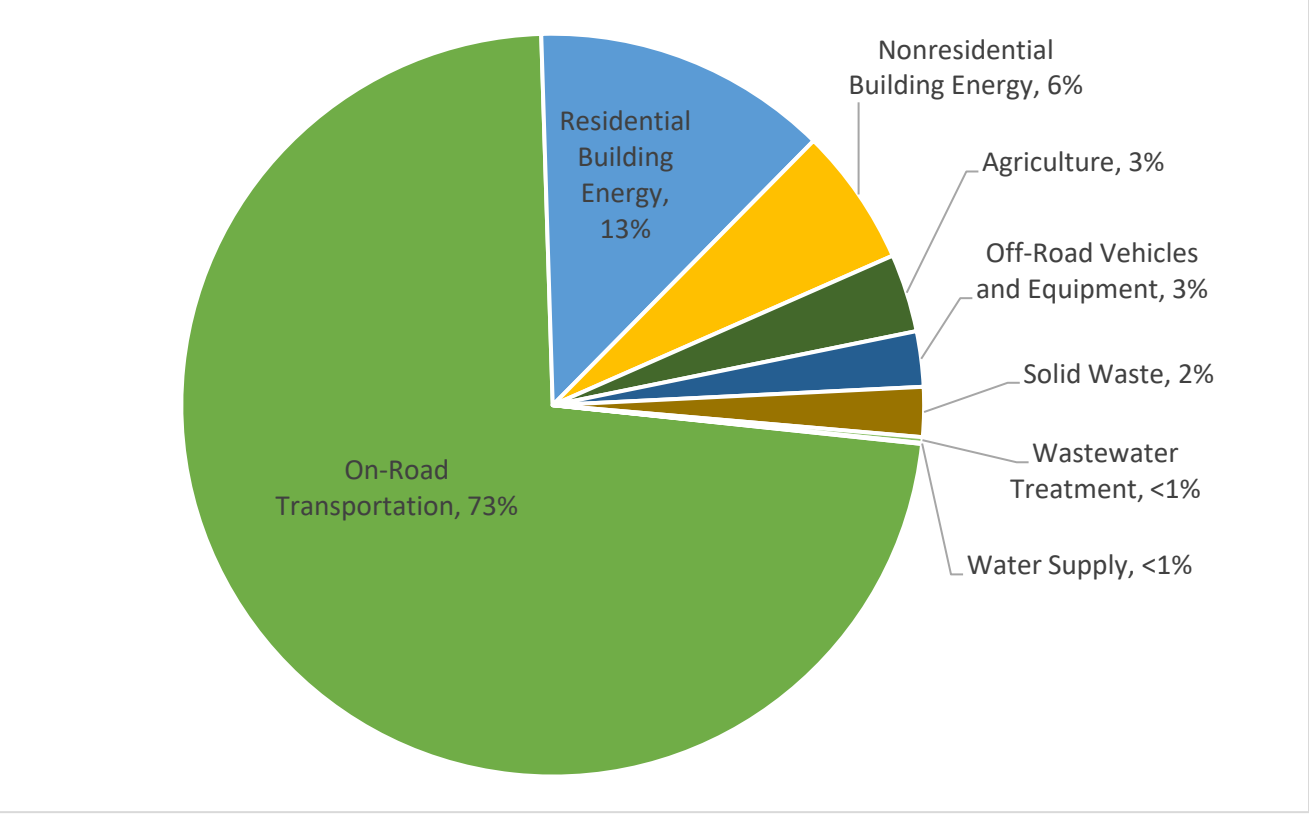
Table 3.3 2019 Unincorporated Alameda County Production-Based GHG Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
On-Road Transportation	692,138	73%
Building Energy	179,606	19%
Agriculture	32,288	3%
Off-Road Vehicles and Equipment	22,886	2%
Solid Waste	20,562	2%
Wastewater Treatment	2,404	<1%
Water Supply	350	<1%
Total	**950,235**	**100%**

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

Source: **Prepared by Ascent in 2023**.

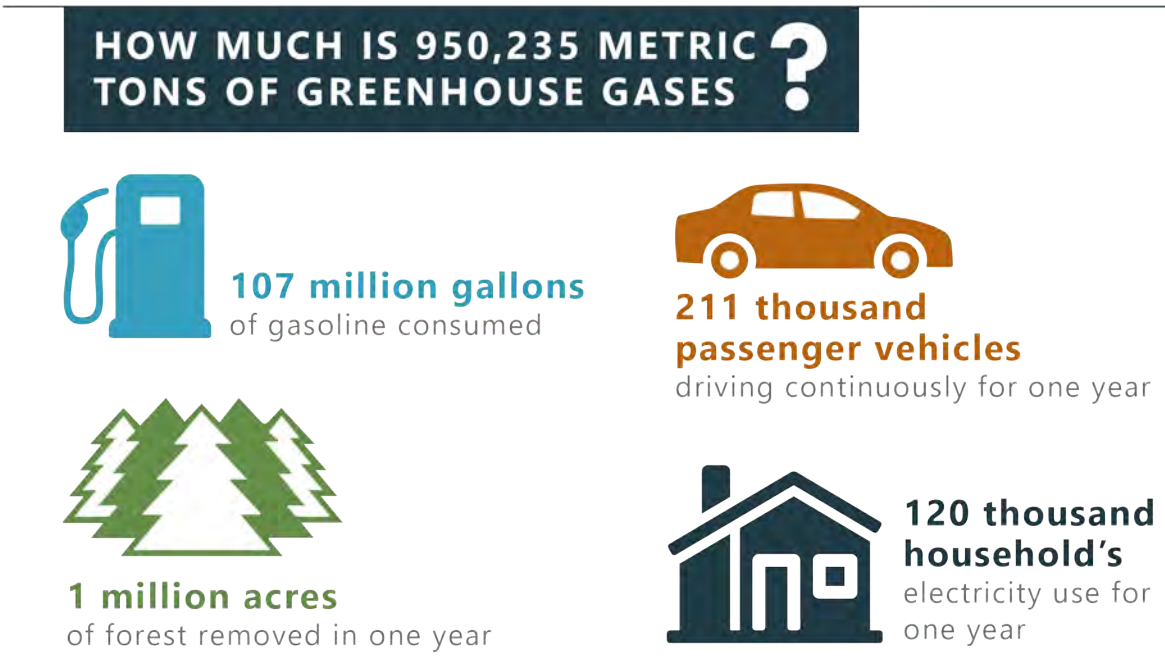
Figure 3.1 Unincorporated Alameda County 2019 Production-Based GHG Emissions Inventory



Source: **Prepared by Ascent in 2023.**

As shown in **Figure 3.2**, emissions for the unincorporated county in 2019 of 950,235 $MTCO_2e$ are equivalent to combusting 107 million gallons of gasoline, or the total combustion from 211,000 passenger vehicles driving continuously for one year. It is also equivalent to removing 1 million acres of forest in a year and 120,000 homes' energy use for one year (EPA 2023).

Figure 3.2 2019 Greenhouse Gas Emissions Equivalency



Source: EPA 2023; adapted by Ascent in 2023.

3.3 Emissions Forecasts

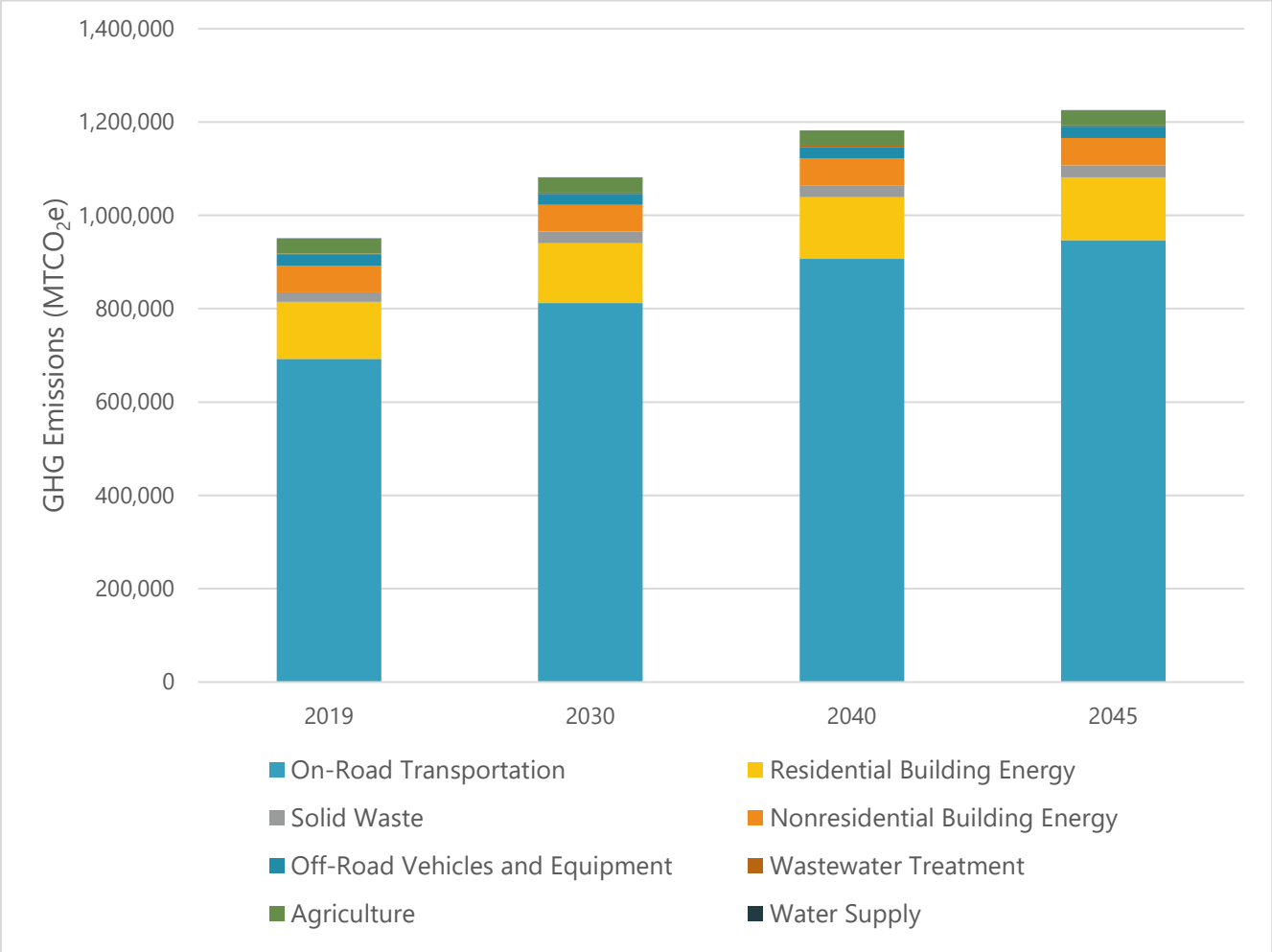
GHG emissions forecasts provide a modeled estimate of future unincorporated county GHG levels based on a continuation of trends in activity, population, and job growth. Additionally, the forecast accounts for known regulatory actions by State and federal agencies (i.e., "legislative" actions) that are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

The two forecast scenarios included in the CCAP are a "business-as-usual" (BAU) scenario and a legislative-adjusted BAU scenario. The BAU scenario assumes no additional State or federal actions will occur after 2019 (the updated baseline inventory year), it also includes a variety of scaling factors for each sector (or activities that occur within the sector[s]). However, in the legislative-adjusted BAU forecast, the BAU forecast is "adjusted" to account for the effects of State and federal laws and regulatory actions on the unincorporated county's forecasted emissions. Forecasted estimate emissions are presented for the years 2030, 2040, and 2045, which aligns with the State's GHG reduction target years established in key legislation and policies, including Senate Bill (SB) 32 and Assembly Bill (AB) 1279.

Business-As-Usual Forecasts

The BAU forecast estimates GHG emissions based on an assessment of how emissions generated by community activities will change over time without federal, State, or local action. The BAU forecast includes employment and population changes in the future. Based on 2019 GHG emissions levels, the BAU forecast estimates annual GHG emission in the unincorporated county will increase steadily and rise by approximately 77 percent in 2045 (**Figure 3.3**). This projected increase in BAU emissions is due to anticipated growth in demographics and vehicle activity within the unincorporated county.

Figure 3.3 Unincorporated Alameda County Business-as-Usual Greenhouse Gas Emissions Forecasts



Source: **Prepared by Ascent in 2023**.

Legislative-Adjusted Business-As-Usual Forecasts

The legislative-adjusted BAU emissions forecast evaluates how the unincorporated county's GHG emissions will 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 County with the information needed to focus efforts on certain emissions sectors and sources that have the most GHG reduction opportunities. **Table 3.4** provides a summary of the legislative reductions applied.

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 Transportation
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 Transportation
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Transportation
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Transportation
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 2023**.

Accounting for the reductions outlined above, the unincorporated county's forecasted legislative-adjusted emissions are expected to decrease by 6 percent in 2030 and by 14 percent in 2045 from 2019 levels. **Table 3.5** and **Figure 3.4** below illustrate the anticipated gradual decrease in GHG emissions through 2045, and **Figure 3.4** also shows the emissions trend that would occur without legislative reductions (i.e., BAU emissions).

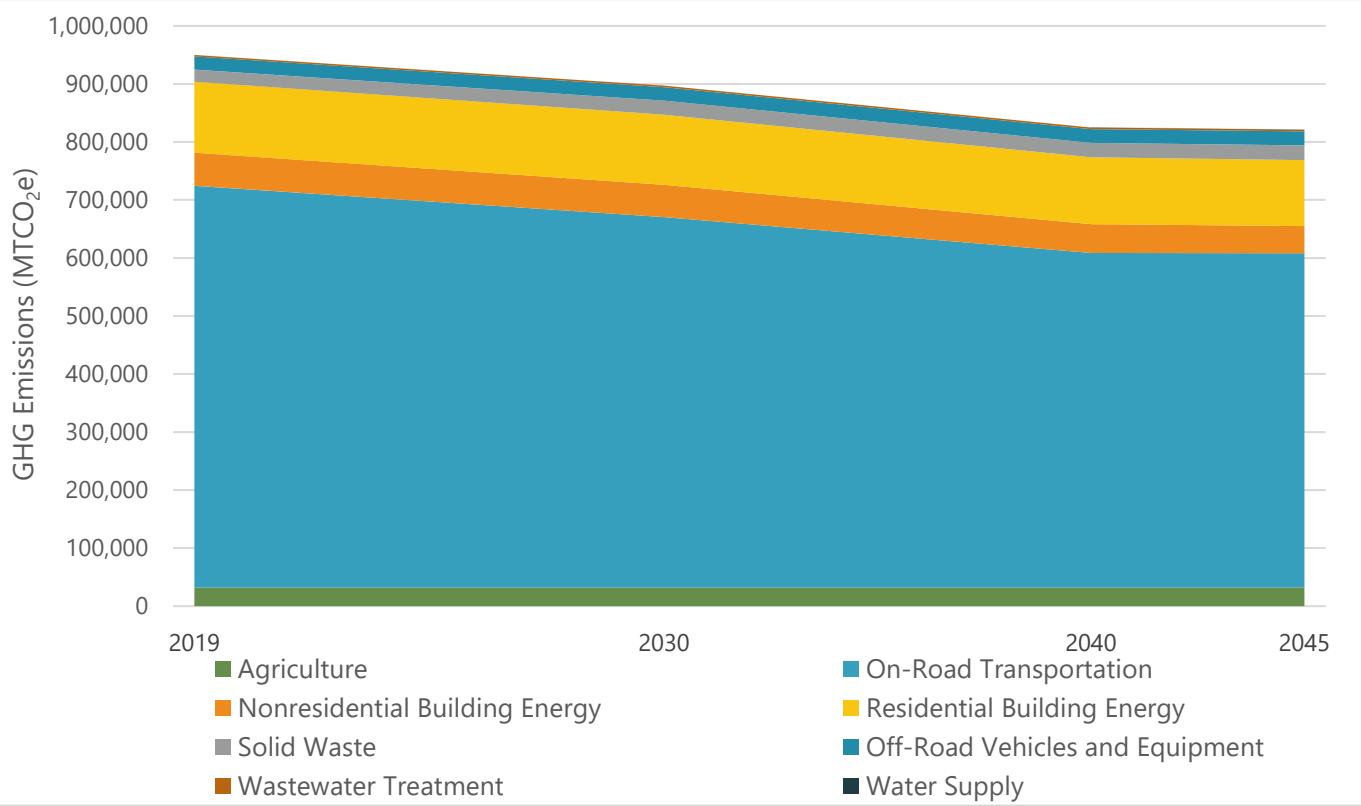
Table 3.5 Unincorporated Alameda County Legislative-Adjusted Business-as-Usual Greenhouse Gas Emissions Forecasts ($MTCO_2e$)

Sector	2019	2030	2040	2045
On-Road Transportation	692,138	637,948	576,639	575,635
Residential Building Energy	122,466	120,347	114,810	113,664
Nonresidential Building Energy	57,141	56,127	49,645	47,095
Agriculture	32,288	32,288	32,288	32,288
Off-Road Vehicles and Equipment	22,886	23,479	23,884	24,127
Solid Waste	20,562	24,406	25,061	25,464
Wastewater Treatment	2,404	2,511	2,579	2,620
Water Supply	350	202	47	0
Total	**950,235**	**897,307**	**824,952**	**820,894**
Percent Change from 2019 Levels	–	-6%	-13%	-14%
BAU Emissions (without legislative adjustments)	950,235	1,081,260	1,181,732	1,225,238

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 2023**.

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



Source: **Prepared by Ascent in 2023**.

3.4 Reduction Targets

The emissions reduction targets in this CCAP have been established to be consistent with statewide GHG targets. The County is seeking consistency with these targets because they have been determined as technologically and financially feasible through analysis by CARB. The County does not intend to place undue burden on community members by seeking to adopt overall targets that are more stringent than those set by the State of California. As directed in SB 32 and AB 1279, the State aims to reduce annual GHG emissions to:

- 40 percent reduction below 1990 levels by 2030;
- 85 percent reduction in anthropogenic emissions 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 Fahrenheit [°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 County 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. Thus, community GHG reduction targets for the CCAP were developed relative to the County's emissions in 2019 and established in proportion with statewide reduction for all emissions sectors relevant to the County's jurisdiction, consistent with CARB guidance. Estimating equivalent reductions needed from the 2019 baseline, the County aims to reduce emissions to:

- 2030 target: 24 percent below 2019 levels (723,139 $MTCO_2e$);
- 2040 target: 72 percent below 2019 levels (266,819 $MTCO_2e$); and
- 2045 target: 85 percent below 2019 levels (138,283 $MTCO_2e$).

The County's 2030 target requires GHG emission to be reduced by 228,056 $MTCO_2e$ in 2030. The 2040 target, which the County has set based on the trajectory necessary to meet the 2045 goal, requires that community emissions be reduced to 80,949 $MTCO_2e$. Achievement of the 2040 and 2045 targets 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 County's GHG emissions reduction targets. The County 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 unincorporated county's forecasted emissions, targets, and the local emissions gap.

Table 3.6 Unincorporated Alameda County Greenhouse Gas Local Emissions Gap ($MTCO_2e$)

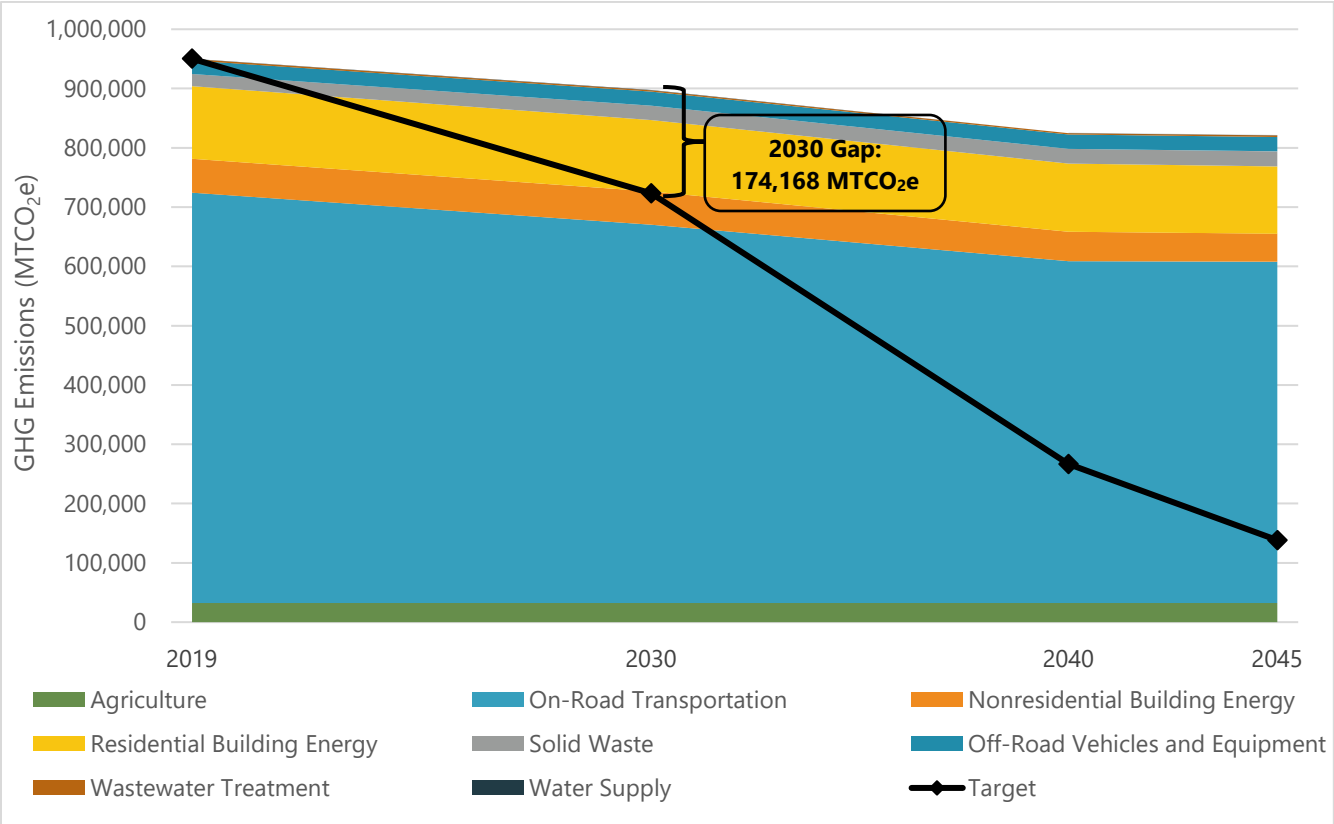
	2019	2030	2040	2045
BAU Emissions	950,235	1,081,260	1,181,732	1,225,238
Legislative-Adjusted BAU Emissions	950,235	897,307	824,952	820,894
Target Percent Below 2019 Levels	–	24%	72%	85%
Target Annual Emissions	–	723,139	266,819	138,283
Local Emissions Gap	–	174,168	558,133	682,611

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

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

The CCAP 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 Unincorporated Alameda County Local Emissions Gap

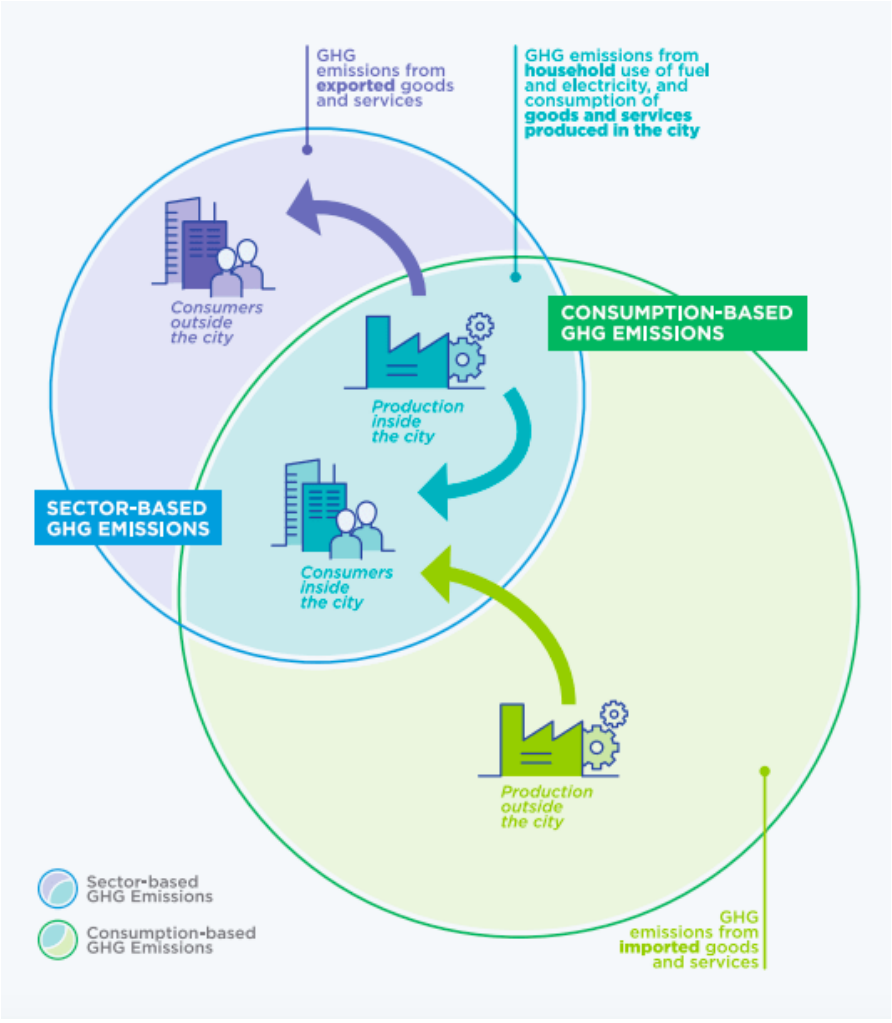


Source: **Prepared by Ascent in 2023**.

3.6 Consumption-Based Emissions Inventory

To understand the full impact of community activities and the unincorporated county's contribution to global climate change, the County has prepared a CBEI. A CBEI accounts for the total quantity of GHG emissions associated with the production (e.g., extraction of raw materials, manufacturing, and transportation), use, and disposal of products and services consumed by residents of a community within a given year. Unlike production-based inventories, which only estimate GHG emissions generated from activities that occur within specific geographic boundaries, CBEIs account for indirect lifecycle GHG emissions, or "embedded" emissions, and attribute them to residents of a jurisdiction, regardless of where the emissions are released into the atmosphere, as shown in **Figure 3.6**. For example, if a resident of California purchases a car that was made in Japan, the emissions embedded within the supply chain of producing and shipping that car are allocated to the California consumer, rather than to Japan (as they would be in a production-based approach). In addition to these embedded GHG emissions, all emissions produced from the resident driving the car – both within and outside of the community – are accounted for in the consumption-based inventorying approach.

Figure 3.6 Overlap Between Consumption-Based and Production-Based GHG Inventories



Source: **C40 Cities 2018**.

By accounting for lifecycle emissions generated outside of a community's boundaries, CBEIs capture a different subset of emissions than those included in production-based inventories. Therefore, CBEIs complement the findings of traditional production-based inventories and provide an additional lens through which local governments and individuals can view the responsibility to reduce local GHG emissions and mitigate impacts to climate change. In particular, the information on communities' carbon footprints (i.e., the amount of GHG emissions attributable to a community) associated with the consumption of food, goods, and services offers additional opportunities for GHG mitigation, as these sectors are unique to the consumption-based inventorying approach. CBEIs typically report emissions at the household level, although they are often scaled to jurisdiction levels using per capita metrics.

2019 CBEI Inventory

In the first effort to comprehensively explore household carbon footprints at a fine geospatial resolution, University of California, Berkeley (UC Berkeley) developed CBEIs for all census block groups, cities, and counties within the San Francisco Bay Area (Bay Area), including Alameda County. Using local consumption and emissions data wherever possible, researchers calculated GHG emissions for the year 2013 and published their results in *A Consumption-Based Greenhouse Gas Inventory of San Francisco Bay Area Neighborhoods, Cities and Counties: Prioritizing Climate Action for Different Locations* (hereafter referred to as "the study") (UC Berkeley 2015). The study provides consumption-based emissions estimates for six emissions sectors: transportation, food, goods, services, housing, and composting.

The study and its findings are commonly referenced by other CBEI protocols and guidance, including ICELI's Community Protocol (ICLEI 2019). These protocols recommend that Bay Area communities seeking to gain an understanding of local consumption-based emissions utilize the study's data and results. The researchers published jurisdiction-specific consumption and carbon footprint data for each emissions sector, which were used to prepare the unincorporated county's CBEI. It is important to note that the unincorporated county's CBEI uses demographic data from 2019 to develop this inventory to make it consistent with the production-based inventory's baseline year. The County's main objective in preparing a CBEI is to gain a better understanding of consumption-based emissions in the community, and it is unlikely that the overall picture of the unincorporated county's consumption-based emissions changed significantly between 2013 and 2019. Therefore, this CCAP uses the data, methods, and results of the study to address the community's consumption-based emissions.

Consumption by unincorporated county residents generated approximately 2,417,015 $MTCO_2e$ in 2019, which is equivalent to approximately 15.5 $MTCO_2e$ per person or 45.3 $MTCO_2e$ per household, which is slightly lower than the California household average of 45.7 $MTCO_2e$. Major emissions sectors included transportation, food, goods, and services. **Table 3.7** and **Figure 3.7** present the results of the unincorporated county's 2019 CBEI by sector and source.

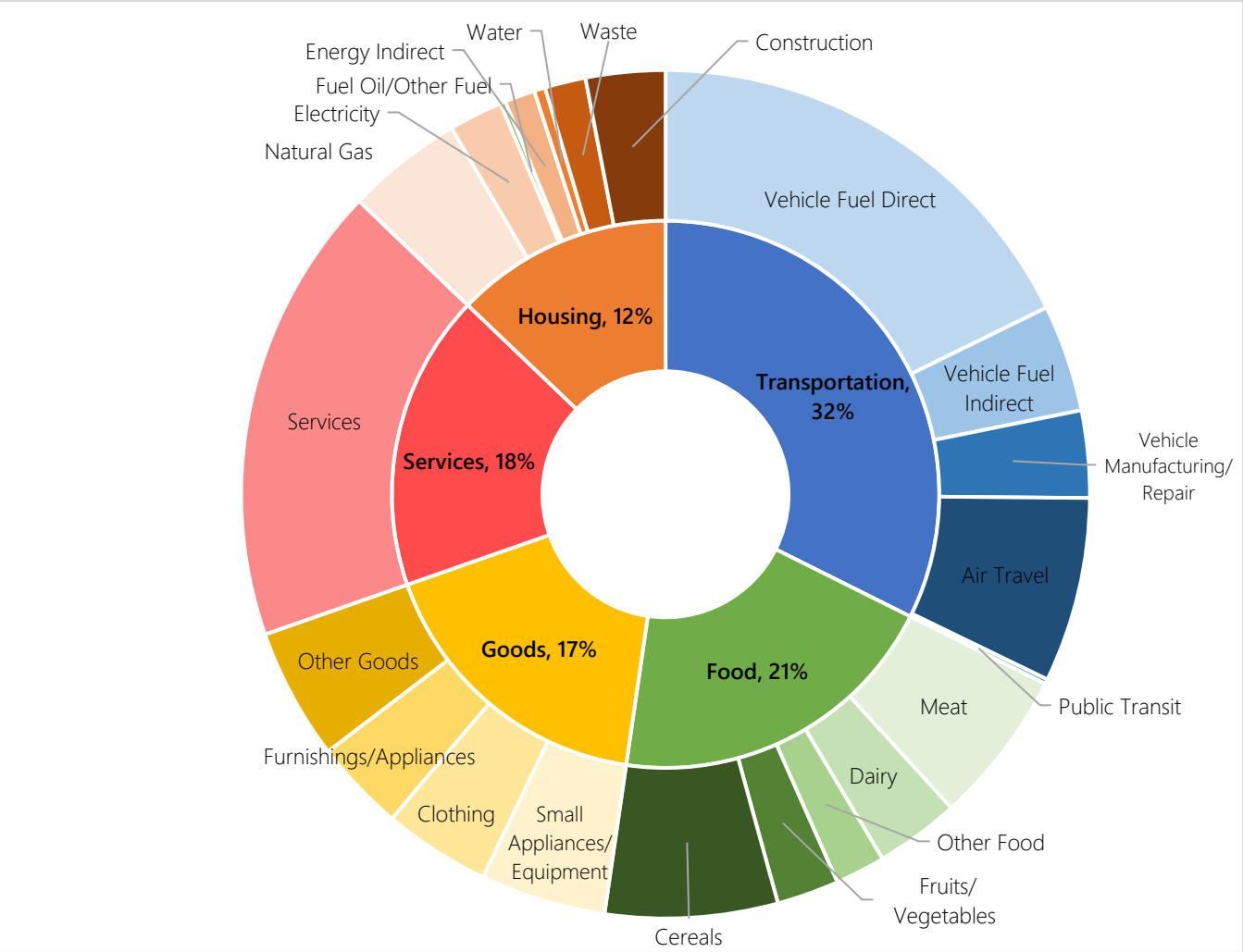
Table 3.7 2019 Unincorporated Alameda County Consumption-Based Emissions Inventory

Sector/Source	$MTCO_2e$/ person	$MTCO_2e$/ household	Total $MTCO_2e$	Percent of Total
Transportation	**5.1**	**14.8**	**789,777**	**33%**
Vehicle Fuel Direct	2.8	8.1	432,870	18%
Vehicle Fuel Indirect	0.6	1.9	99,565	4%
Vehicle Manufacturing/Repair	0.5	1.5	80,891	3%
Air Travel	1.1	3.2	172,042	7%
Public Transit	0.03	0.1	4,408	0.2%
Food	**3.1**	**9.1**	**486,253**	**20%**
Meat	0.9	2.7	143,268	6%
Dairy	0.5	1.5	78,424	3%
Fruits/Vegetables	0.3	0.9	46,531	2%
Cereals	0.4	1.1	57,752	2%
Other Food	1.0	3.0	160,278	7%
Goods	**2.7**	**7.9**	**423,022**	**18%**
Small Appliances/Equipment	0.7	2.2	116,526	5%
Clothing	0.6	1.9	99,484	4%
Furnishings/Appliances	0.5	1.6	84,921	4%
Other Goods	0.8	2.3	122,092	5%
Services	**2.7**	**8.0**	**427,145**	**18%**
Housing	**2.0**	**5.9**	**313,521**	**13%**
Natural Gas	0.7	2.0	108,281	4%
Electricity	0.3	0.9	50,054	2%
Fuel Oil/Other Fuel	0.03	0.1	4,942	0.2%
Energy Indirect	0.2	0.5	28,044	1%
Water	0.1	0.2	10,385	0.4%
Waste	0.2	0.7	37,971	2%
Construction	0.5	1.4	73,844	3%
Composting	**-0.1**	**-0.4**	**-22,703**	**-1%**
Total	**15.5**	**45.3**	**2,417,015**	**100%**

Notes: Totals may not sum exactly due to independent rounding. MTCO2e = metric tons of carbon dioxide equivalent.

Source: **UC Berkeley 2015; adapted by Ascent in 2023**.

Figure 3.7 2019 Unincorporated Alameda County Consumption-Based Emissions Inventory[1]



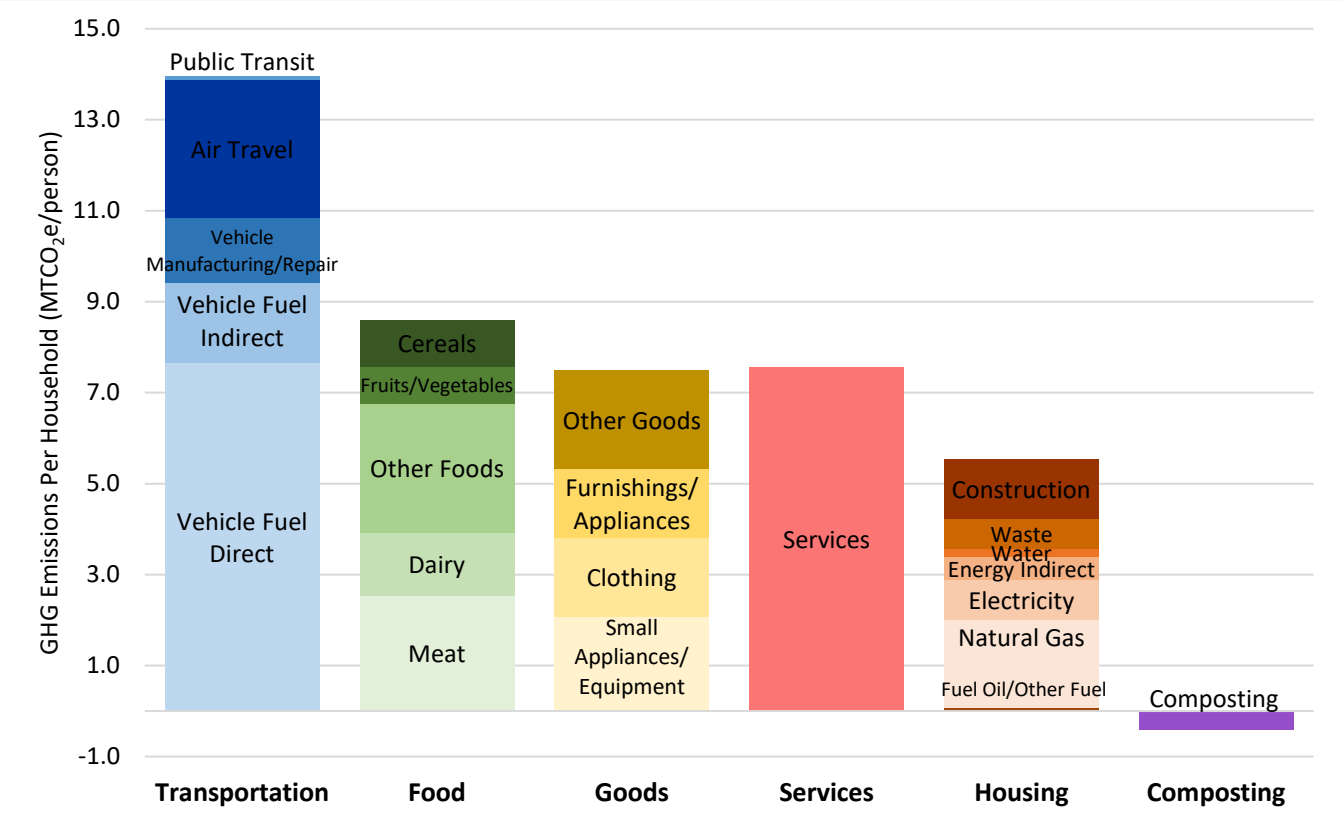
Notes: [1] Consumption-based emissions estimates for composting are not shown in the chart, as these are emissions reductions (or avoided emissions) and cannot be represented in the chart type.

Source: **Prepared by Ascent in 2023**.

As shown above, transportation represented the unincorporated county's largest consumption-based emissions sector in 2019, accounting for 33 percent of the CBEI. Transportation sector emissions result primarily from the consumption of vehicle fuel, which includes both direct emissions from the combustion of fuel as well as indirect emissions from fuel production. Transportation emissions also include embedded emissions associated with vehicle manufacturing and repair, as well as emissions from air travel and public transit. The second-largest emissions-generating sector was food, which contributed 20 percent of the unincorporated county's consumption-based emissions in 2019. Meat and dairy products contribute significantly to this sector, producing nearly half of all food-related emissions, with the remaining emissions generated from fruits, vegetables, cereals, and other food. The goods and services sectors were also substantial contributors, with each sector accounting for 18 percent of the unincorporated county's CBEI. The goods sector consists of embedded emissions from small appliances and equipment, clothing, furnishings and large appliances, and other goods, and the services sector includes GHG emissions embedded in the services consumed by unincorporate county residents, including health care, education, financial services, communication, and entertainment. The housing sector, which consists of emissions from household energy use, construction, water, and

wastewater, contributed the smallest proportion of the unincorporated county's consumption-based emissions, accounting for 13 percent in 2019. Composting in the unincorporated county accounted for a net negative contribution to the unincorporated county's CBEI, reducing GHG emissions per household by 0.4 $MTCO_2e$ in 2019. **Figure 3.8** presents the unincorporated county's CBEI by household.

Figure 3.8 Unincorporated Alameda County 2019 Consumption-Based Emissions Inventory by Household



Source: **Prepared by Ascent in 2023**.

3.7 Consumption-Based and Production-Based Comparison

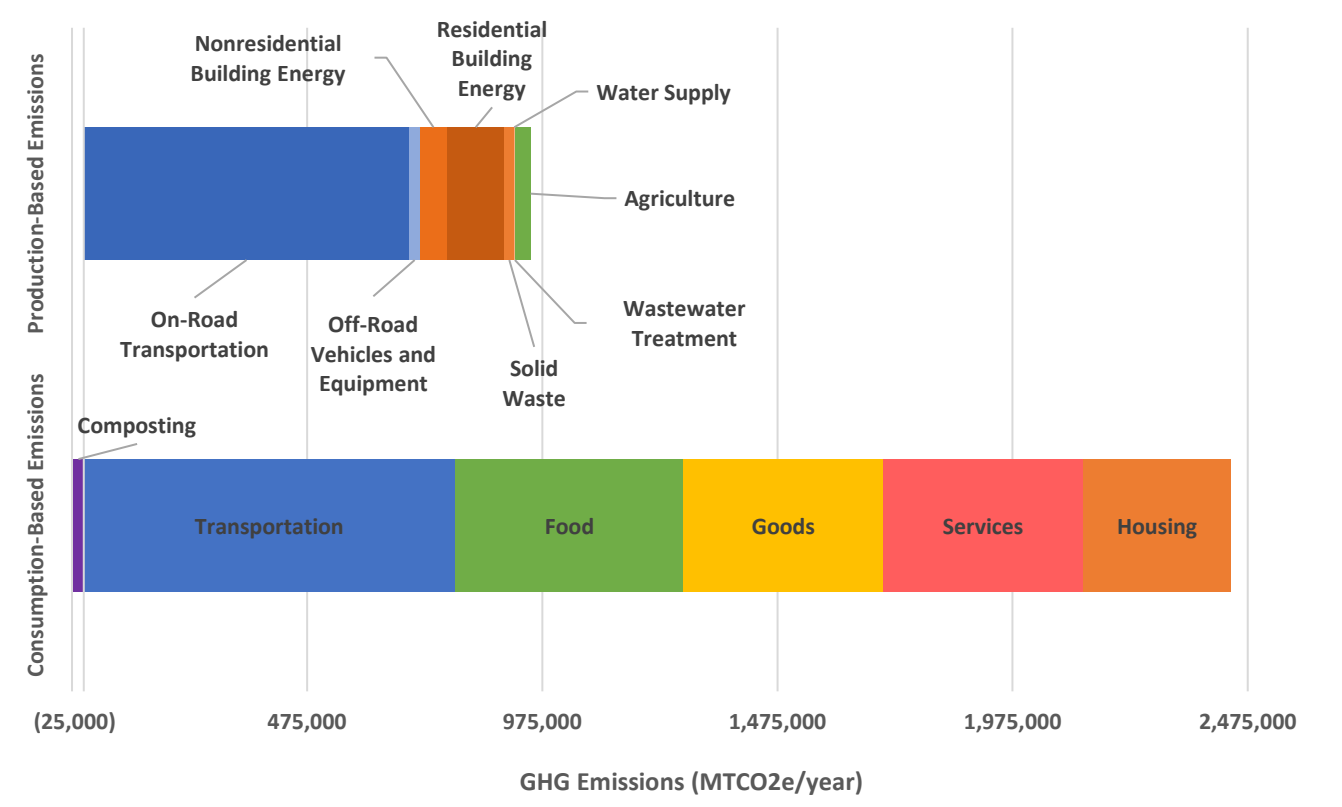
The unincorporated county's consumption-based emissions in 2019 are 154 percent higher than its production-based emissions in 2019. Certain emissions sectors are accounted for in both inventories, including direct emissions from vehicle transportation fuels, household energy use, and waste disposal. The consumption-based inventory shows higher emissions because it captures emissions not included in the production-based inventory, such as embedded lifecycle emissions from the production of fuel, food, goods, services, and construction. These indirect emissions represent over two-thirds of the unincorporated county's CBEI. The inclusion of these additional GHG emissions provides new opportunities for the County and unincorporated area communities to reduce emissions and mitigate their overall impact to climate change. **Table 3.8** presents a comparison of the unincorporated county's 2019 consumption-based emissions and 2019 production-based emissions, and **Figure 3.9** illustrates the two inventories by sector.

Table 3.8 Comparison of Unincorporated Alameda County 2019 Consumption-Based and Production-Based Emissions Inventories

Emissions	Production-Based Emissions Inventory	Consumption-Based Emissions Inventory	Percent Difference
Total	950,235	2,417,015	+154%

Source: Production-based emissions inventory **prepared by Ascent in 2023**. Consumption-based emissions inventory prepared by **Jones and Kammen 2013** and **UC Berkeley 2015**; **adapted by Ascent in 2023**.

Figure 3.9 Comparison of Unincorporated Alameda County 2019 Consumption-Based and Production-Based Emissions Inventories



Source: **Prepared by Ascent in 2023.**

3.8 Natural and Working Lands Inventory

Why Prepare a Natural and Working Lands Inventory?

Natural and working lands hold a prominent place in California's path toward carbon neutrality, and quantification of carbon storage is an evolving area. Understanding the magnitude and nature of existing carbon storage can help inform the potential future carbon sequestration opportunities from natural and working lands, which will be an important advancement in climate mitigation and resilience planning for unincorporated Alameda County.

Land use changes have direct impacts on the amount of carbon that is stored and sequestered within vegetation and soils in the unincorporated county. New development that converts grasslands, forests, shrublands, or other natural land covers to urban uses reduces the carbon sequestration potential of unincorporated county lands. Reforesting or afforesting barren, unproductive lands to preserve them

from development will have the opposite effect, increasing the unincorporated county's carbon sequestration potential. This inextricable link between land use and carbon sequestration highlights the need for thoughtful land use planning that minimizes losses to current carbon storage and maximizes preservation/enhancements.

Alameda County reaps the benefits of its natural and working lands through recreational amenities, wildlife habitat, and arable land that produces food that is distributed throughout the region. Further, voters in Alameda County have committed to preserving natural and working lands through the passage of Measure D in 2000, which established an urban growth boundary. The urban growth boundary limits development in rural areas of the unincorporated county.

Baseline Carbon Stock Inventory

The baseline estimate for the carbon already stored in the unincorporated county's vast natural and working lands is split into two types of carbon stock: aboveground live carbon storage and soil carbon storage. Additionally, within the urban growth boundary, urban forest carbon storage was estimated.

Aboveground live carbon storage refers to the carbon that is stored in live vegetation (i.e., trees, shrubs and grasses). Soil carbon storage refers to the carbon stored in soil organic matter from microorganisms, root exudates, decomposed organisms, and soil biota. Urban forest carbon storage refers to the amount of carbon stored in street trees in urban areas (Bay Area Greenprint 2019).

Based on estimates from Bay Area Greenprint, the unincorporated areas of Alameda County have 18,071,164 $MTCO_2e$ of carbon stored in its ecosystem—including carbon in aboveground biomass in rural areas, urban forests, and soil, shown in **Table 3.9**. Additional information on the data and methods used for each type of carbon stock can be found in **Appendix A**.

Table 3.9 Unincorporated Alameda County 2019 Carbon Stock Inventory

Source	Carbon Stock ($MTCO_2e$)	Percent of Total
Aboveground Live Carbon Storage	4,884,713	27%
Soil Carbon Storage	12,486,405	69%
Urban Forest Carbon Storage	700,046	4%
Total	**18,071,164**	**100%**

Source: **Bay Area Greenprint, N.d.**; **adapted by Ascent in 2023**.

CHAPTER 4

Climate Adaptation and Resilience

4 Climate Adaptation and Resilience

This chapter describes the context of climate change adaptation and resilience for the unincorporated areas of Alameda County (unincorporated county). First, it provides relevant background on climate change adaptation and resilience and outlines the adaptation planning process. Additionally, it provides an overview and summary of the Vulnerability Assessment (VA) conducted by the Alameda County government (County), which was developed in preparation of this Community Climate Action Plan (CCAP). Specifically, the summary underscores the primary climate hazards that the unincorporated county faces (i.e., wildfire, increased temperatures and extreme heat, extreme precipitation and flooding, drought). This includes an overview of the findings from the exposure, sensitivity and potential impacts, and adaptive capacity analyses conducted for each hazard as part of the VA, along with the vulnerability scoring associated with each hazard. The full VA, which includes additional information, data, and methodologies can be found in **Appendix B**.

4.1 Climate Adaptation and Resilience

The effects of climate change are already occurring at global, regional, and local scales and will continue to alter or worsen existing hazards in the unincorporated county. The primary effects of climate change include increased temperatures, changes in precipitation patterns, and sea level rise. These changes to our climate will cause or exacerbate secondary climate hazards, including wildfire, extreme heat, extreme precipitation, flooding, and drought. While these hazards have existed historically in the unincorporated county and surrounding regions, their frequency and intensity are projected to increase or change as a result of climate change. The level of impact from these climate hazards will vary across the unincorporated county due to variations in physical, social, and economic characteristics.

As the County continues to do its part to combat global climate change by reducing local greenhouse gas (GHG) emissions, it must also prepare the unincorporated communities to withstand the impacts of climate change through adaptation planning. Local and regional efforts are critical in building climate resilience—the capacity of a community to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from disruptive experiences related to climate change—and can lead to a greater understanding of climate risks and strategies to reduce their impacts.

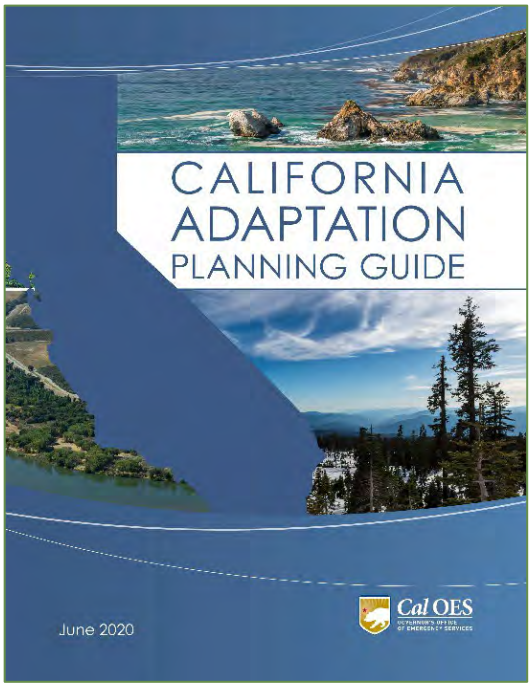
To ensure that climate adaptation planning works for everyone, the County must take special care to consider the diverse needs and risks faced by frontline communities. Historical patterns of inequity, socioeconomic disparities, and systemic environmental injustices are likely to result in disproportionate climate impacts among communities and individuals who already face the greatest burdens. Equitable adaptation and resilience solutions must take into account existing social vulnerabilities and differences in access to power, knowledge, and resources so that all residents share the benefits of climate adaptation efforts.

There are many plans, policies, and programs already in place 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 CCAP aims to identify and address those gaps.

4.2 Equitable Adaptation Planning Process

The goal of the equitable adaptation planning process is to improve community resilience to climate change and reduce vulnerability through strategies that address existing inequities. A resilient community is one in which all residents are equally prepared for current, future, and ongoing hazards, with the ability to dynamically respond, recover, learn from, and adapt to hazards when they occur.

To assist local governments, the California Governor's Office of Emergency Services (Cal OES) prepared the California Adaptation Planning Guide (APG), which provides communities with vulnerability assessment and adaptation planning guidance (Cal OES 2020). Most recently updated in June 2020, the APG includes a step-by-step process that communities may use to help equitably 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 County prepared the adaptation components of this CCAP consistent with the APG framework.

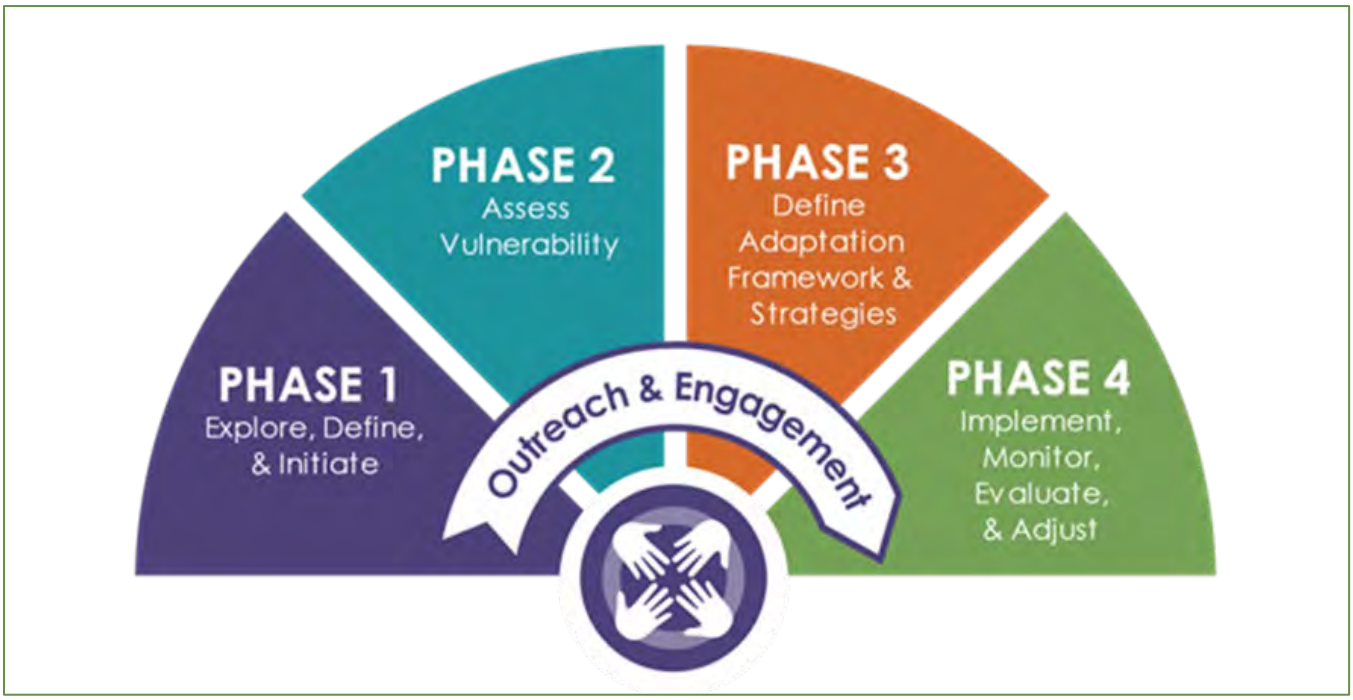


California Adaptation Planning Guide

The APG 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 and vulnerable 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 equitably address the risks posed by climate change hazards based on the results of the vulnerability assessment.
- In **Phase 4, "Implement, Monitor, Evaluate, and Adjust,"** ensures implementation, monitoring, and ongoing evaluation of the adaptation framework, adjusting strategies over time based on continual learning, feedback, or triggers.

Figure 4.1 Adaptation Planning Process



Source: **Cal OES 2020; adapted by Ascent in 2023**.

4.3 Vulnerability Assessment Overview

The VA provides a comprehensive analysis of community vulnerabilities to climate change across the unincorporated county. It identifies and characterizes climate 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 hazards does the unincorporated county currently face? How are these climate hazards projected to change in the future?
- **Sensitivity and Potential Impacts**: what aspects of the community (i.e., populations, built environment, community functions) in the unincorporated county will be affected by climate hazards, and to what degree?
- **Adaptive Capacity**: what is currently being done to address climate hazards and their associated impacts in the unincorporated county? What ability does the County have to address impacts in the future?
- **Vulnerability**: how vulnerable is the unincorporated county to climate hazards?

To effectively adapt to climate change and improve community resilience, the County first needs to understand its vulnerability to climate hazards. This is determined through the Vulnerability Assessment.

The County conducted the VA consistent with APG guidance using the steps described above. For the exposure analysis, and to summarize historic data and determine future projections for climate hazards in and around the unincorporated county, the County used Cal-Adapt – a tool developed by the California Energy Commission (CEC) and the University of California, Berkeley that uses downscaled global climate model data. The severity of future potential impacts from climate hazards on the unincorporated county's populations, built environment, and community functions will largely depend on the level of current and future global GHG emissions. The County's VA uses two future GHG emissions scenarios, known as Representative Concentration Pathways (RCPs): the RCP 8.5 scenario,

which represents a high GHG emissions scenario, and the RCP 4.5 scenario, which represents a lower GHG emissions scenario. Generally, climate hazards were evaluated for changes to occur by near-term (current-2050), midterm (2040-2069), and long-term (2070-2099) timescales, unless noted otherwise. Due to Cal-Adapt data constraints, the geographic boundary used in these analyses was the boundary of Alameda County as a whole (i.e., the unincorporated county and incorporated cities within Alameda County). It is important to note that although incorporated cities are included within this boundary, their inclusion does not significantly alter the results of the analyses and still produces data that accurately portrays unincorporated county conditions.

In addition to Cal-Adapt, the County reviewed several existing resources to obtain information about climate-related hazard risks that may threaten the unincorporated county, including information from *California's Fourth Climate Change Assessment: San Francisco Bay Area Region Report* (OPR, CEC, and CNRA 2018), along with a variety of additional resources (see **Appendix B**).

4.4 Vulnerability Assessment Summary

The VA helps the County understand its vulnerabilities to climate hazards, which includes wildfire, increased temperatures and extreme heat, extreme precipitation and flooding, and drought. Additionally, the results of the VA inform adaptation strategies intended to improve the unincorporated county's resilience to each identified climate hazard. The full VA, including detailed data, additional information, and references, is available in **Appendix B** to this CCAP.

Climate Hazards Facing the Unincorporated County

The following sections provide a snapshot of the unincorporated county's projected exposure to climate hazards and potential impacts to populations, the built environment, and community functions.

Populations include residents, visitors, and segments of the population that are particularly vulnerable to climate change impacts – including climate migrants or others who may move to unincorporated Alameda County in the future as a result of climate hazard-related displacement. The County's Draft Environmental Justice Element identifies the communities of Ashland, Cherryland, and Hayward Acres, and parts of Castro Valley and San Lorenzo as Environmental Justice "Priority Communities," or low-income census tracts that have been historically and disproportionately burdened by environmental factors (see Figure 1.2). Though all persons within the unincorporated county will experience climate change impacts, frontline communities, including the Environmental Justice Priority Communities and other vulnerable populations (children, pregnant people, the elderly, communities of color, linguistically isolated communities, individuals experiencing homelessness, low-income individuals, individuals with access and functional needs, workers in vulnerable populations, and those with preexisting health issues) are particularly vulnerable.

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 hazard events. This includes residential and commercial buildings, critical facilities, transportation infrastructure, and utility infrastructure, among other built assets.

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 unincorporated county and across the region.

Wildfire

Wildfire behavior is largely determined by three factors: topography, fuel (e.g., vegetation), and weather. Climate change influences two of these three factors—fuel and weather.

Historically, attention to wildfire in California has mostly focused on the Sierra Nevada region and Southern California, but recent large and destructive wildfires in the San Francisco Bay Area, including in Alameda County, have rapidly shifted attention to the ongoing risks in this region. Climate change is exacerbating many of the factors that contribute to wildfire risk. Increased variability in precipitation may lead to wetter winters and increased vegetative growth in the spring. Potentially longer and hotter summer periods will lead to the drying of vegetative growth, which may ultimately result in a greater amount of fuel for wildfire ignition and spread. This has already been seen across California in recent years, with the area burned by wildfires increasing in parallel with rising air temperatures.

Wildfires have proven to be costly as well as deadly and have put many elements of the unincorporated county at risk, including human lives, property, rivers and watersheds, recreation, wildlife habitats, historic and cultural assets, and local economies, among others. The areas most susceptible to wildfire across the entirety of Alameda County are the hilly northwestern, central, and southeastern portions of the county. The Fire Hazard Severity Zones (FHSZs) presented in **Figure 4.2**, which are designated by the California Department of Forestry and Fire Protection (CAL FIRE), represent these areas with greater risk of fire hazard, ranging from Moderate, to High, to Very High. According to Cal-Adapt, and as shown in **Table 4.1**, the total area burned annually by wildfire within Alameda County is expected to increase from the historic (1961-1990) annual average of 4,020 acres to 4,516 acres in the near-term and 4,513 acres in the midterm. In the long-term, average annual area burned is projected to increase to 4,534 acres under RCP 4.5, and to 4,193 acres under RCP 8.5 (CEC 2022a). To underscore the severity and scale of future wildfire risk potential, comparison data for the state as a whole is also included in this table.

Table 4.1 Changes in Average Annual Area Burned in Alameda 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[3]	RCP 8.5[4]
Alameda County					
Average Annual Area Burned (acres)	4,020	4,516	4,513	4,534	4,193
Average Annual Area Burned Change from Historic (± %)	N/A	+12.3	+12.3	+12.8	+4.3
California					
Average Annual Area Burned (acres)	422,728	524,316	617,598	596,213	748,490
Average Annual Area Burned Change from Historic (± %)	N/A	+24.0	+46.1	+41.0	+77.1

Notes: Due to Cal-Adapt limitations, the data presented in this table encompasses the entirety of Alameda County, rather than just the unincorporated county; N/A = not applicable; RCP = Representative Concentration Pathway.

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

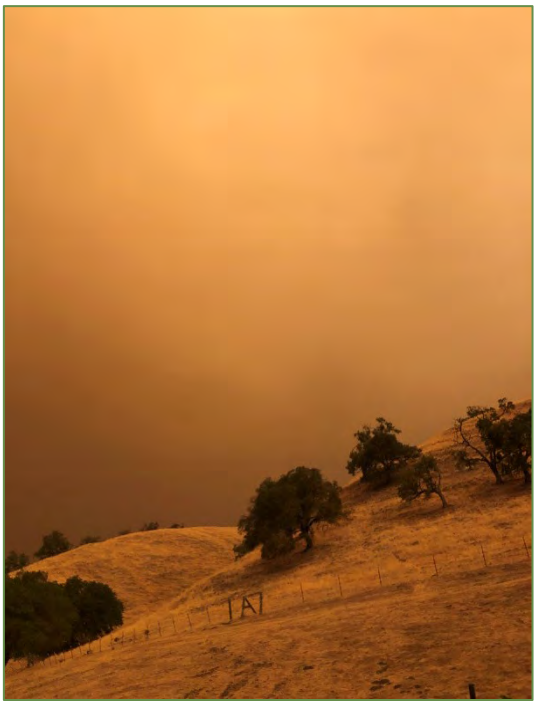
[2] Projections for the near-term and midterm timescales are based on RCP 8.5.

[3] RCP 4.5 represents a lower greenhouse gas emissions scenario.

[4] RCP 8.5 represents a high greenhouse emissions scenario, also known as a "business-as-usual" scenario.

Source: **CEC 2022a**.

The potential impacts of wildfire on the unincorporated county's populations, built environment, and community functions are wide-ranging. First, the risk of direct exposure of populations and the built environment to wildfire are especially worrisome for those that reside or lie in FHSZs or wildland-urban interface (WUI) areas. Direct exposure can result in severe injuries to populations and can cause significant damage to residential and nonresidential buildings, critical facilities, roadways, and bridges. Additionally, smoke and air pollution linked to wildfires can be a severe human health hazard, potentially leading to cognitive impairment, premature births, and eye and respiratory illnesses, and exacerbating other pre-existing conditions. Wildfires can also create hazardous conditions even after they are suppressed; most notably, destructive debris flows triggered by intense precipitation are one of the most dangerous post-fire hazards, and the risk of debris flows is directly correlated with the degree of vegetation loss and soil exposure after a wildfire (USGS 2018). Further, during high wildfire risk conditions, a Public Safety Power Shutoff (PSPS) event may be triggered. While PSPS events are meant to prevent the ignition of potentially widespread, devastating wildfires, vulnerable populations without alternate power options may be adversely affected by the PSPS event itself, for example, if they lose air conditioning during extreme heat conditions. The potential impacts of wildfire presented here serve as a snapshot of a larger discussion of potential impacts that is presented in the VA, which can be found in **Appendix B**.



Source: **Alameda County Community Development Agency**

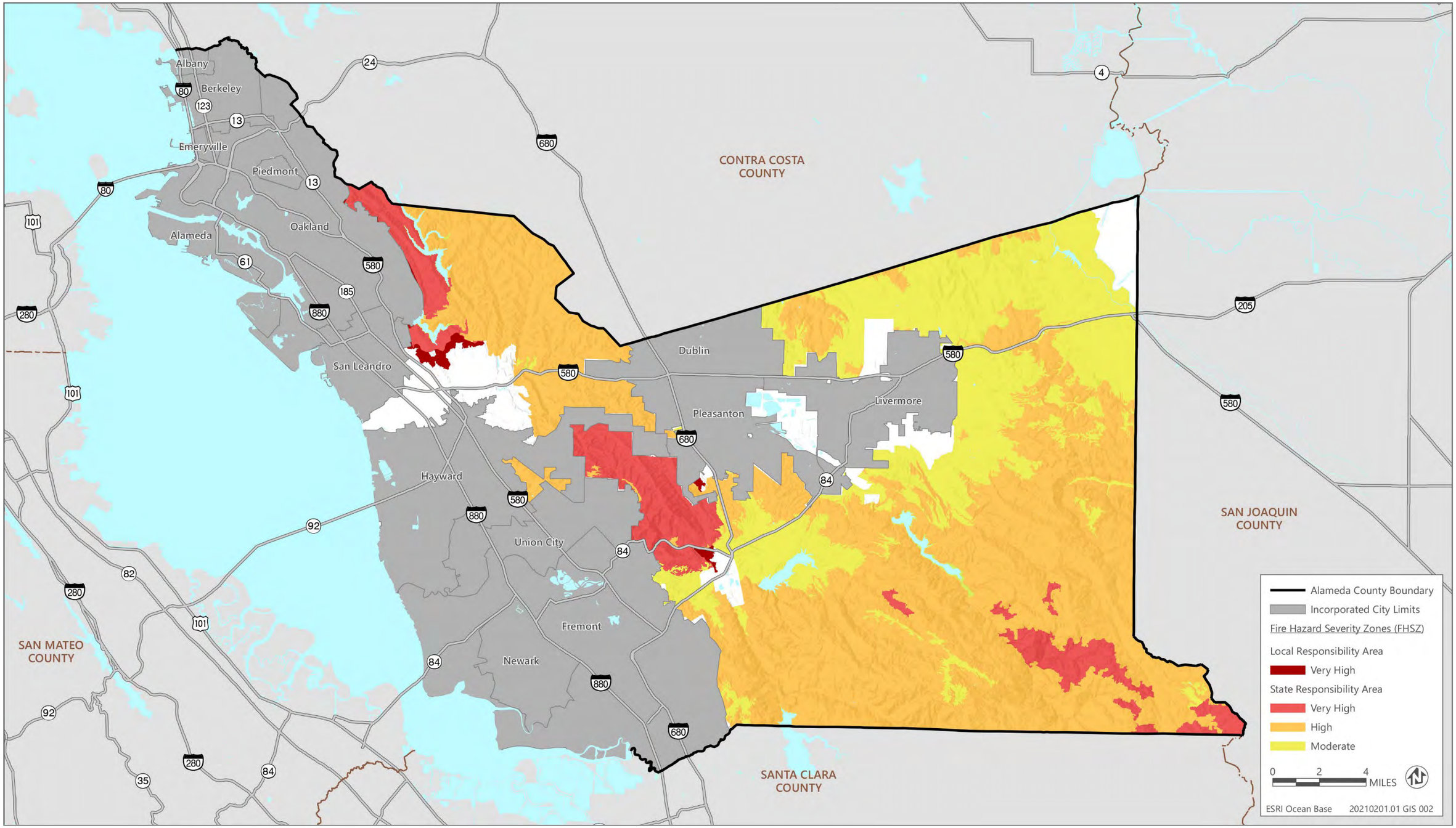
Smoky Skies in Unincorporated Alameda County

Increased Temperatures and Extreme Heat

Extreme heat thresholds are unique to any location. Alameda County's threshold is 92.7 °F, which means that 98 percent of daily maximum temperatures in the county between the months of April and October from 1961 to 1990 were below this temperature.

The unincorporated county has experienced, and is projected to continue experiencing, increases in average annual temperature and extreme heat, which could lead to an array of potential impacts, including negative public health outcomes, worsened air quality, increased demand for air conditioning, and deterioration of critical infrastructure. According to Cal-Adapt, the average annual maximum and minimum temperature across Alameda County are both projected to rise between 3 and 8 degrees Fahrenheit (°F) from their respective historic averages by the end of the century as a result of climate change (CEC 2022b). Increased temperatures will also lead to a significant increase in extreme heat events. For Alameda County as a whole, an extreme heat day is defined as a day when the maximum temperature is above the extreme heat threshold of 92.7 °F. Heat waves refer to a period of four or more consecutive extreme heat days (CEC 2022c). The average annual number of extreme heat days, heat waves, and the number of days in the longest stretch of consecutive extreme heat days are all projected to rise through the end of the century. **Table 4.2** displays historic data and future projections for increased temperatures and extreme heat in Alameda County across each timescale through 2099.

Figure 4.2 Fire Hazard Severity Zones in Unincorporated Alameda County



Source: Data downloaded from CAL FIRE in 2022; adapted by Ascent in 2022.

Acknowledging that the data in the table represents Alameda County as a whole, it should be noted that both temperature and extreme heat vary depending on location within the county due to various geographic, topographic, and climatological factors. Because of that, increasing temperatures and extreme heat are also experienced differently—for example, certain areas that have historically experienced lower temperatures may have limited air conditioning in local residential and nonresidential buildings, which can exacerbate the risk posed by increasing temperatures and extreme heat, especially for renters and people living on limited incomes.

Table 4.2 Changes in Average Annual Temperature and Extreme Heat in Alameda County

Annual Averages	Historic (1961-1990)	Near-Term[1] (current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5[2]	RCP 8.5[3]
Temperature					
Maximum Temperature (°F)	68.5	71.8	73.5	73.5	76.2
Maximum Temperature Change from Historic (± °F)	N/A	+3.3	+5.0	+5.0	+7.7
Minimum Temperature (°F)	46.8	50.0	51.6	51.5	54.7
Minimum Temperature Change from Historic (± °F)	N/A	+3.2	+4.8	+4.7	+7.9
Extreme Heat Events					
Number of Extreme Heat Days[4]	4.3	13.0	19.3	18.7	32.7
Number of Heat Waves[5]	0.2	1.2	2.2	2.0	4.6
Number of Days in Longest Stretch of Consecutive Extreme Heat Days	2.3	4.7	6.3	5.5	9.0

Notes: Due to Cal-Adapt limitations, the data presented in this table encompasses the entirety of Alameda County, rather than just the unincorporated county; N/A = not applicable; RCP = Representative Concentration Pathway.

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

[2] RCP 4.5 represents a lower greenhouse gas emissions scenario.

[3] RCP 8.5 represents a high greenhouse gas emissions scenario, also known as a "business-as-usual" scenario.

[4] The threshold for an extreme heat day in Alameda County is 92.7 °F.

[5] Heat waves are defined by Cal-Adapt as four or more consecutive extreme heat days.

Source: **CEC 2022b; 2022c**.

The unincorporated county's populations are at significant risk of being harmed by increased temperatures and extreme heat. Extreme heat can be harmful to public health, both directly and indirectly. Extreme heat itself can cause heat stroke and other heat-related illnesses, increase the risk of cardiovascular disease, respiratory disease, kidney failure, and preterm births, and exacerbate other pre-existing conditions in certain vulnerable populations, such as the medically fragile or chronically ill (CDPH 2017; LAO 2022). Additionally, extreme heat and rising temperatures can heighten allergies and intensify the photochemical reactions that produce smog, ground-level ozone and fine particulate matter measuring 2.5 micrometers or smaller ($PM_{2.5}$), which can be detrimental to human health (CDPH 2017). Further, increased temperatures and extreme heat may lead to a large increase in air conditioning demand across the unincorporated county, placing more stress on the electrical grid, leading to higher-cost electricity bills for residents who have air conditioning access, and causing disproportionate impacts on individuals or families residing in units that do not have air conditioning.

Further, the unincorporated county's transportation systems are at risk of being adversely affected by increased temperatures and extreme heat. During prolonged periods of increased temperatures or extreme heat, pavement may deteriorate, rail lines may buckle, the structural integrity of bridges may be compromised, air conditioning in buses could fail, and overall transportation maintenance costs may increase (Caltrans 2018; Cambridge Systematics 2015). Further details on the potential impacts of increased temperatures and extreme heat can be found in the VA, located in **Appendix B**.

Extreme Precipitation and Flooding

Like extreme heat thresholds, extreme precipitation thresholds are unique to any location. Alameda County's threshold is 0.9 inches of precipitation over a two-day period.

The unincorporated county is also projected to experience a steady increase in average annual precipitation through the end of the century, with much of that precipitation likely to occur during extreme precipitation events, which can lead to flood impacts. According to Cal-Adapt, the historic average annual precipitation in Alameda County is 18.0 inches, and the historic average annual number of extreme precipitation events is 1.5. As shown in **Table 4.3**, the average annual precipitation across the county may rise upwards of 22 inches, with the number of extreme precipitation events potentially exceeding 4 per year by the end of the century, depending on the level of current and future GHG emissions (CEC 2022b; 2022d).

Table 4.3 Changes in Average Annual Precipitation and Extreme Precipitation in Alameda County

Annual Averages	Historic (1961-1990)	Near-Term[1] (current-2050)	Midterm[1] (2040-2069)	Long-Term (2070-2099)	
				RCP 4.5[2]	RCP 8.5[3]
Precipitation					
Precipitation (inches)	18.0	20.5	20.4	20.4	22.6
Precipitation Change from Historic (± inches)	N/A	+2.5	+2.4	+2.4	+4.6
Extreme Precipitation Events					
Number of Extreme Precipitation Events[4]	1.5	2.4	2.9	2.8	4.4
Number of Extreme Precipitation Events Change from Historic (±)	N/A	+0.9	+1.4	+1.3	+2.9

Notes: Due to Cal-Adapt limitations, the data presented in this table encompasses the entirety of Alameda County, rather than just the unincorporated county; N/A = not applicable; RCP = Representative Concentration Pathway.

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

[2] RCP 4.5 represents a lower greenhouse gas emissions scenario.

[3] RCP 8.5 represents a high greenhouse gas emissions scenario, also known as a "business-as-usual" scenario.

[4] The threshold for an extreme precipitation event in Alameda County is 0.9 inches of precipitation over a two-day period.

Source: **CEC 2022b; 2022d**.

In general, the Bay Area exhibits "booms and busts," which refers to the existence of both very wet years and very dry years. The amount of precipitation that falls in any particular year is largely influenced by occurrences of large, discrete winter storms, also known as atmospheric rivers, which often provide a substantial fraction of the region's annual precipitation, inclusive of Alameda County (OPR, CEC, and CNRA 2018). In California, atmospheric rivers vary in intensity; some are beneficial for water supply and replenish snowpack that naturally melts during the summer, serving as water supply for people and agriculture, while others are responsible for widespread and adverse impacts (NOAA 2021). Extreme precipitation from these atmospheric rivers in the future may prove to be more variable, volatile, and potentially more severe. Noting this, the unincorporated county may experience changes in the frequency and/or intensity of flood events, though the exact frequency, intensity, and duration of these events will vary annually.

In addition to extreme precipitation, sea level rise can also result in permanent or temporary inundation and flooding. In the unincorporated county, sea level rise poses a direct threat only in San Lorenzo—a small portion of total unincorporated county lands.

The unincorporated county's 100- and 500-year floodplains are displayed in **Figure 4.3**.

Source: **Alameda County Fire Department.**

Collapsed portion of Redwood Road in Castro Valley from January 2023 Storms

The populations and components of the built environment that will likely be most directly affected by extreme precipitation and flooding in the unincorporated county are those that reside or lie within the 100- and 500-year floodplains. Depending on the severity of a flooding event, there is the potential for populations to be displaced and for people to lose their homes and livelihoods, in addition to the risk of injuries and even death. Flooding resulting in overflow of sewage systems or hazardous waste site infiltration may create conditions that release contaminants and promote water- or food-borne diseases that can severely impact human health (CDPH 2017). Flooding-related disruption of the transportation network may reduce the capacity of individuals to evacuate or access hospitals and other health-related infrastructure in the event of an emergency and can prevent emergency services providers from reaching vulnerable populations or making necessary repairs (OPR, CEC, and CNRA 2018). Additionally, local bus routes and bus stops can be directly affected, and transportation infrastructure, along with other critical facilities, are at direct risk of flooding-induced scouring. These potential impacts of extreme precipitation and flooding represent a snapshot of a broader array of impacts, which are discussed further in the VA, located in **Appendix B**.

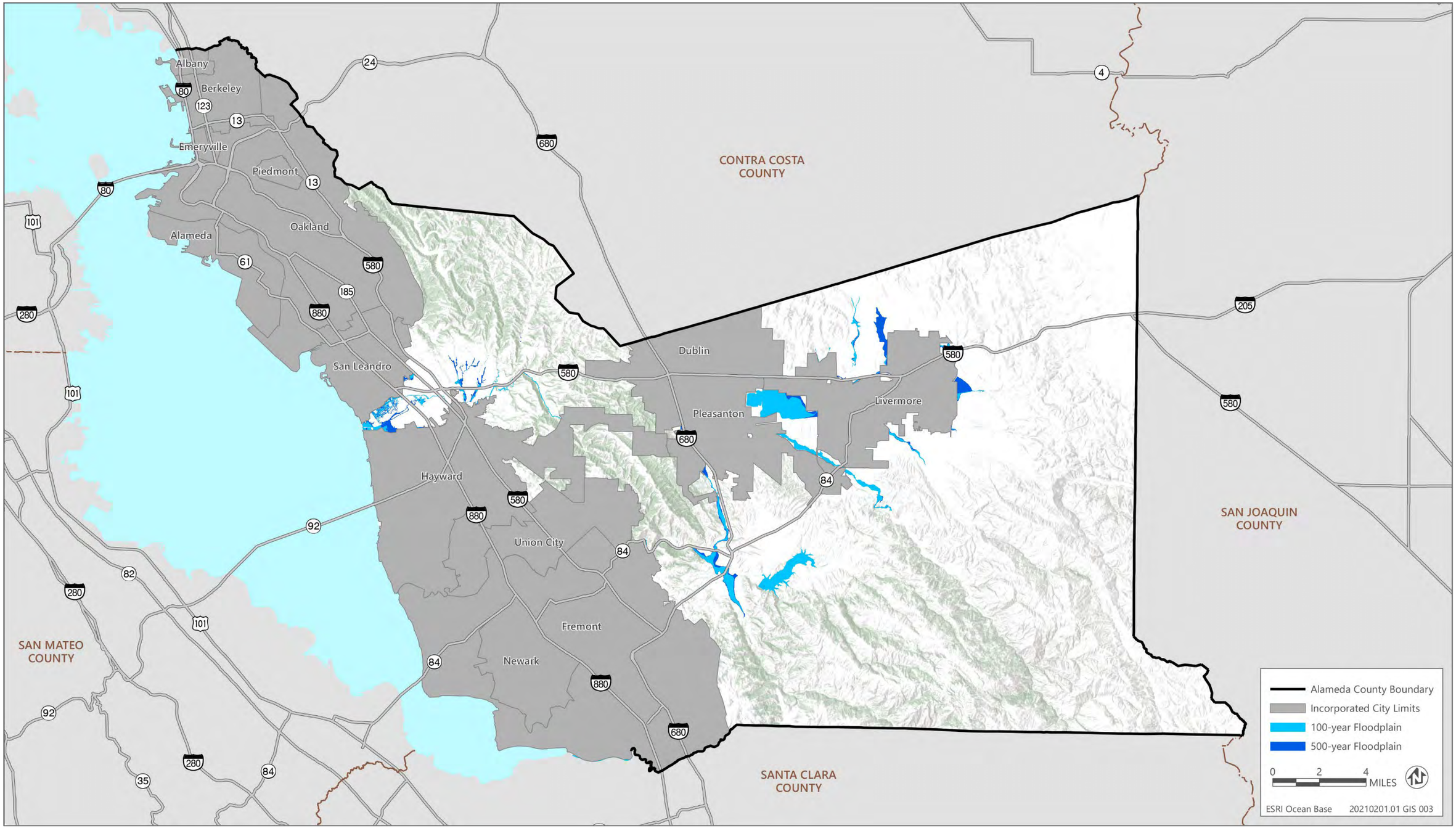
Drought

California, including Alameda County, has a highly variable climate that is susceptible to prolonged periods of drought, and recent research suggests that extended drought occurrences (or "mega-droughts") could become more pervasive in future decades, which may result in major impacts on state and local water supplies and other secondary impacts (CEC 2022e). Under a modeled drought scenario between 2051 and 2070, Alameda County's average annual precipitation would fall to 15.7 inches from the historic average of 18.0 inches, with some individual years falling below 10.0 inches of precipitation, as shown in **Figure 4.4**. It should be noted that actual occurrence and duration of droughts are difficult to predict, and though this figure serves as a scenario rather than an actual projection or forecast, Alameda County is expected to experience extended drought periods like this as a result of climate change.

While the likely occurrence of future drought may seem contradictory to the projections that Alameda County is expected to see more average annual precipitation and a greater number of extreme precipitation events in future years, overall precipitation patterns are projected to change, with precipitation variability expected to increase substantially. In other words, some years, compared to average, may be abnormally wet, while other years may be extremely dry. With the oscillation between wet and dry years and the potential for precipitation to occur over shorter, more intense time periods, future droughts will challenge the management of the Bay Area's water supplies, inclusive of the unincorporated county (OPR, CEC, and CNRA 2018).

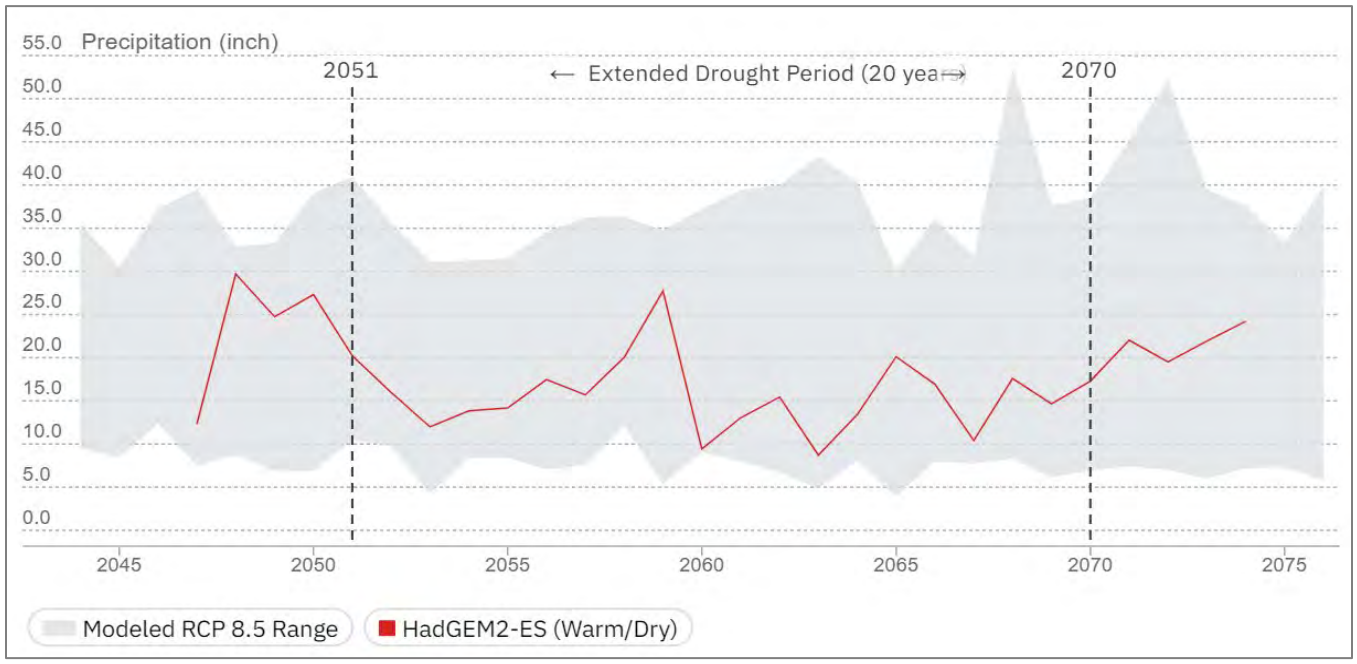
The potential impacts of drought are broad. First, drought may exacerbate or indirectly increase exposure of populations and the built environment to other hazards, such as extreme heat events, flash floods, post-fire debris flows, landslides, degraded water quality, and reduced water quantity. Additionally, the unincorporated county's agricultural sector is especially vulnerable to drought conditions, with the most notable consequences directly related to water availability for crop irrigation. A decrease in water availability could greatly reduce crop yields and overall levels of production, leading to higher consumer costs, loss of income for the supply chain, and reduced regional food security issues. Some of the unincorporated county's other economic sectors and local businesses, along with environmental conditions, could also be adversely affected by drought. A full discussion of potential drought-related impacts can be found in the VA, located in **Appendix B**.

Figure 4.3 Floodplains in Unincorporated Alameda County



Source: Data downloaded from FEMA in 2022; adapted by Ascent in 2022.

Figure 4.4 Projected Average Annual Precipitation in Alameda County During an Extended Drought Scenario between 2051 and 2070



Source: **CEC 2022e**.

Summary of Potential Impacts

Based on guidance from the APG, potential impacts from each climate hazard 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: **Cal OES 2020**.

The climate hazards anticipated to impact the unincorporated county are rated for a potential impact score in **Table 4.5**. This evaluation is based on the exposure analysis and analysis of sensitivities and impacts, where further details can be found in the VA attached to this CCAP in **Appendix B**.

Table 4.5 Potential Impact Summary for Unincorporated Alameda County

Climate Hazard	Potential Impact Score
Increased Wildfire Risk	High
Increased Temperatures and Extreme Heat	High
Extreme Precipitation and Flooding	Medium
Drought	Low/Medium

Source: **Evaluated by Ascent in 2022**.

Adaptive Capacity

The third step in the vulnerability assessment process is to evaluate the unincorporated county's adaptive capacity, which refers to a community's current and future ability to cope with potential impacts from climate hazards. The VA reviews existing local policies, plans, programs, and resources, as well as those from relevant regional and State agencies and organizations, to evaluate the unincorporated county's adaptive capacity to each climate hazard. **Table 4.6** below displays a snapshot of some of the existing plans and reports that contribute to the unincorporated county's adaptive capacity to address the anticipated impacts of climate hazards. These plans, along with additional adaptive efforts, are further described and evaluated in the VA, which can be found in **Appendix B**.

Table 4.6 Summary of Existing Plans and Reports

Plan or Report (Prepared By)	Climate Hazards			
	Increased Wildfire Risk	Increased Temperatures and Extreme Heat	Extreme Precipitation and Flooding	Drought
2017 Clean Air Plan: Spare the Air, Cool the Climate (BAAQMD)	✓	✓		✓
2020 Urban Water Management Plan: Zone 7 Water Agency (Zone 7)			✓	✓
2021 Alameda County Local Hazard Mitigation Plan (County)	✓	✓	✓	✓
Adapting to Rising Tides, Bay Area: Regional Sea Level Rise Vulnerability and Adaptation Study (BCDC)			✓	
Alameda and Contra Costa County Regional Wildfire Prevention Plan (ACRCD and CCRCD)	✓			✓
Alameda County Emergency Operations Plan (County)	✓	✓	✓	✓
CAL FIRE Santa Clara Unit: Strategic Fire Plan (CAL FIRE)	✓			✓
California's Fourth Climate Change Assessment: San Francisco Bay Area Region Report (OPR, CEC, and CNRA)	✓	✓	✓	✓
Caltrans Climate Change Vulnerability Assessments: District 4 Technical Report (Caltrans)	✓	✓	✓	

Plan or Report (Prepared By)	Climate Hazards			
	Increased Wildfire Risk	Increased Temperatures and Extreme Heat	Extreme Precipitation and Flooding	Drought
Climate Change and Health Profile Report: Alameda County (CDPH)	✓	✓	✓	✓
Community Wildfire Protection Plan 2015 Update: Alameda County (DFSC)	✓			✓
San Francisco Bay Area Integrated Regional Water Management Plan			✓	✓
Urban Water Management Plan 2020: East Bay Municipal Utility District (EBMUD)			✓	✓
Water Shortage Contingency Plan 2020: East Bay Municipal Utility District (EBMUD)				✓

Notes: ACRCD and CCRCD = Alameda County Resource Conservation District and Contra Costa Resource Conservation District; BAAQMD = Bay Area Air Quality Management District; BCDC = Bay Conservation and Development Commission; CAL FIRE = California Department of Forestry and Fire Protection; Caltrans = California Department of Transportation; County = Alameda County government; CDPH = California Department of Public Health; DFSC = Diablo Fire Safe Council; EBMUD = Easy Bay Municipal Utility District; OPR, CEC, and CNRA = California Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency; Zone 7 = Zone 7 Water Agency.

Source: **Compiled by Ascent in 2022**.

Based on a combination of the adaptation initiatives outlined in existing documents and resources and additional adaptive efforts that have been pursued or implemented, the unincorporated county'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 that more work is needed to build adaptive capacity. Adaptive capacity scoring descriptions are described below in **Table 4.7**.

Table 4.7 Adaptive Capacity Scoring

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

Source: **Cal OES 2020**.

Table 4.8 summarizes the unincorporated county's adaptive capacity regarding each climate hazard. Like the potential impact scoring evaluation, the scoring of adaptive capacity allows the County to understand priority areas where there are gaps in preparing for and adapting to climate change.

Table 4.8 Adaptive Capacity Summary for Unincorporated Alameda County

Climate Hazard	Adaptive Capacity Score
Increased Wildfire Risk	High
Increased Temperatures and Extreme Heat	Medium
Extreme Precipitation and Flooding	Medium
Drought	Medium

Source: **Evaluated by Ascent in 2022**.

Vulnerability Scoring

The final step in the vulnerability assessment process is to characterize the unincorporated county's vulnerability to each climate hazard, which 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. Each climate hazard is assigned an overall vulnerability score based on associated scores for potential impacts and adaptive capacity. Detailed analyses and rationale for the scores can be found in the VA (see **Appendix B**). Vulnerability scoring can help the County understand which climate hazards it should prioritize 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 identified climate hazard—increased wildfire risk, increased temperatures and extreme heat, extreme precipitation and flooding, and drought—is included in **Table 4.10** below. The table shows increased temperatures and extreme heat as the highest vulnerability (4 out of a possible 5), indicating that it should be a high priority for the County in its climate adaptation and planning efforts. Increased wildfire risk and extreme precipitation and flooding both have the next-highest vulnerability score of 3, indicating that the County should also consider these high priorities. These climate hazards could potentially have significant impacts on the unincorporated county's populations, built environment, and community functions in the near-term to midterm. Although a variety of adaptive efforts related to both climate hazards are already in place, the magnitude or risks posed by these hazards contributes to higher vulnerability in the unincorporated county, particularly among frontline communities that disproportionately bear existing social, economic, and environmental burdens. Drought and water supply is characterized as having a vulnerability rating of 2-3. This climate change effect is currently being addressed adequately based on existing conditions, but as droughts potentially become more severe in future years and water supplies start to become less abundant and

reliable, additional adaptation and resilience planning will be required in the future to mitigate potential impacts and protect the unincorporated county.

Table 4.10 Vulnerability Scoring Summary for Unincorporated Alameda County

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

Source: **Evaluated by Ascent in 2022**.

CHAPTER 5

Strategies and Measures

5 Strategies and Measures

The strategies and measures in this chapter aim to reduce greenhouse gas (GHG) emissions and build resilience to the impacts of climate change through equitable, achievable, and implementable actions that equally benefit all residents of unincorporated Alameda County. These locally based initiatives are organized under seven focus areas and include descriptions of actions that can be taken for implementation.

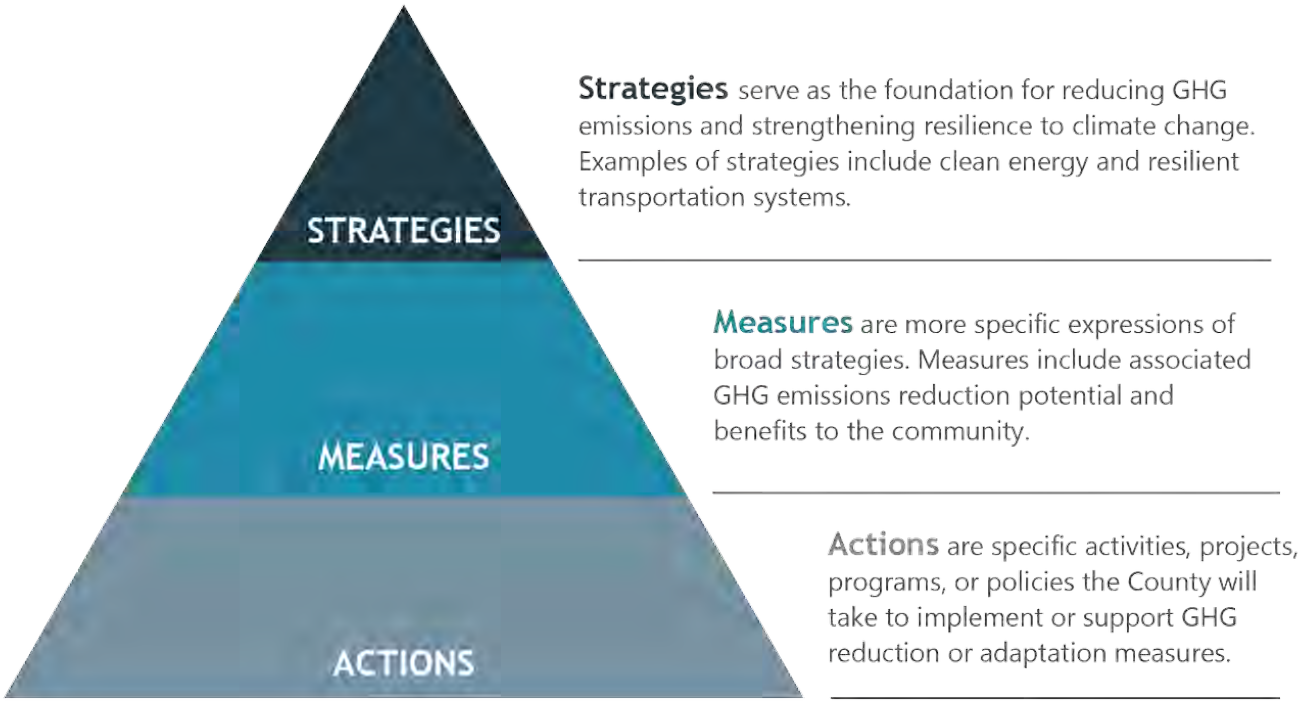
5.1 Overview

This Community Climate Action Plan (CCAP) includes 25 strategies and 56 measures that will reduce GHG emissions and support adaptation and resilience to climate impacts in the community, referred to collectively as climate action strategies and measures. These climate action strategies and measures are organized under the following seven focus areas: **Land Use and Mobility**, **Buildings, Infrastructure, Waste**, **Agriculture and Vegetation, Health and Resiliency**, and **Community Engagement and Monitoring**.

The climate action strategies within each focus area serve as the foundation for reducing GHG emissions and supporting adaptation and resilience to climate change in the unincorporated county. Within each strategy are one or more measures that serve as more specific expressions of the broad strategies. Measures are further evaluated with specific actions that define activities, programs, policies, or projects that the County will implement or support to achieve its climate goals. While the initiatives included in this chapter are primarily intended to reduce GHG emissions and support adaptation and community resilience, many of them will also result in co-benefits, such as air pollution prevention, health and well-being improvements, and resource preservation.

The strategies and measures discussed in this chapter were developed based on a combination of factors, including the results of the unincorporated county's GHG emissions inventory and forecast (see **Chapter 3**), the Vulnerability Assessment (see **Chapter 4**), engagement with the public and stakeholders, feedback from County 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 CCAP.

Figure 5.1 Climate Action Framework



Source: **Prepared by Ascent in 2023.**

5.2 GHG Emissions Reduction Quantification Analysis

In its preparation of the CCAP, the County 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 175,139 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2030; 346,234 $MTCO_2e$ in 2040; and 443,680 $MTCO_2e$ 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 Unincorporated Alameda County GHG Emissions Quantification Analysis

Emissions	2019	2030	2040	2045
Legislative-Adjusted Business-as-Usual Emissions ($MTCO_2e$)	950,235	897,307	824,952	820,894
Target Percent Reduction below 2019 Levels	-	24%	72%	85%
Reduction Needed to Meet Target ($MTCO_2e$)	-	174,168	558,132	682,610
Total Reductions from Measures (MTCO2e)	**-**	**175,139**	**346,234**	**443,680**
Remaining Gap to Meet Target ($MTCO_2e$)	-	(972)[1]	211,899	238,931
Target Met?	**-**	**Yes**	**No**	**No**

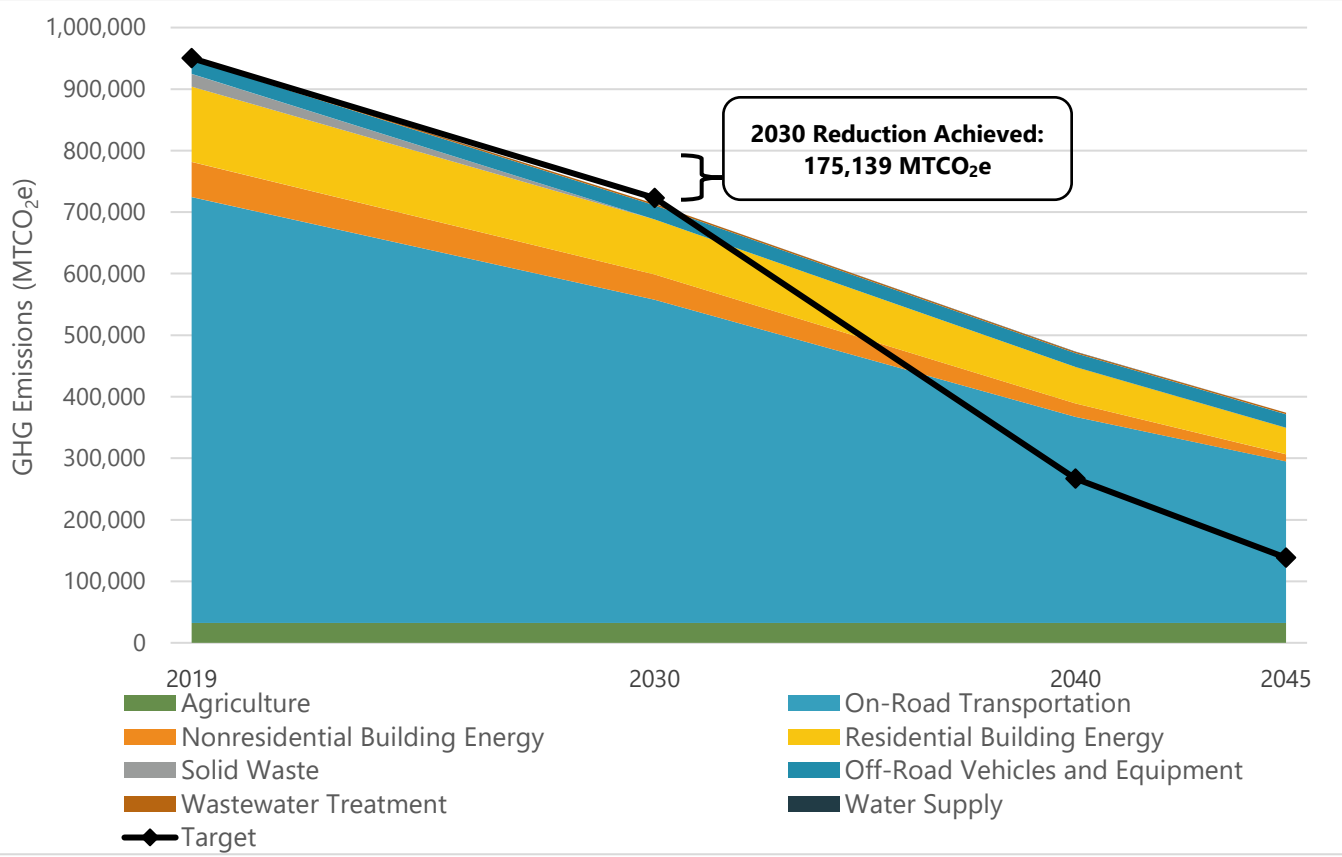
Notes: Totals may not sum exactly due to independent rounding. $MTCO_2e$ = metric tons of carbon dioxide equivalent.

[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 CCAP 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 CCAP measures, organized by the sectors used for the inventories and forecasts. Additionally, the figure displays the County's achievement of the 2030 target with the GHG reduction measures and demonstrates progress towards the 2040 and 2045 targets.

Figure 5.2 Unincorporated Alameda County GHG 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 for the unincorporated county. 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 or avoidance of double-counting GHG emissions reductions) do not include performance indicators. Further details on GHG quantification are available in **Appendix A**.

Land Use and Mobility

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: Parking

Strategies and Measures

On-road transportation makes up 73 percent of the unincorporated County's greenhouse gas emissions, making the **Land Use and Mobility** focus area a critical piece of this CCAP. Decisions regarding the way land within the unincorporated county is used and how people get around the unincorporated county (i.e., mobility) provide significant opportunities for the County to build a more sustainable future and improve the quality of life for its residents. This focus area is divided into five 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**, and **LU-5) Parking**. These strategies, and their respective measures and actions, are outlined below.

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

The first strategy of this focus area is to improve the safety, accessibility, and reliability of active transportation options for all residents of the unincorporated county. Active transportation refers to any form of human-powered transportation, such as walking, running, or using any form of mobility assistance device (e.g., bicycles, wheelchairs, scooters, skateboards). Investing in and prioritizing improvements to active transportation systems and infrastructure in the unincorporated county can reduce GHG emissions and increase community resilience by making it more attractive for people to choose and use these modes of transportation. Promoting active transportation can also result in a variety of co-benefits, such as preventing air pollution, advancing community cohesion, and improving quality of life.

MEASURE LU-1.1: Develop and maintain a safe, connected, and continuous bicycle and pedestrian network.

2030 Target	2040 Target	2045 Target
7.1% reduction in passenger vehicle miles traveled (VMT) associated with existing development **20,029 $MTCO_2e$**	7.1% reduction in passenger VMT associated with existing development **18,439 $MTCO_2e$**	7.1% reduction in passenger VMT associated with existing development **18,607 $MTCO_2e$**

- **Action LU-1.1.1:** Implement specific recommendations for improving bicycle and pedestrian infrastructure (e.g., bike paths, sidewalks) included in the 2019 Alameda County Bicycle & Pedestrian Master Plan for Unincorporated Areas and its future updates.
- **Action LU-1.1.2:** Continue to eliminate gaps in the existing network and improve bicycle and pedestrian connections to transit, schools, parks/trails, retail and employment centers, community/senior centers, and libraries.

Source: **Alameda County CDA**

Roadway in Ashland with Bike Lane

- **Action LU-1.1.3:** Work with Alameda County Transportation Commission, local cities, school districts, and community-based organizations to launch a Vision Zero program for the unincorporated county.
- **Action LU-1.1.4:** Consider establishing temporary and permanent car-free areas.

MEASURE LU-1.2: Increase and improve access to walking and bicycling throughout the unincorporated county.

- **Action LU-1.2.1:** Promote the Bay Area Air Quality Management District's (BAAQMD's) rebate program for e-bikes.
- **Action LU-1.2.2:** Work with school districts and park districts that serve unincorporated areas of the county to install secure bicycle parking at all elementary, middle, and high schools; and parks.
- **Action LU-1.2.3:** Promote partnerships with transit providers (e.g., AC Transit, BART, Wheels, ACE, Amtrak) to increase bicycle access on board transit vehicles to bicycle users, especially during peak commute hours.
- **Action LU-1.2.4:** Work with the Alameda County Transportation Commission to build community awareness, through multilingual outreach efforts, of walking and biking as an alternative to driving, road safety responsibilities, and existing programs such as Safe Routes to Schools.

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

The next strategy in this focus area is to improve the safety, accessibility, and reliability of public 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. Prioritizing accessible, affordable, and safe public transportation can reduce the use of personal vehicles and associated GHG emissions, reduce transportation inequities, and enhance quality of life for all residents.

MEASURE LU-2.1: Continue to partner with transit agencies to improve reliability, affordability, and convenience of existing transit services through increased frequency, expanded service areas, extended service hours, and better facilities. Prioritize improvements in frontline communities.

2030 Target	2040 Target	2045 Target
13.6% reduction in existing passenger VMT	14.5% reduction in existing passenger VMT	15% reduction in existing passenger VMT
37,817 $MTCO_2e$	**36,902 $MTCO_2e$**	**38,295 $MTCO_2e$**

- **Action LU-2.1.1:** Request that AC Transit evaluate the potential for increasing service frequency on key routes.
- **Action LU-2.1.2:** Prepare formal request for AC Transit to extend bus rapid transit service to the unincorporated county and determine the conditions necessary for bus rapid transit route expansion.

- **Action LU-2.1.3:** Ensure that bus stops provide shade, weather protection, seating, lighting, route information, and are frequently cleaned and maintained.
- **Action LU-2.1.4:** Develop a "first and last mile" plan to connect riders to public transit.
- **Action LU-2.1.5:** Work with regional transit providers (e.g., BART, AC Transit) to make public transit safer for all riders.
- **Action LU-2.1.6:** Promote discounted transit passes such as the Clipper START program and the Student Transit Pass Program.

BART Station

LU-3: Equitable Shared Mobility

Equitable shared mobility refers to improving shared-use vehicle or microtransit (e.g., scooters, bicycles) options in the unincorporated county, prioritizing frontline communities, such as the County's Environmental Justice Priority Communities. Providing more shared mobility options will add redundancy to the various ways that people can choose to get around, potentially increasing the accessibility of health services, food, education, and employment for residents who would not otherwise be able to efficiently reach those services. Increased use of shared mobility options will also contribute to GHG emissions reductions in the unincorporated county.

MEASURE LU-3.1: Develop programs and incentives that promote shared mobility (e.g., car sharing, bike sharing, and scooter sharing) in frontline communities and that increase access to health services, food, education, and employment.

- **Action LU-3.1.1:** Explore programs and funding to provide an electric vehicle (EV) car share program for areas of the unincorporated county that are not well served by transit.
- **Action LU-3.1.2:** Promote expansion of Bay Wheels' Bike Share for All program, which offers affordable membership options for low-income residents, to include the urban unincorporated areas of Alameda County.
- **Action LU-3.1.3:** Develop community awareness and education programs around shared mobility (e.g., car sharing, bike sharing, and scooter sharing), prioritizing multilingual outreach to frontline communities.

LU-4: Sustainable Land Use Planning

Sustainable land use planning is the fourth strategy in this 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 CCAP, sustainable land use planning refers to increasing residential density 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 and commercial density in urban areas located near transit.

2030 Target	2040 Target	2045 Target
15% reduction in passenger VMT associated with new development, in compliance with Senate Bill (SB) 743 VMT targets **3,637 $MTCO_2e$**	15% reduction in passenger VMT associated with new development, in compliance with SB 743 VMT targets **5,423 $MTCO_2e$**	15% reduction in passenger VMT associated with new development, in compliance with SB 743 VMT targets **6,398 $MTCO_2e$**

- **Action LU-4.1.1:** Facilitate construction of Accessory Dwelling Units (ADUs) by connecting unincorporated area residents to the Alameda County ADU Resource Center. Develop an accessory dwelling unit (ADU) incentive program that will offer grants and loans for the construction of ADUs.
- **Action LU-4.1.2:** Streamline the permitting process and reduce parking requirement for affordable housing as an incentive.
- **Action LU-4.1.3:** Encourage transit-oriented development and promote co-location of childcare centers and family childcare homes with affordable housing, employment centers, and health and social services.

MEASURE LU-4.2: Promote and ensure land uses that support walking and bicycling.

- **Action LU-4.2.1:** Develop 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 regional agencies to promote vanpools by creating community vanpool programs, including farmworker vanpools, employer-sponsored shuttles and rural vanpool programs.
- **Action LU-4.2.3:** Collaborate with regional transportation agencies and business networks to provide information about, and access to, incentives and services that increase the use of alternatives to single-occupant vehicle commuting, including the Bay Area Commuter Benefits Program, the Alameda County Guaranteed Ride Home Program, and the 511 SF Bay traffic information program.

LU-5: Parking

The final strategy of the Land Use and Mobility focus area is related to parking. Surface parking lots take up a lot of space and promote the use 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 unincorporated county.

MEASURE LU-5.1: Reduce minimum parking requirements and strategically evaluate the parking needs of the community.

- **Action LU-5.1.1:** Modify the zoning code in accordance with Assembly Bill (AB) 2097 to remove parking minimums for new developments within half a mile of public transit and consider establishing parking maximums in new developments.
- **Action LU-5.1.2:** Evaluate current and future parking needs and consider repurposing underutilized and vacant lots.
- **Action LU-5.1.3:** Implement the recommendations of the Ashland Cherryland Business District Specific Plan Area Parking Demand and Management Strategy Study.

Buildings

BE-1: Building Decarbonization

BE-2: Clean and Renewable Energy

BE-3: Energy Efficiency and Reliability

BE-4: Resilient and Sustainable Buildings

Strategies and Measures

The **Buildings** focus area is a critical component of this CCAP. Buildings offer an opportunity to significantly reduce GHG emissions, as energy consumption in buildings is one of the largest sources of local GHG emissions (e.g., energy used for heating, cooling, and lighting). Buildings also represent an opportunity 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 four overarching building strategies: **BE-1) Building Decarbonization**; **BE-2) Clean and Renewable Energy**, **BE-3) Energy Efficiency and Reliability**, and **BE-4) Resilient and Sustainable 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: Building Decarbonization

Energy consumption in buildings is a major source of GHG emissions. Decarbonizing existing buildings by replacing gas instrustructure and appliances with electric alternatives is critical to reducing GHG emissions. Removing natural gas and other fossil fuels from being combusted inside buildings can also improve indoor air quality and lead to healthier homes and business. It is crucial to ensure that new buildings operate without fossil fuel infrastructure, as well, so that future decarbonization of those buildings is not needed. Ensuring that vulnerable communities and residents have easy access to information and resources related to building decarbonization is a key component of an inclusive and equitable transition.

MEASURE BE-1.1: Decarbonize existing residential and nonresidential buildings (i.e., replace gas infrastructure and appliances with electric alternatives).

2030 Target	2040 Target	2045 Target
18% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric	54% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric	72% of Existing Single-Family and Multifamily Residential Buildings are Retrofitted to All-Electric
7% of Existing Commercial Buildings are Retrofitted to All-Electric	26% of Existing Commercial Buildings are Retrofitted to All-Electric	40% of Existing Commercial Buildings are Retrofitted to All-Electric
17,237 $MTCO_2e$	**68,604 $MTCO_2e$**	**100,370 $MTCO_2e$**

- **Action BE-1.1.1:** Develop a comprehensive energy retrofit plan to transition mixed-fuel residential and nonresidential buildings to all-electric, prioritizing the needs of frontline communities. The plan should address end-of-life recycling and disposal of gas appliances.
- **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:** Work with Renew Alameda County to expand the services eligible for home improvements and repair to include energy efficiency and electric appliance changeouts, and to reduce barriers to accessing the services for low-income property owners.

- **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, including solar-ready panels.

MEASURE BE-1.2: Require new buildings, and significant remodels or additions, to be all-electric.

2030 Target	2040 Target	2045 Target
90% All-Electric New Residential and Commercial Development (Built in 2026 or Later) **997 $MTCO_2e$**	93% All-Electric New Residential and Commercial Development **3,682 $MTCO_2e$**	95% All-Electric New Residential and Commercial Development **5,487 $MTCO_2e$**

- **Action BE-1.2.1:** Adopt a reach code for the 2025 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.

Heat Pump

MEASURE BE-1.3: Encourage and support the use of electricity and alternative fuels in construction equipment.

2030 Target	2040 Target	2045 Target
50% of diesel-powered construction equipment used is powered by renewable diesel or other alternative fuels that meet EPA's Renewable Fuel Standards 7% of construction equipment used is electrified **367 $MTCO_2e$**	75% of diesel-powered construction equipment used is powered by renewable diesel or other alternative fuels that meet EPA's Renewable Fuel Standards 15% of construction equipment used is electrified **846 $MTCO_2e$**	80% of diesel-powered construction equipment used is powered by renewable diesel or other alternative fuels that meet EPA's Renewable Fuel Standards 19% of construction equipment used is electrified **1,110 $MTCO_2e$**

- **Action BE-1.3.1:** Require all construction projects starting in 2025 and later to use renewable diesel in diesel-powered construction equipment.
- **Action BE-1.3.2:** Encourage the use of electric-powered construction equipment in all discretionary projects.
- **Action BE-1.3.3:** Prohibit the use of fossil fuel-powered generators at construction sites in all discretionary projects.

BE-2: Clean and Renewable Energy

To complement building decarbonization, it is also crucial to transform the electrical grid by increasing clean and renewable energy sources. Installing renewable energy-generating technologies (e.g., solar panels) in both new and existing residential and nonresidential development, and promoting equitable access to those technologies, is essential to reducing GHG emissions resulting from building energy consumption.

MEASURE BE-2.1: Install additional renewable energy-generating technologies (e.g., solar panels) in existing residential and nonresidential buildings.

- **Action BE-2.1.1:** Identify commercial and industrial areas with optimal solar orientation, building structure, and land ownership/management conditions.
- **Action BE-2.1.2:** Adopt ordinance that establishes Solar EmPowerment Districts in high potential areas.
- **Action BE-2.1.3:** Minimize barriers and streamline permitting for solar photovoltaic installation in Solar EmPowerment Districts.
- **Action BE-2.1.4:** Promote the availability of incentive programs to support the installation of renewable energy-generating technologies.

MEASURE BE-2.2: Install renewable energy-generating technologies (e.g., solar panels) beyond minimum State requirements in new residential and nonresidential development.

- **Action BE-2.2.1:** Adopt a reach code with the 2025 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.
- **Action BE-2.2.2:** 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 County policies.
- **Action BE-2.2.3:** Provide guidelines, in multiple languages, for the permit application process for renewable energy generation installation (e.g., solar photovoltaics) in residential and nonresidential development.
- **Action BE-2.2.4:** Collaborate with Pacific Gas & Electric Company (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.

BE-3: Energy Efficiency and Reliability

Improving energy efficiency and reliability within existing building stock in the unincorporated county is another key strategy to reducing GHG emissions. Though new development will account for a modest proportion of the unincorporated county's building stock, most of the unincorporated county's building stock consists of existing buildings. By promoting equitable access to programs and resources that increase energy efficiency and reliability in existing buildings, the County can reduce GHG emissions, eliminate additional stress and demand on the electrical grid, and improve living conditions for residents of the unincorporated county.

MEASURE BE-3.1: Connect owners/occupants of existing residential and nonresidential buildings to energy audit and weatherization programs and resources.

- **Action BE-3.1.1:** Work with regional organizations such as BayREN to support and expand access to rental property energy efficiency and electrification outreach and incentive programs.
- **Action BE-3.1.2:** Connect to external programs that provide low-cost financing and encourage energy efficiency investments for existing residential buildings, focused on owner-occupants.

MEASURE BE-3.2: Retrofit existing residential and nonresidential buildings to improve energy efficiency.

- **Action BE-3.2.1:** Work with PG&E, Ava Community Energy (Ava), and community-based organizations (e.g., Rising Sun Center for Opportunity) to provide free energy audits of existing buildings, prioritizing implementation in frontline communities.
- **Action BE-3.2.2:** 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-3.2.3:** Promote existing community education programs around energy efficiency best practices and cost savings opportunities, prioritizing outreach to frontline communities.

MEASURE BE-3.3: Reduce plug loads (i.e., energy used by equipment that is plugged into an outlet) in existing residential and nonresidential buildings.

- **Action BE-3.3.1:** Promote appliance upgrades to energy-efficient technologies and products through campaigns focused on residents and local businesses (e.g., ENERGY STAR® appliance change-out programs, and incentives).
- **Action BE-3.3.2:** Facilitate the adoption of smart grid and other peak load reduction technologies such as building energy management systems and smart appliances.

BE-4: Resilient and Sustainable Buildings

The final strategy within this focus area is to improve the resilience and sustainability of buildings within the unincorporated county. Climate change is already worsening the risk of natural hazards in the community, such as extreme heat, flooding, and wildfire. To prevent or minimize any potential damage from climate change, unincorporated community members need equitable access to adaptation tools that ensure the long-term resilience of residential and nonresidential buildings.

Source: **Alameda County CDA.** *Mural design by Tiffany King & Greg Duggan. Created by youth artists from the Arts & Creativity Program at the REACH Ashland Youth Center.*

Pacific Apparel Mural in Ashland

MEASURE BE-4.1: Improve resilience of existing residential and nonresidential buildings to climate hazards.

- **Action BE-4.1.1:** Increase access to and use of indoor air purification systems capable of enhancing and protecting public health from wildfire smoke and poor air quality in the existing building stock in the unincorporated county, as well as from toxic air contaminants associated with freeway traffic and vehicle travel (consistent with the County's proposed Air Pollution Exposure Zone Ordinance).
- **Action BE-4.1.2:** Through focused outreach, encourage all residential and nonresidential building owners located in wildland-urban interface (WUI) areas or "High" or "Very High" fire hazard severity zones (FHSZs) to conduct hardening retrofits, which may include installing fire-resistant roofs and building materials, covering vents or using ember- and flame-resistant vents, and installing dual-paned windows with one pane of tempered glass, among other actions.
- **Action BE-4.1.3:** Encourage residential and nonresidential building owners that lack air conditioning, or that are located in areas vulnerable to extreme heat, to install reflective "cool roofs" to mitigate the impacts of increased temperatures and extreme heat through public education campaigns and incentive programs.
- **Action BE-4.1.4:** Encourage residential and nonresidential building owners located in the 100- or 500-year floodplain to floodproof their building to a point at, or above, the base flood elevation, and to raise mechanical equipment through public education campaigns and incentive programs.

MEASURE BE-4.2: Enhance resilience of new residential and nonresidential buildings to climate hazards.

- **Action BE-4.2.1:** Require new buildings located within or in the vicinity of the 100- or 500-year floodplain, or in areas that are historically prone to flooding, to be designed and located to allow unrestricted flow of flood waters or be able to withstand flood forces.
- **Action BE-4.2.2:** Require new development to comply with the requirements and criteria for stormwater quantity controls established in the Alameda County Hydrology and Hydraulics Criteria Summary and the Alameda County Clean Water Program to control surface runoff from new development.

- **Action BE-4.2.3:** Require new buildings located within "High" or "Very High" FHSZs to use fire-resistant building materials, fire-resistant landscaping, and adequate clearance around structures.
- **Action BE-4.2.4:** Encourage new development to use high-albedo (i.e., reflective) materials for features such as roofs and driveways to help mitigate the impacts of increased temperatures and extreme heat through public education campaigns and incentives.

MEASURE BE-4.3: Increase the use of low-carbon concrete and other types of sustainable materials in new construction and renovations.

- **Action BE-4.3.1:** Adopt a reach code with the 2025 code cycle that requires new residential and nonresidential construction to use low-carbon concrete, steel, and other key impact materials.

Infrastructure

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

IN-6 Resilient Infrastructure

Strategies and Measures

Infrastructure encompasses a wide array of assets, including those related to energy, transportation, water, wastewater, agriculture, and industrial equipment. Much of the unincorporated county's infrastructure can be classified as critical because residents rely on these assets to help maintain their quality of life. The **Infrastructure** focus area presents a set of opportunities for the County to mitigate and adapt to climate change, and ultimately, build a more sustainable and resilient future that enables all residents to thrive. 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 Infrastructure**. These strategies, and their respective measures and actions, are outlined below.

IN-1: Clean and Reliable Energy

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

MEASURE IN-1.1: Transition the community to 100 percent clean energy.

2030 Target	2040 Target	2045 Target
All Ava and PG&E customers switch to Ava's Renewable Choice option, a 100% carbon-free electricity plan	All Ava and PG&E customers continue to opt into Ava's Renewable Choice option, a 100% carbon-free electricity plan	All Ava and PG&E customers continue to opt into Ava's Renewable Choice option, a 100% carbon-free electricity plan
27,795 $MTCO_2e$	**11,139 $MTCO_2e$**	**0 $MTCO_2e$**

- **Action IN-1.1.1:** Work with Ava Community Energy (Ava) on a transition plan to automatically enroll all unincorporated-area accounts in the Renewable Choice tier, with an option for residents and businesses to opt-out.
- **Action IN-1.1.2:** Promote enrollment in Ava for current PG&E customers through a multilingual outreach campaign.
- **Action IN-1.1.3:** Require all newly built parking lots and structures to have solar-ready generation capabilities.
- **Action IN-1.1.4:** Require the installation of solar heaters for all new swimming pools which propose the use of heating systems.
- **Action IN-1.1.5:** Work with Ava to provide incentives for replacing existing swimming pool heaters with solar versions.
- **Action IN-1.1.6:** Encourage the installation of solar canopies on surface parking lots.

Source: **Alameda County CDA**

Altamont Wind Turbines

MEASURE IN-1.2: Increase the use of battery storage technologies (i.e., 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. Ensure that battery storage systems are responsibly handled during operation and are properly disposed of at the end of useful life.
- **Action IN-1.2.2:** Require battery storage readiness design in new nonresidential construction.
- **Action IN-1.2.3:** Seek funding opportunities for additional backup power capabilities at critical facilities.
- **Action IN-1.2.4:** Evaluate opportunities to remove barriers to battery storage throughout the unincorporated county. Opportunities could include development-related incentives, streamlined permitting, or incentives for medical uses.

MEASURE IN-1.3: Support the development of innovative approaches to energy generation, distribution, and storage (e.g., energy recapture [in-conduit hydro, co-generation], developing clean microgrids for schools, hospitals, or neighborhoods).

- **Action IN-1.3.1:** Develop renewable microgrids at County libraries, fire and police stations and other emergency facilities and community hubs.
- **Action IN-1.3.2:** Encourage non-municipal public service facilities (e.g., hospitals and public schools) to develop renewable microgrids.
- **Action IN-1.3.3:** Evaluate opportunities and incentives that remove barriers 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: Encourage the increase of smart grid integration throughout the unincorporated county.

- **Action IN-1.4.1:** Partner with PG&E and develop a community smart grid integration plan.
- **Action IN-1.4.2:** Develop an outreach program that informs property owners and businesses about benefits of smart grid and smart appliances.
- **Action IN-1.4.3:** Adopt an ordinance that requires smart grid energy management systems and compatible heating, ventilation, air conditioning and lighting in new construction.

MEASURE IN-1.5: Evaluate the potential for district energy systems (multi-building heating and cooling systems) in urban areas of the unincorporated county and develop an implementation plan for cost-effective systems.

- **Action IN-1.5.1:** Conduct an analysis of district heating potential in the Castro Valley Central Business District Specific Plan area, the Ashland and Cherryland Business District Specific Plan area, the San Lorenzo Village Center Specific Plan area, and other neighborhood commercial centers.

IN-2: Low- and Zero-Emission Vehicles

Deploying measures that promote the accessibility of EVs is the second strategy within this 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 by expanding EV charging infrastructure and supporting EV adoption can significantly reduce GHG emissions and result in an array of co-benefits.

Curbside Electric Vehicle Charging

MEASURE IN-2.1: Increase electric vehicle charging infrastructure.

2030 Target	2040 Target	2045 Target
25% of passenger vehicles will be EVs 10% of medium- and heavy-duty vehicles will be EVs **50,951 $MTCO_2e$**	68% of passenger vehicles will be EVs 40% of medium- and heavy-duty vehicles will be EVs **180,943 $MTCO_2e$**	90% of passenger vehicles will be EVs 50% of medium- and heavy-duty vehicles will be EVs **249,892 $MTCO_2e$**

- **Action IN-2.1.1:** Adopt an EV charging reach code with the 2025 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:** Ensure EV charging stations are encouraged and allowed through land use designations that currently permit gas fueling stations.
- **Action IN-2.1.3:** Work with Ava, BAAQMD, and regional agencies to provide incentives for existing gas stations and retail centers to add EV charging stations.
- **Action IN-2.1.4:** Work with regional agencies and EV charging companies to incentivize, install, and maintain in good working order EV charging stations and preferred parking for EVs at public facilities, parks, retail centers, multifamily residential properties, and other high-use parking areas throughout the unincorporated county.
- **Action IN-2.1.5:** Collaborate with Ava to establish EV charging mobility hubs at publicly accessible sites that support tenants of multifamily properties and rideshare drivers.
- **Action IN-2.1.6:** Provide guidelines in multiple languages for the permit application process for EV charging infrastructure installation in residential and nonresidential development.
- **Action IN-2.1.7:** Promote the Alameda County Incentive Project to increase EV charging infrastructure in frontline communities, at workplaces, in multifamily residential properties, and in affordable housing developments.

- **Action IN-2.1.8:** Promote Ava's EV charging rates for residents, which provides a cost-effective way to charge EVs at residences by charging during off-peak hours.
- **Action IN-2.1.9:** Require all nonresidential development with loading docks to supply sufficient electrical power for delivery trucks and associated equipment to reduce idling when making deliveries.

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

- **Action IN-2.2.1:** Implement the recommendations for local governments provided in the Bay Area Electric Vehicle Acceleration Plan to support outreach and education for EV adoption.
- **Action IN-2.2.2:** Promote Electric For All, which provides information and an incentive database for EVs and associated charging equipment.
- **Action IN-2.2.3:** Collaborate with Ava to develop and implement a Medium- and Heavy-Duty Goods Movement Electrification Blueprint.
- **Action IN-2.2.4:** Promote the California Clean Vehicle Rebate Project and the Clean Vehicle Assistance Program, which provide rebates and financial incentives that prioritize accessibility and affordability for low- to moderate-income consumers to switch to EVs.

IN-3: Low- and Zero-Emission Equipment

The third strategy in this focus area is to promote the use of low- and zero-emission equipment. 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. Promoting access to and use of zero-emissions landscape equipment can reduce GHG emissions and result in additional co-benefits for the unincorporated county.

MEASURE IN-3.1: Transition to electric landscaping equipment.

2030 Target	2040 Target	2045 Target
12% of existing landscaping equipment will be replaced with zero-emission alternatives	30% of existing landscaping equipment will be replaced with zero-emission alternatives	39% of existing landscaping equipment will be replaced with zero-emission alternatives
311 $MTCO_2e$	**803 $MTCO_2e$**	**1,082 $MTCO_2e$**

- **Action IN-3.1.1:** Encourage business owners (e.g., landscaping businesses) to convert or replace their gasoline-powered gardening equipment, such as lawn mowers, leaf blowers, and hedge trimmers, with electric or other zero-emission alternative equipment.
- **Action IN-3.1.2:** Promote California's Clean Off-Road Equipment Voucher Program for professional landscape services, which provides vouchers to purchase zero-emission landscaping equipment.

MEASURE IN-3.2: Encourage the use of electric or alternatively fueled agricultural equipment.

- **Action IN-3.2.1:** Encourage the use of electric-powered agricultural equipment where feasible and promote the California Air Resources Board's Carl Moyer Program, which provides grants to replace diesel-powered agricultural equipment. Encourage the use of renewable diesel in diesel-powered agricultural equipment where electrification is infeasible.
- **Action IN-3.2.2:** 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.

IN-4: Water Conservation

The fourth strategy in this focus area is water conservation. Water is a vital resource in the community, and strategic water management practices can reduce the amount of water used for landscaping, irrigation, and other potable and non-potable uses. Reducing water consumption will reduce GHG emissions because the electricity used to provide water will decrease. Reducing water consumption will also improve resilience to future occurrences of prolonged droughts, to which the unincorporated county and state are highly susceptible.

MEASURE IN-4.1: Reduce water consumption in buildings.

2030 Target	2040 Target	2045 Target
5% reduction in water consumption per capita	10% reduction in water consumption per capita	15% reduction in water consumption per capita
11 $MTCO_2e$	**5 $MTCO_2e$**	**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:** Require ultra-low-flow fixtures in new development to reduce water consumption.
- **Action IN-4.1.3:** Consider requiring 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:** Continue to promote landscape water conservation incentives in partnership with EBMUD and Zone 7.

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 major remodels.
- **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.
- **Action IN-4.3.4:** Support residents and businesses interested in installing onsite recycled water systems (i.e., greywater) consistent with all State and County health codes and standards and in compliance with regional water agency requirements through providing guidance in multiple languages, incentives, and/or streamlining permitting processes.

IN-5: Wastewater

The next strategy in this focus area is related to wastewater—specifically, improving septic system management for residents who are not connected to the Oro Loma Sanitary District/Castro Valley Sanitary District Wastewater Pollution Control Plant. Septic systems release methane, a potent GHG that accelerates climate change. Improving septic system management can reduce the unincorporated county's GHG emissions.

MEASURE IN-5.1: Foster best management practices and innovative strategies for Onsite Wastewater Treatment System (OWTS) management for the protection of groundwater and surface water bodies.

- **Action IN-5.1.1:** Explore the feasibility of reducing wastewater through a variety of methods, including the use of dry/composting toilets in new development and encourage these systems, repairing leaks in plumbing, using water-saving devices (e.g., low-flow fixtures), reducing water usage in daily activities, and avoiding the plumbing of greywater systems into the OWTS.
- **Action IN-5.1.2:** Promote best management practices of septic system OWTSs by properly sizing and maintaining wastewater dispersal fields (avoiding plants with invasive roots and parking of vehicles/heavy equipment on dispersal fields), using supplemental treatment units, pumping and maintaining all tanks and other components of the OWTS every 3 to 5 years (or as needed by a licensed professional), and avoiding chemical additive to maintain the OWTS or using harsh chemicals for cleaning.

IN-6: Resilient Infrastructure

The final strategy in this focus area is to improve the resilience of the variety of infrastructure types within the unincorporated county, particularly those related to the energy, water, 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 CCAP, which includes protecting and strengthening the infrastructure within the unincorporated county upon which residents and visitors rely.

MEASURE IN-6.1: Improve energy sector resilience.

- **Action IN-6.1.1:** Coordinate with PG&E and other utility providers/suppliers to identify and protect critical energy infrastructure in the unincorporated county from climate hazards.

- **Action IN-6.1.2:** Integrate energy assurance actions into countywide planning processes to decrease vulnerability to grid outages during hazard events.
- **Action IN-6.1.3:** Ensure adequate utility redundancy and backup power is available to maintain critical facilities where not already installed, prioritizing clean backup power sources where feasible.
- **Action IN-6.1.4:** Encourage the inclusion of broadband infrastructure in new development proposals to enable connectivity for building and utility controls and operating system networks.
- **Action IN-6.1.5:** Encourage residents to use the California Interactive Broadband Map developed by the California Public Utilities Commission, which reports internet speeds and helps to document and identify unserved and underserved areas.

MEASURE IN-6.2: Improve resilience of water and wastewater systems.

- **Action IN-6.2.1:** Collaborate with relevant local and regional agencies to identify and 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 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 grey water, 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.

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

- **Action IN-6.3.1:** Coordinate with AC Transit, community-based organizations, and other relevant partners 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 County transportation system maintenance protocols, for which the Public Works Agency is responsible, to incorporate climate vulnerabilities.
- **Action IN-6.3.3:** Pilot cool pavement initiatives and evaluate effectiveness post-implementation.

Waste

WR-1: Inorganic Waste Management and Reduction

WR-2: Organic Waste Management and Reduction

Strategies and Measures

Waste serves as one of the focus areas of this CCAP. Reducing and managing waste in smarter ways provides great opportunities for the County to meet its sustainability goals, while also promoting social equity and reducing GHG emissions. The two overarching climate action strategies within this focus area include: **MW-1) Inorganic Waste Management and Reduction**, and **MW-2) Organic Waste Management and Reduction**. These two strategies, along with their respective measures and actions, are outlined below.

WR-1: Inorganic Waste Management and Reduction

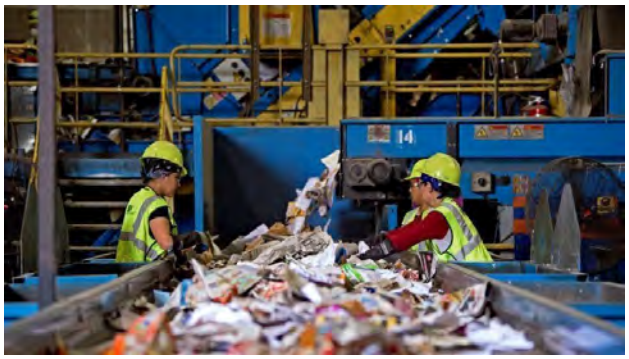
The first strategy in this focus area is to improve waste management practices and reduce inorganic waste. Inorganic waste includes waste that does not contain organic compounds and thus is difficult to decompose (e.g., glass, aluminum, plastic). The production and incineration of inorganic waste uses 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. These actions also help achieve GHG emissions reductions from upstream production processes.

MEASURE WR-1.1: Increase recycling in the unincorporated areas of the county.

- **Action WR-1.1.1:** Partner with waste haulers, Sanitary Districts, and StopWaste to expand the diversion of recyclable inorganic solid waste from landfills.
- **Action WR-1.1.2:** 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 and pick-up opportunities and additional items that can be recycled curbside.
- **Action WR-1.1.3:** Provide education, audits, and other technical assistance in multiple languages to increase waste diversion rates in coordination with StopWaste. Develop waste reduction and diversion behavior campaigns in partnership with StopWaste and local organizations for residential, multifamily property managers, and commercial sectors.
- **Action WR-1.1.4:** For events that require a County-issued permit, 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.

MEASURE WR-1.2: Reduce solid waste generation.

- **Action WR-1.2.1:** Adopt a comprehensive construction and demolition ordinance to reach a 75 percent diversion rate.
- **Action WR-1.2.2:** Work with restaurants in the unincorporated areas of the county to reduce single-use plastics.
- **Action WR-1.2.3:** Create and support "fix-it clinics" at community facilities that can build skills among local businesses and residents in innovation, repair, and reuse.



Recycling Plant

- **Action WR-1.2.4:** Support Extended Producer Responsibility initiatives that drive end of product life management.
- **Action WR-1.2.5:** Explore establishment of a tool lending library in unincorporated Alameda County to reduce unnecessary waste associated with purchasing home improvement tools and equipment, increase access to electric or hand-powered tools, and decrease cost-related barriers to home improvements.

WR-2: Organic Waste Management and Reduction

Managing and reducing organic waste is the second strategy in this focus area. 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 unincorporated county, as well as increasing edible food recovery, provide opportunities that can greatly reduce GHG emissions and support communities that experience food insecurity.

MEASURE WR-2.1: Continue to educate the community on composting best practices and increase onsite/home composting and use of curbside green organic recycling bins.

2030 Target	2040 Target	2045 Target
80% of organic waste is diverted	85% of organic waste is diverted	90% of organic waste is diverted
15,531 $MTCO_2e$	**18,226 $MTCO_2e$**	**20,834 $MTCO_2e$**

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

Agriculture and Vegetation

AG-1: Climate-Resilient Agricultural and Working Lands

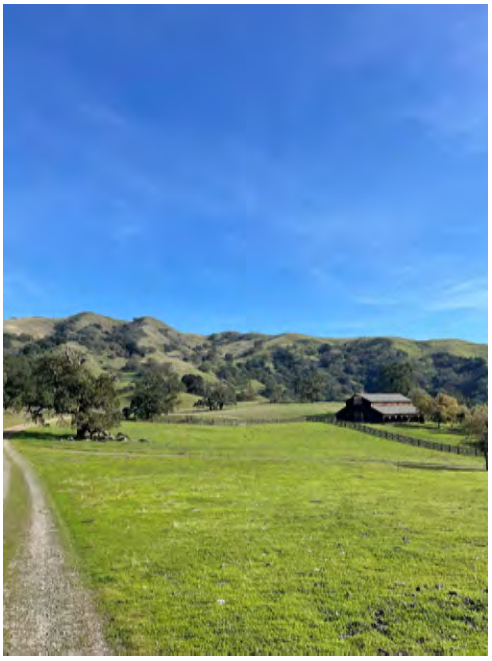
AG-2: Nature-Based Solutions

Strategies and Measures

There are numerous benefits of trees, open space, agriculture, and vegetation, especially in the context of a community. Whether it's trees capturing and storing carbon from the atmosphere or providing shade on hot days, vegetation filtering stormwater and acting as a barrier for pollution (e.g., bioswales), farms and ranches providing food and ecosystem services, or open green spaces, such as parks, serving as a place for community members to meet and recreate, nature-based solutions support equitable adaptation and vibrant, resilient communities. These benefits serve as the foundation of the **Agriculture and Vegetation** focus area, which is divided into two overarching climate action strategies: **NU-1) Climate-Resilient Agriculture** and **NU-2) Nature-Based Solutions.** These strategies, and their respective measures and actions, are presented below.

AG-1: Climate-Resilient Agricultural and Working Lands

The first strategy within this focus area is related to increasing climate-resilient agricultural and working lands, including farms, orchards, vineyards, and ranch/equine operations. Encouraging agricultural best practices that improve soil quality, protect groundwater, and increase soil organic matter and soil carbon content can reduce GHG emissions and improve the resilience of agricultural and working lands to climate impacts.



Source: **Alameda County CDA**

Barn in Unincorporated Alameda County

MEASURE AG-1.1: Encourage best practices in agricultural and working lands that improve resilience to climate impacts.

- **Action AG-1.1.1:** Promote the use of agroforestry in agricultural systems, which may improve soil fertility, water retention, and overall agricultural resilience.
- **Action AG-1.1.2:** Coordinate with California Department of Food and Agriculture, United States Department of Agriculture, and other relevant partners to improve and integrate projected climate impacts into pest detection and management, while minimizing the use of potentially harmful pesticides.
- **Action AG-1.1.3:** Promote crop diversification to minimize the risk of crop failure and enhance resilience to climate impacts.
- **Action AG-1.1.4:** Work with the State and other relevant partners to advocate for the subsidization and/or incentivization of obtaining crop insurance. Advocate for the inclusion of diverse crops in crop insurance offerings (such as culturally relevant crops).
- **Action AG-1.1.5:** Work with ranchers to manage grazing to support oak woodland regeneration.

- **Action AG-1.1.6:** Promote the use of livestock grazing near development, especially on steep hillsides and vacant lots, to support fire fuel management and provide discounted or free water supplies to ranchers whose livestock are serving this purpose.
- **Action AG-1.1.7:** Promote the use of efficient irrigation systems to reduce crop water needs.
- **Action AG-1.1.8:** Review County tax policies affecting land and infrastructure improvements for agriculture to avoid taxing landowners at home site improvement rates (e.g., water wells for agriculture that may be on a home site parcel).
- **Action AG-1.1.9:** Promote and expand enrollment and participation in Williamson Act contracts.

MEASURE AG-1.2: Increase soil organic matter and soil carbon content in working lands.

- **Action AG-1.2.1:** Promote the Alameda County Resource Conservation District's (ACRCD's) carbon farming program and technical assistance programs to develop and implement site-specific carbon farm plans and soil-beneficial conservation practices in unincorporated Alameda County.
- **Action AG-1.2.2:** Assess and work to eliminate barriers to permitting carbon farm plans and allow for streamlining of permits related to carbon farm practices.
- **Action AG-1.2.3:** In partnership with ACRCD, develop a healthy soil strategy for the county to support agriculture, address carbon sequestration, and increase water capture, building on the work of ACRCD's Healthy Soils Demonstration project.
- **Action AG-1.2.4:** Promote the use of cover crops, hedgerows, mulch, and windbreaks and support farmers' and ranchers' pursuits of State and federal funding, in part through ACRCD's technical assistance.
- **Action AG-1.2.5:** Work with ranchers, ACRCD, StopWaste, and other agency partners to increase compost application on rangelands.
- **Action AG-1.2.6:** Work with horse-keepers, ACRCD, StopWaste, and other agency partners to improve on-farm composting and commercial composting acceptance of manure.
- **Action AG-1.2.7:** Support partner-led (e.g., ACRCD, University of California Agriculture and Natural Resources, StopWaste, US Department of Agriculture's Natural Resources Conservation Science) educational and workshop events tailored to both the public and farmers and ranchers on topics of soil-beneficial practices and management techniques.

AG-2: Nature-Based Solutions

Increasing use of nature-based solutions is the next strategy in this focus area. Increasing tree canopy and other types of vegetation can address both climate change mitigation and adaptation, along with furthering the broader sustainability and livability goals of the community. Nature-based solutions (e.g., landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or surface waters) can also help bolster community resilience and can provide additional environmental, social, and economic benefits.

MEASURE AG-2.1: Increase and improve urban tree canopy and green spaces.

2030 Target	2040 Target	2045 Target
10 acres of tree canopy added to Priority Communities annually from 2030 through 2045	10 acres of tree canopy added to Priority Communities annually from 2030 through 2045	10 acres of tree canopy added to Priority Communities annually from 2030 through 2045
458 $MTCO_2e$	**1,222 $MTCO_2e$**	**1,604 $MTCO_2e$**

- **Action AG-2.1.1:** Partner with local park districts to ensure sustainable park maintenance and to make parks more accessible, safe, and comfortable for all. This can include providing more benches and shade in local parks, revitalizing and investing in parks that serve vulnerable communities, increasing the number of local parks throughout the unincorporated county, and improving transition points between parks and communities.
- **Action AG-2.1.2:** Compile and manage a street tree inventory to help in effectively managing and maintaining urban trees, monitoring the health and condition of urban trees, guiding evidence-based decision making (e.g., tree species selection, planting strategies, maintenance priorities), and raising public awareness of the value of urban and native trees.
- **Action AG-2.1.3:** Develop a residential tree planting, care, and replacement program that assists single-family homeowners and provides free trees and maintenance services to low-income residents.
- **Action AG-2.1.4:** Evaluate and expand the Alameda County Tree Program.
- **Action AG-2.1.5:** Develop an Urban Greening Master Plan.

Source: **Alameda County CDA**

Trail in Unincorporated Alameda County

MEASURE AG-2.2: Utilize nature-based solutions to reduce the impacts of climate hazards and improve community resilience.

- **Action AG-2.2.1:** Continue to implement and expand stormwater management best practices pursuant to Chapter 17.64 of the Alameda County Ordinance Code (Water Efficient Landscape Ordinance) by using natural infrastructure to recharge groundwater, improve water quality, and minimize runoff. This can include rain gardens, infiltration beds, bioswales and basins, and constructed wetlands and retention ponds.
- **Action AG-2.2.2:** Scale and incentivize the use of innovative natural infrastructure features, such as green roofs and walls, permeable pavements, vegetated corridors, and multi-functional open spaces, where appropriate.
- **Action AG-2.2.3:** Use tools, such as CalEnviroScreen, to determine priority pollution-burdened communities across the unincorporated county that may benefit most from vegetative barriers and plant hazard-resistant barriers in these areas, aligning with the objectives of the Environmental Justice Element and the proposed Air Pollution Exposure Zone Ordinance.

Health and Resiliency

HR-1: Resilient Communities, Equity, and Environmental Justice

HR-2: Emergency Preparedness and Disaster Response

HR-3: Hazard-Specific Resilience

HR-4: High-Road, Green Workforce and Business Development

Strategies and Measures

While many of the strategies and measures in the CCAP promote both GHG mitigation and adaptation, the strategies and measures within the **Health and Resiliency** focus area are aimed specifically at promoting better public health outcomes, building community resilience, building communities' adaptive capacity, and developing a high-road, green workforce. This focus area is divided into four overarching climate action strategies: **HR-1) Resilient Communities, Equity, and Environmental Justice**, **HR-2) Emergency Preparedness and Disaster Response**, **HR-3) Hazard-Specific Resilience**, and **HR 4) High-Road, Green Workforce and Business Development**. These strategies, along with their respective measures and actions, are outlined below.

HR-1: Resilient Communities, Equity, and Environmental Justice

The first strategy in the Health and Resiliency focus area relates to establishing and building community resilience and adaptation and promoting equity and environmental justice. 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: Support the creation of resilience hubs and other place-based resilience resources to provide community members with essential services and community capacity building opportunities before, during, and after climate-related hazard events.

- **Action HR-1.1.1:** Pursue funding to establish resilience hubs in frontline communities. Resilience hubs should be community-accessible centers that serve to deliver disaster preparedness messaging, facilitate stronger community ties and ongoing community capacity building, provide an accessible point of distribution for basic needs (such as food, masks, and emergency supplies), and to play a critical role in post-disruption recovery and ongoing communications needs.
- **Action HR-1.1.2:** Partner with AC Transit, BART, and other public and private transportation providers to plan to transport community members most at risk to inclement weather centers and resilience hubs during hazard events.
- **Action HR-1.1.3:** Develop a broad, accessible, and multilingual communication strategy for hazard events.

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

- **Action HR-1.2.1:** Integrate climate resilience throughout long-term planning and current development projects.
- **Action HR-1.2.2:** Work with surrounding jurisdictions to accelerate, expand, and build new climate adaptation collaborative efforts across communities, governments, community and faith-based organizations, and businesses, such as the partnerships and efforts produced by the Bay Area Climate Adaptation Network (BayCAN) and the Coastal Hazards Adaptation Resiliency Group (CHARG).

MEASURE HR-1.3: Ensure essential services are available for community members most at risk.

- **Action HR-1.3.1:** Improve broadband connectivity through focused efforts resulting from a comprehensive Broadband Needs Assessment and through the promotion of existing programs, such as the Federal Communications Commission's Affordable Connectivity Program.
- **Action HR-1.3.2:** Promote the services of nearby health, wellness, and social service providers that serve frontline communities and support the expansion of such facilities and services throughout the unincorporated county.
- **Action HR-1.3.3:** Pursue grant funding and partnerships to provide water refill stations at community gathering spots (e.g., schools, parks) throughout the unincorporated county.
- **Action HR-1.3.4:** During extreme weather and climate hazard events, ensure support services for people experiencing homelessness.

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

- **Action HR-1.4.1:** Promote the Microenterprise Home Kitchen Operation (MEHKO) program and ensure that there are educational materials available in multiple languages.
- **Action HR-1.4.2:** Encourage the development of, and facilitate access to, healthy food retail outlets throughout the unincorporated county, such as grocery stores, healthy corner stores, and farmers' markets.
- **Action HR-1.4.3:** Establish new partnerships to increase healthy food access for youth. These partnerships may optimize school-based emergency food distribution, expand youth agricultural opportunities at local schools, and enhance school garden curricula.

Source: **Alameda County CDA.** Mural design by Tiffany King & Greg Duggan. Created by youth artists from the Arts & Creativity Program at the REACH Ashland Youth Center.

Dig Deep's Greenhouse Farm, Ashland

- **Action HR-1.4.4:** Promote, incentivize, and remove barriers to urban agriculture across the unincorporated county. This may include establishing partnerships to identify and active urban agriculture sites, reviewing existing ordinances and regulations to explore removing barriers, and encouraging the inclusion of food-growing spaces in new or remodeled multifamily residential sites.

MEASURE HR-1.5: Prioritize measures and investments that protect frontline community residents and small businesses from displacement.

- **Action HR-1.5.1:** Establish a Displacement Avoidance Task Force comprising local government staff, community leaders, and others to develop policies for preventing the displacement of frontline community residents and small businesses as a result of climate impacts or as an unintended consequence of policies meant to address climate change.

- **Action HR-1.5.2:** Develop and implement assistance programs to provide financial and technical support to frontline community residents and small businesses, helping them to adapt to climate change and transition to more climate-friendly practices without being displaced.

HR-2: Emergency Preparedness and Disaster Response

The third strategy of this focus area is improving emergency preparedness and disaster response by ensuring their adequate capacity and improving accessibility, especially for community members most at risk. 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.

MEASURE HR-2.1: Ensure that emergency and critical service providers have adequate capacity to address increased demand due to potential impacts of climate hazards.

- **Action HR-2.1.1:** Consult with other local jurisdictions, water providers, and fire departments to ensure the adequacy of emergency water flow, emergency vehicle access, and evacuation routes prior to approving any new development.
- **Action HR-2.1.2:** Maintain up-to-date emergency preparedness and evacuation plans and procedures in coordination with appropriate State, regional, and local agencies and departments.
- **Action HR-2.1.3:** Revise and coordinate cross-jurisdictional emergency management plans, programs, and activities to account for changing hazard profiles and their associated impacts.
- **Action HR-2.1.4:** Promote the Community Emergency Response Team (CERT) training program through the Alameda County Fire Department to improve disaster preparedness and disaster response skills among residents.
- **Action HR-2.1.5:** Develop disaster documentation program to include tracking disasters affecting the unincorporated county 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-2.1.6:** Host regular disaster preparedness trainings at convenient locations, in widely spoken languages, to provide basic training to community members who are unable to commit to the CERT training program.

MEASURE HR-2.2: Prioritize making emergency services more accessible and equitable, especially for community members most at risk.

- **Action HR-2.2.1:** Encourage residents to register with the AC Alert emergency notification system for those who have access to mobile communication devices or devices with internet accessibility. Promote the availability of emergency notifications through KCBS radio 740 for those who do not have internet access, or who are at risk of losing internet access in an emergency scenario.
- **Action HR-2.2.2:** Partner with local healthcare providers, community-based organizations, and Medical Reserve Corps programs to establish emergency response networks and train volunteers to assist in emergencies.

- **Action HR-2.2.3:** Coordinate to deploy "pop-up" mobile emergency units to areas that may be geographically isolated or have limited access to traditional healthcare facilities. In addition to rapid response to medical emergencies, these units can help build capacity and connectedness through health education and raising awareness about emergency services.
- **Action HR-2.2.4:** Ensure that emergency service providers are prepared to serve the community with disability accessibility and language access capabilities, such as multilingual staff and/or interpretation and translation services.
- **Action HR-2.2.5:** Establish an equity officer in the Alameda County Emergency Operations Center to connect disaggregated data and equity metrics, consider diverse community needs, and engage trusted messengers in outreach efforts. help coordinate related efforts across County agencies.

HR-3: Hazard-Specific Resilience

The next strategy within this focus area is to build resilience that is specific to different types of climate hazards. Climate hazards in the unincorporated county include flooding, wildfires, and extreme heat, as well as sea level rise in San Lorenzo. Developing programs and resources to address the specific needs associated with each type of climate hazard and protect residents is a critical component of the CCAP.

MEASURE HR-3.1: Build resilience to flooding across the county, along with sea level rise in San Lorenzo.

- **Action HR-3.1.1:** Work with Alameda County Flood Control & Water Conservation District and other partner agencies and jurisdictions to conduct community engagement and feasibility studies and implement further flood control improvement projects, including those related to creek restoration, sea level rise in San Lorenzo, regional detention facilities, and dredging existing facilities for increased capacity.
- **Action HR-3.1.2:** Continue to improve the County's rating under the National Flood Insurance Program so that flood insurance premiums for residents in flood-prone areas may be reduced.

Source: **Alameda County Fire Department**

2023 Storm Damage to Redwood Road in Castro Valley

- **Action HR-3.1.3:** Where it is not already required, encourage property owners to purchase flood insurance to reduce the financial risk from flooding.
- **Action HR-3.1.4:** Dedicate adequate resources to ensure effective and timely monitoring and maintenance of public drainage facilities, including storm drains, to maintain adequate capacity for peak flows in the area.

- **Action HR-3.1.5:** Ensure that any sea level- or flood-related barriers do not result in the diversion of flood waters or otherwise increase flooding potential near development and critical facilities.
- **Action HR-3.1.6:** Incorporate future sea-level rise, permanent and temporary inundation, and precipitation projections into long-term infrastructure planning processes, influencing decisions on expansion, relocation, elevation, or retrofitting of assets.

Forest Firefighters

- **Action HR-3.1.7:** Collaborate with partner agencies and organizations throughout the San Francisco Bay Area to encourage and expedite projects and initiatives aimed at addressing sea level rise (e.g., shoreline protection and restoration).

MEASURE HR-3.2: Build resilience to wildfires across the unincorporated county.

- **Action HR-3.2.1:** Develop a structure ignition zone assessment program (and grant funding, if feasible) that connects homeowners and businesses to mitigation specialists to develop a comprehensive report with recommended mitigation actions to increase building resilience to wildfire.
- **Action HR-3.2.2:** Partner with landowners, State agencies, and others to implement vegetative fuels reduction projects that are beyond defensible space requirements, but within two miles of homes and other structures, such as pruning, utility management, removal of understory, and biomass removal. Consider developing incentives to encourage brush removal around structures in fire-prone areas.
- **Action HR-3.2.3:** Require private property owners to maintain the vegetation on their property in a condition that will not contribute to the spread of wildfire. Requirements may include, but are not limited to, removing all portions of trees within 10 feet of chimneys and stovepipe outlets, maintaining a 30-foot defensible space around all buildings and structures, and removing materials that may act as a fuel or conveyance of fire.
- **Action HR-3.2.4:** Consider establishing and funding an enforcement district for residents within WUI areas and establish an inspection period to be conducted annually to ensure compliance with vegetation management standards.
- **Action HR-3.2.5:** Promote programs from Diablo Firesafe Council and other partner organizations to further support wildfire preparedness and the implementation of wildfire risk reduction measures throughout the unincorporated county.
- **Action HR-3.2.6:** Utilize goat grazing as a cost-effective and environmentally friendly alternative to controlled burns that reduce wildfire risk, where feasible.
- **Action HR-3.2.7:** Promote and expand free or low-cost fire fuel reduction programs such as ACFD's Chipper Program.

MEASURE HR-3.3: Build resilience to extreme heat across the county.

Source: **Alameda County CDA**

San Lorenzo Library

- **Action HR-3.3.1:** Seek funding to expand upon the work piloted by "Cooling Our Communities" to provide multilingual heat preparedness materials and resources to all areas of the unincorporated county.
- **Action HR-3.3.2**: Update, revise, and promote the guidance of and ensure that residents have access to the "Pocket Guide to Emergency Preparedness & Heat Events" developed by the Alameda County Health Care Services Agency and Community Development Agency through the "Cooling Our Communities" heat preparedness program. This will include ensuring language and ADA accessibility, making physical and digital copies readily available, and partnering with communities to disseminate.
- **Action HR-3.3.3:** Partner with community-based organizations, faith-based organizations, businesses, and other public agencies to develop a "Community Cool Zone Network" comprised of air-conditioned spaces that are made available and accessible to community members most at risk during extreme heat events.
- **Action HR-3.3.4:** Develop a "Cool Buddy" program where local volunteers are trained to build neighborhood networks, identify heat-vulnerable neighbors, and set up systems to check in on each other during extreme heat events.
- **Action HR-3.3.5:** Encourage the installation or use of cool roof technologies, green roofs, and rooftop gardens in new and existing private and public development.
- **Action HR-3.3.6:** 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. Where feasible, use open-grid pavement systems (at least 50 percent pervious).

HR-4: High-Road, Green Workforce and Business Development

The final strategy within this focus area is related to developing a high-road, green workforce and promoting sustainable business development. Enabling new economic development opportunities in green industries within the unincorporated county can boost the local economy and provide jobs that promote fair labor practices and provide a living wage, benefits, and worker protection.

MEASURE HR-4.1: Improve the quality and availability of green jobs, ensuring jobs have fair labor practices, living wages, benefits, and worker protection.

Source: **Alameda County CDA.** Mural design by Tiffany King & Greg Duggan. Created by youth artists from the Arts & Creativity Program at the REACH Ashland Youth Center.

Pacific Apparel in Ashland

- **Action HR-4.1.1:** Partner with the Alameda County Workforce Development Board and local organizations (e.g., Bay Region Center of Excellence for Labor Market Research, Rising Sun Center for Opportunity, Grid Alternatives) and community colleges to promote local green job opportunities.
- **Action HR-4.1.2:** Promote BayREN programs to support contractor training and resident education in the unincorporated areas on electric appliances and systems and their installation, operation, and maintenance.
- **Action HR-4.1.3:** Develop a robust scoring and reporting system (e.g., health and wellness scorecard) to evaluate employer practices at workplaces in the unincorporated areas of the county. Develop incentives for workplaces to meet defined scorecard standards to improve physical and mental health, wages, job security, advancement opportunities, and meaningful voices in the workplace.
- **Action HR-4.1.4:** Work with regional partners to convene a multistakeholder regional board that brings together residents, small businesses, and workers to identify, launch, and evaluate economic investment pilot programs that align small business goals with people-focused and place-based community priorities through shared decision-making power and aligned objectives.

MEASURE HR-4.2: Incentivize and promote green business practices.

- **Action HR-4.2.1:** Promote business creation, retention, and entrepreneurship by providing technical assistance and financial incentives to local businesses.
- **Action HR-4.2.2:** Continue to promote and encourage participation in the Alameda County Green Business Program through the California Green Business Network.

Community Engagement and Monitoring

CE-1: Ongoing Equitable Community Engagement

CE-2: Climate Action Monitoring

Strategies and Measures

The final focus area of the CCAP is **Community Engagement 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 strategies, measures, and actions presented in the CCAP, and updating the techincal components such as the GHG inventory and climate vulnerability assessment, are crucial to determining what may or may not be working in terms of reducing GHG emissions, building community resilience in the context of climate change, or advancing equitable solutions for uincorporated-area residents and businesses. The two overarching climate action strategies within this focus area are: **CE-1) Ongoing Equitable Community Engagement** and **CE-2) Climate Action Monitoring**.

CE-1: Ongoing Equitable Community Engagement

The first strategy within the Community Engagement and Monitoring focus area is related to ongoing equitable community engagement. This refers to increasing the opportunities for all, but especially for frontline communities, to benefit from and engage in climate solutions. Providing multilingual 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 the unincorporated frontline communities, can help improve overall community resilience in the context of climate change.

MEASURE CE-1.1: Foster ongoing and deep community engagement with frontline communities.

- **Action CE-1.1.1:** Develop a strategy to foster ongoing and deep community engagement with frontline communities to advise on equitable policy development, program design, and implementation of climate-related actions. This strategy may include providing incentives for participation time, offering childcare, adjusting meeting times to accommodate work schedules, providing translation, and/or combining planning meetings with workshops or trainings related to disaster preparedness or other topics of interest to the community.

MEASURE CE-1.2: Develop an array of accessible outreach programs with multilingual capacity for widely spoken languages that emphasize preparedness to climate hazards.

- **Action CE-1.2.1:** Create an online and offline public outreach campaign for climate hazards (e.g., Red Flag warnings, Public Safety Power Shutoff events, Air Quality Index alerts), including information about what the warning is, what areas may be closed, what individuals should do to be prepared, and what activities should be avoided.
- **Action CE-1.2.2:** Review and revise (as needed) the County's wildfire smoke and air quality communications protocols to ensure that related messaging can be disseminated to all populations, including those that may be difficult to reach.

- **Action CE-1.2.3:** Promote the array of extreme heat-related resources already produced or hosted by the County to bolster extreme heat preparedness and prevent heat-related illnesses through targeted outreach and awareness campaigns.
- **Action CE-1.2.4:** Develop neighborhood readiness plans and promote flood/sea level rise/storm preparedness education.
- **Action CE-1.2.5:** As a minimum standard, ensure that any outreach efforts that are developed are accessible and available in multiple languages.

Source: **Alameda County Fire Department**

Community Members Gather Sand Bags

MEASURE CE-1.3: Prioritize community-based solutions to improve climate resilience.

- **Action CE-1.3.1:** Form community-based committees consisting of local stakeholders, residents, and experts to actively engage in climate resilience and response planning and decision-making processes and provide micro-grants to support community-led planning and projects.
- **Action CE-1.3.2:** Establish partnerships with local businesses, institutions, and community-based organizations to leverage resources, expertise, and community networks for implementing climate resilience initiatives effectively.

CE-2: Climate Action Monitoring

The second, and final, strategy of the Community Engagement and Monitoring focus area is related to monitoring the implementation of CCAP actions and conducting periodic updates to the GHG emissions inventory to measure progress and to the climate vulnerability assessment to track changes in climate hazards. These activities will help the County hone its climate action strategy over time and provide useful insights into the effectiveness of CCAP implementation. Identifying strengths and gaps will allow for the County to continue implementing actions that are achieving the goals and revise and/or replace actions that are not as successful.

MEASURE CE-2.1: Monitor implementation of CCAP actions to reduce GHG emissions and enhance adaptation and resilience in unincorporated Alameda County.

- **Action CE-2.1.1:** Conduct updates of the unincorporated county GHG emissions inventory every five years to monitor the progress of GHG-reducing actions.
- **Action CE-2.1.2:** Provide annual monitoring reports to the Alameda County Board of Supervisors on the implementation of CCAP actions.
- **Action CE-2.1.3**: Conduct comprehensive updates of the CCAP every eight years, aligning with updates to the County's Housing Element and Safety Element.
- **Action CE-2.1.4:** Proactively seek additional cost-effective implementation and strategic funding opportunities.

CHAPTER 6

Implementation & Monitoring

6 Implementation and Monitoring

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

6.1 Implementation Strategy

Effective implementation of the CCAP will require ongoing management and oversight. To gauge progress over time, it will also require updates to the County's greenhouse gas (GHG) emissions inventory and Vulnerability Assessment (VA). Ensuring that the measures identified in the CCAP result in emissions reductions and resilience improvements is central to the success of the CCAP. Achieving these goals will require investments and long-term commitments from the County as well as participation from staff. The success of CCAP implementation will also depend on the meaningful and equitable inclusion of residents, businesses, and other stakeholders in unincorporated Alameda County and the region, with an emphasis on the frontline communities that bear the greatest risk from the impacts of climate change.

To help guide the implementation of CCAP actions, the County developed a prioritization matrix, evaluating each action to generate a prioritization score based on a variety of criteria. These criteria included GHG reduction potential, climate adaptation and 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 CCAP adoption, the prioritization matrix and scores will help County staff work with community members and stakeholders to determine which actions should be implemented and when, and which will contribute to the effectiveness of the CCAP and to overall community health and well-being.

Prioritization Evaluation Factors

The following criteria were used to develop a prioritization score for each CCAP action, focusing on GHG reduction and adaptation separately. Summaries of the criteria are provided in **Tables 6.1 and 6.2**.

- **GHG Reduction Potential** considers the greenhouse gas reduction potential of each measure using the results of the County's GHG emissions reduction quantification analysis (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 increases 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. The

resultant GHG emissions reduction potential score for a measure was applied to each action under that measure.

- **Climate Adaptation and/or Resilience Potential** considers whether the measures will impact the climate adaptation capacity and/or resilience of the County, its residents, and/or ecosystems to climate-related disruptions. A score of 0 was assigned to actions that either do not impact resilience, or where it is unclear whether the action will have an impact on adaptation or resilience. A score of 3 was assigned to actions that increase climate adaptation capacity and resilience and a score of 6 was assigned to actions that increase climate adaptation capacity and resilience to the greatest vulnerabilities facing Alameda County: extreme heat and wildfire (per the VA). For example, Action HR-4.3.5, which scored 6, supports the use of green roofs for the purpose of lowering the urban heat island effect, among other intents, which can help the County's populations and buildings adapt and become more resilient to extreme heat, a hazard that will continue to be exacerbated by climate change.
- **Cost-Effectiveness** considers cost effectiveness of measures for the County and, separately, for residents and businesses. For County 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 County; a score of 0 was assigned to an action if the long-term financial benefits match implementation costs to the County 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 County. The same scoring criteria were applied to residential and business cost-effectiveness, but with scores of -2, 0, or 2.
- **Technological Feasibility** considers the availability of necessary technology or other resources (e.g., funding) for successful implementation and achievement of the action's intended goal. 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. 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** considers whether existing County policies or ordinances that would support the implementation of an action are currently in place. If County policies or ordinances currently exist that would prohibit an action, a score of -2 was assigned. If County policies or ordinances would need to be developed to support an action, or it was unknown whether County policies or ordinances currently exist to support an action, a score of 0 was assigned. If County policies or ordinances currently exist to support an action, a score of 2 was assigned. Where County policies or ordinances did not exist, but either other County initiatives (e.g., established programs) or State regulations did exist, these actions also received a score of 2. For example, Action LU-1.1.1, which involves implementing projects that improve bicycle and pedestrian infrastructure identified in the County's Bicycle & Pedestrian Master Plan, received a score of 2.
- **Jurisdictional Control / Ease of Implementation** considers the County's authority to achieve the overall objective of an action. A score of -2 was assigned to actions where the County would only be able to influence—through encouragement, support, or similar effort—the success of the intended

goal. Under Action IN-2.1.8, for example, the County would promote East Bay Community Energy's (EBCE's) electric vehicle (EV) charging rates to provide a cost-effective way to charge EVs at residences during off-peak hours, so this action received a score of -2 due to the County's influencing role. When the County could require the desired outcome of an action through regulation and/or enforcement, a score of 0 was assigned. Actions that involved the County developing a program, creating a partnership, or engaging in a similar initiative also received a score of 0, such as Action IN-2.2.3, which involves the County collaborating with EBCE to develop and implement a Medium- and Heavy-Duty Goods Movement Electrification Blueprint. Lastly, a score of 2 was given to actions where the County would be the primary actor and would have direct authority over the implementation and success of the action. For example, Action IN-2.1.1, which involves the County adopting an EV charging ordinance to increase EV readiness in new residential and nonresidential development beyond minimum mandatory standards established in CalGREEN, received a score of 2 due to the County's role as the primary actor.

- **Implementation Timeframe** considers 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 County encouraging or supporting initiatives received a score of 2 because of the ease of implementation, while those that would require the County to create and implement a program, develop an ordinance, or install infrastructure received a score of 1.
- **Co-benefits** considers 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. Using community feedback provided in public meetings and on the County's online platform, hosted by Consider.it, measures that received significant supportive comments and/or high priority ratings on average received a score of 2, while measures that received medium- and low-priority received scores of 0, and -2, respectively. A full breakdown of the prioritization framework and the scoring systems used for each criterion can be found in **Appendix A**.

Table 6.1 Summary of Prioritization Evaluation Factors for GHG Reduction Actions

Evaluation Factors	Possible Scores by Evaluation Factor
GHG Reduction Potential	4, 6, or 8
County Cost-Effectiveness	-2, -1, 0, 1, or 2
Resident and Business Cost-Effectiveness	-2, 0, or 2
Technological Feasibility	-2, 0, or 2
Current Policies or Ordinances	-2, 0, or 2
Jurisdictional Control / Ease of Implementation	-2, 0, or 2
Implementation Timeframe	0, 1, or 2
Co-benefits Benefits to Renters Equity Air Pollution Prevention Health and Well-Being Reliability Prioritized by Community Job Development Resource Preservation	Score is specific to type of co-benefit 0 or 1 0 or 2 -1, 0, or 1 -1, 0, or 1 0 or 1 -2, 0, or 2 -1, 0, or 1 0 or 1
Highest Total Possible Score	***30***

Table 6.2 Summary of Prioritization Evaluation Factors for Adaptation Actions

Evaluation Factors	Possible Scores by Evaluation Factor
Climate Resilience Potential	0, 3, or 6
County Cost-Effectiveness	-2, -1, 0, 1, or 2
Resident and Business Cost-Effectiveness	-2, 0, or 2
Technological Feasibility	-2, 0, or 2
Current Policies or Ordinances	-2, 0, or 2
Jurisdictional Control / Ease of Implementation	-2, 0, or 2
Implementation Timeframe	0, 1, or 2
Co-benefits Benefits to Renters Equity Air Pollution Prevention Health and Well-Being Reliability Prioritized by Community Job Development Resource Preservation	Score is specific to type of co-benefit 0 or 1 0 or 2 -1, 0, or 1 -1, 0, or 1 0 or 1 -2, 0, or 2 -1, 0, or 1 0 or 1
Highest Total Possible Score	***28***

6.2 Prioritization Matrix for GHG Reduction Actions

Based on the prioritization evaluation approach described above, the maximum score any action could receive was 30. To enable the County to focus on and feasibly implement high-priority GHG-reducing actions, a minimum score of 21 was chosen as the threshold for the inclusion of an action in the GHG Reductions prioritization matrix. The 13 actions with scores equal to or greater than 21 are included in the summarized prioritization matrix below, which presents each GHG reduction action's overall prioritization score and the County 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.

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
BUILDINGS				
STRATEGY BE-1	**BUILDING DECARBONIZATION**			
Measure BE-1.1: Decarbonize existing residential and nonresidential buildings.	**Action BE-1.1.1:** Develop a comprehensive energy retrofit plan to transition mixed-fuel residential and nonresidential buildings to all-electric, prioritizing frontline communities. The plan should address end-of-life recycling and disposal of gas appliances.	21	2024	Public Works Agency – Building Department
INFRASTRUCTURE				
STRATEGY IN-2	**LOW- AND ZERO-EMISSION VEHICLES**			
Measure IN-2.1: Increase electric vehicle charging infrastructure.	**Action IN-2.1.1:** Adopt an EV charging reach code with the 2025 code cycle to increase levels of EV readiness in new residential and nonresidential development beyond the minimum mandatory levels established in CALGreen.	23	2025	Public Works Agency – Building Department
	Action IN-2.1.4: Work with regional agencies and EV charging companies to incentivize, install, and maintain in good working order EV charging stations and preferred parking for EVs at public facilities, parks, retail centers, multifamily residential properties, and other high-use parking areas throughout the unincorporated county.	21	Ongoing	CDA – Economic and Civic Development Department
	Action IN-2.1.5: Collaborate with Ava Community Energy to establish EV charging mobility hubs at publicly accessible sites that support tenants of multifamily properties and rideshare drivers.	21	Ongoing	CDA – Economic and Civic Development Department

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
	Action IN-2.1.6: Provide guidelines in multiple languages for the permit application process for EV charging infrastructure installation in residential and nonresidential development.	23	2024	CDA – Planning Department Public Works Agency – Building
Measure IN-2.2: Encourage public EV and low-carbon vehicle adoption.	**Action IN-2.2.1:** Implement the recommendations for local governments provided in the Bay Area Electric Vehicle Acceleration Plan to support outreach and education for EV adoption.	24	2026	CDA – Planning Department
LAND USE AND MOBILITY				
STRATEGY LU-1 SAFE, ACCESSIBLE, AND RELIABLE ACTIVE TRANSPORTATION				
Measure LU-1.1: Develop and maintain a safe, connected, and continuous bicycle and pedestrian network.	**Action LU-1.1.1:** Implement specific recommendations for improving bicycle and pedestrian infrastructure (e.g., bike paths, sidewalks) included in the 2019 Alameda County Bicycle & Pedestrian Master Plan for Unincorporated Areas and its future updates.	25	Ongoing	Public Works Agency
	Action LU-1.1.2: Continue to eliminate gaps in the existing network and improve bicycle and pedestrian connections to transit, schools, parks/trails, retail and employment centers, community/senior centers, and libraries.	27	Ongoing	Public Works Agency
	Action LU-1.1.4: Consider establishing temporary and permanent car-free areas.	21	2025	Public Works Agency
WASTE				
STRATEGY WR-2 ORGANIC WASTE MANAGEMENT AND REDUCTION				
Measure WR-2.1: Continue to educate the community on composting best practices and increase onsite/home composting and use of curbside green organic recycling bins.	**Action WR-2.1.1:** Implement and enforce the requirements of SB 1383 and eliminate disposal of compostable organic materials to landfills.	24	Ongoing	CDA – Planning Waste Program
	Action WR-2.1.2: Expand existing organic waste collection routes and drop-off sites to improve composting services for interested residents and businesses.	27	2024	CDA – Planning Waste Program
HEALTH AND RESILIENCY				
Measure HR-4.2: Incentivize and promote green business practices.	**Action HR-4.2.2:** Continue to promote and encourage participation in the Alameda County Green Business Program through the California Green Business Network.	22	Ongoing	AC Workforce Development Board

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
AGRICULTURE AND VEGETATION				
STRATEGY AG-2 **NATURE-BASED SOLUTIONS**				
Measure AG-2.1: Increase and improve urban tree canopy and green spaces.	**Action AG-2.1.4:** Evaluate and expand the Alameda County Tree Program.	23	2025	Public Works Agency Tree Program

6.3 Prioritization Matrix for Adaptation and Resilience Actions

Based on the prioritization evaluation approach described above, the maximum score any action could receive was 28. To enable the County to focus on and feasibly implement high-priority adaptation and resilience actions, a minimum score of 19 was chosen as the threshold for the inclusion of an adaptation and/or resilience action in the prioritization matrix. The 21 actions with scores equal to or greater than 19 are included in the summarized prioritization matrix below, which presents each adaptation/resilience action's overall prioritization score and the County 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.

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
BUILDINGS				
STRATEGY BE-3 **ENERGY EFFICIENCY AND RELIABILITY**				
Measure BE-3.2: Retrofit existing residential and nonresidential buildings to improve energy efficiency.	**Action BE-3.2.2:** 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.	19	2024	PWA – Building Department CDA - Healthy Homes Department
STRATEGY BE-4 **RESILIENT AND SUSTAINABLE BUILDINGS**				
Measure BE-4.1: Improve resilience of existing residential and nonresidential buildings to climate hazards.	**Action BE-4.1.1:** Increase the use of indoor air purification systems capable of enhancing and protecting public health from wildfire smoke and poor air quality in the existing building stock in the unincorporated county, as well as from toxic air contaminants associated with freeway traffic and vehicle travel (consistent with the County's proposed Air Pollution Exposure Zone Ordinance).	21	Ongoing	PWA – Building Department CDA - Healthy Homes Department

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
	Action BE-4.1.2: Through focused outreach, encourage all residential and nonresidential building owners located in wildland-urban interface (WUI) areas or "High" or "Very High" fire hazard severity zones (FHSZs) to conduct hardening retrofits, which may include installing fire-resistant roofs and building materials, covering vents or using ember- and flame-resistant vents, and installing dual-paned windows with one pane of tempered glass, among other actions.	19	Ongoing	Alameda County Fire Department PWA – Building Department
	Action BE-4.1.3: Encourage residential and nonresidential building owners that lack air conditioning, or that are located in areas vulnerable to extreme heat, to install reflective "cool roofs" to mitigate the impacts of increased temperatures and extreme heat through public education campaigns and incentive programs.	21	Ongoing	Public Works Agency – Building Department CDA – Planning Department
Measure BE-4.2: Enhance resilience of new residential and nonresidential buildings to climate hazards.	**Action BE-4.2.3:** Require new buildings located within "High" or "Very High" fire hazard severity zones (FHSZs) to use fire-resistant building materials, fire-resistant landscaping, and adequate clearance around structures.	20	Ongoing	PWA – Building Department Alameda County Fire Department
INFRASTRUCTURE				
STRATEGY IN-1 CLEAN AND RELIABLE ENERGY				
Measure IN-1.4: Encourage the increase of smart grid integration throughout the unincorporated county.	**Action IN-1.4.3:** Adopt an ordinance that requires smart grid energy management system and compatible heating, ventilation, air conditioning and lighting in new construction.	22	2025	Public Works Agency – Building Department
STRATEGY IN-6 RESILIENT INFRASTRUCTURE				
Measure IN-6.3: Protect vulnerable transportation infrastructure, services, and systems from hazards exacerbated by climate change.	**Action IN-6.3.2:** Update County transportation system maintenance protocols, for which the Public Works Agency is responsible, to incorporate climate vulnerabilities.	19	2026	Public Works Agency
	Action IN-6.3.3: Pilot cool pavement initiatives and evaluate effectiveness post-implementation.	21	2027	Public Works Agency

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
LAND USE AND MOBILITY				
STRATEGY LU-1 **SAFE, ACCESSIBLE, AND RELIABLE ACTIVE TRANSPORTATION**				
Measure LU-1.1: Develop and maintain a safe, connected, and continuous bicycle and pedestrian network.	**Action LU-1.1.1:** Implement specific recommendations for improving bicycle and pedestrian infrastructure (e.g., bike paths, sidewalks) included in the 2019 Alameda County Bicycle & Pedestrian Master Plan for Unincorporated Areas and its future updates.	20	Ongoing	Public Works Agency
	Action LU-1.1.2: Continue to eliminate gaps in the existing network and improve bicycle and pedestrian connections to transit, schools, parks/trails, retail and employment centers, community/senior centers, and libraries.	22	Ongoing	Public Works Agency
WASTE				
STRATEGY WR-2 **ORGANIC WASTE MANAGEMENT AND REDUCTION**				
Measure WR-2.1: Continue to educate the community on composting best practices and increase onsite/home composting and use of curbside green organic recycling bins.	**Action WR-2.1.2:** Expand existing organic waste collection routes and drop-off sites to improve composting services for interested residents and businesses.	19	Ongoing	CDA – Planning Department Waste Program
HEALTH AND RESILIENCY				
STRATEGY HR-3 **HAZARD-SPECIFIC RESILIENCE**				
Measure HR-3.1: Build resilience to flooding across the county, along with sea level rise in San Lorenzo.	**Action HR-3.1.7:** Collaborate with partner agencies and organizations throughout the San Francisco Bay Area to encourage and expedite projects and initiatives aimed at addressing sea level rise (e.g., shoreline protection and restoration).	19	Ongoing	Public Works Agency
Measure HR-3.2: Build resilience to wildfires across the county.	**Action HR-3.2.3:** Require private property owners to maintain the vegetation on their property in a condition that will not contribute to the spread of wildfire. Requirements may include, but are not limited to, removing all portions of trees within 10 feet of chimneys and stovepipe outlets, maintaining a 30-foot defensible space around all buildings and structures, and removing materials that may act as a fuel or conveyance of fire.	19	Ongoing	Alameda County Fire Department CDA – Planning Department
	Action HR-3.2.5: Promote programs from Diablo Firesafe Council and other partner organizations to further support wildfire preparedness and the implementation of wildfire risk reduction measures throughout the unincorporated county.	19	Ongoing	Alameda County Fire Department

Measure	Action	Prioritization Score	Timing	Implementing Department(s)
	Action HR-3.2.7: Promote and expand free or low-cost fire fuel reduction programs such as ACFD's Chipper Program.	20	Ongoing	Alameda County Fire Department
STRATEGY HR-4	**High-Road, Green Workforce and Business Development**			
Measure HR-4.1: Improve the quality of green jobs, ensuring jobs have fair labor practices, living wages, benefits and worker protection.	**Action HR-4.1.1:** Partner with the Alameda County Workforce Development Board and local organizations (e.g., Bay Region Center of Excellence for Labor Market Research, Rising Sun Center for Opportunity, Grid Alternatives) and community colleges to promote local green job opportunities.	19	Ongoing	Alameda County Workforce Development Board
AGRICULTURE AND VEGETATION				
STRATEGY AG-2	**NATURE-BASED SOLUTIONS**			
Measure AG-2.1: Increase and improve urban tree canopy and green spaces.	**Action AG-2.1.3:** Develop a residential tree planting and replacement program that assists single-family homeowners and provides free trees and maintenance services to low-income residents.	19	2027	Community Development Agency Public Works Agency
	Action AG-2.1.4: Evaluate and expand the Alameda County Tree Program.	22	2025	Public Works Agency Tree Program
	Action AG-2.1.5: Develop an Urban Greening Master Plan.	19	2026	Community Development Agency Public Works Agency
Measure AG-2.2: Utilize nature-based solutions to reduce the impacts of climate hazards and improve community resilience.	**Action AG-2.2.1:** Continue to implement and expand stormwater management best practices pursuant to Chapter 17.64 of the Alameda County Ordinance Code (Water Efficient Landscape Ordinance) by using natural infrastructure to recharge groundwater, improve water quality, and minimize runoff. This can include rain gardens, infiltration beds, bioswales and basins, and constructed wetlands and retention ponds.	19	Ongoing	CDA – Planning Department
COMMUNITY ENGAGEMENT AND MONITORING				
STRATEGY CE-1	**Ongoing Equitable Community Engagement**			
Measure CE-1.2: Develop an array of accessible outreach programs with multilingual capacity for widely spoken languages that emphasize preparedness to climate hazards.	**Action CE-1.2.2**: Review and revise (as needed) the County's wildfire smoke and air quality communications protocols to ensure that related messaging can be disseminated to all populations, including those that may be difficult to reach.	19	2026	AC Office of Emergency Services

6.4 Monitoring and Updates

As implementation proceeds, the County will need to perform CCAP maintenance and updates to evaluate impacts on emissions trends and climate resilience and adaptation and ensure the plan's ongoing relevancy and effectiveness. County staff will need to evaluate and monitor CCAP 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.

County staff will evaluate the performance of each action it has 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- and adaptation-related improvements in the community. By evaluating whether the implementation of an action is on track to achieve its objective, the County can identify successful actions and reevaluate or replace underperforming measures.

County staff will prepare a monitoring report annually and a GHG emissions inventory and vulnerability assessment update every 4 or 5 years. The monitoring report will provide updates on CCAP progress, including the status of actions implemented to achieve GHG reductions and/or improve adaptation/resilience, as well as other important milestones in the CCAP implementation process. As technologies and markets change and the County implements the actions in the CCAP, 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 Board of Supervisors and County commissions about implementation progress on actions and overall progress towards CCAP objectives. The report would also serve to provide transparency and promote engagement with the public for CCAP implementation.

Finally, the County will prepare an update to the CCAP every 8 years, to align with updates to the County's Safety Element and Housing Element. Updates will 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 CCAP 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 CCAP. As the County implements and monitors CCAP actions, involvement with residents and businesses, community organizations, developers, property owners, and other local, regional, and State agencies will ultimately guide the County's action implementation and promote achievement of CCAP objectives. While a handful of actions will be led solely by the County, many will require partnerships and collaboration. Wherever possible, the County should enable residents – and especially climate-vulnerable frontline communities – to directly shape the design and implementation of measures and actions through democratic and participatory processes.

Effective and long-term climate action, adaptation, 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 County is committed to continuing its outreach efforts through CCAP implementation, monitoring, and future plan updates as specified in the actions under Measure CE-1: Ongoing Equitable Community Engagement. 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.

Frontline communities, such as the County's Environmental Justice Priority Communities, experience disproportionate impacts of climate change relative to the rest of the community. Following CCAP adoption, addressing climate inequities in the form of meaningful ongoing engagement with frontline communities will be a high priority. The County is committed to overcoming the barriers of engagement with community members most at risk, such as lack of access to technology and language barriers, to ensure a more equitable implementation process.

6.6 Funding and Financing Opportunities

The County will incur costs to implement some of the measures and actions included in the CCAP. 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 CCAP implementation. While some measures will only require funding from the County and other public entities, others would result in cost impacts for businesses, developers, and residents. However, in general, implementation of CCAP measures and actions will result in substantial cost savings for the County, residents, and business owners in the long term.

Noting that the County will incur some costs related to CCAP 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 6.3**. 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 County can seek related to funding CCAP actions. Aside from these potential opportunities, the County will be proactive in seeking additional cost-effective implementation and strategic funding opportunities, consistent with CCAP Action CE-2.1.4. 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 County can use to search for new funding sources.

Table 6.3 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 county government to share ownership of an action put forth in the CCAP, while also sharing possible cost savings and revenue generation with a third party.	▶ Bay Area Air Quality Management District ▶ East Bay Community Energy ▶ Pacific Gas and Electric Company ▶ Association of Bay Area Governments/Metropolitan Transportation Commission
Loans	
Loans give cities access to upfront capital, whose principal and interest must be repaid over the duration of the loan. While the county government should first consider grants and private partners that can provide repayment-free capital for implementation of CCAP 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 county can issue a bond directly or apply for funds from a state bonding program. These bonds can be backed either by general county 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 county government's general fund to capitalize projects. Every year, counties 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 counties turn to budget funding. There are also opportunities for climate action to take higher priority in counties' budgeting processes and for county budgets to fund appropriate climate-related expenditures. If using county 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 county'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 counties' 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: **Prepared by Ascent in 2023.**

CHAPTER 7

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7 Works Cited

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Chapter 6 – Implementation and Monitoring

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