

May 21, 2025

#### Land Acknowledgment

We honor the Pomo tribes, including the Yokayo, Hopland, Pinoleville, Redwood Valley Rancheria, Potter Valley, Coyote Valley, and Guidiville Rancheria communities, who have acted as stewards of this land, its waters, and its natural resources with profound respect and wisdom for generations. We acknowledge the enduring resilience of the Pomo people in the face of colonization, displacement, and systemic oppression and whose descendants continue to maintain their political sovereignty, cultural traditions, and connection to the Ukiah Valley as vital members of our community. We are grateful to share this space and thank them for their long-term stewardship. As climate change increasingly threatens our region, its peoples, their livelihoods, and their cultural identities, we strive to learn from local wisdom and Traditional Ecological Knowledge so to foster greater harmony with our natural environment, preserve the health of our planet, and build a more climate resilient community.

May this acknowledgment remind us of our shared responsibility to care for this land and to uplift the voices, sovereignty, and leadership of Indigenous peoples. We commit to fostering relationships built on respect, reciprocity, and reconciliation, today and for generations to come.

#### **A Special Thanks**

This community-informed Climate Action Plan (CAP) places public input and equity at its core and aspires to foster collaborative community efforts that will help build a sustainable future for all residents in the City of Ukiah. The CAP is the result of a multi-year process developed by the City of Ukiah's Community Development Department (CDD) and Rincon Consultants Inc.

We wish to extend our sincere gratitude to the many people who helped shape the CAP, including the City of Ukiah City Council, City Manager's Office, and an inter-departmental project team comprised of City staff. The City of Ukiah also would like to acknowledge the County of Mendocino as well as the State of California for their ongoing support and collaboration. We particularly want to convey a special thanks the residents of Ukiah who shared their voices throughout the public engagement process create a plan that addresses Ukiah's existing needs and its future aspirations. This inaugural Climate Action Plan would not have been possible without the significant contributions in time, energy and thoughtful comments provided by Ukiah's diverse community members, environmental stakeholders, local businesses, community organizations, tribal groups, and advocacy groups.

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## **Glossary of Terms**

Active Transportation – Humanpowered transportation, such as walking or biking.

Adaptation – Adjusting to actual or expected climate changes to minimize harm or take advantage of beneficial opportunities.

Area of Interest (AoI) – A geographic area designated for study, analysis, or project planning, commonly used in environmental and land-use assessments.

**CALGreen** – The California Green Building Standards Code, setting minimum sustainability requirements for residential and commercial construction projects, updated every three years.

**CALGreen Tier 1 & 2** – Voluntary sustainability standards exceeding CALGreen's mandatory requirements; Tier 1 adds additional measures, while Tier 2 includes even stricter requirements.

#### **California Air Resources Board**

(CARB) – The lead agency overseeing climate change programs and air pollution control efforts in California to achieve and maintain health-based air quality standards.

California Environmental Quality Act

**(CEQA)** – A statute requiring state and local agencies to identify and mitigate environmental impacts of development projects.

#### **California Public Utilities**

**Commission (CPUC)** – A regulatory agency overseeing electricity, natural gas, water, and telecommunications services in California.

**Carbon Dioxide (CO<sub>2</sub>) –** A naturally occurring greenhouse gas an by-product emitted from fossil fuel combustion, land-use changes, and industrial processes.

**Carbon Dioxide Equivalents (CO<sub>2</sub>e)** – A metric that standardizes emissions from various greenhouse gases based on their global warming potential. **Carbon Neutrality** – Achieving net-zero carbon emissions by balancing emitted carbon with carbon removal through sequestration.

**Carbon-Free Energy** – Energy generated without carbon emissions, such as wind or solar power.

**Circular Economy** – An economic system focused on eliminating waste and maximizing resource efficiency through reuse, repair, refurbishment, and recycling.

**Climate Action Plan (CAP)** – A strategic framework that outlines policies, programs, and actions to reduce greenhouse gas emissions and address climate change impacts at the local level.

#### Community Choice Aggregation

(CCA) – A local energy program allowing cities and counties to procure electricity for residents and businesses, often prioritizing renewable sources.

**De-carbonization** – The process of replacing fossil fuel-based technologies with zero-carbon alternatives, such as renewable electricity.

**Electrification** – Transitioning from fossil fuel-based technologies to electricity-powered alternatives, particularly those sourced from renewables.

#### Environmental Justice (EJ) -

Prioritizing fair treatment and meaningful participation of all communities in environmental policies, preventing disproportionate negative impacts on any group.

**Equity** – Refers to fairness and justice and is distinguished from equality: Whereas equality means providing the same to all, equity means recognizing that we do not all start from the same place and must acknowledge and make adjustments to imbalances. The process is ongoing, requiring us to identify and overcome intentional and unintentional barriers arising from bias or systemic structures. **Fossil Fuel** – A natural energy source formed from decomposed plants and animals, including coal, oil, and natural gas.

**Greenhouse Gas (GHG)** – Gases that trap heat in the atmosphere, contributing to climate change, including carbon dioxide ( $CO_2$ ), methane ( $CH_4$ ), and nitrous oxide ( $N_2O$ ).

Intergovernmental Panel on Climate Change (IPCC) – A United Nations

body assessing scientific research on climate change, its impacts, and strategies for adaptation and mitigation.

#### Local Governments for

Sustainability (ICLEI) – A global network of local and regional governments committed to sustainable urban development, using best practices for emissions assessments.

Low-Impact Development (LID) -

Sustainable land-use practices that manage stormwater and promote water conservation through features like permeable pavements, rain gardens, and green roofs.

**Mendocino Council of Governments** (MCOG) – A regional agency coordinating transportation planning and funding in Mendocino County.

Mendocino Solid Waste Management Authority (MSWMA) – A joint powers authority overseeing solid waste disposal, recycling programs, and waste reduction efforts in Mendocino County.

#### Mendocino Transit Authority (MTA)

- The public transportation agency providing bus services throughout Mendocino County.

**Methane (CH<sub>4</sub>)** – A potent greenhouse gas emitted under anaerobic conditions (without oxygen) from sources such as landfills, livestock digestion, wastewater treatment, and fossil fuel extraction.

**Microgrid** – A localized energy system that can operate independently or in connection with the main power grid, often integrating renewable energy and battery storage. **Migration** – Actions taken to reduce greenhouse gas emissions and mitigate climate change impacts, such as transitioning to renewable energy or increasing energy efficiency.

**Mode Share –** The proportion of travelers using different transportation modes, such as walking, biking, public transit, or private vehicles.

**Model Water Efficient Landscape Ordinance (MWELO)** – A California regulation establishing standards for water-efficient landscaping and irrigation practices.

**Nitrous Oxide (N<sub>2</sub>O)** – A greenhouse gas with high global warming potential, primarily emitted from agricultural activities, fossil fuel combustion, and industrial processes.

#### Northern California Power Agency

**(NCPA)** – A joint powers agency that provides energy generation and transmission services to its member communities in Northern California. **Renewable Energy** – Energy sourced from naturally resources which replenish faster than they are consumed, such as solar, wind, hydropower, and geothermal.

**Renewable Portfolio Standard** (**RPS**) – A California policy requiring utilities to increase the percentage of renewable energy in their electricity supply over time.

**Resilience** – The ability of a system or community to anticipate, withstand, and adapt to climate-related disruptions.

**Sequestration** – The process of capturing and storing atmospheric carbon dioxide in natural systems such as forests, soil, and wetlands to reduce greenhouse gas concentrations.

Small Off-Road Engines (SORE) – Gasoline-powered engines under 25 horsepower, commonly found in lawn mowers, leaf blowers, and other small equipment.

#### Sustainable Land Use -

Development and planning practices that balance environmental, social, and economic factors to create long-term, livable communities.

#### **Traditional Ecological Knowledge**

(TEK) – Indigenous and local knowledge systems encompassing environmental beliefs, practices, and wisdom passed down through generations.

#### Urban Water Management Plan

(UWMP) – A long-term planning document required for water suppliers in California to ensure a reliable water supply and promote water conservation.

#### Vehicle Miles Traveled (VMT) – A

measure of the total miles driven by all vehicles in a defined area over a specific time period, often used to assess transportation impacts and emissions.

**Zero-Emission Vehicle (ZEV)** – A vehicle that produces no tailpipe emissions, such as electric or hydrogen fuel cell vehicles.



### Disclaimer

The City of Ukiah's CAP articulates broad policy and program objectives to achieve equitable climate action. This CAP does not directly approve, fund, or authorize implementation of any specific projects. Greenhouse gas (GHG) reduction Measures will be achieved through implementation of Actions, and corresponding City Projects. City Projects will be reviewed and approved and follow protocols and best practices for adoption, which may require additional public review, review by City decision-makers, and/ or environmental review under the California Environmental Quality Act (CEQA). As a result of those reviews, there may be viable alternatives and/or mitigation measures that may be implemented as well. The CAP includes implementation monitoring of the CAP's progress toward achieving the identified targets. In 2030, the City of Ukiah will provide an update to its 2025 CAP and, at that time, will reassess all available strategies for climate action while also addressing any gaps or obstacles to progress.



### Introduction

The City of Ukiah faces the growing threat of an increasingly warming planet as a community set on the frontlines of climate change. The City of Ukiah exists as a rural, disadvantaged community with a population of 16,000 but provides critical services to more than 40,000 people. The City is situated along the Russian River, which flows through the Ukiah Valley, winding its way through agricultural lands bracketed on both sides by the heavily forested foothills of the Mendocino and Mayacamas ranges. Located 45 miles north of Healdsburg and 155 miles south of Eureka, the City of Ukiah spans more than 3,000 acres (4.6 square miles). Ukiah, which serves as the center of governance seat of for the County of Mendocino, also functions as a regional hub for commerce, recreation, medical and social services, and cultural events. **Figure 1** shows Ukiah's location in the region. The nearest major city to Ukiah is Santa Rosa, a city of 175,000, which is located approximately 60 miles to the south. Larger urban centers including San Francisco and Sacramento are approximately 100 miles to the south and southeast. The City of Ukiah's geography, physical terrain, land use, and Mediterranean climate<sup>1</sup> create conditions that put the City at severe risk for climate forces including extreme heat, extreme drought, extreme weather, wildfire, and flooding.

The primary strategy to limit the worst impacts of climate change is to rapidly reduce GHG emissions, especially carbon dioxide and methane. The State of California has set clear statutory goals for municipal climate action calling for a 40% reduction in 1990 level GHG emissions by 2030 and 100% reduction in GHG emissions by 2045. In 2022, the City of Ukiah adopted a resolution endorsing the declaration of a climate emergency and a call to action to restore a safe climate<sup>2</sup>. vThe Ukiah 2040 General Plan<sup>3</sup> as well as the 2024 City Council Strategic Plan set the initial tone for climate action, sustainable development, and conservation of Ukiah's natural resources. The Ukiah 2040 General Plan established a local goal "to create a more resilient community that is prepared for, responsive to, and recoverable from hazards created or made worse by climate change" and calls for the adoption of a Community CAP.

A communitywide GHG inventory was subsequently produced in 2023, in advance of the development of this CAP. Ukiah's GHG Inventory demonstrates that 97% of the City's emissions derive from two sectors: Building Energy & Transportation<sup>4</sup> (see below for more information). Since Ukiah does not possess a GHG emissions inventory for calendar year 1990, a 1990 baseline was developed based on State GHG emissions trends and Ukiah's 2022 GHG Inventory in order to measure performance. The geographic boundary used for the purposes of this planning document is the incorporated city limits of Ukiah, as defined in the planning year of 2022.

This document has been carefully designed to ensure alignment with scientific findings and in support of goals outlined within the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report<sup>5</sup>, Indicators of Climate Change in California (Fourth Edition)<sup>6</sup> , California's Fourth Climate Change Assessment<sup>7</sup>, The State of California's Priority Climate Action Plan (PCAP)8, California's Nature-Based Solutions Climate Targets<sup>9</sup>, California's 2022 Scoping Plan for Achieving Carbon Neutrality<sup>10</sup>, U.N. Sustainable Development Goals (SDGs)<sup>11</sup>, and Executive Order N-82-20 (30x30 California)<sup>12</sup>. Measures were developed based on community input and established best practices for municipal climate action, taking inspiration from peer cities here in California and across the world. Actions were further informed by staff subject matter expertise, as well as implementation programs established within the City of Ukiah 2040 General Plan and its Environment & Sustainability Element<sup>13</sup>. The Ukiah CAP recognizes the urgent threat of climate change to both the local community and the world and establishes SMART<sup>14</sup> goals for GHG reduction.

Acknowledging the need to do our fair share, the City of Ukiah is committed to reducing our community's contribution to climate change and will take all necessary actions to achieve the goals outlined in this document.



Figure 1 Map of Ukiah Community

### Background

### Local Context

Ukiah will face unique challenges as well as intriguing opportunities to reduce GHG emissions. Notable challenges include local staffing and program funding limitations, as well as physical land constraints for new development projects such as utility-scale renewable energy installations. Ukiah's aging building stock currently relies heavily on natural gas, which has been found to cause detrimental harm both to human health and the environment, and is used for heating, cooling, and cooking. Ukiah's geography, namely its rural and dispersed setting, as well as its role as a regional economic hub and aspirations for growth further complicates mitigation efforts. Addressing the region's reliance on personal vehicles and fossil fuel use provides the City with sizeable opportunities for sustainable electrification.

Ukiah also has significant opportunities to enhance its urban sustainability standards, improve local public health and environmental quality, and achieve economic growth. For example, Ukiah's proximity to the Mendocino National Forest and recently annexed Western Hills, as well as its rich agricultural heritage, offers intriguing opportunities for carbon sequestration initiatives. Ukiah can also leverage its municipal ownership over the community's electric utility to enhance regional energy resilience, renewable energy procurement, and local renewable energy generation. Ukiah's true strengths can be found in its history of progressive environmental stewardship, cultural diversity, its core values<sup>15</sup>, and its close-knit community structure. Ukiah can tap into its robust network of local community organizations and non-profits, and regional partners to achieve success. This CAP underscores the importance of strategic partnerships to leverage opportunities that effectively address emissions across the transportation, energy distribution, water resources, and waste management sectors.



### **Regional Context**

**California has long been a leader in environmental policy and stewardship, pioneering innovative approaches to address climate change, protect natural resources, and promote sustainable development**. California's climate policy is anchored by the Global Warming Solutions Act of 2006, Assembly Bill (AB) 32. This landmark legislation established a statewide goal of reducing GHG emissions to 1990 levels by 2020 which under Senate Bill (SB) 32 (Pavley, 2016) extended the target to a 40% reduction below 1990 levels by 2030. The state's cap-and-trade program, established under AB 32, is a cornerstone of its climate strategy. The program sets a declining cap on GHG emissions and allows industrial businesses to buy and sell allowances. The program was extended through 2030 by AB 398 (Garcia, 2017). Revenues from the program fund projects through the Greenhouse Gas Reduction Fund (GGRF), supporting initiatives like clean transportation, affordable housing, and renewable energy. California participates in the Western Climate Initiative (WCI), a regional cap-and-trade market that includes Quebec. Private sector initiatives, such as voluntary carbon offset programs, also complement state efforts by enabling businesses to offset emissions through investments in reforestation, renewable energy, and other projects.

The California Environmental Quality Act (CEQA, Public Resources Code § 21000 et seq.) remains a critical tool for assessing the environmental impacts of development projects. Recent legislative efforts have sought to streamline CEQA to balance environmental protection with the need for affordable housing and clean energy infrastructure. Key policies include:

- SB 7 (Atkins, 2021): Known as the Environmental Leadership and Economic Development Act, this law expedites CEQA review for qualifying housing and clean energy projects.
- SB 9 (Atkins, 2021): Allows for the development of duplexes and lot splits on single-family parcels, with exemptions from full CEQA review.
- AB 819 (Friedman, 2023): Streamlines CEQA compliance for renewable energy projects, supporting the state's goal of achieving 100% clean electricity by 2045.

California has also set ambitious targets for transitioning to a clean energy economy. Key policies include:

- SB 100 (De León, 2018): Mandates 100% clean electricity by 2045.
- AB 1279 (Muratsuchi, 2022): Establishes a statewide goal of achieving carbon neutrality by 2045.
- AB 1346 (Berman, 2021): Phases out the sale of new gas-powered small off-road engines, such as those used in lawn equipment.

In the transportation sector, California has adopted the Advanced Clean Cars II rule, requiring 100% of new car sales to be zero-emission vehicles (ZEVs) by 2035. The state also offers incentives for ZEV adoption through programs like the Clean Vehicle Rebate Project (CVRP) and the Clean Cars for All initiative.

Environmental justice has become a central focus of California's environmental policy agenda. The State has established the California Environmental Justice Advisory Committee (CEJAC) to ensure that disadvantaged communities benefit from climate investments. Key initiatives include:

- AB 617 (C. Garcia, 2017): Requires air quality monitoring and emissions reductions in communities disproportionately affected by pollution.
- SB 535 (De León, 2012): Directs at least 25% of cap-and-trade revenues to projects that benefit disadvantaged communities.

California's environmental policies often align with federal initiatives, such as the Inflation Reduction Act (IRA) of 2022, which provided funding for clean energy, electric vehicles, and climate resilience. The state also collaborates with private sector partners through programs like the California Climate Investments initiative, which leverages cap-and-trade revenues to support communi-ty-based projects.

In November 2024, California voters approved Proposition 4, a \$10 billion bond measure aimed at funding environmental and climate resilience projects. Proposition 4 reflects California's focus on addressing the dual challenges of climate change and environmental degradation through targeted investments. This bond measure is anticipated to be a game-changer for local climate action and will likely provide Ukiah with a tangible funding opportunity to catalyze City projects. By leveraging state and federal resources, fostering public-private partnerships, and maintaining strong public support, the City of Ukiah looks forward to building a collaborative framework across these stakeholder groups to ensure success.

### **Interested Party Context**

The City of Ukiah plays a critical role in advancing climate action within its jurisdiction and beyond. The city's efforts are part of a broader ecosystem that includes local government agencies, residents, businesses, county-wide stakeholders, the County of Mendocino, the State of California, and the private sector, each with distinct yet interconnected roles.

#### **Local Government Agencies**

The City of Ukiah's municipal government will be the primary driver of local climate action, responsible for developing and implementing policies, programs, and infrastructure projects that reduce GHG emissions and enhance community resilience. This includes adopting CAPs and supporting ordinances, leading by example to promote energy efficiency across municipal operations, directly investing in renewable energy, improving public transportation and bike infrastructure, and leveraging the City's purchasing power for sustainable goods and services. The city also collaborates with Mendocino County and other local agencies to align regional efforts, such as wildfire prevention and water conservation, with state climate goals.

#### **Residents of the City of Ukiah**

Residents are essential partners in climate action, as individual behaviors and collective community efforts significantly impact emissions reduction and sustainability. Ukiah residents can contribute by adopting energy-efficient practices at home and in their places of business, reducing waste, opting to utilize active and public modes of transportation, conserving water and electricity, supporting local agriculture, shopping locally and "with a conscious", and by participating in city-led initiatives. Public engagement in climate planning processes ensures that policies reflect the community's needs and priorities, fostering a sense of ownership and accountability.

#### **Ukiah's Small Business Community**

Local businesses play a dual role in climate action: reducing their own carbon footprints and driving innovation in sustainable practices. Ukiah's business owners can adopt energy-efficient technologies, minimize waste, and source materials locally to support the circular economy. Additionally, businesses can serve as community leaders by educating customers and employees about sustainability practices and advocating for supportive policies at the local and state levels.

#### **Residents and Travelers Across Mendocino County**

As the county seat, the actions that Ukiah takes directly influences climate action across Mendocino County. Residents and travelers in the region can support Ukiah's efforts by supporting local business during this transition, using sustainable public transportation options, and participating in county-wide initiatives like forest conservation and eco-tourism. Collaboration between Ukiah and other county municipalities ensures a unified approach for the region to address shared challenges, such as wildfire risk, extreme heat, drought, extreme weather, natural resource scarcity, and energy security.

#### Government of the State of California

The State of California provides the regulatory framework, funding, and technical assistance that enable cities like Ukiah to pursue ambitious climate goals. State mandates, such as SB 32 and AB 32, set emissions reduction targets that guide local action, while grant programs support projects like renewable energy installations and resilience planning. Ukiah can leverage these resources to align its local efforts with statewide objectives, such as achieving carbon neutrality by 2045.

#### **The Private Sector**

The private sector, particularly technology companies and start-ups in California, can play a transformative role in advancing climate action here in Ukiah. Established tech firms can partner with the City of Ukiah to pilot innovative solutions, such as smart grid technologies or carbon capture systems, while emerging start-ups bring fresh ideas and agility to the table. By fostering strategic partnerships with the private sector and establishing physical space for innovation districts and/or clean energy parks, the City can attract cutting-edge technology and expertise thereby accelerating its climate action and economic development goals.

### **Our Commitment to Equity**

The City of Ukiah is committed to advancing a CAP that prioritizes equity, inclusivity, and environmental justice as foundational pillars of our socially just transition to a sustainable and resilient future.

We recognize that the impacts of climate change disproportionately affect marginalized communities, including low-income households, Indigenous peoples, communities of color, and other vulnerable or at-risk populations. As such, we pledge to center social justice in every aspect of our climate strategies, ensuring that no one is left behind in our pursuit of a healthier, more equitable, and environmentally sustainable community. By centering equity in our climate actions, we can ensure a more livable and resilient Ukiah where everyone has access to clean air, affordable clean energy, sustainable transportation options, and preserved green space.

#### We commit to:

- 1. Equitable Engagement and Representation: Actively involving historically underserved and marginalized communities in the planning, decision-making, and implementation of climate actions. We will prioritize their voices, knowledge, and needs to ensure that solutions are inclusive and culturally responsive.
- 2. Culturally Tailored Education and Outreach: Develop educational materials and programs in multiple languages and formats (e.g., visual, audio, and digital) to ensure accessibility for diverse communities.
- 3. Culturally Sensitive Enforcement: Train enforcement staff in cultural competency and equitable practices to ensure fair and respectful interactions with all community members. Focus on education and assistance rather than punitive measures, helping residents understand and comply with climate-related regulations.
- 4. Fair Distribution of Benefits and Burdens: Ensuring that the benefits of climate action—such as clean energy, green jobs, and improved air quality—are accessible to all, while mitigating potential burdens that may arise from this multi-decade transition, such as displacement or economic hardship, will be critical to long-term success.
- 5. Investment in Vulnerable Communities: By designing resources, funding, and programs for communities most impacted by climate change and systemic inequities ensures a socially just transition can occur. This includes expanding access to affordable renewable energy and public transportation, bolstering rebates and subsidies for low-income home upgrades, and siting climate-resilient infrastructure.
- 6. Green Job Creation and Workforce Development: Identifying ways to create accessible pathways to high-quality, well-paying green jobs through targeted training, education, and apprenticeship programs, with a focus on empowering underrepresented groups, is a winning economic development strategy.
- 7. Climate Resilience and Adaptation: By prioritizing climate action projects that also enhance the resilience of vulnerable populations to climate impacts, such as extreme heat, wildfires, and flooding, while preserving cultural heritage and community values, Ukiah can both address the community's needs of today while preparing for future risk.
- 8. **Transparency and Accountability:** By establishing clear metrics and mechanisms to track progress toward our social equity and climate goals, the city can ensure accountability and foster public trust through open communications and reporting.



### **Engaging With Our Diverse Community**

Taking the City's commitment to equity, inclusivity, and diversity to heart, the City's Climate Adaptation & Resilience Division implemented a bi-lingual public engagement campaign to solicit valued public input from a wide cross-section of Ukiah's population. An innovative "balancing act" community survey provided respondents with an opportunity to select between Moderate and High rates of action for key climate action strategies. Respondents could also provide direct public comment, and the survey was accessible online for a period of 30 days. When given a choice, survey respondents consistently opted to select the High impact measure options which demonstrates the community's eagerness to see transformative change. Respondents demonstrated the highest support towards actions like City procurement efforts to bolster the City's carbon-free energy mix, EV adoption rates for both commercial and passenger vehicles, and tree planting. Additional comments centered around leveraging the City's ownership of its electric grid as a means to quickly achieve goals. Specifically, residents and stakeholders expressed desire for the City to consider microgrids, battery storage, heat pumps, a green rate option and rebate access, and EV charging infrastructure. Altogether this represents a theme - residents and ratepayers wish to see rapid adoption of renewable energy and electrification here in Ukiah. In addition to the online survey, the engagement campaign featured social media posts, physical flyers, email notices, earned media, a community workshop, two online webinars, and two 30-day public comment periods. The City also upgraded its Climate Adaptation & Division website during this process, which can be found by visiting: *https://cityofukiah.com/climate-resilience/*.

As part of the development of the CAP. the Community Development Department (CDD), on behalf of the City of Ukiah, hosted an in-person Climate Action Community Workshop on Thursday, September 26, 2024, at the Ukiah Valley Conference Center (UVCC) to solicit feedback from the community regarding their priorities for future city-led investment. The City provided Spanish language translation, food and beverage, and on-site childcare services. Members of the public and City staff were in attendance. This public engagement event involved a community activity where members of the public were given fictional dollars (\$) and were asked to make "investments" in 7 different climate action strategies to help the City determine an appropriate level of prioritization. Participants were directed to spend their entire "capital budget" and select at least three different strategies. Figure 2 details the results of this exercise and is being shared to demonstrate the community's "willingness to pay" for climate solutions which can be used at a City leadership level to inform budget formulation and the City's capital improvement plan (CIP).





#### Climate action, and climate adaptation and resilience, are interconnected yet distinct approaches to addressing the challenges posed by climate change.

*Climate action* refers to proactive measures aimed at reducing GHG emissions and slowing the pace of global warming. *Climate action* focuses on addressing the root causes of climate change by transitioning to cleaner energy sources, improving energy efficiency, promoting sustainable transportation, and protecting natural carbon sinks like forests and wetlands. In California, climate action is often codified in local CAPs, which outline strategies for cities and counties to meet state-mandated emissions reduction targets under laws like AB 32 and SB 32. Climate action is inherently forward-looking, emphasizing prevention and systemic change to avoid the worst impacts of climate change.

In contrast, *climate adaptation and resilience* focus on preparing for and responding to the unavoidable impacts of climate change. While *climate action* seeks to mitigate future risks, adaptation addresses the present and near-term consequences of a warming planet. Building resilience, a key component of the integrated climate planning model, refers to the ability of communities, ecosystems, and infrastructure to withstand, recover from, and adapt to climate- related disruptions. In California, *climate adaptation* efforts are critical due to the state's vulnerability to extreme weather, sea-level rise, extreme heat, wildfire, drought, flood, and broad-scale environmental shifts.

### Local governments play a pivotal role in both climate action and adaptation and resilience.

Local efforts by the City's Climate Adaptation & Resilience Division will reflect the understanding that climate action and adaptation and resilience are not mutually exclusive but rather complementary. Climate action (mitigation) measures lessen the severity of future impacts, while adaptation and resilience measures ensure communities can thrive in the face of current and projected changes. Together, these approaches form a two-pronged strategy that enables the City to tackle the climate crisis holistically, safeguarding both the environment and the well-being of its residents. Some jurisdictions have opted to develop a singular, integrated model for climate action, adaptation, and resilience within the same planning document. The City of Ukiah has opted to address climate action and adaptation and resilience separately, albeit still within an integrated model. As such, City staff have designed these climate action strategies to complement forthcoming adaptation and resilience measures currently being developed in tandem as part of a Climate Adaptation & Resilience Strategy (CARS). The City expects to release this strategy in 2026 as a complement to the 2025 CAP. Together, these two documents will represent the City of Ukiah's unified climate strategy.



### **Prioritizing Actions That Maximize Community Impact**

This section highlights key themes and implementation priorities to establish a visionary framework for climate action in Ukiah. To achieve carbon neutrality by 2045, the City of Ukiah will reduce our emissions as much as possible and offset irreducible emissions. Achieving carbon neutrality requires a paradigm shift away from fossil fuels. This also means generating and sourcing 100% clean power sources while maximizing energy and water efficiencies in buildings.

### **Co-Benefits**

The implementation of activities detailed in the CAP would deliver additional co-benefits beyond GHG emissions reduction, providing longer-term positive outcomes for the community as a result of implementing the CAP. These co-benefits would support Ukiah in achieving the broader community goals. The co-benefits associated with each measure in the CAP include the following:



#### **Improved Health and Safety**

This co-benefit is connected to CAP measures that promote a healthier community by reducing respiratory illnesses through improved indoor and outdoor air quality, enhancing safety and property protection by strengthening adaptive capacity and improving quality of life by expanding opportunities for physical activity, increasing access to green spaces, and maintaining thermal comfort.



#### **Climate Change Resilience**

This co-benefit is connected to CAP measures that enhance community capacity to prepare for, mitigate, and recover from climate hazards such as extreme heat, sea level rise, flooding, wildfires, landslides, and drought.



#### **Environmental Quality & Ecosystem Services**

This co-benefit is connected to CAP measures that restore and protect local ecosystems provide multiple public benefits, including reducing pollutants and runoff in creeks, supporting biodiversity through habitat creation, improving water and air quality, decreasing local flood risks, and offering recreational opportunities for community enjoyment.



#### Sustainable Land Use/Transportation Connection

This co-benefit is connected to CAP measures that prioritize human-centered economic corridors, such as transit-oriented development and promote intentional, sustainable development (i.e., smart growth) that supports Ukiah's climate goals.



#### **Jobs Development**

This co-benefit is connected to CAP measures that promote clean energy adoption and sustainable business practices that, in turn, are essential for creating lucrative, modern, and well-paying job opportunities and supporting Ukiah's long-term economic prosperity.

### **Implementation Themes**

Prioritization is a means to describe how the City plans to pursue public supported activities that are also the most immediate, tangible, and cost-effective. Community priorities were identified during the engagement process and represent, from the City's perspective, "the middle way" for local climate action - where broad-scale community needs like public health and safety, afford-ability, economic development, and equity benefit from well-designed programs and activities. Section 1 outlines in greater technical detail and specificity regarding the specific Measures and Actions that the City of Ukiah will take to achieve its GHG reduction goals, but the following section aims to highlight emerging implementation "themes" that will define successful implementation, thus representing a visionary framework for action:



#### Education, Outreach, & Enforcement

The City of Ukiah is committed to spurring efforts that positively influence human behavior, both on an individual and collective basis, as human behavior is what ultimately drives local climate action. To promote more sustainable behaviors and foster broad community participation, the City will need to develop targeted education and outreach campaigns, host "hands-on" public workshops and trainings, develop youth education programs, and leverage tools like digital and social media. This includes addressing topics such as vehicle idling, turfgrass lawns, water use, and food waste recovery. Taking these steps will ensure that engagement and enforcement efforts are meaningful, cultur-ally sensitive, and equitable.

### **Implementation Themes Continued**



#### **Financial Assistance & Incentives**

To achieve Ukiah's electrification and renewable power goals, the City will rely upon a combination of financial assistance and incentive programs tailored to meet the needs of its residents and businesses, particularly within disadvantaged communities. These financial support programs may include the provision of rebates/vouchers, mini-grants, low-interest loans, incentivized utility rate programs, and point-of-sale discounts designed. By combining these approaches, Ukiah can address financial barriers, build-out its local green economy and green workforce, and ensure that climate action benefits are equitably distributed across the community.



#### Walking, Biking, & Active Transportation

The City is committed to investing in Ukiah's public right-of-way to ensure all residents and visitors have equitable access to a safe network of protected bike lanes and walking/running paths that connect residents with green spaces and one another. By fully embracing active modes of transportation, the City can create healthy alternatives to personal vehicle use, empowering residents to advance local climate action and improve public health. The City can pilot bike-share programs, test temporary bike lanes, pedestrian plazas, walking buses, carpooling, and car-free pedestrian zones to demonstrate the benefits of active transportation and gather feedback from the community.



#### Local Renewable Power & Storage

The City of Ukiah is committed to expanding local renewable energy generation, such as solar and wind, to reduce emissions, lower energy costs, and enhance energy independence. To effectively increase local renewable energy generation at a local level, the City of Ukiah can invest in community solar projects and incentives to promote residential solar and battery storage systems that provide backup power during outages and reduce household energy costs over the long-term. The City can also look to underutilized urban space such as rooftops, parking lots, mobile home parks, and playgrounds as a means of increasing local renewable generation while also reducing the urban heat effect.



#### Affordable & Convenient Public Transportation

The City of Ukiah is committed to working with Mendocino Transit Authority (MTA) to identify strategies to expand affordable, reliable, and convenient public transportation options that reduce community emissions and enhance mobility. Investing in expanded service routes and schedules that connect residents to essential services, education, workforce development, and business corridors, can catalyze local economic growth. Installing bike racks at transit stops and on vehicles and co-locating bike share stations near transit hubs can encourage multimodal transportation.



#### **Residential Electrification & Home Hardening**

The City of Ukiah is committed to advancing residential home electrification and resilient home improvements to reduce emissions, lower energy costs, and enhance climate resilience. To support the community during this transition, the City can adopt innovative building codes and standards that phase-out fossil fuel energy and protect structures from extreme weather and wildfire, partner with trade schools and institutions of higher learning to develop a local workforce comprised of electricians, contractors, and skilled labor, and streamline permitting processes for electrification projects to reduce barriers and costs for homeowners.



#### **Circular Economy**

The City of Ukiah is committed to supporting local waste reduction, reuse, repair, and recycling initiatives that can help build a circular economy that strengthens community resilience. To realize this vision of enhanced materials circularity, the City will need to work with established haulers to expand education and outreach to increase awareness and improve participation rates particularly within multi-family housing, and by leveraging the City's purchasing power encourage the use of locally sourced, sustainable materials in new construction and manufacturing to reduce the carbon footprint of new development projects. Lastly, the City can establish a network of distributed composting infrastructure to recycle food waste into soil that supports urban agriculture and community gardens to enhance food security, especially in underserved areas.



#### **Nature Based Solutions**

Some of the best available tools for climate action are nature-based solutions, such as urban greening, regenerative agriculture, reforestation, afforestation, and wetland restoration. To enhance climate resilience, sequester carbon, and improve community health, the City can strengthen the local ecosystem through urban tree planting, enhancing wetland and riparian habitats, promote regenerative agriculture and carbon farming, support pollinators and the soil micro-biome, and manage healthy and fire-resilient landscapes. Leveraging Ukiah's vibrant and culturally valuable natural resources, particularly its open, wild, and working lands, presents intriguing opportunities for carbon sequestration as a strategy to offset unavoidable emissions.

### **Implementation Themes Continued**



#### **Resource Conservation & Land Use**

The Ukiah 2040 General Plan along with the Ukiah Valley Area Plan outline how the City plans to protect and conserve valuable natural and ecological resources, such as the western hills and the Ukiah Valley Basin Watershed, preserve the natural and aesthetic character of hillside areas, and permanently protect open spaces and agricultural lands. To achieve these aspirations of environmental stewardship while balancing sustainable growth, the City is working to adopt zoning regulations that prioritize the preservation of open spaces, green spaces, and agricultural lands, limiting urban sprawl and incompatible development. The City also recognizes that concrete, asphalt, and other low-albedo surfaces contribute directly to global warming and amplify the local urban heat effect and, therefore, should be minimized wherever possible.



#### Sustainable Development

To ensure the City's future growth aspirations are balanced with the goal of carbon neutrality by 2045, the City will look to align its land use policies, development strategy, and climate action efforts with the UN's 17 Sustainable Development Goals (SDGs)<sup>16</sup> and the U.S. Green Building Council's (USGBC) LEED rating system<sup>17</sup> along with emerging innovations in building codes and community development planning trends in California. By promoting density, infill development, and redevelopment of underutilized urban space, the City can achieve its inclusive economic growth and climate action goals.



#### **Climate Resilient Infrastructure & Energy Systems**

The City of Ukiah is committed to developing climate-resilient infrastructure and energy systems to withstand extreme weather, reduce emissions, and ensure reliable services. To model the way for the public to emulate, the City can integrate solar power with battery storage in all its critical facilities to improve operational resilience and reliability, especially during power outages. The City-owned and operated electric utility can both procure more renewable energy and identify ways to store intermittent power at scale, which supports Ukiah's energy security and resilience goals. Households and businesses can support the City during this transition by taking advantage of available and future incentives for household solar, wind, and battery storage systems.



#### **Pilots & Demonstration Projects**

Climate action demands urgent, bold, and relentless effort, but also flexibility as challenges and solutions emerge and evolve over time. For Ukiah, integrating pilot and demonstration projects as a strategy for implementation offers a practical way for the City and the public to test innovative approaches, refine strategies, and identify alternatives before scaling solutions. This pragmatic approach can inform how citywide infrastructure, operations, programs, and policies should be designed while also providing for an opportunity for the public to be educated on the efficacy of climate solutions.



**Table 1** summarizes the CAP measures developed in accordance with the community's priorities and highlights how they alignwith other initiatives already occurring in Ukiah. For more information regarding the actions needed to implement these measures,see Sections 3-9.

Table 1	CAP Implementation Alignment with City Initiatives

Measure/ Action Number	Goal/Measure	City Plan Alignment <sup>1</sup>	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost	
Building Energy					
Measure BE-1	Procure 77% of electricity from renewable and zero-carbon sources by 2030 and 100% renewable and carbon- free no later than 2045	2040 GP HO-1b CCSP AI-15 CCSP AI-14 CCSP AI-30	High	High (City) Moderate (Com)	
Measure BE-2	Decarbonize 15% of existing buildings by 2030 and 100% by 2045	2040 GP HO-1d 2040 GP HO-1e CCSP AI-1 CCSP AI-10	High	Moderate (Com)	
Measure BE-3	Decarbonize 95% of new building construction by 2026	2040 GP HO-1d 2040 GP HO-1e CCSP AI-1 CCSP AI-10	Moderate	Low (Com)	
Measure BE-4	Decarbonize 50% of municipal buildings by 2030 and 100% by 2045	2040 GP AG-M CCSP AI-12 CCSP AI-13	Low	Moderate (City)	
Transportation					
Measure T-1	Increase the total mode share of active trans- portation to 15% by 2030, and 30% by 2045	2040 GP LU-A 2040 GP ED-5 2040 GP MO-C CCSP AI-5 CCSP AI-34 CCSP AI-37	Low	High (City)	
Measure T-2	Increase total public transportation mode share to 5% by 2030, and 20% by 2045	2040 GP MO-F 2040 GP MO-J CCSP AI-36 CCSP AI-38	Low	High (City)	
Measure T-3	Reduce local VMT from single passenger vehicles	2040 GP LU-A 2040 GP MO-D 2040 GP MO-E CCSP AI-30	Low	Low (City)	
Measure T-4	Achieve zero-emission vehicle adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045	CCSP AI-30	High	Moderate (City)	
Measure T-5	By 2030, electrify or otherwise decarbonize 12% of applicable SORE off- road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N- 79-20	CCSP AI-30 CCSP AI-10	Low	Low (City)	
Measure T-6	Decarbonize the municipal fleet in compli- ance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements	2040 GP AG-M 2040 GP ES-M CCSP AI-10	Low	Moderate (City)	

Measure/ Action Number	Goal/Measure	City Plan Alignment <sup>1</sup>	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Water Resource	25			
Measure WR-1	Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption	2040 GP PI-A 2040 GP SF-W 2040 GP ES-J 2040 GP ES-B 2040 GP ES-K 2040 GP ES-L CCSP AI-23 CCSP AI-15	Low	Low/ Moderate (City)
Solid Waste				
Measure SW-1	Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030	2040 GP HO-1e 2040 GP PI-E CCSP AI-2 CCSP AI-21	Moderate	Moderate (City) Low (Com)
Measure SW-2	Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030	2040 GP AG-M 2040 GP AG-I	Low	Moderate (City) Low (Com)
Carbon Seques	tration			
Measure CS-1	Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045	2040 GP ES-B 2040 GP ES-A 2040 GP ES-E 2040 GP ES-C 2040 GP ES-F 2040 GP SF-U CCSP AI-4	Low	Low (City) Low (Com)
Measure CS-2	Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region	CCSP AI-13 CCSP AI-11 CCSP AI-17 CCSP AI-30	Low	Low (City)

#### Notes:

1. See Appendix F Climate Action Plan City Plans Alignment for more information regarding City Plan Alignment."

The following sections outline, in full technical detail, the data supported GHG inventory, forecast, targets, and reduction measures and actions that will define climate action in the City of Ukiah and as required by CEQA guidelines (see **Table 2**). The following sections are designed to inform implementation by policy and decision makers, while providing interested parties such as the business community, environmental groups, regulatory bodies, and regional governments with the full, in-depth context for how the City of Ukiah will take action.

# **1** Technical Overview

### 1.1 Purpose

This living document serves as an iterative roadmap to help Ukiah achieve GHG emissions reductions in line with state goals and science-based thresholds set by the Intergovernmental Panel on Climate Change (IPCC). The CAP primarily focuses on outlining the Ukiah's current and projected GHG emissions, while prioritizing and detailing key near-term measures and actions that will have the greatest impact on reducing emissions, safeguarding that they are community-driven, feasible, and equitable.

While the impacts of climate change will be felt by all, certain groups—such as older adults, young children, individuals with pre-existing health conditions, and those with lower socioeconomic status—are particularly vulnerable. Consistent with the values identified in the 2040 General Plan, it is a priority for the City of Ukiah that strategies and measures developed as part of this CAP prioritize equity, benefiting all community members while avoiding disproportionate burdens on those most vulnerable to climate risks.

### 1.2 CEQA GHG Emissions Analysis Streamlining

This CAP fulfills the requirements of California Environmental Quality Act (CEQA) Guidelines Section 15183.5(b) to be considered a "qualified" GHG reduction plan.18 In compliance with CEQA and CEQA Guidelines, local agencies are required to evaluate the environmental impacts of discretionary projects or plans, including impacts related to GHG emissions associated with the construction and operation of projects or plans. The CEQA Guidelines provide guidance for proposed projects and plans to streamline CEQA GHG emissions analysis by conducting a consistency analysis with a qualified GHG reduction plan.

This CAP and the associated CEQA environmental assessment documentation are consistent with the criteria set forth in CEQA Guidelines Section 15183.5(b) as summarized in **Table 2**. Therefore, this CAP is considered a qualified GHG reduction plan. If future projects and plans are consistent with this CAP, future CEQA GHG emissions impact analyses can be streamlined according to the City's direction.

Table 2	CEQA Guidelines Section 15183.5(b) Criteria Addressed in CAP

Те	m	Definition
1.	Quantify existing and projected GHG emissions within the plan area	Chapter 2
2.	Establish a reduction target consistent with State targets	Chapter 2
3.	Identify and analyze sector specific GHG emissions from specific actions or categories of actions anticipated within the geographic area	Chapter 2; Appendix C
4.	Specify measures and actions that substantial evidence demonstrates would collectively achieve the specified reduction target	Chapters 4, 5, 6, 7, 8; Appendix D
5.	Establish a mechanism to monitor progress and amend the plan if it is not achieving specified emissions levels	Chapter 9
6.	Adopt in a public process following environmental review	See associated CEQA environmental assessment documentation

### 1.3 Ukiah General Plan EIR GHG Mitigation Requirement

Acknowledging the need for actionable strategies to address climate change, the City of Ukiah is required to develop and implement a community CAP as outlined in the 2040 Ukiah General Plan Environmental Impact Report (EIR) GHG emissions mitigation. The EIR established the necessity for a CAP to identify and implement measures that would enable Ukiah to meet GHG emissions reduction targets for 2030 and 2045, in alignment with State climate goals and the Ukiah climate emergency declaration (Resolution No. 2022-44).

This CAP is intended to serve as a key implementation tool for the 2040 Ukiah General Plan, providing a framework for measurable GHG emissions reduction while addressing local priorities such as economic resilience and community health. The planning process for this CAP has included strategies to achieve consistency with State climate policies, specifically SB 32 and AB 1279, that call for reduction of GHG emissions and carbon neutrality by 2030 and 2045, respectively.

### For more details regarding the planning requirements and EIR GHG emissions mitigation measures tied to the CAP, please refer to the 2040 Ukiah General Plan and EIR.

2 Current and Projected GHG Emissions

### 2.1 Ukiah GHG Emissions Inventory Summary

Community GHG inventories measure the GHG emissions generated by residents and businesses operating within the jurisdictional boundaries of a given community, in this case City of Ukiah limits. The process of creating a GHG inventory includes identifying activities that are major sources of GHG emissions and collecting data on those activities for a specific calendar year. GHG emission factors are used to convert the collected activity data into GHG emissions produced. Inventories measure GHG emissions in units of metric tons of carbon dioxide equivalent, or MT CO<sub>2</sub>e.

### **GHG Inventory Protocols**

Emissions estimates were calculated using the International Council for Local Environmental Initiatives (ICLEI) methodologies. Specifically, the United States Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 (Community Protocol) is used for community- wide emission. The Community Protocol is an authoritative guide for best practices in calculating community-scale GHG inventories. The protocol separates a city's GHG-generating activities into categories known as emissions sectors. Large emissions sectors identified by the Protocol include the transportation sector (such as combustion emissions from cars and other vehicles operating within the city), the building sector (including emissions from electricity and natural gas usage), and the waste sector (capturing emissions from sending solid waste to the landfill).

Activities that cannot be controlled or influenced by City policies are excluded from community inventory. For example, irreducible emissions from vehicles traveling with origins and destinations that are both outside of city limits are excluded because a city haslimited influence on pass-through travel activity.<sup>19</sup>

### Ukiah 2022 Community GHG Inventory

The CAP includes a 2022 inventory of GHG emissions from Ukiah's community-wide activities. The inventory accounts for sources within Ukiah's jurisdictional control in alignment with established GHG accounting protocols and state guidance. In 2022, Ukiah's GHG emissions totaled 132,323 MT  $CO_2e$  (see Appendix C).

As shown in **Figure 3** and **Table 3**, transportation emissions represented the largest share of community-wide emissions (70,050 MT  $CO_2e$ , or 53% of total emissions). Within the transportation sector, passenger on-road transportation was the largest contributor (44,190 MT  $CO_2e$ , 33%), followed by commercial on-road transportation (21,979 MT  $CO_2e$ , 17%). Building energy use, including electricity and natural gas consumption, was the second-largest source of emissions (58,368 MT  $CO_2e$ , 44% of total emissions). Residential energy use contributed 26,080 MT  $CO_2e$  (20%), while nonresidential energy use accounted for 32,288 MT  $CO_2e$  (24%). The remaining emissions were attributed to solid waste (3,873 MT  $CO_2e$ , 3%) and wastewater treatment (31 MT  $CO_2e$ , <1%).

#### Figure 3 Ukiah Greenhouse Gas Emissions by Sector, 2022



#### Table 3 Ukiah 2022 GHG Emissions Inventory Summary

GHG Emissions Sector/Source	MT CO <sub>2</sub> e	% of Total Emissions
Transportation	70,050	53%
On-Road Transportation - Passenger	44,190	33%
On-Road Transportation - Commercial	21,979	17%
On-Road Transportation - Bus	455	0%
Off Road - Diesel	1,742	1%
Off Road - Gasoline	1,684	1%
Off Road - Natural Gas	0	0%
Electricity	30,436	23%
Residential Electricity	10,265	8%
Nonresidential Electricity <sup>1</sup>	20,171	15%
Natural Gas	27,932	21%
Residential Natural Gas	15,815	12%
Nonresidential Natural Gas <sup>1</sup>	12,117	9%
Water Resources	31	< 0.1%
Wastewater	31	0%
Water <sup>2</sup>	0	0%
Solid Waste	3,873	3%
Solid Waste	3,873	3%
Total		
Total Emissions	132,323	100%

Notes: CO<sub>2</sub>e = carbon dioxide equivalent; MT = metric tons

1. Nonresidential includes emissions from commercial and industrial building electricity consumption

2. Distribution of water to consumers is anticipated to be included under nonresidential electricity consumption, as the City is the sole supplier of water to the community. Thus, emissions associated with distribution are not included to avoid double counting.

### 2.2 Ukiah GHG Emissions Forecasts Summary

GHG emissions forecasts estimate Ukiah's future GHG emissions and serve as a tool to track trends and measure progress. They help Ukiah determine the level of GHG emissions reduction needed to meet future GHG reduction targets. These forecasts, covering the years 2030, 2035, 2040, and 2045, were developed using data from the 2022 inventory.

To contextualize how GHG emissions are expected to change and guide GHG reduction efforts, the City developed two types of forecasts. The first is a business-as-usual (BAU) forecast, which is based on the 2022 inventory and projected changes in population, housing, and job growth. The second is an adjusted forecast, which incorporates the impact of State regulations aimed at reducing GHG emissions across California.

#### **Business-as-Usual Forecast**

The BAU forecast assumes that emission factors and activity levels remain constant over time, making population and job growth the primary drivers of GHG-emitting activities. This forecast serves as a baseline for comparison, operating under the assumption that there are no advancements in technology, shifts in behavior, or new legislation, while population and job growth follow projected trends.

To develop a GHG emissions forecast, growth metrics (e.g., population, housing, and employment projections) are multiplied by BAU growth indicators, which represent a baseline metric developed from the GHG emissions inventory (**Table 4**). Appendix C provides additional details on the growth metrics, demographics, and methodologies used to develop the BAU forecast.

Growth Metric	2022	2030	2035	2040	2045
Population <sup>1</sup>	15,929	17,834	19,025	20,216	21,407
Households <sup>2</sup>	6,589	7,616	8,109	8,601	9,094
Employment <sup>3</sup>	6,800	9,632	11,402	13,172	14,942
Service Population <sup>4</sup>	22,729	27,466	30,427	33,388	36,349

#### Table 4 Growth Metrics for Ukiah BAU GHG Emissions Forecast

Note:

1. Population growth for 2045 provided by GHD was developed based on Department of Finance and Ukiah 2040 General Plan population data. Interim years were linearly interpolated based on reported 2045 population.

2. Household growth was calculated by multiplying GHD population projections by the 2022 Department of Finance average people per household.

3. Employment growth for 2045 provided by GHD was developed based on State of California Employment Development Department and Ukiah 2040 General Plan data. Interim years were linearly interpolated based on reported 2045 employment.

4. Service Population = Population + Employment

This BAU approach enables the City to translate growth projections into GHG emissions estimates by applying the same emissions factors used in the 2022 GHG emissions inventory. This methodology is applied to sectors such as electricity, natural gas, water resources, and solid waste. **Table 5** summarizes the BAU forecast for each forecast year.

#### Table 5 BAU Emissions Forecast (MT CO, e)

GHG Emissions Source	2030	2035	2040	2045
Transportation				
On-Road Transportation - Passenger	54,037	59,851	65,452	70,855
On-Road Transportation - Commercial	22,894	24,626	27,090	30,237
On-Road Transportation - Buses	480	496	512	528
Off Road Transportation & Equipment	3,639	3,795	3,944	4,108
Electricity				
Residential Electricity	11,866	12,634	13,402	14,170
Nonresidential Electricity	28,572	33,822	39,073	44,323
Natural Gas				
Residential Natural Gas	15,815	18,281	19,463	20,646
Nonresidential Natural Gas	12,117	17,163	20,317	23,470
Water Resources				
Wastewater	37	41	45	49
Water <sup>1</sup>	0	0	0	0
Solid Waste				
Solid Waste	4,681	5,185	5,690	6,195
Total	161,649	180,231	199,324	218,918

Notes: All values are of the unit metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e); Values in this table may not add up to totals due to rounding

1. Distribution of water to consumers is anticipated to be included under nonresidential electricity consumption as the City is the sole supplier of water to the community. Thus, emissions associated with distribution are not included to avoid double counting.

### **Adjusted Forecast**

The adjusted forecast refines the BAU forecast to incorporate the impact of state-level legislation, policies, and programs (e.g., SB 100, Title 24 Energy Efficiency Standards, Advanced Clean Truck Rule) expected to reduce GHG emissions. By accounting for the effects of enacted laws, this projection offers a more accurate representation of Ukiah's future emissions (see Table 6). Comparing the BAU and adjusted forecasts illustrates the anticipated reduction in Ukiah's GHG emissions resulting from State initiatives.

Numerous regulations and policies at the State level have been put into effect and are anticipated to lower Ukiah's future emissions. These pieces of legislation are incorporated into the adjusted forecast to provide a more accurate depiction of Ukiah's future emissions. The pertinent policies and initiatives are outlined below:

- Advanced Clean Cars Program. A comprehensive car emissions control program which regulates smog, soot-causing pollutants, and GHG emissions into a single coordinated package of requirements.<sup>20</sup>
- Innovative Clean Transit. A regulation focused on long-term goal of full transition of the heavy- duty transportation sector to zero-emission technologies. It requires all public transit agencies to gradually transition to a 100 percent zero-emission bus fleet and encourages them to provide innovative first and last-mile connectivity and improved mobility for transit riders.
- Title 24 Building Energy Efficiency Standards. Building standards that regulate new residential and commercial development in California by requiring increased effciency related to space heating and cooling, lighting, and water heating.
- California Renewable Portfolio Standard (RPS). Requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from renewable energy resources. Adopted in 2018, SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 60 percent by 2030 and 100 percent by 2045. SB 1020 builds upon SB 100 by advancing the State trajectory to 100 percent clean energy procurement by 2045 by creating clean energy targets of 90 percent by 2035 and 95 percent by 2040.

See Appendix B for more information on these and a suite of other programs and policies that are intended to reduce emissions, including SB 1383 and AB 341, that are not included in the adjusted forecast because they are emphasized in the CAPs GHG reduction measures.

GHG Emissions Source	2030	2035	2040	2045
Transportation				
On-Road Transportation - Passenger	45,323	46,276	48,323	51,001
On-Road Transportation - Commercial	21,732	21,252	21,738	23,145
On-Road Transportation - Buses	412	347	296	227
Off Road Transportation & Equipment	3,639	3,795	3,944	4,108
Electricity				
Residential Electricity	5,963	1,541	796	0
Nonresidential Electricity	14,070	4,017	2,258	0
Natural Gas				
Residential Natural Gas	18,108	19,208	20,307	21,407
Nonresidential Natural Gas	17,163	20,317	23,470	26,624
Water Resources				
Water <sup>1</sup>	0	0	0	0
Wastewater <sup>1</sup>	37	41	45	49
Solid Waste				
Solid Waste	4,681	5,185	5,690	6,195
Total	131,128	121,979	126,868	132,758

#### Table 6 Adjusted Forecast (MT CO, e)

Note: All values are of the unit metric tons of carbon dioxide equivalent (MT CO,e); Values in this table may not add up to totals due to rounding

1. Distribution of water to consumers is anticipated to be included under nonresidential electricity consumption as the City is the sole supplier of water to the community. Thus, emissions associated with distribution are not included to avoid double counting.

### **Comparing Forecast Scenarios**

The BAU forecast for Ukiah projects an increase in GHG emissions above the 2022 GHG emissions inventory from all GHG emissions sources through 2045 based on projected job and population growth. Ukiah's BAU GHG emissions are projected to increase to 218,918 MT CO<sub>2</sub>e by 2045 (see **Table 5**).

The adjusted forecast projects significant GHG emissions reduction in the electricity sector, nearing zero by 2045 due to stringent renewable energy mandates under SB 100 and SB 1020. Natural gas emissions are projected to rise with housing and employment growth but are partially offset by Title 24 efficiency standards for new construction. Transportation emissions are expected to grow due to increasing VMT and the expiration of State regulations on vehicle emissions and efficiencies by 2030, resulting in slower emissions reduction as 2045 approaches. Wastewater and solid waste emissions are also projected to increase through 2045.<sup>21</sup> A detailed breakdown of projected emissions by sector and year can be found in **Table 6**. Refer to Appendix C for a more detailed discussion related to methodology modeling, and supportive evidence for Ukiah's GHG forecasts.

### 2.3 Ukiah GHG Emissions Targets and Gap Summary

### **State GHG Emissions Targets Context**

Over the past two decades, California has implemented a wide range of legislation, policies, and programs to reduce GHG emissions, solidifying the State's position as a global leader in climate action. Key legislation driving the State's current climate goals includes SB 32 and AB 1279. These regulations establish State-wide GHG reduction targets for 2030 and 2045 and outline a pathway toward achieving carbon neutrality in California by 2045, as detailed below. See Appendix B for a full list of relevant State-level legislation.

- Senate Bill 32: Requires a State-wide reduction in GHG emissions of 40 percent below 1990 levels by 2030. A respective California Climate Change Scoping Plan update detailing the State's plan to achieve this reduction was adopted in 2017.
- Assembly Bill 1279: Requires California to achieve carbon neutrality no later than 2045, including an 85 percent GHG emissions reduction below 1990 levels. A respective California Climate Change Scoping Plan update detailing the State's plan to achieve this reduction was adopted in 2022.

### **Ukiah GHG Emissions Targets**

The 2022 California Climate Change Scoping Plan recommends that local agencies establish community-wide GHG reduction goals for local CAPs that will help California achieve the 2030 target and longer-term goal. The Scoping Plan notes that it is appropriate to derive evidence-based targets or goals from local GHG emissions sectors and population projections, consistent with the framework used to develop the Statewide targets. CARB also notes that GHG goals and targets should display a downward trend consistent with State-wide objectives.<sup>22</sup>

State climate legislation compares emissions reduction targets to a 1990 baseline. Ukiah's GHG targets were set based on the 2022 Community GHG emissions inventory which was used to back- cast to the 1990 GHG emissions level. This back-cast uses the State-wide change in GHG emissions from 1990 to 2021 for the same emission sectors that exist in Ukiah as a guide for estimating changes in Ukiah during the same period.<sup>23</sup> The estimated 1990 GHG emissions were then reduced by 40 percent to set the 2030 target and to zero for the 2045 target. These targets align with the State's GHG reduction goals for 2030 and 2045, as outlined below:

- Reduce GHG emissions to 40 percent below 1990 levels by 2030 (SB 32 target year)
- Make substantial progress towards carbon neutrality<sup>24</sup> by 2045 (AB 1279 target year)

These targets are further outlined and compared to the BAU and adjusted emissions forecasts from the 2022 baseline year through 2045 in the table below. The emissions "gap" is the difference between the adjusted emissions forecast and Ukiah's GHG targets. Gaps are presented for each year in the final row of **Table 7** and represents the amount of GHG emissions reduction that the community must achieve to meet Ukiah's targets. **Figure 4** provides a graphical representation of the forecasted emissions pathways.

#### Table 7 GHG Reduction Target Pathway (MT CO, e)

GHG Emissions Pathways	2022	2030	2035	2040	2045
BAU Forecast	132,323	161,649	180,231	199,324	218,918
Adjusted Forecast	132,323	131,128	121,979	126,868	132,758
Emissions Targets <sup>1</sup>	132,323	96,544	64,363	32,181	0
Emissions "Gap"	0	34,583	57,616	94,686	132,758

Note: All values are of the unit metric tons of carbon dioxide equivalent (MT CO<sub>2</sub>e)

1. The State carbon neutrality goal established by Assembly Bill 1279 considers carbon neutrality to be at least an 85 percent reduction in GHG emissions with the remaining fraction achieved through removals such as carbon sequestration. However, targets are set on a net-zero pathways to reflect that community-scale strategies will need to be employed to achieve sufficient carbon sequestration by 2045 and achieve carbon neutrality.





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### **Meeting the GHG Emissions Targets**

While State regulations and programs will contribute to reducing state-wide GHG emissions, Ukiah must implement local GHG reduction measures to take on a fair share of GHG emissions reduction and meet the 2030 emissions target and make significant progress toward the 2045 target. To align with these goals, Ukiah needs to reduce emissions by 34,583 MT CO<sub>2</sub>e by 2030 and 132,758 MT CO<sub>2</sub>e by 2045.

Local policies and programs referred to as Measures and Actions, are key to achieving GHG reduction. The GHG reduction associated with these measures, as outlined in the CAP, are sufficient to meet the 2030 target set by SB 32 and substantially advance progress toward the 2045 carbon neutrality goal aligned with AB 1279. Further details on measures and actions are provided in Sections 3 through 8. **Table 8** summarizes Ukiah's emissions targets and the reduction expected from implementing the identified measures, showing that the 2030 target will be achieved and significant progress made toward the 2045 goal. **Figure 5** illustrates how Ukiah's measures align with the climate action targets, demonstrating Ukiah's strong commitment to reducing GHG emissions.

#### Table 8 Targets and GHG Reduction (MT CO<sub>2</sub>e)

Target/Forecast	2030 GHG Emissions	2045 GHG Emissions
Adjusted Forecast <sup>1</sup>	131,128	132,758
GHG Reduction from CAP Measures	35,606	125,726
GHG Emissions after Measure Reduction <sup>2</sup>	95,522	7,032
Climate Action GHG Targets	96,544	0
Target Anticipated to be Met?	Yes	Substantial progress demonstrated

Note: All values are of the unit metric tons of carbon dioxide equivalent (MT  $CO_2e$ )

1. Calculated by subtracting Total GHG Reduction from CAP Measures from the Adjusted Forecast emissions.

#### Figure 5 Measures Emissions Reduction and Ukiah Targets (MT CO<sub>2</sub>e)



**3 GHG Reduction Measures** Framework

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### 3.1 Structure of GHG Reduction Measures

As part of the CAP development process, the City led interdepartmental staff interviews, conducted an engagement campaign for the public, and leveraged the expertise of its consultant team to design a comprehensive framework of measures aimed at reducing community-wide GHG emissions and achieving the climate action targets. Each measure is supported by a series of actions that provide measurable GHG emissions reduction backed by substantial evidence. Additionally, the City has established measures and actions to offset irreducible GHG emissions through carbon sequestration, organized under a sector titled "Carbon Sequestration."

The measures and actions are structured according to the following hierarchy:

- 1. Sectors. Sectors represent the GHG emissions categories where reduction will occur, including Building Energy, Transportation, Solid Waste, Water Resources, and Carbon Sequestration.
- 2. Measures. Measures outline specific goals (e.g., activity data targets for 2030 and 2045) to reduce GHG emissions within each sector.
- **3.** Actions. Actions define the programs, policies, and other commitments the City will undertake to achieve each measure. A set of actions is included within each measure, collectively designed to meet the city's specific measure.

### 3.2 Type of GHG Reduction Measures

Measures and actions can be either quantitative or supportive, depending on whether they directly result in GHG emissions reduction or support other direct reduction:

- Quantitative. Quantitative measures and actions lead to GHG emissions reduction that can be measured and aggregated, demonstrating how Ukiah will progress toward and achieve the climate action targets. The reduction anticipated from implementation of these measures and actions are backed by substantial evidence, such as peer-reviewed research, that confirms their effectiveness in reducing GHG emissions.
- **Supportive.** Supportive measures and actions play a vital role in the overall success of a CAP by enabling the effective implementation of quantitative measures. While supportive measures may also be quantifiable and supported by evidence, they are not formally quantified due to factors such as minimal GHG reduction impact, indirect emissions benefits, or the risk of double-counting. As a result, they do not directly contribute to the calculated GHG reduction targets but support specific measure or overall CAP implementation.



# **4 Building Energy Sector Measures**

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# **Building Energy Sector Measures**

CAP measures in the building energy sector prioritize increasing procurement of renewable and carbon-free energy sources, as well as decarbonizing buildings. When all-electric buildings are powered by carbon-free electricity, their operational energy foot-print is carbon-free.

### **Renewable Energy and Carbon-Free Electricity**

The City of Ukiah owns and operates the community's electric utility, providing electricity to residents through the City's Electric Department. Ukiah's grid mix is currently powered by hydroelectric energy from City of Ukiah owned facilities, complemented by geothermal and natural gas energy provided through the Northern California Power Agency (NCPA). To meet the climate action goals established in the CAP, Ukiah is committed to increasing the share of renewable and carbon-free electricity to 77% by 2030.

### **Building Electrification**

Electrification of buildings offers a cost-effective and equitable way to reduce GHG emissions, lower energy bills, and improve public health. All-electric buildings can be more efficient and may offer long-term savings, especially as natural gas prices are expected to rise.<sup>25,26</sup> Furthermore, replacing natural gas appliances, such as stoves, helps reduce harmful indoor pollutants linked to respiratory illnesses.<sup>27</sup> Electrification becomes even more beneficial as the electrical grid becomes increasingly renewable and ultimately carbon-free, amplifying the climate benefits of transitioning away from fossil fuels.

In this CAP, decarbonization and electrification of buildings are achieved through setting building energy performance standards and air emissions thresholds. These efforts are supported by incentive programs, expanding microgrid capacity, increasing the local green workforce, and streamlining permitting processes. Together, these measures and actions help promote a smooth and socially just transition to a cleaner, more modern and efficient building stock, driving long-term reduction in emissions and fostering a healthier community.

### 4.1 Measures and Actions Detail

Measure BE-1: Procure 77% of electricity from renewable and zero-carbon sources by 2030 and 100% renewable and carbon-free no later than 2045.

Action ID	Action Description	
BE-1a	Evaluate options for utility-scale battery storage to accommodate future renewable electricity supply to build energy resilience.	
BE-1b	Work to increase local renewable energy supply by pursuing funding opportunities to incentivize community adoption of renewable energy solutions such as residential solar, wind, and battery storage. Prioritize subsidies for disadvantaged and low-income households and small businesses. Target underutilized urban spaces, such as parking lots and rooftops, as an opportunity to develop the city's solar canopy.	
BE-1c	Develop a long-range community-wide electric energy and demand forecast to:	
	<ol> <li>Estimate future usage and peak demands due to adoption rates of building and transportation electrification and grid capacity, as well as future annexation and economic development plans.</li> <li>Formalize a pathway (resource-plan) to meet the City's energy needs and list of potential renewable resources through 2030 and 2045. Long-range planning of generation resources should take into consideration opportunities to implement carbon sequestration and utilization opportunities in alignment with State and City goals.</li> <li>Develop a decarbonization priority list and implementation schedule for all municipal buildings.</li> <li>Pending results of the forecast, the City shall develop and implement renewable energy procurement schedule for 2030 and 2045 and will track progress towards goals.</li> </ol>	
<b>GHG Emiss</b>	ions Reduction (2030): 10,971 MT CO <sub>2</sub> e	
GHG Emissions Reduction (2045): 0 MT CO <sub>2</sub> e		
Co-benefits: Improved Public Health & Safety, Climate Change Resilience		
Performance Standard: Change in Ukiah electric emissions factor (%)		

Table 9 Measure BE-1 Actions

#### Measure BE-2: Decarbonize 15% of existing buildings by 2030 and 100% by 2045.

#### Table 10 Measure BE-2 Actions

Action ID	Action Description	
BE-2a	Adopt a zero NOx (nitrogen oxides) threshold by 2026 to require replacement of water heaters and HVAC appli- ances in residential and commercial buildings upon burnout.	
BE-2b	Incentivize energy and water efficiency measures to improve building performance and reduce utility costs. Reduce energy use in residential and commercial buildings by promoting and incentivizing energy efficient solu- tions including heat pumps (air-source and geothermal), "cool" building strategies, trees, green roofs, and other nature-based solutions.	
BE-2c	Outline and prioritize a pathway to carbon-free emergency and back-up power across the City's critical asset portfolio with an emphasis on developing community-scale microgrids and/or clean energy districts.	
BE-2d	Expand the local building decarbonization workforce, with targeted supports designed for disadvantaged workers.	
BE-2e	Eliminate fossil fuel use in buildings by 2045 by tailoring electrification solutions to different building ownership, systems, and use types. Work with PG&E to develop a strategy for the equitable decommissioning of the local natural gas system by 2045. Incentivize electrification across all building types.	
GHG Emissions Reduction (2030): 4,258 MT CO <sub>2</sub> e		
GHG Emissions Reduction (2045): 27,920 MT CO <sub>2</sub> e		
Co-benefits: Improved Public Health & Safety, Climate Change Resilience, Jobs Development		
Performance Standard: Natural gas reduced by existing buildings (therms)		

#### Measure BE-3: Decarbonize 95% of new building construction by 2026.

#### Table 11 Measure BE-3 Actions

Action ID	Action Description	
BE-3a	Adopt a single margin hourly source energy threshold (EDR1) performance standard for new construction by 2026.	
BE-3b	Incorporate additional climate resilient design requirements as part of any future updates to the City's building code or zoning code.	
BE-3c	Continue to remove procedural barriers and establish a more streamlined permitting process for all new construction by 2027.	
GHG Emissions Reduction (2030): 2,704 MT CO <sub>2</sub> e		
GHG Emissions Reduction (2045): 15,608 MT CO <sub>2</sub> e		
Co-benefits: Improved Public Health & Safety, Climate Change Resilience		
Performance Standard: Share of new construction electrified (%)		

#### Measure BE-4: Decarbonize 50% of municipal buildings by 2030 and 100% by 2045

#### Table 12 Measure BE-4 Actions

Action ID	Action Description	
BE-4a	Adopt policy that requires the City to decarbonize 50% of municipal buildings and facilities by 2030 and 100% by 2045 while prioritizing critical and public access facilities.	
BE-4b	Pursue grant funding and rebates to electrify municipal buildings.	
GHG Emissions Reduction (2030): Supportive		
GHG Emissions Reduction (2045): Supportive		
Co-benefits: Improved Public Health & Safety, Climate Change Resilience		
Performance Standard: Change in municipal natural gas consumption (%)		

# **5** Transportation Sector Measures

## **Transportation Sector Measures**

The City of Ukiah is dedicated to fostering a transportation network that enhances health, mobility, and overall quality of life for all community members. By creating a robust, safe, and accessible system, the City aims to empower residents to make more sustainable and healthy transportation choices.

### **Reducing Vehicle Miles Travelled**

The primary strategies for reducing transportation-related GHG emissions focus on decreasing vehicle miles traveled (VMT) and replacing fossil fuel-powered internal combustion engines with zero-emission vehicles (ZEVs). These measures prioritize improving active and public transportation options to reduce VMT first, followed by transitioning the remaining VMT to ZEVs.

Full vehicle decarbonization in Ukiah could theoretically achieve zero emissions in the transportation sector. However, reducing VMT remains critical because it lowers energy demand associated with vehicle production, road construction, and maintenance—activities that carry significant embodied GHG emissions.

Additionally, as the community transitions to ZEV vehicles, investing in infrastructure that supports alternative transportation options beyond single-occupancy vehicles can reduce strain on the electric grid, promoting energy resilience. Beyond GHG reduction, reducing VMT also delivers co- benefits such as alleviating traffic congestion, minimizing space needed for roads and parking, supporting local economic revitalization, and enhancing overall quality of life.

This CAP includes strategies aimed at reducing VMT and promote an interconnected transportation network, such as updating the Ukiah Bicycle and Pedestrian Master Plan to create a connected, accessible network of low-stress bikeways and walkways across neighborhoods. Working with local agencies like Mendocino Council of Governments (MCOG) and Mendocino Transit Authority (MTA), the City will implement a transportation system plan to encourage public transit use and shift travel behavior away from single-occupancy vehicles. Furthermore, the City will promote infill development and increased residential density in the downtown core, transit corridors, and areas suitable for sustainable growth, supporting pedestrian-friendly, mixed-use, and transit-oriented development.

### **Zero Emission Vehicles**

While the City cannot mandate that residents or businesses purchase ZEVs, it is committed to creating the supporting infrastructure and incentives needed to overcome current barriers to passenger and commercial ZEV adoption. This CAP recognizes that while all-electric vehicles are a key component of decarbonizing transportation, they are not the only option. A complete reliance on electric vehicles presents challenges due to limitations in battery technology and energy resilience concerns in areas that experience extended power grid shutdowns. Therefore, this CAP includes a diversified approach to ZEV conversion, incorporating renewable fuels, such as bio-diesel generated from organic and renewable sources, as an alternative. To support this transition, the City will increase the adoption of ZEVs within the municipal fleet in alignment with the State of California's ZEV goals. Additionally, the City aims to increasingly decarbonize off-road equipment through electrification and procurement of renewable diesel drop-in fuels, further contributing to overall GHG emissions reduction.


### 5.1 Measures and Actions Detail

Measure T-1: Increase the total mode share of active transportation to 15% by 2030, and 30% by 2045.

### Table 13 Measure T-1 Actions

Action ID	Action Description	
T-1a	Update the Ukiah Bicycle and Pedestrian Master Plan (2015) to reflect current conditions and projects <sup>28</sup> to outline where new lanes are needed to construct a comprehensive, connected network of safe and accessible (low-stress) bikeways and walkways, on- and off- street, and within and across neighborhoods. Develop and pilot a program that provides community-wide access to bicycles.	
T-1b	Establish affordable public transportation options for low-income residents while prioritizing bicycles and other micro-mobility options. Re-explore and expand available rebates with a focus on supporting low- income families and qualified residents.	
T-1c	Develop a priority list of active transportation projects for MCOG's 2023/2024 Regional Transportation Plan and proposed update to the Ukiah Bicycle and Pedestrian Master Plan. Prioritized projects should be selected on level of impact, expansion of inter-jurisdictional connectivity, and access considerations for historically disadvantaged communities. Identify and pursue available resources in order to implement the top 5 priority projects by 2028.	
T-1d	Further develop safe bike lane transportation corridors by 2027 to be implemented with State and federal funding through available grant programs.	
GHG Emissions Reduction (2030): 373 MT CO <sub>2</sub> e		
GHG Emissions Reduction (2045): 2,164 MT CO <sub>2</sub> e		
Co-benefits: Improved Public Health & Safety, Sustainable Land Use Planning		
Performance Standard: Miles of bike and pedestrian lane developed (miles)		

### Measure T-2: Increase total public transportation mode share to 5% by 2030, and 20% by 2045.

### Table 14 Measure T-2 Actions

Action ID	Action Description		
T-2a	Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multi-modal transportation options. The plan may include the following considerations:		
	<ol> <li>Increasing MTA ridership through improved routes and modifying schedules to increase efficiency and align with rider needs.</li> </ol>		
	2. Prioritizing transportation access and improvements in low-income areas, active aging neighborhoods, schools, infill development areas, and at major destinations.		
	<ol> <li>Identification of design improvements of seating and shading at bus stops and along active transportation routes.</li> </ol>		
	<ol> <li>Increasing micro-transit access to improved public transit network facilities to promote last-mile commute access to alternative transportation methods.</li> </ol>		
	5. Developing a local electric trolley or bus system that operates year-round.		
T-2b	Identify high-trafficked areas of the City to: eliminate parking minimums, develop parking maximums, and require parking management and transportation demand management plans based on available transportation options, travel patterns, and land use.		
T-2c	Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA), Mendocino College, and other key institutional partners to establish free or subsidized local public transit programs that service local residential and commercial areas.		
<b>GHG Emiss</b>	ions Reduction (2030): 997 MT CO <sub>2</sub> e		
GHG Emiss	ions Reduction (2045): 5,319 MT CO <sub>2</sub> e		
Co-benefits	: Sustainable Land Use Planning, Jobs Development		
Performance	ce Standard: Change in rate of ridership (%)		

### Measure T-3: Reduce local VMT from single passenger vehicles.

### Table 15 Measure T-3 Actions

Action ID	Action Description				
Т-За	Require developers to meet Reach Code requirements to include EV charging infrastructure and local active and public transit facilities in new multi-family construction. Promote development that increases walkability and is bikeable in neighborhoods.				
T-3b	Reduce VMT by promoting and prioritizing infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that are compact, mixed use, pedestrian friendly, and transit-oriented where applicable. Continue to evaluate surplus or annexed land potential opportunities to promote infill development and sustainable growth management.				
T-3c	Pursue and implement policies by 2027 that support accessible, walkable neighborhoods and connected bike networks as part of infill development projects. Infrastructure requirements may include:				
	<ol> <li>Interconnected bike lanes and sidewalks connecting to City's trail network.</li> <li>Bike locks/stations or other micro-mobility hubs outside of mixed use or commercial development.</li> <li>Increase public bike parking capacity outside of public and commercial development.</li> <li>Establish parking policies that encourage the use of public transit and active transportation.</li> </ol>				
GHG Emissions Reduction (2030): Supportive					
GHG Emissions Reduction (2045): Supportive					
Co-benefits: Improved Public Health & Safety, Sustainable Land Use Planning, Jobs Development					
Performance Standard: Change in community mode share (%)					



## Measure T-4: Achieve zero-emission vehicle adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045.

### Table 16 Measure T-4 Actions

Action ID	Action Description				
	Complete an inventory of existing public EV infrastructure and locations. Additionally, identify key locations to add new public EV chargers (Level 2+) to facilitate the transition to EVs. The analysis shall include the following:				
	Passenger Fleets				
	<ol> <li>Survey existing publicly accessible electric vehicle chargers and locations and identify a prioritized list of new electric vehicle charging stations or lots for increased chargers.</li> <li>Identify and quantify apportunities to increase public access to purbeid a charging with quidenea for appreciate of the second statement of the second stateme</li></ol>				
	2. Identify and quantify opportunities to increase public access to curbside charging, with guidance for appro- priate types and charging scenarios.				
T-4a	<b>3.</b> Identify funding opportunities for the installation of public EV chargers and residential home EV charging systems by 2030.				
	Commercial Vehicles subject to Advanced Clean Fleet requirements				
	<ol> <li>Identifies opportunities for accelerated fleet ZEV adoption and establish a strategy to promote ZEV/EV adop- tion within business fleets, with consideration for vehicle exceptions.</li> </ol>				
	2. For high priority fleets, conduct a utility grid planning analysis to identify necessary infrastructure upgrades to support a fully built-out fleet				
	<ol> <li>Identifies the responsible party to submit construction permits early and submit utility interconnection applications early.</li> </ol>				
	By 2026, develop a reach code requiring electric vehicle capable charging spaces to promote EV chargers in new development and existing parking spaces, to require, at a minimum:				
	1. Single Family – CalGreen Tier 2 provisions				
	<ol> <li>Multitamily - CalGreen Tier 2 provisions</li> <li>Non-residential - CalGreen Tier 2 provisions</li> </ol>				
T-4b	<ol> <li>Expand the designation of EV charging parking spaces to 30% of parking spaces within multi-family residential buildings by 2030</li> </ol>				
	5. Require larger residential rental building owners (more than 20 tenants) to install working electric vehicle char- gers in 30% of parking spaces for new buildings, and existing buildings at time of renovation pending results of a local economic impact analysis				
	<ol> <li>Expediate EV charger permits</li> <li>Additionally, continue to install and provide EV charger access at City-owned facilities</li> </ol>				
GHG Emiss	ions Reduction (2030): 11.847 MT CO e				
GHG Emiss	ions Reduction (2045): 66,664 MT CO_e				
Co-benefits	: Improved Public Health & Safety, Jobs Development				
Performance	ce Standard: Number of EV chargers installed and registered ZEVs				

# Measure T-5: By 2030, electrify or otherwise decarbonize 12% of applicable SORE off-road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N-79-20.

### Table 17 Measure T-5 Actions

Action ID	Action Description			
T-5a	Identify potential users of fossil fuel-based equipment and target education and incentives for replacement with SORE zero emissions alternatives.			
T-5b	Implement and promote CARB's Small-Off Road Engines (SORE) regulations, requiring most newly manufactured small off-road engines (e.g., leaf blowers, lawn mowers) to be zero emission starting in Model Year 2024, with Phase 2 targeting zero emissions for generators and large pressure washers by Model Year 2028.			
T-5c	Coordinate with California Air Resources Board (CARB) and Mendocino County Air Quality Management District (MCAQMD) to notify affected fleets and establish a compliance tracking system for diesel vehicles over 25 horsepower to use R99 or R100 renewable diesel. Partner with regional fuel suppliers to support and promote the increased procurement of renewable diesel.			
GHG Emissions Reduction (2030): 606 MT CO <sub>2</sub> e				
GHG Emissions Reduction (2045): 1,541 MT CO <sub>2</sub> e				
Co-benefits: Improved Public Health & Safety, Environmental Quality & Ecosystem				
Performance Standard: Number of participants in incentive programs				

# Measure T-6: Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements.

### Table 18 Measure T-6 Actions

Action ID	Action Description		
Т-ба	Align the City's Sustainable Purchasing Policy by 2025 to require all new and replacement municipal fleet vehicle purchases to be EVs or ZEVs, where commercially viable. Implement a schedule to comply with the California Advanced Clean Fleet rule for low population counties, mandating that 100% of medium and heavy-duty vehicle purchases be zero-emission beginning in 2027, where commercially viable.		
T-6b	Evaluate opportunities for procuring renewable diesel for all applicable jurisdiction-owned equipment while replacing end-of-life off-road equipment with zero-emission alternatives, where feasible.		
T-6c	Obtain the necessary resources to install additional ZEV chargers and renewable fueling stations in municipal parking lots for use by the fleet, employees, and the public.		
GHG Emissions Reduction (2030): Supportive			
GHG Emissions Reduction (2045): Supportive			
Co-benefits: Improved Public Health & Safety			
Performance Standard: Fuel use of municipal fleet (gallons)			



# 6 Solid Waste Sector Measures

# **Solid Waste Sector Measures**

Sustainable solid waste management is an essential component for reducing GHG emissions and fostering an inclusive circular economy. The CAP measures in the solid waste sector focus on implementing strategies to meet the State's SB 1383 requirements.

### **Waste Prevention and Diversion**

Minimizing organic waste sent to landfills is essential for the City to meet their climate targets, as methane emissions from landfilled organic waste are a primary source of waste-related GHG emissions. Under SB 1383, the State mandates that 75% of community-generated organic waste be diverted from landfills. The City's CAP outlines strategies to meet this requirement, including expanding organics collection by adding bins in public areas, promoting curbside collection services through partnerships with the City's franchise solid waste collector and hauler, C&S Waste Solutions, and the Mendocino Solid Waste Management Authority (MSWMA), and organizing free food scrap collection pail giveaways.

The City also plans to enhance multi-lingual bin signage in both commercial and residential areas to ensure proper source separation of refuse, and recyclables and compostable materials. Additionally, the City will explore opportunities for community compost hubs and partner with local community gardens to increase access to composting. Long-term solutions will be explored for wastewater bio- solids reuse. These waste diversion efforts will also deliver co-benefits to the community such as improving environmental quality, conserving resources, and fostering local sustainability initiatives. These actions, along with securing necessary resources and staffing, will help the City achieve SB 1383 goals and reduce waste-related emissions by 2027.

### **Organics Procurement**

SB 1383 also mandates that cities procure a minimum amount of recovered organic waste products, specifically 0.08 tons per person annually. The City is committed to aligning with these organics procurement requirements as part of the CAP strategy. To meet these requirements, the City will promote compliance with SB 1383 by establishing a minimum annual level of compost or mulch application on appropriate land throughout the community to support urban greening activities.

The City's strategy also includes expanding and creating community composting programs, paired with community gardens, to increase local access to compost and support the sustainable reuse of organic materials. These efforts, alongside strengthened procurement practices, will help the City meet SB 1383 procurement targets and promote the continued diversion and beneficial reuse of organic waste.

The City acknowledges that meeting SB 1383 requirements solely through compost and mulch procurement may be challenging due to land use limitations in an urban setting. As a result, the City also plans to establish procurement policies for alternative organic waste products that are well- suited to the Ukiah community while still meeting SB 1383 requirements.



## 6.1 Measures and Actions Detail

Measure SW-1: Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030.

### Table 19 Measure SW-1 Actions

Action ID	Action Description					
SW-1a	Meet the requirements of SB 1383 to reduce organics in the waste stream by 75% below 2014 levels by 2030 and achieve through activities such as:					
	1. Implement enforcement and fee for incorrectly sorted materials with sensitivity to shared collection. Utilize funding to implement programs and efforts to increase community wide organic waste diversion					
	<ol> <li>Assure adequate bin signage across commercial and residential areas of acceptable landfill, recyclable, and compostable materials.</li> </ol>					
	<ol> <li>Identify public areas for adding organics collection and recycling bins where needed.</li> <li>Work with C&amp;S Waste Solutions and Mendocino Solid Waste Management Authority (MSWMA) to conduct free food scrap collection pail giveaways and promote curbside organics collection service offered in applicable communities.</li> </ol>					
	<ol> <li>Evaluate opportunities to have community compost hubs that are easily accessible for community members. Partner with regional community gardens to increase community wide access to local compost bins.</li> <li>Identify long-term and alternate solutions for the community's wastewater bio-solids and develop local, beneficial reuse. Facilitate meeting SB 1383 requirements by identifying and obtaining the resources necessary for implementation of solid waste diversion projects by 2027, such as increased funding and/or MSWMA staffing and capacity.</li> </ol>					
GHG Emissi	ons Reduction (2030): 3,511 MT CO <sub>2</sub> e					
GHG Emissions Reduction (2045): 4,646 MT CO <sub>2</sub> e						
Co-benefits: Environmental Quality & Ecosystem Services						
Performance Standard: Change in diversion rates (%)						

## Measure SW-2: Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030.

### Table 20 Measure SW-2 Actions

Action ID	Action Description				
SW-2a	Establish and execute an implementation plan for meeting procurement requirements. This may include:				
	1. 2. 3.	Enforcing compliance with SB 1383, aiming to exceed baseline requirements by establishing a minimum annual level of compost or mulch application on appropriate land throughout the region. Maintaining procurement policies to purchase recovered organic waste products in accordance with SB 1383 requirements. Expansion/creation of community composting programs paired with community gardens.			
GHG Emissions Reduction (2030): 190 MT CO <sub>2</sub> e					
GHG Emissions Reduction (2045): 228 MT CO <sub>2</sub> e					
Co-benefits: Environmental Quality & Ecosystem Services					
Performance Standard: Amount of organic waste procured (tons)					

# 7 Water Resource Measures

# Water Resource Measures

Water and wastewater infrastructure requires energy for transportation and treatment, which contributes to the community's GHG emissions. Residential and commercial buildings use water for various indoor and outdoor activities, such as cooking, cleaning, bathing, irrigation, and maintaining pools and fountains. Water efficiency measures not only decrease water use but also reduce the energy required for conveying, treating, and distributing water. Additionally, since water consumption and wastewater generation are interconnected, water conservation efforts help reduce wastewater generation, easing the demand on wastewater treatment systems. These efforts also support California's resilience by reducing pressure on water resources during drought conditions.

To increase Ukiah's water and wastewater efficiency, the City will focus efforts to best align with the California Water Code requirements, updating the Ukiah Urban Water Management Plan (UWMP) every five years, and implement demand reduction actions. These updates may include developing water shortage contingency plans, collaborating with large water users to create On-Site Water Reuse Plans, revisiting the Model Water Efficient Landscape Ordinance (MWELO) in partnership with the Community Development Department, and continuing to require the use of low-impact development (LID) strategies as specified by the Ukiah LID Technical Manual for new construction.<sup>29</sup> Additionally, the City will work to engage the community, especially low-to-moderate income residents, to promote water-saving incentives and revise water and wastewater rates as needed to ensure cost-effective service while meeting conservation goals. These wastewater and water efforts will also deliver co-benefits to the community such as increasing Ukiah's climate change resilience, environmental quality, and sustainable land use planning.

## 7.1 Measures and Actions Detail

Measure WR-1: Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption.

### Table 21 Measure WR-1 Actions

Action ID	Action Description					
WR-1a	The City of Ukiah's water utility department will update the Ukiah Urban Water Management Plan every 5 years, as required by the State, and implement the identified demand reduction actions to ensure compliance with the State's Making Water Conservation a Way of Life regulations. Include new actions in the UWMPs as needed to achieve State regulations, which may include:					
	<ol> <li>Develop or amend Water Shortage Contingency Plans in the region to develop water waste restrictions for households, businesses, industries, and public infrastructure.</li> <li>Work with large water users, and other interested parties to develop an On-Site Water Reuse Plan to maximize utilization of local water supplies.</li> </ol>					
	<ol> <li>In conjunction with the Community Development Department, revisit and update the Model Water Efficient Landscape Ordinance (MWELO), as needed. Engage, through regional partnerships, with builders and developers to provide information on the requirements for development projects.</li> </ol>					
	<ol> <li>Develop an ordinance allowing the installation of dual-plumbing water systems that utilize greywater or recycled water for irrigation at new residential and commercial construction.</li> </ol>					
	5. Increase engagement with the community, specifically low-to-moderate income residents, to understand available incentives or rebates, ontions, and programs to reduce per capita water use					
	6. Revise water and wastewater rates as necessary to ensure that the cost of service is covered.					
WR-1b	Continue to require the use of low-impact-development (LID) strategies as specified by the Ukiah LID Technical Manual for new construction and development.					
<b>GHG Emiss</b>	ions Reduction (2030): Supportive					
<b>GHG Emiss</b>	ions Reduction (2045): Supportive					
Co-benefits	s: Climate Change Resilience, Environmental Quality & Ecosystem Services, Sustainable Land Use Planning					

Performance Standard: Completion of UWMP updates

# 8 Carbon Sequestration Measures

# **Carbon Sequestration Measures**

To achieve carbon neutrality by 2045, the State of California aims to reduce GHG emissions across all sectors, with 15% of these reductions coming from carbon sequestration strategies. Emissions reductions refer to efforts that directly decrease GHG emissions at the source, such as transitioning to renewable energy or improving energy efficiency, whereas carbon sequestration involves capturing and storing carbon from the atmosphere to offset remaining emissions. Ukiah aims to significantly reduce GHG emissions across all sectors, however, due to current technological limitations and the time required for widespread adoption of low-carbon behaviors, some irreducible or residual emissions will remain under the City's jurisdiction. As a result, carbon sequestration strategies will play a crucial role in offsetting these emissions.

This CAP's strategies to increase carbon sequestration include preserving and planting trees, improving land and water management, and supporting nature-based climate solutions. As part of their climate commitment, Ukiah will plant at least 200 new trees per year starting in 2025, aiming for long-term carbon sequestration and urban shading to reduce the heat island effect. The City will also prepare an Urban Forest Master Plan, update Tree Management Guidelines, and create a Tree Protection Plan to promote public tree health and enhance environmental co-benefits. Additionally, Ukiah will foster regenerative land management practices, advance ongoing conservation and wildfire prevention efforts, and conduct carbon sequestration farming pilot projects. As emissions from other sectors are reduced, these sequestration efforts will be vital in achieving carbon neutrality. To support sustainable economic development, Ukiah will explore opportunities such as forest biomass-to-energy strategies, circular economy initiatives, and sustainable purchasing policies. These efforts will contribute to creating green jobs, enhancing resilience, and fostering a local, self-sufficient, and sustainable agriculture-based economy.

## 8.1 Measures and Actions Detail

Measure CS-1: Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045.

Table 22 Measure CS-1 Actions

Action ID	Action Description			
CS-1a	Prepare an Urban Forest Master Plan, update the Tree Management Guidelines and create a Tree Protection Plan to promote public tree health, enhancing resiliency, and increasing the environmental benefits and co-benefits of street trees and shading. The City will continue to conduct an urban tree canopy study every 5-8 years to track progress and identify new priority areas.			
CS-1b	Optimize natural carbon sequestration through regenerative land and water management. Advance nature- based climate solutions that sequester carbon, restore ecosystems, and conserve biodiversity. Enhance ongoing conservation and wildfire prevention efforts in the western hills and in forested areas within the City's Area of Interest (AoI).			
CS-1c	Conduct carbon sequestration farming pilot projects within the community and across the City's Aol.			
GHG Emissions Reduction (2030): 149 MT CO <sub>2</sub> e				
GHG Emissions Reduction (2045): 1,635 MT CO <sub>2</sub> e				
Co-benefits: Climate Change Resilience, Environmental Quality & Ecosystem Services, Sustainable Land Use Planning				
Performance Standard: Change in urban tree stock (trees)				

Measure CS-2: Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region.

Table 23 Measure CS-2 Actions

Action ID	Action Description	
CS-2a	Integrate climate action strategies into the City's long-term economic development goals to grow a more local, resilient, self-sufficient, and circular economy.	
CS-2b	Conduct a feasibility study to identify the potential of converting organic materials such as food and yard waste, woody biomass, and wastewater sludge to energy. In addition to identifying technology opportunities, the feasibility study will include research on regional land-use management opportunities and potential financing pathways.	
CS-2c	Develop and adopt a sustainable purchasing policy for municipal operations that emphasize localism. Work with businesses, community organizations, and surrounding jurisdictions to implement reuse, refill, and repair programs to repurpose materials and capture value before disposal.	
GHG Emissions Reduction (2030): Supportive		
GHG Emissions Reduction (2045): Supportive		
Co-benefits: Climate Change Resilience, Environmental Quality & Ecosystem Services, Job Development		

Performance Standard: Completion of feasibility study and purchasing policy

**9 CAP Implementation** 

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## 9.1 Tracking, Monitoring, and Reporting

This CAP provides a strategic roadmap for Ukiah to implement actions that achieve the 2030 GHG emissions reduction target and advance progress toward achieving carbon neutrality by 2045. The assumptions and data underlying this plan—such as adoption rates of actions, advancements in technology, changes in costs, legislative updates, and associated co-benefits—will evolve over time. As such, this CAP is designed to be a dynamic framework that will undergo regular evaluation and adjustment.

The City remains committed to the sustained, incremental, and comprehensive effort required to meet the CAP's long-term climate goals. The City will actively engage the community, share progress updates, and create ongoing opportunities to gather and integrate community input as policies, programs, and infrastructure are developed. Progress on high-impact GHG reduction strategies will be publicly reported at least every two years.

Ongoing monitoring and assessment of Ukiah's progress will play a critical role in achieving community-wide GHG reduction. To this end, the City will conduct routine GHG emissions inventories in alignment with established protocols and climate commitments,<sup>30</sup> with updates occurring every two years. The CAP will be amended if the plan is not on track to achieve the identified targets. However, if the 2027 GHG emissions monitoring demonstrates that the City is on track to meet the 2030 targets, further adjustments to CAP strategies may not be necessary.

**Table 24** provides an overview of the implementation timeline for each CAP action, along with the City department(s) designated to lead related implementation and monitoring efforts, performance standards, and target 2030 performance metrics. The implementation timeline is divided into three phases to promote structured and efficient progress. Phase 1 (1–2 years) focuses on foundational actions, such as planning, engagement, and establishing key programs or policies. Phase 2 (2–3 years) emphasizes scaling up initiatives, building capacity, and achieving early measurable outcomes. Phase 3 (3–5 years) consolidates efforts, refines strategies through evaluation and adjustments, and begins building toward long-term goals.

### City Of Ukiah Climate Action Plan Implementation Timeline



Years 1-2

 Undertake foundational actions—such as feasibility studies, stakeholder engagement, and development of key programs—to understand the scale and applicability of the mitigation effort for the City to initiate follow-on actions.

#### • Years 2-3

 Initiate accessible GHG mitigation— such as project design and release of RFPs, project design and implementation of new programs, plan infrastructure improvements— to initiate accessible or existing GHG mitigation programs.

#### Phase 3

- Years 3-5
- Initiate long-term capital investments and ambitious program development to support the implementation of new or enhanced GHG mitigation efforts.

#### Table 24 CAP Implementation and Monitoring

Action ID	Action Descripti	Lead City Department	Timeframe	
Measure BE-1 Procure 77% of electricity from renewable and zero-carbon sources by 2030 and 100% renewable and carbon- free no later than 2045.				
Performance Standard: Change in Ukiah electric emissions factor				
Performanc	e Metric:	$0.086  \mathrm{MT}  \mathrm{CO}_2 \mathrm{e}  \mathrm{per}  \mathrm{MWh}$		
BE-1a	Evaluate options renewable electr	for utility-scale battery storage to accommodate future ricity supply to build energy resilience	Electric Utility	Phase 1
BE-1b	Work to increase to incentivize co residential solar, and low-income spaces, such as solar canopy.	Electric Utility Community Development	Phase 2	
	Develop a long-ra	ange community-wide electric energy and demand forecast to:		
BE-1c	<ol> <li>Estimate future usage and peak demands due to adoption rates of building and transportation electrification and grid capacity, as well as future annexation and economic development plans.</li> <li>Formalize a pathway (resource-plan) to meet the City's energy needs and list of potential renewable resources through 2030 and 2045. Long-range planning of generation resources should take into consideration opportun to implement carbon sequestration and utilization opportunities in alignment with State and City goals.</li> <li>Develop a decarbonization priority list and implementation schedule for al municipal buildings.</li> <li>Pending results of the forecast, the City shall develop and implement renewable energy procurement schedule for 2030 and 2045 and will track progress towards goals.</li> </ol>		Electric Utility	Phase 1
Measure Bl	<b>-2 Decarbonize</b> 1	5% of existing buildings by 2030 and 100% by 2045.		
Performanc	e Standard:	Natural gas reduced by existing buildings		
Performance Metric:		861,010 therms		
BE-2a	Adopt a zero No: of water heaters upon burnout.	x (nitrogen oxides) threshold by 2026 to require replacement and HVAC appliances in residential and commercial buildings	Community Development	Phase 1
BE-2b	Incentivize energy and water efficiency measures to improve building perfor- mance and reduce utility costs. Reduce energy use in residential and commercial buildings by promoting and incentivizing energy efficient solutions including heat pumps (air-source and geothermal), "cool" building strategies, trees, green roofs, and other nature-based solutions.		Electric Utility Community Development	Phase 1
BE-2c	Outline and prioritize a pathway to carbon-free emergency and back-up power across the City's critical asset portfolio with an emphasis on developing communi- ty-scale microgrids and/or clean energy districts.		Electric Utility	Phase 2
BE-2d	Expand the local designed for dis	building decarbonization workforce, with targeted supports advantaged workers.	Community Development	Phase 2
BE-2e	Eliminate fossil fuel use in buildings by 2045 by tailoring electrification solutions to different building ownership, systems, and use types. Work with PG&E to develop a strategy for the equitable decommissioning of the local natural gas system by 2045. Incentivize electrification across all building types.		Electric Utility	Phase 3

Action ID	Action Description	on	Lead City Department	Timeframe
Measure B	E-3 Decarbonize 9	5% of new building construction by 2026.		
Performanc	e Standard:	Share of new construction electrified		
Performanc	e Metric:	95% of new building permits are decarbonized construction		
BE-3a	Adopt a single m standard for new	argin hourly source energy threshold (EDR1) performance construction by 2026.	Community Development	Phase 1
BE-3b	Incorporate addit updates to the Ci	tional climate resilient design requirements as part of any future ty's building code or zoning code.	Community Development	Phase 1
BE-3c	Continue to remo permitting proce	ove procedural barriers and establish a more streamlined ss for all new construction by 2027.	Community Development	Phase 2
Measure B	E-4: Decarbonize 5	0% of municipal buildings by 2030 and 100% by 2045.		
Performanc	e Standard:	Change in municipal natural gas consumption		
Performanc	e Metric:	50% natural gas reduction		
BE-4a	Adopt policy that and facilities by 2 access facilities.	requires the City to decarbonize 50% of municipal buildings 2030 and 100% by 2045 while prioritizing critical and public	Electric Utility Community Development	Phase 1
BE-4b	Pursue grant fun	ding and rebates to electrify municipal buildings.	Community Development	Phase 2
Measure T-	1 Increase the tota	I mode share of active transportation to 15% by 2030, and 30% by	2045.	
Performanc	e Standard:	Miles of bike and pedestrian lane developed		
Performanc	e Metric:	12 miles added		
T-1a	Update the Ukiah conditions and p comprehensive, o and walkways, or and pilot a progra	Bicycle and Pedestrian Master Plan (2015) to reflect current rojects to outline where new lanes are needed to construct a connected network of safe and accessible (low-stress) bikeways n- and off- street, and within and across neighborhoods. Develop am that provides community-wide access to bicycles.	Community Development Public Works	Phase 1
T-1b	Establish afforda while prioritizing expand available qualified residen	ble public transportation options for low-income residents bicycles and other micro- mobility options. Re-explore and rebates with a focus on supporting low-income families and ts.	Community Development Public Works	Phase 2
T-1c	Develop a priority Regional Transpo Pedestrian Maste expansion of inte historically disad in order to impler	I list of active transportation projects for MCOG's 2023/2024 ortation Plan and proposed update to the Ukiah Bicycle and er Plan. Prioritized projects should be selected on level of impact, er-jurisdictional connectivity, and access considerations for vantaged communities. Identify and pursue available resources ment the top 5 priority projects by 2028.	Community Development Public Works	Phase 2
T-1d	Further develop s with State and fe	safe bike lane transportation corridors by 2027 to be implemented deral funding through available grant programs.	Community Development Public Works	Phase 2

Image: Participance Standard:       Change in rate of ridership         Performance Standard:       Change in rate of ridership         Performance Metric:       To be developed with MTA         Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA) to implement a transportation gystem plan to shift travel behavior away from single-occupancy vehicles and encourage use of public in an unit- modal transportation options. The plan may include the following considerations:       Community performance Standard:       Prioritizing transportation access and improvements in low-income areas, active aging neighobrodosds, schools, infild development areas, and at major destinations.       Community performance in the province of seating and shading at bus stops and along active transportation routes.       Community performance in the province of seating and shading at bus stops and along active transportation routes.       Community performance in the province in the province public transit network facilities to promote last-mile commute access to alternative transportation methods.       Community performance in the province in the province in the province in transportation demand management plans based on available transportation options, travel patterns, and land use.       Community performance in the province in the province in transportation demand management plans based on available transportation options, travel patterns, and land use.       Public Works       Phase 1         T-2c       Callaborate with Mendocino Council of Governments and Mendocino Transit accessitis of residure and public transit programs that service local       Community performance in the down the presponse in the down the prove parking maximums, and r	Action ID	Action Description	on	Lead City Department	Timeframe
Performance Standard:       Change in rate of ridership         Performance Metric:       To be developed with MTA         Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multi- modal transportation options. The plan may include the following considerations:       Community Development         T-2a       2. Prioritizing transportation access and improvements in low-income areas, active aging neighborhoods, schools, infill development areas, and at major destinations.       Community Development Public Works         T-2a       1. Increasing MTA ridership through improved public transit network facilities to promote last-mainic access to improved public transit network facilities to promote last-mainic access to alternative transportation methods.       Community Development Public Works         T-2b       Identify high-trafficked areas of the City to: eliminate parking minimums, develop parking maximums, and require parking management and transportation demand and land use.       Community Development Public Works       Phase 1         T-2c       Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA). Mendocino College, and other key institutional partners to establish free or subsidized local public transit facilities in new multi-family construction. Promote development in the downtown core, along transit oridors, and land use.       Public Works       Phase 2         T-2c       Collaborate	Measure T-	2 Increase total pu	blic transportation mode share to 5% by 2030, and 20% by 2045.		
Performance Metric:         To be developed with MTA           Collaborate with Mendocino Council of Governments and Mendocino Transit         Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multimodal transportation options. The plan may include the following considerations:         Community           T-2a         Increasing MTA ridership through improved routes and modifying schedules to increase efficiency and align with rider needs.         Community         Phase 1           T-2a         Prioritizing transportation coccess and improvements in low-income areas, and transportation methods.         Community         Phase 1           T-2a         Increasing micro-transit access to improved public transit network facilities to promote last-mile commute access to alternative transportation methods.         Community         Phase 1           T-2b         Identify high-trafficked areas of the City to: eliminate parking maximums, advelop parking maximums, and require parking management and transportation demand management plans based on available transportation options, travel patterns, and land use.         Community Development         Phase 1           T-2b         Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA). Mendocino College, and other key institutional partners to establish free or subsidized focul public transit traverice local residential and commercial areas.         Public Works         Phase 2           T-2c         Collaborate with Mendocino Council of Governments to include EV charging	Performanc	e Standard:	Change in rate of ridership		
Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multi- modal transportation options. The plan may include the following considerations:Community Development Public WorksPhase 1T-2a1. Increasing MTA ridership through improved routes and modifying schedules to increase efficiency and align with rider needs.Community 	Performanc	e Metric:	To be developed with MTA		
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5. Developing a local electric trolley or bus system that operates year-round.Community Development analgement plans based on available transportation options, travel patterns, and land use.Community Development Public WorksPhase 1T-2cCollaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA), Mendocino College, and other key institutional partners to establish free or subsidized local public transit programs that service local residential and commercial areas.Public WorksPhase 2Measure T-3 Reduce local VMT from single passenger vehicles.PerformanceStandard: Development T 5% active, 5% public transitCommunity DevelopmentPhase 1T-3aRequire developers to meet Reach Code requirements to include EV charging infrastructure and local active and public transit for any transit corridors, and within future planed development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus or annexed land potential development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus and within future planed development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus 	T-2a	<ol> <li>Increasing M schedules to 2. Prioritizing t active aging major destin</li> <li>Identification and along ac</li> <li>Increasing m facilities to p transportation</li> </ol>	ATA ridership through improved routes and modifying o increase efficiency and align with rider needs. ransportation access and improvements in low-income areas, neighborhoods, schools, infill development areas, and at lations. In of design improvements of seating and shading at bus stops of the transportation routes. nicro-transit access to improved public transit network promote last-mile commute access to alternative on methods.	Community Development Public Works	Phase 1
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Performance Standard:Change in community mode sharePerformance Metric:15% active, 5% public transitT-3aRequire developers to meet Reach Code requirements to include EV charging infrastructure and local active and public transit facilities in new multi-family construction. Promote development that increases walkability and is bikeable in neighborhoods.Community DevelopmentPhase 1T-3bReduce VMT by promoting and prioritizing infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus or annexed land potential opportunities to promote infill development and sustain- able growth management.Community DevelopmentPhase 1T-3cPursue and implement policies by 2027 that support accessible, walkable neighborhoods and connected bike networks as part of infill development projects. Infrastructure requirements may include:Community DevelopmentPhase 2T-3c9. Bike locks/stations or other micro-mobility hubs outside of mixed use or commercial development.Community DevelopmentPhase 2Public Works9. Increase public bike parking capacity outside of public and commercial development.Phase 2Public Works	Measure T-	3 Reduce local VM	IT from single passenger vehicles.		
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T-3aRequire developers to meet Reach Code requirements to include EV charging infrastructure and local active and public transit facilities in new multi-family construction. Promote development that increases walkability and is bikeable in neighborhoods.Community DevelopmentPhase 1T-3bReduce VMT by promoting and prioritizing infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus or annexed land potential opportunities to promote infill development and sustain- able growth management.Community DevelopmentPhase 1T-3cPursue and implement policies by 2027 that support accessible, walkable neigh- borhoods and connected bike networks as part of infill development projects. Infrastructure requirements may include:Community DevelopmentPhase 2T-3cInterconnected bike lanes and sidewalks connecting to City's trail network. S. Increase public bike parking capacity outside of public and commercial development.Community DevelopmentPhase 2	Performanc	e Metric:	15% active, 5% public transit		
T-3bReduce VMT by promoting and prioritizing infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that are compact, mixed use, pedes- trian friendly, and transit-oriented where applicable. Continue to evaluate surplus or annexed land potential opportunities to promote infill development and sustain- able growth management.Community DevelopmentPhase 1Pursue and implement policies by 2027 that support accessible, walkable neigh- borhoods and connected bike networks as part of infill development projects. Infrastructure requirements may include:Community DevelopmentPhase 2T-3c1. Interconnected bike lanes and sidewalks connecting to City's trail network. Community Development.Community DevelopmentPhase 2T-3c3. Increase public bike parking capacity outside of public and commercial development.Public WorksPhase 2	T-3a	Require develope infrastructure an construction. Pro in neighborhoods	ers to meet Reach Code requirements to include EV charging d local active and public transit facilities in new multi-family omote development that increases walkability and is bikeable s.	Community Development	Phase 1
<ul> <li>Pursue and implement policies by 2027 that support accessible, walkable neighborhoods and connected bike networks as part of infill development projects. Infrastructure requirements may include:</li> <li>1. Interconnected bike lanes and sidewalks connecting to City's trail network.</li> <li>2. Bike locks/stations or other micro-mobility hubs outside of mixed use or commercial development.</li> <li>3. Increase public bike parking capacity outside of public and commercial development.</li> </ul>	T-3b	Reduce VMT by p density of resider and within future trian friendly, and or annexed land p able growth man	promoting and prioritizing infill development and/or increased ntial development in the downtown core, along transit corridors, planned development areas that are compact, mixed use, pedes- l transit-oriented where applicable. Continue to evaluate surplus potential opportunities to promote infill development and sustain- agement.	Community Development	Phase 1
<ol> <li>Interconnected bike lanes and sidewalks connecting to City's trail network.</li> <li>Bike locks/stations or other micro-mobility hubs outside of mixed use or commercial development.</li> <li>Increase public bike parking capacity outside of public and commercial development.</li> </ol>		Pursue and imple borhoods and co Infrastructure rec	ement policies by 2027 that support accessible, walkable neigh- nnected bike networks as part of infill development projects. quirements may include:		
<b>4.</b> Establish parking policies that encourage the use of public transit and active	Т-3с	<ol> <li>Interconnect</li> <li>Bike locks/s commercial</li> <li>Increase put commercial</li> <li>Establish pa</li> </ol>	ted bike lanes and sidewalks connecting to City's trail network. tations or other micro-mobility hubs outside of mixed use or development. olic bike parking capacity outside of public and development. rking policies that encourage the use of public transit and active	Community Development Public Works	Phase 2

Action ID	Action Description	n	Lead City Department	Timeframe
Measure T-4 by 2030 and	Achieve zero-em 100% for all vehic	ission vehicle adoption rates of 30% for passenger vehicles and 2 cles by 2045.	25% for commercia	al vehicles
Performance	e Standard:	Number of EV chargers installed and registered ZEVs		
Performance	e Metric:	223 public EV chargers		
	Complete an inve Additionally, iden facilitate the trans	ntory of existing public EV infrastructure and locations. tify key locations to add new public EV chargers (Level 2+) to sition to EVs. The analysis shall include the following:		
	Passenger Fleets	3		
T-4a	<ol> <li>Survey existi and identify a for increased</li> <li>Identify and a charging, wit</li> <li>Identify fund residential ha</li> </ol>	ng publicly accessible electric vehicle chargers and locations a prioritized list of new electric vehicle charging stations or lots d chargers. quantify opportunities to increase public access to curbside h guidance for appropriate types and charging scenarios. ing opportunities for the installation of public EV chargers and ome EV charging systems by 2030.	Community Development City Manager's Office	Phase 1
	Commercial Vehi	icles subject to Advanced Clean Fleet requirements	Public Works	
	<ol> <li>Identifies op a strategy to consideratio</li> <li>For high prio necessary in</li> <li>Identifies the submit utility</li> </ol>	portunities for accelerated fleet ZEV adoption and establish promote ZEV/EV adoption within business fleets, with n for vehicle exceptions. rity fleets, conduct a utility grid planning analysis to identify frastructure upgrades to support a fully built-out fleet. e responsible party to submit construction permits early and vinterconnection applications early.		
T-4b	<ul> <li>By 2026, develop to promote EV ch require at a minin</li> <li>1. Single Family</li> <li>2. Multifamily</li> <li>3. Non-resident</li> <li>4. Expand the d spaces withi</li> <li>5. Require large install workin buildings, an local econom</li> <li>6. Expediate EV</li> <li>7. Additionally, City-owned f</li> </ul>	a reach code requiring electric vehicle capable charging spaces argers in new development and existing parking spaces, to hum: y - CalGreen Tier 2 provisions - CalGreen Tier 2 provisions tial - CalGreen Tier 2 provisions lesignation of EV charging parking spaces to 30% of parking n multi-family residential buildings by 2030. er residential rental building owners (more than 20 tenants) to ng electric vehicle chargers in 30% of parking spaces for new d existing buildings at time of renovation pending results of a nic impact analysis. / charger permits. continue to install and provide EV charger access at acilities.	Community Development Public Works	Phase 1
Measure T-5 fossil diesel	By 2030, electrify consumption with	y or otherwise decarbonize 12% of applicable SORE off-road equi n renewable diesel in alignment with EO N-79-20.	oment and replace	35% of
Performance	e Standard:	Number of participants in incentive programs		
Performance	e Metric:	Program dependent		
T-5a	Identify potential incentives for rep	users of fossil fuel-based equipment and target education and lacement with SORE zero emissions alternatives.	Community Development	Phase 1
T-5b	Implement and pr requiring most ne lawn mowers) to targeting zero em Year 2028.	romote CARB's Small-Off Road Engines (SORE) regulations, wly manufactured small off-road engines (e.g., leaf blowers, be zero emission starting in Model Year 2024, with Phase 2 hissions for generators and large pressure washers by Model	Public Works	Phase 1
Т5-с	Coordinate with C Air Quality Manag a compliance trac or R100 renewab promote the incre	California Air Resources Board (CARB) and Mendocino County gement District (MCAQMD) to notify affected fleets and establish cking system for diesel vehicles over 25 horsepower to use R99 le diesel. Partner with regional fuel suppliers to support and eased procurement of renewable diesel.	Community Development Public Works	Phase 2

Measure T-6 Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements.					
Performan	ce Standard:	Fuel use of municipal fleet			
Performan	ce Metric:	100% municipal fleet decarbonized			
Т-ба	Align the City's Sustainable Purchasing Policy by 2025 to require all new and replacement municipal fleet vehicle purchases to be EVs or ZEVs, where commercially viable. Implement a schedule to comply with the California Public Works Advanced Clean Fleet rule for low population counties, mandating that 100% of medium and heavy-duty vehicle purchases be zero-emission beginning in 2027, where commercially viable.				
T-6b	Evaluate opportu jurisdiction-owne zero-emission alt	Public Works	Phase 1		
Т6-с	Obtain the neces renewable fueling employees, and t	sary resources to install additional ZEV chargers and g stations in municipal parking lots for use by the fleet, he public.	Public Works	Phase 2	
Measure S	W-1 Achieve and r	naintain SB 1383 requirements to reduce organic waste sent to lar	ndfills by 75% by 2	030.	
Performan	ce Standard:	Change in diversion rates			
Performan	ce Metric:	75% diversion			
SW-1a	<ul> <li>Meet the requirer 75% below 2014</li> <li>1. Implement e sensitivity to efforts to inc</li> <li>2. Assure adeq acceptable I</li> <li>3. Identify publ where neede</li> <li>4. Work with Ca ment Author giveaways a applicable co 5. Evaluate opp accessible for gardens to in</li> <li>6. Identify long bio-solids an requirement implementar funding and,</li> </ul>	ments of SB 1383 to reduce organics in the waste stream by levels by 2030 and achieve through activities such as: inforcement and fee for incorrectly sorted materials with o shared collection. Utilize funding to implement programs and prease community-wide organic waste diversion. uate bin signage across commercial and residential areas of andfill, recyclable, and compostable materials. ic areas for adding organics collection and recycling bins ed. &S Waste Solutions5 and Mendocino Solid Waste Manage- ity (MSWMA) to conduct free food scrap collection pail and promote curbside organics collection service offered in communities. bortunities to have community compost hubs that are easily or community members. Partner with regional community necease community wide access to local compost bins. -term and alternate solutions for the community's wastewater and develop local, beneficial reuse. Facilitate meeting SB 1383 s by identifying and obtaining the resources necessary for tion of solid waste diversion projects by 2027, such as increased for MSWMA staffing and capacity.	Community Development Public Works	Phase 3	
Measure S	W-2 Achieve SB 13	883 procurement requirements (0.08 tons recovered organic wast	e per person) by 2	030.	
Performant	ce Standard:	Amount of organic waste procured			
SW-2a	Establish and exe requirements. Th 1. Enforcing cc by establish appropriate 2. Maintaining ucts in accol 3. Expansion/c	ecute an implementation plan for meeting procurement is may include: ompliance with SB 1383, aiming to exceed baseline requirements ing a minimum annual level of compost or mulch application on land throughout the region. procurement policies to purchase recovered organic waste prod- rdance with SB 1383 requirements. creation of community composting programs paired with gardens.	Community Development Public Works	Phase 3	

Action ID	Action Description	on	Lead City Department	Timeframe
Measure V water cons	VR-1. Continue to i sumption.	mplement wastewater recycling and water conservation projects a	and reduce per ca	pita potable
Performan	ce Standard:	Completion of UWMP updates		
Performan	ce Metric:	Completion of 2025 UWMP		
WR-1a	<ul> <li>The City of Ukiah Management Pla identified deman Water Conservat as needed to ach</li> <li>1. Develop or a develop wate public infras</li> <li>2. Work with la Water Reuses</li> <li>3. In conjunction update the N Engage, thro provide infor</li> <li>4. Develop an or utilize greyw commercial</li> <li>5. Increase eng income resion programs to</li> <li>6. Revise wated is covered.</li> </ul>	's water utility department will update the Ukiah Urban Water in every 5 years, as required by the State, and implement the d reduction actions to ensure compliance with the State's Making ion a Way of Life regulations. Include new actions in the UWMPs ieve State regulations, which may include: mend Water Shortage Contingency Plans in the region to er waste restrictions for households, businesses, industries, and tructure. rge water users, and other interested parties to develop an On-Site Plan to maximize utilization of local water supplies. on with the Community Development Department, revisit and Model Water Efficient Landscape Ordinance (MWELO), as needed. ugh regional partnerships, with builders and developers to rmation on the requirements for development projects. ordinance for installation of dual-plumbing water systems that rater or recycled water for irrigation at new residential and construction. gagement with the community, specifically low-to-moderate dents, to understand available incentives or rebates, options, and reduce per capita water use. r and wastewater rates as necessary to ensure the cost of service	Public Works Water Resources Community Development	Phase 1
WR-1b	Continue to requi as specified by th and developmen	re the use of low-impact-development (LID) strategies ne Ukiah LID Technical Manual for new construction t.	Public Works Water Resources	Ongoing
Measure C reduction	S-1 Preserve exis	ting trees and plant at least 200 new trees per year or an equivalen er throughout the community, beginning in 2025 and through 2045	t amount of high	emissions
Performan	ce Standard:	Change in urban tree stock		
Performan	ce Metric:	1,200 trees		
CS-1a	Prepare an Urbar create a Tree Pro and increasing th shading. The City years to track pro	n Forest Master Plan, update the Tree Management Guidelines and tection Plan to promote public tree health, enhancing resiliency, ne environmental benefits and co-benefits of street trees and will continue to conduct an urban tree canopy study every 5-8 ogress and identify new priority areas.	Community Development Community Services	Phase 1
CS-1b	Optimize natural management. Ac restore ecosyste and wildfire preve the City's Area of	carbon sequestration through regenerative land and water lvance nature-based climate solutions that sequester carbon, ms, and conserve biodiversity. Enhance ongoing conservation ention efforts in the western hills and in forested areas within Interest (AoI).	Community Development Community Services	Phase 2
CS-1c	Conduct carbon across the City's	sequestration farming pilot projects within the community and Aol.	Community Development Community Services	Phase 3

Action ID	Action Description	on	Lead City Department	Timeframe			
Measure C circularity	Measure CS-2 Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region.						
Performan							
Performan	Performance Metric: Complete study by 2026						
Integrate climate		e action strategies into the City's long-term economic development	Community Development	Dhace 1			
U3-2d	goals to grow a more local, resilient, self-sufficient, and circular economy.		City Manager's Office	i nase i			
Conduct a feas materials such CS-2b to energy. In ad study will includ		y study to identify the potential of converting organic ood and yard waste, woody biomass, and wastewater sludge n to identifying technology opportunities, the feasibility search on regional land-use management opportunities and	Community Development Community Services	Phase 1			
	potential financing pathways.		Fire (UVFA)				
	Develop and adopt a sustainable purchasing policy for municipal operations that emphasize localism. Work with businesses, community organizations, and surrounding jurisdictions to implement reuse, refill, and repair programs to		Community Development				
CS-2c			City Manager's Office	Phase 2			
		Public Works					

## 9.2 Looking Forward

If the City of Ukiah does not make measurable and sufficient progress toward its GHG emissions reduction targets by the next GHG emissions inventory, the City may need to revise this CAP to incorporate new or more ambitious measures and associated actions. This potential future revision would aim to further enhance reduction efforts and maintain the CAP's status as a CEQA-qualified GHG emissions reduction plan (see CEQA GHG Emissions Analysis Streamlining section above). The updated CAP may require scaling up of the implementation of existing actions and/or introducing new measures, such as transitioning incentive-based or educational programs into mandatory requirements.

Regardless, by 2029, the City is expected to initiate a comprehensive CAP update to re-address GHG emissions reduction targets beyond 2030 and prepare for achieving the 2045 carbon neutrality goal. This process will involve developing or strengthening of this CAP's measures and actions to align with the 2045 target while also leveraging advancements in technology and new State regulations. To support this effort, the City will continue to implement and monitor the CAP's GHG reduction measures, providing progress updates to the City Council every two years beginning in 2027.



The City of Ukiah's CAP envisions a vibrant future for Ukiah that is not only sustainable but also equitable, inclusive, safe, and resilient. The challenges posed by climate change are significant, but so too are the opportunities to build a community that exists in harmony with its environment. By embracing these ambitious yet achievable goals, we commit to reducing GHG emissions, enhancing natural ecosystems, and fostering a culture of sustainability that benefits all residents.

Our path forward is guided by a steadfast commitment to equity and environmental justice. We recognize that the impacts of climate change are not felt equally, and we are dedicated to ensuring that our most vulnerable populations—low-income families, communities of color, and Indigenous peoples—are at the forefront of our efforts. Through inclusive engagement and collaborative decision-making, we will implement solutions over the long-term that reflect the diversity of Ukiah and uplift every voice.

Cost-effectiveness and timely implementation are central to our approach. By leveraging innovative technologies, strategic partnerships, and community-driven initiatives, we will maximize the impact of every dollar spent. Together, we will build a city that is not only prepared for the challenges of a changing climate but also a model for climate action, adaptation and resilience, and sustainability for Mendocino County.

Ukiah's future is bright, and our collective actions today will shape a tomorrow defined by hope, opportunity, and shared prosperity. Let us move forward with confidence, knowing that our commitment to each other and to the planet will ensure a thriving, inclusive, and sustainable community for all.



# Appendix A

List of Ukiah General Plan Implementation Measures

Ukiah Climate Action Plan Draft Greenhouse Gas (GHG) Emissions Reduction Measures

# **1** Overview of Measures and Actions

**Greenhouse Gas (GHG) Reduction Measures** identify specific goals designed to mitigate GHG emissions from each community sector, with a goal to reduce community-wide GHG emissions from 132,323 MT CO2e to 96,544 MT CO2e by 2030 and reach carbon neutrality by 2045.<sup>1</sup> A single measure generally addresses a subsector or represents an incremental step towards reducing GHG emissions in an overall sector; for example, three measures may be established under transportation to address active transportation, shared transportation, and single passenger vehicles. GHG Reduction Actions identify the necessary programs and policies that would accomplish a measure's goal. Measures and actions are organized according to the following hierarchy:

- 1. **Sectors:** Sectors define the GHG emissions category in which the GHG reductions will take place and include Building Energy; Transportation; Solid Waste; Water and Wastewater; and Carbon Sequestration.
- Measures: Measures are developed under each sector pursuant to the GHG Inventory and Forecast and in line with the Community Protocol and the California Air Resources Board (CARB) 2022 Climate Change Scoping Plan. Additional measures developed for the Climate Action Plan (CAP) include municipal-specific measures (are a part of each sector).
- 3. **Actions:** Actions identify the programs and policies, that will be implemented within the region. Each measure contains a suite of actions, which together have been designed to accomplish the measure goal and metrics.

Measures and actions can be either quantitative or supportive, defined as follows:

- **Quantitative:** Quantitative measures and actions result in quantifiable GHG emissions reductions when implemented. GHG emissions reductions from these measures and actions are supported by case studies, scientific articles, calculations, or other third-party substantial evidence.
- Supportive: Supportive measures and actions may also be quantifiable and have substantial evidence to support their overall contribution to GHG reduction. However, due to one of several factors including a low GHG reduction effect, indirect GHG reduction benefit, or potential for double-counting they will not be quantified and do not contribute directly to the expected GHG reduction target and consistency with the State goals. For example, municipal-specific measures are not quantified, as they represent a subset of communitywide emissions for each sector and as such could be characterized as double-counting. Despite not being quantified, supportive measures/actions are nevertheless critical to the overall success of the CAP and provide support so that the quantitative measures and actions will be successfully implemented.

For the purposes of this stage of CAP development, the following list of measures and actions also includes an orderof-magnitude identification regarding GHG reductions compared to the State 2030 target. Specifically, this categorizes a measure's anticipated GHG reduction effect as high, moderate, or low in relation to its contribution to reducing Ukiah's total forecasted community-wide GHG emissions by 2030, offering a clearer understanding of the potential implications while avoiding analysis challenges such as double-counting. The scale of GHG reduction impact is defined as:

- Low 0% 1% GHG reduction by 2030
- Moderate 1% 5% GHG reduction by 2030
- High > 5% GHG reduction by 2030

Additionally, the measures and actions list outline the anticipated implementation schedule for each measure, establishing a timeline to work toward achieving 2030 GHG reduction goals and making substantial progress to the 2045 goals. Implementation is defined in terms of phases, with Phase 1 occurring in the short-term over the next two years (2025-2026). Phase 2 would include implementation of mid-term actions that should begin no later than 2027, while Phase 3 would include implementation of longer-term measures that should begin no later than 2028, that are anticipated to occur after feasibility studies are complete and initial measures are implemented. Additionally, actions that will be ongoing, such as an education program, will have a start date and indicate that the action is ongoing.

<sup>&</sup>lt;sup>1</sup> Achieving the stated 2030 emissions reduction target will require the City to reduce emissions by 27% within 5 years. The 96,544 MT CO2e GHG inventory target was determined based on the State target to reduce emissions by 40% below 1990 levels by 2030. Ukiah's 1990 GHG inventory was estimated to be 160,907 MT CO2e, with 96,544 MT CO2e being reflective of a 40% emissions reduction compared to 1990.

Where applicable, it is also indicated whether a measure aligns with or supports other goals or initiatives in Ukiah, as outlined in the following:

- City of Ukiah's 2040 General Plan (2040 GP)
- City Council Strategic Plan (CCSP)

The list of measures and actions also identifies the anticipated order-of-magnitude cost of each measure, also using a high, moderate, and low category identification. Where applicable, the cost categories indicate whether the cost would be incurred by the City and/or the community. The definition and examples of the different cost categories are defined in Table 1 below.

Cost Category	City	Community
No-Cost	<ul><li>Goals associated with operational changes that do not include new upfront costs or result in zero lifecycle costs.</li><li>Continuing existing programs</li></ul>	<ul> <li>Goals associated with changes that do not include new upfront costs or result in zero lifecycle costs.</li> <li>Switching transportation modes from single accuracy uphicles to active transportation</li> </ul>
Low-Cost	<ul> <li>Goals associated with low upfront costs and will only require staff time to implement, such as:</li> <li>Developing partnerships</li> <li>Policy Updates</li> <li>Community Outreach</li> </ul>	<ul> <li>Goals associated with low upfront costs compared to existing alternatives, such as:</li> <li>Additional energy bill costs for renewable energy compared to fossil fuel-based energy</li> </ul>
Moderate- Cost	<ul> <li>Goals associated with moderate upfront costs to the City and require moderate capital costs or consultant time along with staff time, such as:</li> <li>Feasibility Studies</li> <li>Incentive and Compliance Programs</li> <li>Pilot Projects</li> </ul>	<ul> <li>Goals associated with moderate upfront costs that are not comparable to existing costs nor are offset over lifetime, such as:</li> <li>New fees from utilities or city taxes</li> <li>Upfront costs partially offset by rebate opportunities</li> </ul>
High-Cost	<ul> <li>Goals associated with high upfront costs and require substantial investments into infrastructure and technology system upgrades, such as:</li> <li>Bike Lanes</li> <li>Energy Storage Systems</li> <li>EV Charging Networks</li> </ul>	<ul> <li>Goals associated with high upfront costs that are not comparable to existing cost nor are offset over lifetime, such as:</li> <li>New electric vehicle purchases prior to existing vehicle replacement</li> <li>Single-family residential household retrofits/upgrades</li> </ul>

#### Table 1 Cost Categories

The cost and GHG reduction potentials associated with each measure have not been quantified and are intended to be considered broad estimates based on experience quantifying cost and GHG reduction associated with GHG reduction measures. Actual measures quantification will be completed at a later date after a complete set of measures has been approved by the City.

## 2 Measures and Actions

Ukiah, located in Mendocino County, California, is known for its blend of urban and rural characteristics and serves as a commercial hub for the surrounding rural area. According to Ukiah's 2022 Community GHG Inventory, transportation is the primary source of GHG emissions, accounting for 50 percent. Combined with building electricity (23 percent) and natural gas (21 percent) emissions, the building energy sector constitutes 44 percent. Transportation emissions equate to 50 percent. Thus, the building energy and transportation sectors together constitute 94 percent of Ukiah's total GHG emissions. Therefore, while effort should be applied across all community GHG emissions sources, addressing emissions in these sectors is crucial for achieving substantial reductions in Ukiah's overall GHG emissions.

2040 General Plan	Adopt a Municipal Climate Action Plan (CAP). The City shall adopt a municipal Climate Action Plan to achieve carbon neutrality for all municipal operations and meet State and City GHG emission reduction goals.
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California has a statutory goal of reducing anthropogenic emissions by at least 85% below 1990 levels and achieving carbon neutrality by 2045. A communitywide greenhouse gas inventory was produced in 2023 by Rincon Consultants Inc., in advance of the development of this Climate Action Plan. Since Ukiah does not possess accurate greenhouse gas emission data for 1990, future performance will be measured against the newly established 2023 baseline. The City will develop a Climate Action Progress Report in 2030 and will produce a CAP update once it is identified that progress to achieve GHG reductions targets is no longer tracking with the CAP target trajectory.<sup>2</sup>

Ukiah faces unique challenges in reducing GHG emissions, including limited staff and funding resources, as well as land constraints for new project developments such as utility-scale solar installations or centralized local waste management infrastructure. Additionally, as a regional hub, Ukiah's rural surroundings complicate mitigating transportation emissions from trips that cross the City's boundaries such as public transportation and infrastructure improvements. Furthermore, the dispersed nature of the Ukiah Valley's residential development, as well as its disconnected rural nodes, such as Calpella and Talmage further increase reliance on personal vehicles.

Despite these challenges, Ukiah also has significant opportunities to enhance its sustainability efforts. Ukiah's proximity to the Mendocino National Forest, planned annexation of the western hills and other undeveloped natural lands, and surrounding agricultural industry offers an intriguing opportunity for regional carbon sequestration initiatives. Ukiah also has municipal ownership over the community's electric utility that in turn offers greater control over regional energy resilience and renewable energy procurement. The forthcoming Ukiah Climate Action Plan will underscore the importance of partnerships to leverage these opportunities and effectively address emissions across the transportation, energy distribution, water and wastewater, and waste management sectors. Measures were developed based on community input and best practices to achieve GHG emission reductions. Specific goals for GHG reduction were set based on City staff input, as well as targets set by local initiatives. Tables 1 to 5 provide the actions that accompany each individual measure.

<sup>&</sup>lt;sup>2</sup> In 2030, the City will produce a Climate Action Progress Report which will highlight progress while assessing existing gaps. The report will also make recommendations for future updates to the Climate Action Plan. The City will develop an updated Climate Action Plan as soon as significant gaps in progress emerge, and no later than 2035.

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Building Energy					
Measure BE-1	Procure 77% of electricity from renewable and zero- carbon sources by 2030 and 100% renewable and carbon- free no later than 2045		2040 GP HO-1b 2040 GP AI-15 CCSP AI-14 CCSP AI-30	High	High (City) Moderate (Com)
Action	Evaluate options for utility-scale battery storage to accommodate future renewable electricity supply to build energy resilience.	Phase 1			
Action	Work to increase local renewable energy supply by pursuing funding opportunities to incentivize community adoption of renewable energy solutions such as residential solar, wind, and battery storage. Prioritize subsidies for disadvantaged and low-income households and small businesses. Target underutilized urban spaces, such as parking lots and rooftops, as an opportunity to develop the city's solar canopy.	Phase 2			
Action	<ol> <li>Develop a long-range community-wide electric energy and demand forecast to:</li> <li>Estimate future usage and peak demands due to adoption rates of building and transportation electrification and grid capacity, as well as future annexation and economic development plans.</li> <li>Formalize a pathway (resource-plan) to meet the City's energy needs and list of potential renewable resources through 2030 and 2045. Long-range planning of generation resources should take into consideration opportunities to implement carbon sequestration and utilization opportunities in alignment with State and City goals.</li> <li>Develop a decarbonization priority list and implementation schedule for all municipal buildings.</li> <li>Pending results of the forecast, the City shall develop and implement renewable energy procurement schedule for 2030 and 2045 and will track progress towards goals.</li> </ol>	Phase 1			

### Table 2 GHG Emissions Reduction Measures and Actions by Sector

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Measure BE-2	Decarbonize 15% of existing buildings by 2030 and 100% by 2045		2040 GP HO-1d 2040 GP HO-1e CCSP AI-1 CCSP AI-10	High	Moderate (Com)
Action	Adopt a zero NOx (nitrogen oxides) threshold by 2026 to require replacement of water heaters and HVAC appliances in residential and commercial buildings upon burnout.	Phase 1			
Action	Incentivize energy and water efficiency measures to improve building performance and reduce utility costs. Reduce energy use in residential and commercial buildings by promoting and incentivizing energy efficient solutions including heat pumps (air-source and geothermal), "cool" building strategies, trees, green roofs, and other nature- based solutions.	Phase 1			
Action	Outline and prioritize a pathway to carbon-free emergency and back-up power across the City's critical asset portfolio with an emphasis on developing community-scale microgrids and/or clean energy districts.	Phase 2			
Action	Expand the local building decarbonization workforce, with targeted supports designed for disadvantaged workers.	Phase 2			
Action	Eliminate fossil fuel use in buildings by 2045 by tailoring electrification solutions to different building ownership, systems, and use types. Work with PG&E to develop a strategy for the equitable decommissioning of the local natural gas system by 2045. Incentivize electrification across all building types.	Phase 3			
Measure BE-3	Decarbonize 95% of new building construction by 2026		2040 GP HO-1d 2040 GP HO-1e CCSP AI-1 CCSP AI-10	Moderate	Low (Com)
Action	Adopt a single margin hourly source energy threshold (EDR1) performance standard for new construction by 2026.	Phase 1			
Action	Incorporate additional climate resilient design requirements as part of any future updates to the City's building code or zoning code.	Phase 1			

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Action	Continue to remove procedural barriers and establish a more streamlined permitting process for all new construction by 2027.	Phase 2			
Measure BE-4	Decarbonize 50% of municipal buildings by 2030 and 100% by 2045		2040 GP AG-M CCSP AI-12 CCSP AI-13	Low <sup>2</sup>	Moderate (City)
Action	Adopt policy that requires the City to decarbonize 50% of municipal buildings and facilities by 2030 and 100% by 2045 while prioritizing critical and public access facilities.	Phase 1			
Action	Pursue grant funding and rebates to electrify municipal buildings.	Phase 2			
Transportation					
Measure T-1	Increase the total mode share of active transportation to 15% by 2030, and 30% by 2045		2040 GP LU-A 2040 GP ED-5 2040 GP MO-C CCSP AI-5 CCSP AI-34 CCSP AI-37	Low	High (City)
Action	Update the Ukiah Bicycle and Pedestrian Master Plan (2015) to reflect current conditions and projects <sup>3</sup> to outline where new lanes are needed to construct a comprehensive, connected network of safe and accessible (low-stress) bikeways and walkways, on- and off- street, and within and across neighborhoods. Develop and pilot a program that provides communitywide access to bicycles.	Phase 1			
Action	Establish affordable public transportation options for low- income residents while prioritizing bicycles and other micro-mobility options. Re-explore and expand available rebates with a focus on supporting low-income families and qualified residents.	Phase 1			

<sup>&</sup>lt;sup>3</sup> Projects include the Urban Core Rehabilitation Project (UCRT), construction of Phases 1-3 of the GRT-Ukiah, as well as the Downtown Streetscape (Phases 1 & 2).

Measure/Action		Implementation	City Plan	Magnitude of GHG Reduction	
Number	Goal/Measure	Timeframe	Alignment	Potential <sup>1</sup>	Magnitude of Cost
Action	Develop a priority list of active transportation projects for MCOG's 2023/2024 Regional Transportation Plan and proposed update to the Ukiah Bicycle and Pedestrian Master Plan. Prioritized projects should be selected on level of impact, expansion of inter-jurisdictional connectivity, and access considerations for historically disadvantaged communities. Identify and pursue available resources in order to implement the top 5 priority projects by 2028.	Phase 2			
Action	Further develop safe bike lane transportation corridors by 2027 to be implemented with State and federal funding through available grant programs.	Phase 2			
Measure T-2	Increase total public transportation mode share to 5% by 2030, and 20% by 2045		2040 GP MO-F 2040 GP MO-J CCSP AI-36 CCSP AI-38	Low	High (City)
Action	<ul> <li>Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multi-modal transportation options. The plan may include the following considerations:</li> <li>Increasing MTA ridership through improved routes and modifying schedules to increase efficiency and align with rider needs.</li> <li>Prioritizing transportation access and improvements in low-income areas, active aging neighborhoods, schools, infill development areas, and at major destinations.</li> <li>Identification of design improvements of seating and shading at bus stops and along active transportation routes.</li> <li>Increasing micro-transit access to improved public transit network facilities to promote last-mile commute access to alternative transportation methods.</li> <li>Developing a local electric trolley or bus system that operates year-round.</li> </ul>	Phase 1			

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Action	Identify high-trafficked areas of the City to: eliminate parking minimums, develop parking maximums, and require parking management and transportation demand management plans based on available transportation options, travel patterns, and land use.	Phase 1			
Action	Collaborate with Mendocino Council of Governments and Mendocino Transit Authority (MTA), Mendocino College, and other key institutional partners to establish free or subsidized local public transit programs that service local residential and commercial areas.	Phase 2			
Measure T-3	Reduce local VMT from single passenger vehicles		2040 GP LU-A 2040 GP MO-D 2040 GP MO-E CCSP AI-30	Low <sup>2</sup>	Low (City)
Action	Require developers to meet Reach Code requirements to include EV charging infrastructure and local active and public transit facilities in new multi-family construction. Promote development that increases walkability and is bikeable in neighborhoods.	Phase 1			
Action	Reduce VMT by promoting and prioritizing infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that is compact, mixed use, pedestrian friendly, and transit- oriented where applicable. Continue to evaluate surplus or annexed land potential opportunities to promote infill development and sustainable growth management.	Phase 1			
Action	<ul> <li>Pursue and implement policies by 2027 that support accessible, walkable neighborhoods and connected bike networks as part of infill development projects.</li> <li>Infrastructure requirements may include:</li> <li>1. Interconnected bike lanes and sidewalks connecting to City's trail network.</li> <li>2. Bike locks/stations or other micro-mobility hubs outside of mixed use or commercial development.</li> </ul>	Phase 2			

Measure/Action		Implementation	City Plan	Magnitude of GHG Reduction	
Number	Goal/Measure	Timeframe	Alignment	Potential	Magnitude of Cost
	<ol><li>Increase public bike parking capacity outside of public and commercial development.</li></ol>				
	<ol> <li>Establish parking policies that encourage the use of public transit and active transportation.</li> </ol>				
Measure T-4	Achieve zero-emission vehicle adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045		CCSP AI-30	High	Moderate (City)
	Complete an inventory of existing EV infrastructure and locations. Additionally, identify key locations to add new public EV chargers (Level 2+) to facilitate the transition to EVs. The analysis shall include the following:	Phase 1			
	Passenger Fleets				
	<ol> <li>Survey existing publicly accessible electric vehicle chargers and locations and identify a prioritized list of new electric vehicle charging stations or lots for increased chargers.</li> </ol>				
	<ol> <li>Identify and quantify opportunities to increase public access to curbside charging, with guidance for appropriate types and charging scenarios.</li> </ol>				
	<ol> <li>Identify funding opportunities for the installation of public EV chargers and residential home EV charging systems by 2030.</li> </ol>				
	Commercial Vehicles subject to Advanced Clean Fleet requirements				
	<ol> <li>Identifies opportunities for accelerated fleet ZEV adoption and establish a strategy to promote ZEV/EV adoption within business fleets, with consideration for vehicle exceptions.</li> </ol>				
	<ol> <li>For high priority fleets, conduct an utility grid planning analysis to identify necessary infrastructure upgrades to support a fully built-out fleet.</li> </ol>				
	<ol> <li>Identifies the responsible party to submit construction permits early and submit utility interconnection applications early.</li> </ol>				

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Action	<ul> <li>By 2026, develop a reach code requiring electric vehicle capable charging spaces to promote EV chargers in new development and existing parking spaces, to require at a minimum:</li> <li>1. Single Family – CalGreen Tier 2 provisions</li> <li>2. Multifamily – CalGreen Tier 2 provisions</li> <li>3. Non-residential – CalGreen Tier 2 provisions</li> <li>4. Expand the designation of EV charging parking spaces to 30% of parking spaces within multi-family residential buildings by 2030</li> <li>5. Require larger residential rental building owners (more than 20 tenants) to install working electric vehicle chargers in 30% of parking spaces for new buildings, and existing buildings at time of renovation pending results of a local economic impact analysis.</li> <li>6. Expediate EV charger permits</li> <li>7. Additionally, continue to install and provide EV charger access at City-owned facilities</li> </ul>	Phase 1			
Measure T-5	By 2030, electrify or otherwise decarbonize 12% of applicable SORE off-road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N-79-20		CCSP AI-30 CCSP AI-10	Low	Low (City)
Action	Identify potential users of fossil fuel-based equipment and target education and incentives for replacement with SORE zero emissions alternatives.	Phase 1			
Action	Implement and promote CARB's Small-Off Road Engines (SORE) regulations, requiring most newly manufactured small off-road engines (e.g., leaf blowers, lawn mowers) to be zero emission starting in Model Year 2024, with Phase 2 targeting zero emissions for generators and large pressure washers by Model Year 2028.	Phase 1			

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Action	Coordinate with California Air Resources Board (CARB) and Mendocino County Air Quality Management District (MCAQMD) to notify affected fleets and establish a compliance tracking system for diesel vehicles over 25 horsepower to use R99 or R100 renewable diesel. Partner with regional fuel suppliers to support and promote the increased procurement of renewable diesel.	Phase 2			
Measure T-6	Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off- road requirements		2040 GP AG-M 2040 GP ES-M CCSP AI-10	Low <sup>2</sup>	Moderate (City)
Action	Align the City's Sustainable Purchasing Policy by 2025 to require all new and replacement municipal fleet vehicle purchases to be EVs or ZEVs, where commercially viable. Implement a schedule to comply with the California Advanced Clean Fleet rule for low population counties, mandating that 100% of medium and heavy-duty vehicle purchases be zero-emission beginning in 2027, where commercially viable.	Phase 1			
Action	Evaluate opportunities for procuring renewable diesel for all applicable jurisdiction-owned equipment while replacing end-of-life off-road equipment with zero-emission alternatives, where feasible.	Phase 1			
Action	Obtain the necessary resources to install additional ZEV chargers and renewable fueling stations in municipal parking lots for use by the fleet, employees, and the public.	Phase 2			

				Magnitude of	
Measure/Action	Goal/Measure	Implementation	City Plan	GHG Reduction	Magnitude of Cost
Water Resources		Thirename	Alightinent	Totentia	Magintude of Cost
Measure WR-1	Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption		2040 GP PI-A 2040 GP SF-W 2040 GP ES-J 2040 GP ES-B 2040 GP ES-K 2040 GP ES-L CCSP AI-23 CCSP AI-15	Low <sup>2</sup>	Low/Moderate (City)
Action	<ul> <li>The City of Ukiah's water utility department will update the Ukiah Urban Water Management Plan every 5 years, as required by the State, and implement the identified demand reduction actions to ensure compliance with the State's Making Water Conservation a Way of Life regulations. Include new actions in the UWMPs as needed to achieve State regulations, which may include:</li> <li>1. Develop or amend Water Shortage Contingency Plans in the region to develop water waste restrictions for households, businesses, industries, and public infrastructure.</li> <li>2. Work with large water users, and other interested parties to develop an On-Site Water Reuse Plan to maximize utilization of local water supplies.</li> <li>3. In conjunction with the Community Development Department, revisit and update the Model Water Efficient Landscape Ordinance (MWELO), as needed. Engage, through regional partnerships, with builders and developers to provide information on the requirements for development projects.</li> <li>4. Develop an ordinance for installation of dual-plumbing water systems that utilize greywater or recycled water for irrigation at new residential and commercial construction.</li> <li>5. Increase engagement with the community, specifically low-to-moderate income residents, to understand available incentives or rebates, options, and programs to reduce per capita water use.</li> <li>6. Revise water and wastewater rates as necessary to ensure the cost of service is covered.</li> </ul>	Phase 1			
Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
--------------------------	---	-----------------------------	--	---	------------------------------
Action	Continue to require the use of low-impact- development (LID) <sup>4</sup> strategies as specified by the Ukiah LID Technical Manual for new construction and development.	Ongoing			
Solid Waste					
Measure SW-1	Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030		2040 GP HO-1e 2040 GP PI-E CCSP AI-2 CCSP AI-21	Moderate	Moderate (City) Low (Com)
Action	Meet the requirements of SB 1383 to reduce organics in the waste stream by 75% below 2014 levels by 2030 and achieve through activities such as:	Phase 3			
	<ol> <li>Implement enforcement and fee for incorrectly sorted materials with sensitivity to shared collection. Utilize funding to implement programs and efforts to increase communitywide organic waste diversion.</li> </ol>				
	<ol> <li>Assure adequate bin signage across commercial and residential areas of acceptable landfill, recyclable, and compostable materials.</li> </ol>				
	<ol> <li>Identify public areas for adding organics collection and recycling bins where needed.</li> </ol>				
	<ol> <li>Work with C&amp;S Waste Solutions<sup>5</sup> and Mendocino Solid Waste Management Authority (MSWMA) to conduct free food scrap collection pail giveaways and promote curbside organics collection service offered in applicable communities.</li> </ol>				
	<ol> <li>Evaluate opportunities to have community compost hubs that are easily accessible for community members. Partner with regional community gardens to increase community wide access to local compost bins.</li> </ol>				
	6. Identify long-term and alternate solutions for the community's wastewater bio-solids and develop local, beneficial reuse. Facilitate meeting SB 1383 requirements by identifying and obtaining the resources necessary for implementation of solid waste diversion projects by 2027, such as increased funding and/or MSWMA staffing and capacity.				

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Measure SW-2	Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030		2040 GP AG-M 2040 GP AG-I	Low	Moderate (City) Low (Com)
Action	<ol> <li>Establish and execute an implementation plan for meeting procurement requirements. This may include:</li> <li>Enforcing compliance with SB 1383, aiming to exceed baseline requirements by establishing a minimum annual level of compost or mulch application on appropriate land throughout the region.</li> <li>Maintaining procurement policies to purchase recovered organic waste products in accordance with SB 1383 requirements.</li> <li>Expansion/creation of community composting programs paired with community gardens.</li> </ol>	Phase 3			
Carbon Sequestra	ation				
Measure CS-1	Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045		2040 GP ES-B 2040 GP ES-A 2040 GP ES-E 2040 GP ES-C 2040 GP ES-F 2040 GP SF-U CCSP AI-4	Low	Low (City) Low (Com)
Action	Prepare an Urban Forest Master Plan, update the Tree Management Guidelines and create a Tree Protection Plan to promote public tree health, enhancing resiliency, and increasing the environmental benefits and co-benefits of street trees and shading. The City will continue to conduct an urban tree canopy study every 5-8 years to track progress and identify new priority areas.	Phase 1			
Action	Optimize natural carbon sequestration through regenerative land and water management. Advance nature- based climate solutions that sequester carbon, restore ecosystems, and conserve biodiversity. Enhance ongoing conservation and wildfire prevention efforts in the western hills and in forested areas within the City's Area of Interest (AoI).	Phase 2			

Measure/Action Number	Goal/Measure	Implementation Timeframe	City Plan Alignment	Magnitude of GHG Reduction Potential <sup>1</sup>	Magnitude of Cost
Action	Conduct carbon sequestration farming pilot projects within the community and across the City's Aol.	Phase 3			
Measure CS-2	Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region		2040 GP AI-13 CCSP AI-11 CCSP AI-17 CCSP AI-30	Low	Low (City)
Action	Integrate climate action strategies into the City's long-term economic development goals to grow a more local, resilient, self-sufficient, and circular economy.	Phase 1			
Action	Conduct a feasibility study to identify the potential of converting organic materials such as food and yard waste, woody biomass, and wastewater sludge to energy. In addition to identifying technology opportunities, the feasibility study will include research on regional land-use management opportunities and potential financing pathways.	Phase 1			
Action	Develop and adopt a sustainable purchasing policy for municipal operations that emphasize localism. Work with businesses, community organizations, and surrounding jurisdictions to implement reuse, refill, and repair programs to repurpose materials and capture value before disposal.	Phase 2			

Note: MT CO<sub>2</sub>e = metric tons of carbon dioxide equivalents; CCSP = City Council Strategic Plan; GP = General Plan; MCOG= Mendocino Council of Governments; MSWMA = Mendocino Solid Waste Management Authority

1. GHG reduction potential will be quantified upon finalization of measures and actions list.

2. The measure is considered supportive such that associated GHG reductions are encompassed in other measures within the sector and thereby does not result in additional GHG reductions. To avoid double counting, GHG reductions associated with the measure will not be quantified in the CAP.

- 3. The City generates sufficient geothermal and hydroelectric power to meet 80% of the community's current electricity needs; however, at times, the City sells Renewable Energy Credits (RECs) (the environmental attribute associated with this energy) to other entities through the City's membership in Northern California Power Agency (NCPA). Though this creates a more renewable regional grid mix and helps keep local utility costs low, sale of the RECs by the City results in a higher GHG emissions grid profile for Ukiah. (https://www.ncpa.com/about/ncpa-members/city-of-ukiah/)
- 4. Low Impact Development (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat (https://www.epa.gov/nps/nonpoint-source-urban-areas).
- 5. C&S Solutions operates as Ukiah's curbside garbage, recycling, and organics collection service provider.

# Appendix **B**

Climate Legislation and Executive Orders

# **1** Climate Regulatory Context

As the impacts of climate change are being recognized, many strategies that address climate change have emerged at several different levels of government. This appendix provides an overview of the regulatory context at the international, State, and local levels relative to Ukiah's actions toward reducing its communitywide greenhouse gas (GHG) emissions.

# **1.1 International Climate Action Guidance**

# **1992 United Nations Framework Convention on Climate Change**

The primary international regulatory framework for GHG reduction is the United Nations Framework Convention on Climate Change Paris Agreement (UNFCCC). The UNFCCC is an international treaty adopted in 1992 with the objective of stabilizing atmospheric GHG concentrations to prevent disruptive anthropogenic climate change. The framework established non-binding limits on global GHG emissions and specified a process for negotiating future international climate-related agreements.<sup>1</sup>

# 1997 Kyoto Protocol

The Kyoto Protocol is an international treaty that was adopted in 1997 to extend and operationalize the UNFCCC. The protocol commits industrialized nations to reduce GHG emissions per county-specific targets, recognizing that they hold responsibility for existing atmospheric GHG levels. The Kyoto Protocol involves two commitment periods during which emissions reductions are to occur, the first of which took place between 2008-2012 and the second of which has not entered into force.<sup>2</sup>

# 2015 The Paris Agreement

The Paris Agreement is the first-ever universal, legally binding global climate agreement that was adopted in 2015 and has been ratified by 189 countries worldwide.<sup>3</sup> The Paris Agreement establishes a roadmap to keep the world under 2° C of warming with a goal of limiting an increase of temperature to 1.5° C. The agreement does not dictate one specific reduction target, instead relying on individual countries to set nationally determined contributions (NDCs) or reductions based on GDP and other factors. According to the International Panel on Climate Change (IPCC) limiting global warming to 1.5° C will require global emissions to reduce through 2030 and hit carbon neutrality by mid-century.<sup>4</sup>

# 1.2 California Regulations and State GHG Targets

California remains a global leader in the effort to reduce GHG emissions and combat climate change through mitigation and adaptation strategies. With the passage of Assembly Bill (AB) 32 in 2006, California became the first state in the United States to mandate GHG emission reductions across its entire economy. To support AB 32, California has enacted legislation, regulations, and executive orders (EOs) that put it on course to achieve robust emission reductions and address climate change impacts. Following is a summary of executive and legislative actions relevant to this CAP Update.

<sup>&</sup>lt;sup>1</sup> United Nations Framework Convention on Climate Change (UNFCCC). United Nations Framework Convention on Climate Change. https://unfccc.int/files/essential\_background/background\_publications\_htmlpdf/application/pdf/conveng.pdf

<sup>&</sup>lt;sup>2</sup> UNFCCC. What is the Kyoto Protocol? https://unfccc.int/kyoto\_protocol

<sup>&</sup>lt;sup>3</sup> UNFCCC. Paris Agreement - Status of Ratification. https://unfccc.int/process/the-paris-agreement/status-of-ratification

<sup>&</sup>lt;sup>4</sup> IPCC. Global Warming of 1.5 C. https://www.ipcc.ch/sr15/

## 2002 Senate Bill 1078

In 2002, SB 1078, established the California Renewables Portfolio Standards (RPS) Program and was accelerated in 2006 by SB 107, requiring that 20 percent of retail electricity sales be composed of renewable energy sources by 2010. EO S-14-08 was signed in 2008 to further streamline California's renewable energy project approval process and increase the State's RPS to the most aggressive in the nation at 33 percent renewable power by 2020.

# 2002 Assembly Bill 1493

In 2002, AB 1493, also known as Pavley Regulations, directed the California Air Resources Board (CARB) to establish regulations to reduce GHG emissions from passenger vehicles to the maximum and most cost-effective extent feasible. CARB approved the first set of regulations to reduce GHG emissions from passenger vehicles in 2004, initially taking effect with the 2009 model year.

# 2005 Executive Order S-3-05

EO S-3-05 was signed in 2005, establishing Statewide GHG emissions reduction targets for the years 2020 and 2050. The EO calls for the reduction of GHG emissions in California to 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. The 2050 emission reductions target would put the State's emissions in line with the worldwide reductions needed to reach long-term climate stabilization as concluded by the IPCC 2007 Fourth Assessment Report.

# 2006 Assembly Bill 32

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global Warming Solutions Act of 2006," that was signed into law in 2006. AB 32 codifies the Statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHG emissions to meet the 2020 deadline. AB 32 also requires CARB to adopt regulations requiring reporting and verification of Statewide GHG emissions. Based on this guidance, CARB approved a 1990 Statewide GHG baseline and 2020 emissions limit of 427 million metric tons of CO<sub>2</sub> equivalent (MMT CO<sub>2</sub>e). The Scoping Plan was approved by CARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan. In May 2014, CARB approved an updated Scoping Plan that defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 Statewide goals. The update highlighted State progress toward meeting the 2020 GHG emission reduction strategies with other State policies for water, waste, natural resources, clean energy, transportation, and land use.

# 2007 Executive Order S-1-07

Also known as the Low Carbon Fuel Standard, EO S-1-07, issued in 2007, established a Statewide goal that requires transportation fuel providers to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. EO S-1-07 was readopted and amended in 2015 to require a 20 percent reduction in carbon intensity by 2030, the most stringent requirement in the nation. The new requirement aligns with California's overall 2030 target of reducing climate changing emissions 40 percent below 1990 levels by 2030, which was set by Senate Bill 32 and signed by the governor in 2016.

# 2007 Senate Bill 97

Signed in August 2007, SB 97 acknowledges that climate change is an environmental issue that requires analysis in California Environmental Quality Act (CEQA) documents. In March 2010, the California Natural Resources Agency adopted amendments to the State CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

# 2008 Senate Bill 375

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPOs), including the Metropolitan Transportation Commission (MTC), to prepare a "sustainable communities' strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the MPO's Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.

# 2009 California Green Building Code

The California Green Building Standards Code (CALGreen) is Part 11 of the California Building Standards Code or Title 24 and is the first Statewide "green" building code in the nation. The purpose of CALGreen is to improve public health, safety, and general welfare by enhancing the design and construction of buildings. Enhancements include reduced negative impact designs, positive environmental impact designs, and encouragement of sustainable construction practices. The first CALGreen Code was adopted in 2009 and has been updated in 2013, 2016, 2019, and 2022. The CALGreen Code will have subsequent, and continually more stringent, updates every three years.

# 2009 Senate Bill X7-7

In 2009, SB X7-7, also known as the Water Conservation Act, was signed, requiring all water suppliers to increase water use efficiency. This legislation sets an overall goal of reducing per capita urban water use by 20 percent by 2020.

# 2011 Senate Bill 2X

In 2011, SB 2X was signed, requiring California energy providers to buy (or generate) 33 percent of their electricity from renewable energy sources by 2020.

# 2012 Assembly Bill 341

AB 341 directed the California Department of Resources Recycling and Recovery (CalRecycle) to develop and adopt regulations for mandatory commercial recycling. As of July 2012, businesses are required to recycle, and jurisdictions must implement a program that includes education, outreach, and monitoring. AB 341 also set a Statewide goal of 75 percent waste diversion by the year 2020.

# 2014 Assembly Bill 32 Scoping Plan Update

In 2014, CARB approved the first update to the Scoping Plan. This update defines CARB's climate change priorities and sets the groundwork to reach the post-2020 targets set forth in EO S-3-05. The update highlights California's progress toward meeting the near-term 2020 GHG emissions reduction target, defined in the original Scoping Plan. It also evaluates how to align California's longer-term GHG reduction strategies with other Statewide policy priorities, such as water, waste, natural resources, clean energy, transportation, and land use.

# 2014 Assembly Bill 1826

AB 1826 was signed in 2014 to increase the recycling of organic material. GHG emissions produced by the decomposition of these materials in landfills were identified as a significant source of emissions contributing to climate change. Therefore, reducing organic waste and increasing composting and mulching are goals set out by the AB 32 Scoping Plan. AB 1826 specifically requires jurisdictions to establish organic waste recycling programs by 2016, and phases in mandatory commercial organic waste recycling over time.

## 2015 Senate Bill 350

SB 350, the Clean Energy and Pollution Reduction Act of 2015, has two objectives: to increase the procurement of electricity from renewable sources from 33 percent to 50 percent by 2030 and to double the energy efficiency of electricity and natural gas end users through energy efficiency and conservation.

# 2015 Executive Order B-30-15

In 2015, EO B-30-15 was signed, establishing an interim GHG emissions reduction target to reduce emissions to 40 percent below 1990 levels by 2030. The EO also calls for another update to the CARB Scoping Plan.

## 2016 Senate Bill 32

On September 8, 2016, the governor signed SB 32 into law, extending AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). The bill charges CARB to adopt the regulation so that the maximum technologically feasible emissions reductions are achieved in the most cost-effective way.

## 2016 Senate Bill 1383

Adopted in September 2016, SB 1383 requires CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane 40 percent below 2013 levels
- Hydrofluorocarbons 40 percent below 2013 levels
- Anthropogenic black carbon 50 percent below 2013 levels

SB 1383 also requires CalRecycle, in consultation with CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills. The bill further requires 20% of edible food disposed of at the time to be recovered by 2025.

# 2017 Scoping Plan Update

On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 goal set by SB 32. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies, such as SB 350 and SB 1383. The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2014 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with Statewide per capita goals of six metric tons (MT) CO<sub>2</sub>e by 2030 and two MT CO<sub>2</sub>e by 2050. As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level), but not for specific individual projects because they include all emissions sectors in the State.

# 2018 Senate Bill 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

# 2018 Executive Order B-55-18

Also, on September 10, 2018, the governor issued Executive Order B-55-18, which established a new Statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing Statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

# 2020 Advanced Clean Trucks Regulation

The Advanced Clean Trucks Regulation was approved on June 25, 2020. The regulation establishes a zero-emissions vehicle sales requirement for trucks or on-road vehicles over 8,500 lbs gross vehicle weight and set a one-time reporting requirement for large entities and fleets. Under the regulation, manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Additionally, the regulation established a one-time reporting requirement for large entities and fleets where fleet owners, with 50 or more trucks, are required to report about their existing fleet operations by March 15, 2021.

# 2022 Scoping Plan Update

In November 2022, CARB adopted the 2022 Scoping Plan, which provides a framework for achieving the 2045 carbon neutrality goal set forth by AB 1279. The 2022 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently approved legislation, such as AB 1279. The 2022 Scoping Plan includes discussion of the Natural and Working Lands sector as both an emissions source and carbon sink. The Plan centers equity in terms of State climate investments and climate mitigation strategies.

# 2022 Senate Bill 1020

Adopted in September 2022, SB 1020 advances the State's trajectory to 100 percent clean energy procurement by 2045 by creating clean energy targets of 90 percent by 2035 and 95 percent by 2040. SB 1020 builds upon SB 100, which accelerated the State's RPS and requires electricity providers to increase procurement from eligible renewable energy resources to 60 percent by 2030 and 100 percent by 2045.

# 2022 Assembly Bill 1279

Adopted in September 2022, AB 1279, codifies the Statewide carbon neutrality goal into a legally binding requirement for California to achieve carbon neutrality no later than 2045 and ensure 85 percent GHG emissions reduction under that goal. AB 1279 builds upon EO B-55-18 that originally established California's 2045 goal of carbon neutrality.

# 2022 Advanced Clean Cars II

The Advanced Clean Cars II regulation was adopted in August 2022. The regulation amends the Zero-emission Vehicle Regulation to require an increasing number of zero-emission vehicles, and relies on advanced vehicle technologies, including battery electric, hydrogen fuel cell electric and plug-in hybrid electric-vehicles, to meet air quality, climate change emissions standards, and Executive Order N-79-20, which requires that all new passenger vehicles sold in California be zero emissions by 2035. The regulation also amends standards for gasoline cars and heavier passenger trucks to continue to reduce smog-forming emissions.

# 2023 Advanced Clean Fleet

Approved by CARB on April 28, 2023, the Advanced Clean Fleets Regulation requires fleets, businesses, and public entities that own or direct the operation of medium- and heavy-duty vehicles in California to transition to 100 percent zero-emission capable utility fleets by 2045. Under the regulation, fleet operators may choose to purchase only ZEVs beginning in 2024 and remove internal combustion engine vehicles at the end of their useful life or fleet operators may elect to meet the State's ZEV milestone targets as a percentage of the total fleet starting with vehicle types that are most suitable for electrification.

# 1.3 Local Policies

# Mendocino Multi-Jurisdiction Hazard Mitigation Plan

Adopted in November 2020, the Mendocino County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) provides a comprehensive framework to reduce risks from natural hazards, such as wildfires, earthquakes, floods, and droughts, across the county and its participating jurisdictions, including the City of Ukiah. The plan identifies key vulnerabilities, outlines mitigation goals, and details actionable strategies to protect lives, property, and infrastructure. For Ukiah, the MJHMP emphasizes localized risk assessments and mitigation actions tailored to the city's specific vulnerabilities, including wildfire risk and earthquake resilience. By adopting the MJHMP, Ukiah remains eligible for federal funding under FEMA's Hazard Mitigation Assistance programs to implement projects that enhance community safety and disaster preparedness.

# **Climate Resolution 2022-24**

Adopted by the City of Ukiah on October 19, 2022, Resolution No. 2022-44 declares a climate emergency and outlines the City's commitment to achieving carbon neutrality no later than 2045. The resolution recognizes the urgent need to address the climate crisis and prioritizes equitable and sustainable policies to reduce greenhouse gas emissions and build climate resilience. Under the resolution, the City establishes targets across key sectors, such as energy, transportation, and solid waste, while committing to reducing emissions from municipal operations and embedding climate considerations into planning and decision-making processes. The resolution also emphasizes community engagement and equity in implementing climate actions to ensure benefits are shared across all populations.

# City of Ukiah's 2040 General Plan

Adopted in December 2022, the City of Ukiah's 2040 General Plan serves as a long-term blueprint for guiding sustainable growth, development, and resource management through 2040. The plan emphasizes a vision for a vibrant, resilient, and inclusive community, addressing key priorities such as housing, economic development, transportation, public services, and environmental stewardship. It includes policies and strategies to support renewable energy adoption, reduce greenhouse gas emissions, promote multi-modal transportation options, and preserve natural resources. The General Plan also integrates climate adaptation and equity considerations to ensure a sustainable and equitable future for all residents.

# **City Council Strategic Plan**

The City of Ukiah's Strategic Plan outlines a focused framework to guide decision-making and prioritize initiatives that address the needs of residents and businesses. Centered on five key priorities—enhance neighborhood, develop quality infrastructure, plan for the future, grow businesses, value the team—the plan establishes clear goals and actionable strategies to foster a thriving, safe, and sustainable community. It emphasizes enhancing public services, investing in critical infrastructure, supporting economic vitality, and promoting community engagement. The Strategic Plan serves as a living document, ensuring adaptability to emerging challenges and opportunities while remaining aligned with the City's long-term vision.

# Appendix C

GHG Inventory, Forecast, and Targets Methodology and Modeling



# Ukiah Community GHG Inventories

# Final Greenhouse Gas Emissions Inventories Report

prepared by

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prepared with the assistance of

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January 12, 2024

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# 1 Introduction

# 1.1 Report Overview and GHG Inventory Purpose

This Ukiah community greenhouse gas (GHG) inventories report includes the following information by section:

- Section 1: report sections overview and GHG inventories approach;
- Section 2: Ukiah's new 2022 community GHG emissions inventory methodology, activity data, emissions factors, and results by sector;
- Section 3: Ukiah's 2005 and 2010 community GHG inventories including updates to methodology, activity data, emissions factors, and results by sector; and
- Section 4: comparison of updated 2005/2010 inventories and the new 2022 inventory.

The 2005 and 2010 community GHG inventories previously completed for the Ukiah 2014 Climate Action Plan (CAP) were updated to leverage the latest available models and best available data in accordance with the Community Protocol to be consistent with the 2022 GHG inventory. Updating the 2005 and 2010 inventories provides a comparable baseline utilizing a consistent methodology, which is a crucial measure for the City of Ukiah staff to be able to accurately track Ukiah's progress towards achieving its community GHG emissions reduction goals.

# 1.2 GHG Inventories Approach

# **GHG Emissions Accounting Protocol**

Ukiah's 2005, 2010, and 2022 community GHG inventories were developed in alignment with accounting protocols provided by the Local Governments for Sustainability International Council for Local Environmental Initiatives (ICLEI) as recommended by the Association of Environmental Professionals (AEP) and the California Office of Planning and Research (OPR).<sup>1</sup> ICLEI protocols are designed for local-scale accounting of GHG emissions that contribute to climate change and provide authoritative guidance to account for GHG emissions accurately and consistently. The ICLEI U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions Version 1.2 (Community Protocol) serves to guide the measurement and reporting of GHG emissions in a standardized way and is used by other jurisdictions to support their own inventory, forecast, and climate action planning efforts. Use of Community Protocol methodology for GHG accounting aligns with statewide GHG inventory methods and focuses on analyzing sectors which are within jurisdictional control of cities or counties. The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory.

GHG emissions were calculated by multiplying the activity data in each GHG emissions sector (e.g., transportation, energy, waste, water and wastewater) by an associated emission factor. Activity data refer to the relevant measured or estimated level of GHG-generating activity (e.g., energy consumption, miles traveled). Emission factors are observation-based conversion factors used to equate activity data to generated GHG emissions. The 2022 community GHG Inventory serves to provide a comprehensive understanding of the community's current GHG emissions. The following sections contain further information on the inventory approach, calculation methodologies, data used, and results.

<sup>&</sup>lt;sup>1</sup> Association of Environmental Professionals (AEP). 2013. AEP Climate Change Committee's "The California Supplement to the United States Community-Wide Greenhouse Gas (GHG) Emissions Protocol". Available at: https://califaep.org/docs/California\_Supplement\_to\_the\_National\_Protocol.pdf

# **Emissions Geographic Boundary**

Ukiah's community inventories cover the relevant emissions sources within the boundary of the City (i.e., City limits). The inventory, thereby, reflects emissions sectors over which the City of Ukiah has jurisdictional control and influence. Sectors where the jurisdiction has limited influence are generally excluded from the 2005, 2010, and 2022 community GHG inventories, as the City of Ukiah does not have the power to develop measures to impact associated emissions. This method of exclusion for the emissions boundary aligns with Community Protocol standards and is recommended by State guidance for inventory, forecast, and targets accounting.<sup>2</sup>

# **Emissions Inventory Scope**

The Community Protocol recommends reporting GHG emissions from five basic reporting activities in a community inventory that include:

- Use of electricity by the community
- Use of fuel in residential and commercial stationary combustion equipment
- On-road passenger and freight motor vehicle travel
- Use of energy in potable water and wastewater treatment and distribution
- Generation of solid waste by the community

The Community Protocol also provides recommendations for additional GHG emissions source reporting for activities that can be influenced by the accounting agency. Based on reporting practices in California, it is recommended that GHG emissions from off-road equipment fuel combustion and wastewater treatment processes are also included in community GHG emissions inventories. GHG emissions sources can be categorized more generally into the following five activity sectors:

- Electricity
- Natural Gas
- Transportation
- Water and Wastewater
- Solid Waste

All Ukiah community GHG inventories discussed in this report include an assessment of communitywide GHG emissions associated with these five sectors that also serve as the basis for the GHG emissions forecast and target setting.

<sup>&</sup>lt;sup>2</sup> Governor's Office of Planning and Research (OPR). 2023. Chapter 8, Climate Change. Available at: https://www.opr.ca.gov/docs/OPR\_C8\_final.pdf

# 2 2022 Community GHG Inventory

The 2022 GHG emissions assessment (2022 Community GHG Inventory) completed for Ukiah includes GHG emissions from activities within the Ukiah's jurisdictional boundaries during 2022.

A GHG emissions inventory provides a comprehensive understanding of a community's GHG emissions and is developed to serve the following purposes:

- Establish perspective of GHG emissions conditions in an applicable inventory year.
- Provide an understanding of where the highest sources of GHG emissions in the community originate and where the greatest opportunities for emissions reduction exist.
- Create a GHG emissions baseline from which the jurisdiction can track community emissions progress over time.

# 2.1 2022 Community GHG Emissions Inventory Activity Data and Emissions Factors

# 2.1.1 Global Warming Potential

The Community Protocol assesses GHG emissions associated with the six internationally recognized GHGs, as outlined in Table 1. The 2022 inventory focuses on the three GHGs most relevant to the City's operations: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O). The other gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) are emitted primarily in private sector manufacturing and electricity transmission and are therefore omitted from the inventory. This approach is consistent with typical community inventory approaches, as industrial emissions are typically outside of the City's jurisdictional control. Table 1 also includes the global warming potentials (GWP) for each gas. The 2022 inventory used 100-year global warming potentials (GWP) for each gas that are consistent with the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report,<sup>3</sup> which were also used by the State in their latest GHG emissions inventory. The GWP refers to the ability of each gas to trap heat in the atmosphere. For example, one pound of methane gas has 28 times more heat capturing potential than one pound of carbon dioxide gas. GHG emissions are reported in metric tons of CO<sub>2</sub> equivalent (MT CO<sub>2</sub>e).

Greenhouse Gas	Primary Source	100-year GWP
Carbon dioxide (CO <sub>2</sub> )	Combustion	1
Methane (CH <sub>4</sub> )	Combustion, anaerobic decomposition of organic waste (e.g., in landfills, wastewater treatment plants)	28
Nitrous Oxide (N <sub>2</sub> O)	Leaking refrigerants and fire suppressants	265
Hydrofluorocarbons	Leaking refrigerants and fire suppressants	4 - 12,400
Perfluorocarbons	Aluminum production, semiconductor manufacturing, HVAC equipment manufacturing	6,630 - 11,100
Sulfur Hexafluoride (SH6)	Transmission and distribution of power	23,500

#### Table 1 2022 Inventory GHGs and GWPs

Source: Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

<sup>&</sup>lt;sup>3</sup> Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Accessed January 5, 2023 at: https://www.ipcc.ch/report/ar5/syr/

# 2.1.2 Energy

# **Energy: Residential and Nonresidential Electricity**

The community of Ukiah relies on electricity sourced exclusively from the City. By establishing its own utility service, the City is able to provide the community of Ukiah with lower cost electricity and better manage energy profiles which affect Ukaih's renewable energy goals. GHG emissions associated with electricity are intricately tied to the energy generation sources from which it is procured such as coal, natural gas, hydroelectric, wind, solar, biomass, and geothermal. Wind and solar are considered carbon-free renewable sources, while biomass and geothermal emit GHGs but are deemed eligible renewables by the State as they produce significantly less emissions compared to fossil-based sources. These eligible renewables typically provide additional benefit by increasing grid resilience as carbon-free sources such as wind and solar are subject to variable conditions for energy generation.

In the context of Ukiah's energy landscape, the City manages the Lake Mendocino Hydroelectric Plant and is an active participant in the Northern California Power Agency (NCPA), a joint powers association (JPA). The hydroelectric plant is a significant contributor to the region's power supply. Hydroelectric power is considered a carbon-free and renewable energy source, as it does not produce direct GHG emissions during the generation process. Furthermore, as a member municipality in the NCPA, the City is actively involved in both selling to, and purchasing power from, the NCPA electric grid mix as well as participating in power generation projects. The NCPA incorporates a diverse array of energy sources, including eligible renewables such as geothermal energy,<sup>4</sup> to increase energy resilience in the region while also reducing GHG emissions. By supplying carbon-free hydroelectric power to the NCPA energy supply, the City is contributing to the overall regional objective to meet and exceed State renewable energy portfolio goals.

Activity data for community electricity consumption was provided by the City through electricity usage reports for the residential sector and nonresidential sector (including commercial and industrial sectors). As industrial electricity use was included as aggregated nonresidential activity data in the Ukiah 2005 and 2010 GHG inventories completed for the Ukiah 2014 CAP (see Section 3), industrial emissions are included in the 2022 Community GHG Inventory to align the scope of the previous inventories.

Emissions from residential and nonresidential electricity were calculated using Community Protocol Equation BE.2.1. To account for electricity only consumed in the built environment, equation 2.1 subtracts electricity consumed by electric vehicles (EVs) from total purchased electricity by removing passenger car EV electricity use from residential electricity consumption and commercial and bus EV electricity consumption from nonresidential consumption. Electricity use from passenger, commercial, and bus EVs are instead accounted for under the transportation sector of the inventory to provide a more thorough differentiation between building and transportation sector emissions. More information regarding EV energy use can be found in Section 2.1.3. Equation 2.1 and Table 2 provide the equation and data sources used to quantify GHG emissions associated with community electricity consumption.

#### **EQUATION 2.1**

#### **BE.2.1 RESIDENTIAL/NONRESIDENTIAL ELECTRICITY SECTOR EMISSIONS**

$$CO_2e_{electricity,j} = \sum_i (Elec_{i,j} - EV_{i,j}) \times EF_{elec,i,j}$$

2.1

<sup>&</sup>lt;sup>4</sup> Northern California Power Agency (NCPA). 2023. NCPA Geothermal. Available at: https://www.ncpa.com/about/generation/geothermal/

Table 2	Emissions Parameters and Data Sources	<ul> <li>Communit</li> </ul>	y Electricit	y Use BE.2.1
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Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from electricity consumption per building type	CO <sub>2</sub> e <sub>electricity,j</sub>	See Table 16	MT CO₂e/year	Calculated
Electricity consumption per building type per energy provider	Elec <sub>i,j</sub>	See Table 16	kWh/year	City of Ukiah Electricity Report <sup>1</sup>
Attributed electric vehicle electricity consumption	$EV_{i,j}$	See Table 16	kWh/year	EMFAC2021 <sup>2</sup>
Electricity emission factor based on energy provider <sup>3</sup>	EF <sub>elec,i,j</sub>	See Table 16	MT CO₂e/kWh	2. City of Ukiah 2022 Power Content Label <sup>4</sup> 3. CEC Power Source Disclosure Regulations <sup>5</sup>
Energy Providers	i	City of Ukiah	Categorical	
Building type	j	Residential Nonresidential <sup>6</sup>	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

1. City of Ukiah Electricity Report provided by the City via email on August 31, 2023

2. California Air and Resources Board (CARB). 2023. Emission FACtor (EMFAC2021 v1.0.1) Model. Available at:

https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

3. The electricity emissions factor was calculated according to regulatory guidance established by the California Energy Commission (CEC) and based on the Ukiah 2022 power label grid mix. According to CEC guidance, emissions factors for each fuel source are to be sourced from MRR requirements, which in turn stipulates the use of Energy Information Administration (EIA) or Environmental Protection Agency (EPA) emissions factors depending on fuel type. More information regarding MRR regulation requirements are available here: https://ww2.arb.ca.gov/sites/default/files/classic/cc/reporting/ghg-rep/regulation/mrr-2018-unofficial-2019-4-3.pdf

4. City of Ukiah. 2023. 2022 Power Content Label, City of Ukiah Electric Utility. Available at: https://cityofukiah.com/wp-content/uploads/2023/09/City-of-Ukiah-2022-PCL.pdf

5. California Energy Commission (CEC). 2020. Modification of Regulations Governing the Power Source Disclosure Program. Available at: https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program/p

6. Nonresidential includes kWh consumption from commercial and industrial sources.

# **Energy: Electricity Transmission and Distribution Losses**

Electricity Transmission and Distribution (T&D) losses arise from electricity lost during delivery to the buildings and associated end-uses in Ukiah. Electricity T&D losses occur in the electricity transmission and distribution system and are therefore upstream of the delivery endpoints located within Ukiah jurisdictional boundaries. This means that this electricity is lost before it is counted. However, T&D losses are estimated and included in the 2022 Community GHG Inventory as they are associated with energy usage in Ukiah and thereby directly impacted by the community's electricity consumption. Additionally, emissions from T&D losses are recommended for inclusion in community GHG inventories by the Community Protocol. Equation 2.2 and Table 3 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions associated with community T&D losses from electricity consumption. T&D losses associated with EV electricity use are considered negligible and therefore are included in the quantification of residential and nonresidential electricity T&D.

#### **EQUATION 2.2**

#### **BE.4 ELECTRICITY T&D LOSS SECTOR EMISSIONS**

$$CO_2 e_{T\&D,j} = \sum_{i} Elec_{i,j} \times L_{T\&D} \times EF_{elec,i,j}$$

2.2

#### Table 3 Emissions Parameters and Data Sources – Community Electricity T&D Loss

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from transmission and distribution losses per building type	$CO_2e_{T\&D,i}$	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Electricity consumption per energy provider and building type	Elec <sub>i,j</sub>	See Table 16	kWh/year	City of Ukiah Electricity Report <sup>1</sup>
Electricity emissions factor per energy provider and building type <sup>2</sup>	EF <sub>elec,i,j</sub>	See Table 16	MT CO <sub>2</sub> e/kWh	2. City of Ukiah 2022 Power Content Label <sup>3</sup> 3. CEC Power Source Disclosure Regulations <sup>4</sup>
Electricity loss factor	$L_{T\&D}$	4.12%	Percent	City of Ukiah Electricity Report
Energy Providers	i	City of Ukiah	Categorical	
Building type	j	Residential Nonresidential <sup>5</sup>	Categorical	

Notes: MT CO2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour

1. City of Ukiah Electricity Report provided by the City via email on August 31, 2023

2. The electricity emissions factor was calculated according to regulatory guidance established by the California Energy Commission (CEC) and based on the Ukiah 2022 power label grid mix. According to CEC guidance, emissions factors for each fuel source are to be sourced from MRR requirements, which in turn stipulates the use of Energy Information Administration (EIA) or Environmental Protection Agency (EPA) emissions factors depending on fuel type. More information regarding MRR regulation requirements are available here: https://ww2.arb.ca.gov/sites/default/files/classic/cc/reporting/ghg-rep/regulation/mrr-2018-unofficial-2019-4-3.pdf

3. City of Ukiah. 2023. 2022 Power Content Label, City of Ukiah Electric Utility. Available at: https://cityofukiah.com/wp-content/uploads/2023/09/City-of-Ukiah-2022-PCL.pdf

4. California Energy Commission (CEC). 2020. Modification of Regulations Governing the Power Source Disclosure Program. Available at: https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program/p

5. Nonresidential includes kWh consumption from commercial and industrial sources.

# **Energy: Residential and Nonresidential Natural Gas**

GHG emissions from natural gas result from the stationary combustion of natural gas in both the residential and nonresidential building sectors. Ukiah's natural gas is supplied by Pacific Gas and Electric (PGE) which provided activity data through natural gas usage reports. GHG emission calculations are based on natural gas used in residential and nonresidential buildings (i.e., commercial and industrial). However, data provided by PG&E did not report natural gas use associated with industrial sector consumption, and therefore there was no natural gas use attributable to industrial operations in the 2022 Community GHG Inventory.

Emissions from residential and nonresidential natural gas use were calculated using Community Protocol Equation BE.1.1. Though the majority of GHG emissions result from the combustion of natural gas, not all the natural gas purchased is combusted. Natural gas that leaks from pipes and processing plants has a larger GHG impact compared to combusted natural gas due to the higher global warming potential of methane. Some natural gas also leaks from fittings and appliances within a building, after the natural gas meter which is used to quantify total gas usage. Therefore, Community Protocol has been adjusted to remove this small percentage of "behind the meter" natural gas from the combustion calculation, and instead count it as leakage. More information regarding emissions associated with natural gas leaks can be found under "Energy: Natural Gas Methane Leaks" subsection below. Equation 2.3 and Table 4 provide the equation used, associated parameters, and data sources used to quantify GHG emissions associated with community natural gas consumption in residential and nonresidential buildings.

#### **EQUATION 2.3**

#### **BE.1.1 RESIDENTIAL/NONRESIDENTIAL NATURAL GAS SECTOR EMISSIONS**

$$CO_2 e_{NatGas,i} = (Fuel_{NG,i} - [1 - L_{enduse}]) \times [(EF_{NG,CO_2} \times GWP_{CO_2}) + (EF_{NG,CH_4} \times GWP_{CH_4}) + (EF_{NG,N_2O} \times GWP_{N_2O})] \times 10^{-1} \times 10^{-3}$$

Table 4	Emissions Parameters and Data Sources	<ul> <li>Community</li> </ul>	Natural Gas Use BE.1.1

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	CO <sub>2</sub> e <sub>NatGas,i</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Natural gas consumed per building type	Fuel <sub>NG,i</sub>	See Table 16	therms/year	PGE Natural Gas Report <sup>1</sup>
Percent natural gas lost during consumer end-use	L <sub>enduse</sub>	0.50%	Percent	Environmental Defense Fund <sup>2</sup>
Carbon dioxide emission factor for natural gas combustion	EF <sub>NG,CO2</sub>	53.06	kg CO <sub>2</sub> /mmBTU natural gas	EPA Emission Factors Hub <sup>3</sup>
Methane emission factor for natural gas combustion	$EF_{NG,CH_4}$	0.001	kg CH₄/mmBTU natural gas	EPA Emission Factors Hub
Nitrous oxide emission factor for natural gas combustion	$EF_{NG,N_2O}$	0.0001	kg N <sub>2</sub> O/mmBTU natural gas	EPA Emission Factors Hub
Global warming potential of carbon dioxide	GWP <sub>CO2</sub>	1		IPCC Fifth Assessment Report <sup>4</sup>
Global warming potential of methane	$GWP_{CH_4}$	28		IPCC Fifth Assessment Report
Global warming potential of nitrous oxide	$GWP_{N_2O}$	265		IPCC Fifth Assessment Report
Conversion factor	10 <sup>-1</sup>	0.1	mmBTU/therm	
Conversion factor	10 <sup>-3</sup>	0.001	MT/kg	
Building type (i.e. residential or nonresidential)	i	Residential Nonresidential	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

1. Pacific Gas and Electricity (PGE) Natural Gas Report provided by the City via email on August 31, 2023

2. Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Available at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

3. Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub (April, 2022). Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

4. Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

5. Nonresidential includes natural gas consumption from commercial and industrial sources.

2.3

### **Energy: Natural Gas Methane Leaks**

Natural gas methane leaks occur during delivery to the buildings and during associated end-uses in the community. Gas methane leaks from delivery occur in the pipeline distribution system and are therefore upstream of the delivery endpoints located in Ukiah and not reflected in reported total natural gas purchased. While natural gas pipeline distribution leakage is technically outside of the Ukiah jurisdictional boundaries, the leakage is directly impacted by natural gas consumption in the community. As leakage is directly connected to the community's natural gas consumption, it is best practice to include leakage as an emissions sector and is therefore included in the Ukiah 2022 Community GHG Inventory. Methane leaks from end-use discussed previously occur at the point of use in Ukiah and therefore occur within Ukiah's jurisdictional boundaries. Though it is best practice to include emissions from natural gas leakage, the Community Protocol does not provide a specific calculation methodology for determining GHG emissions from natural gas leakage. Therefore, emissions from natural gas leaks were calculated using Equation 2.4 which aligns with energy calculation principles set forth by the Community Protocol and the guidance provided under Community Protocol Section BE.5 Upstream Emissions from Energy Use. Table 5 shows the parameters and data sources associated with Equation 2.4 which were used to quantify GHG emissions from natural gas distribution and end-use leakage.

#### **EQUATION 2.4**

#### **NATURAL GAS LEAKAGE SECTOR EMISSIONS**

#### $CO_2e_{leak,i} = Fuel_{NG,i} \times EF_{NG \ leak} \times (L_{enduse} + L_{dist})$

2.4

#### Table 5 Emissions Parameters and Data Sources – Community Natural Gas Leaks

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from natural gas distribution leakage per building type	CO <sub>2</sub> e <sub>leak,i</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Natural gas consumed per building type	Fuel <sub>NG,i</sub>	See Table 16	therms/year	PGE Natural Gas Report <sup>1</sup>
Emission factor for natural gas leakage	EF <sub>NG leak</sub>	0.053067	MT CO <sub>2</sub> e/therm	Calculated <sup>2</sup>
Percent natural gas lost during distribution	L <sub>dist</sub>	2.3%	Percent	Alvarez, Ramón et al. (2018) <sup>3</sup>
Percent natural gas lost during consumer end-use	L <sub>enduse</sub>	0.5%	Percent	Environmental Defense Fund <sup>4</sup>
Building type (i.e. residential or nonresidential)	i	Residential Nonresidential <sup>5</sup>	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; therms = thermal unit

1. Pacific Gas and Electricity (PGE) Natural Gas Report provided by the City via email on August 31, 2023

2. Emission factor is calculated using the following equation:

2.85 
$$\frac{cubic meters}{therm}$$
 \* 95% methane content \* 0.7  $\frac{kg}{cubic meter}$  \* 28  $\frac{CO_2e}{CH_4}$  \* 0.001  $\frac{MT}{kg}$ 

3. Alvarez, Ramón et al. (2018). Assessment of methane emissions from the U.S. oil and gas supply chain. Science. 361. Available at: https://www.science.org/doi/abs/10.1126/science.aar7204

4. Environmental Defense Fund USER GUIDE FOR NATURAL GAS LEAKAGE RATE MODELING TOOL. Available at: https://www.edf.org/sites/default/files/US-Natural-Gas-Leakage-Model-User-Guide.pdf

5. Nonresidential includes natural gas consumption from commercial and industrial sources.

# 2.1.3 Transportation

# **Transportation: On-road**

On-road vehicles in the community produce GHG emissions from the mobile combustion of fossil fuels (i.e., internal combustion engines) and up-stream from the production of electricity (i.e., electric vehicles). GHG emissions from the on-road transportation sector were calculated in accordance with Community Protocol TR.1.A and TR.2.B. The methodology leverages on-road transportation emission factors and EV penetration data from CARB's 2021 EMission FACtor (EMFAC2021) model.<sup>5</sup> EMFAC2021 provides data on the county-wide data level and does not differentiate data according to cities. This assessment assumes county-wide data reported by EMFAC2021 is representative of city-level on-road transportation emission factors and EV penetration rates.

The Community Protocol recommends use of regional travel demand models to differentiate passenger, commercial, and bus vehicle miles travelled activity data attributed to the community. This assessment utilizes vehicle miles travelled (VMT) data provided by GHD.<sup>6</sup> The VMT allocation study provided by GHD is based on data pulled from the Mendocino Council of Governments (MCOG) travel demand model<sup>7</sup> which generates attributable daily average VMT for participating communities in Mendocino County. VMT data provided by GHD for the purposes of this inventory were derived from the MCOG travel demand model using the SB 375 Regional Targets Advisory Committee (RTAC) origin-destination methodology.<sup>8</sup> The GHD study provides VMT data from trips occurring within Ukiah city limits (internal-internal), traversing city limits (internal-external), and trips which are entirely outside city limits (external-external). Weekday VMT accounted for 100 percent of internal-internal trips and 50 percent of internal-external trips and was annualized<sup>9</sup> to determine 2022 VMT activity data for Ukiah. As the MCOG model does not differentiate between passenger, commercial, and bus VMT, activity data was allocated to these sectors based on percent VMT share which was determined using data provided by the EMFAC2021 model. Equation 2.5 and Table 6 define the equations, parameters, and data sources used to convert resulting GHD VMT activity data to GHG emissions from onroad transportation fuel combustion.

#### **EQUATION 2.5**

#### TR.1.A & TR.2.B ON-ROAD TRANSPORTATION COMBUSTION EMISSIONS

$$CO_2e_{onroad,i} = \left(T + \frac{1}{2}T_O + \frac{1}{2}T_D\right) \times \%Share_i \times EF_{auto,i}$$

2.5

<sup>&</sup>lt;sup>5</sup> California Air and Resources Board. 2023. Emission FACtor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

<sup>&</sup>lt;sup>6</sup> https://www.ghd.com/en-US

<sup>&</sup>lt;sup>7</sup> https://www.mendocinocog.org/

<sup>&</sup>lt;sup>8</sup> California Air and Resources Board (CARB). 2018. Appendix F, Final Environmental Analysis. Available at:

https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375\_Final\_Target\_Staff\_Report\_%202018\_AppendixF.pdf

<sup>&</sup>lt;sup>9</sup> Daily VMT is scaled based on a 347 days per year in alignment with methodology specified in the CARB AB 32 Scoping Plan methodology summary, available at: https://www.arb.ca.gov/cc/scopingplan/document/measure\_documentation.pdf. The conversion factor accounts for difference between weekend vs weekday transportation activities.

Table 6 Emissions Parameters and Data Sources – Community On-road Transportation TR.1.A and TR.2.B

Definition	Parameter	Value	Unit	Data Source
Total annual community on- road GHG emissions per vehicle class	CO2e <sub>Onroad,i</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
VMT occurring within jurisdictional boundaries	Т	83,249	miles	MCOG Travel Demand Model (GHD) <sup>1</sup>
VMT originating within and terminating outside of jurisdictional boundaries	T <sub>o</sub>	122,583	miles	MCOG Travel Demand Model (GHD)
VMT originating outside of and terminating within jurisdictional boundaries	T <sub>D</sub>	526,526	miles	MCOG Travel Demand Model (GHD)
Percent share of total VMT for each vehicle class	%Share <sub>i</sub>	See Table 16	%	EMFAC2021 v1.0.1 <sup>2</sup>
Emissions factor for on-road vehicles per vehicle class	EF <sub>auto,i</sub>	See Table 16	MT CO <sub>2</sub> e/mile	EMFAC2021 v1.0.1
Vehicle class	i	Passenger Commercial Bus	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

1. Mendocino Council of Governments (MCOG) Travel Demand Model activity data provided by GHD via email on October 27, 2023. Further information regarding the regional transportation model is available at: https://www.mendocinocog.org/

2. California Air Resources Board (CARB). 2023. EMission FACtor (EMFAC2021 v1.0.1) Model. Available at:

https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

In addition to mobile combustion emissions accounted under Community Protocol Equations TR.1.A and TR.2.B, GHG emissions from electric vehicles were included in the 2022 Community GHG Inventory for more accurate accounting of on-road transportation trends. This was achieved through modifying Equation 2.5 to account for EV modeshare estimates based on total VMT (see Equation 2.6). Note that Equation 2.5 was not adjusted above to account for EV share of VMT data due to use of the EMFAC2021 weighted emissions factors which attribute GHG emissions to be zero for EV activity. Due to this zero emissions attribution, application of the EMFAC2021 emissions factor to total VMT data in Equation 2.5 in effect excludes EV GHG emissions. As such, GHG emissions associated with EV VMT quantified according to Equation 2.6 below does not result in double counting of emissions resulting from Equation 2.5 methodology. The equation, parameters, and data sources used to estimate GHG emissions attributable to on-road EV activity is provided in Equation 2.6 and Table 7 below.

#### **EQUATION 2.6**

#### **ON-ROAD TRANSPORTATION ELECTRIC VEHICLE EMISSIONS**

$$CO_{2}e_{onroad,EV,i} = \left(T + \frac{1}{2}T_{O} + \frac{1}{2}T_{D}\right) \times \%Share_{i} \times EV_{share,i} \times EPM_{i}$$

$$\times EF_{elec,j}$$
2.6

Table 7	Emissions Parameters and Data Sources -	- Community	y On-road	Transportation E
		Communit	y Oli-Ioau	i i ansportation i

Definition	Parameter	Value	Unit	Data Source
Total annual community on- road EV GHG emissions per vehicle class	CO <sub>2</sub> e <sub>Onroad,EV,i</sub>	See Table 16	$MT CO_2e/year$	Calculated
VMT occurring within jurisdictional boundaries	Т	83,249	miles	MCOG Travel Demand Model (GHD) <sup>1</sup>
VMT originating within and terminating outside of jurisdictional boundaries	T <sub>O</sub>	122,583	miles	MCOG Travel Demand Model (GHD)
Vehicle miles travelled originating outside of and terminating within jurisdictional boundaries	T <sub>D</sub>	526,526	miles	MCOG Travel Demand Model (GHD)
Percent share of total VMT for each vehicle class	%Share <sub>i</sub>	See Table 16	%	EMFAC2021 v1.0.1 <sup>2</sup>
Percent share of VMT attributable to EVs	EV <sub>share,i</sub>	See Table 16	%	EMFAC2021 v1.0.1
Average rate of electricity consumption per EV-mile per vehicle class	EPM <sub>i</sub>	Various <sup>3</sup>	kWh/mile	EMFAC2021 v1.0.1
Weighted average electricity emissions factor per building type	EF <sub>elec,j</sub>	See Table 16	MT CO <sub>2</sub> e/kWh	See Table 2
Vehicle class	i	Passenger Commercial Bus	Categorical	
Building type	j	Residential Nonresidential	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; EV = electric vehicles; VMT = vehicle miles travelled; kWh = kilowatt hour

1. Mendocino Council of Governments (MCOG) Travel Demand Model activity data provided by GHD via email on October 27, 2023. Further information regarding the regional transportation model is available at: https://www.mendocinocog.org/

2. California Air Resources Board (CARB). 2023. EMission FACtor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

3. The electricity consumption per EV-mile (EPM) in 2022 is as follows: Passenger = 0.3647, Commercial = 0.0000, and Bus = 1.7498

# **Transportation: Off-road**

Off-road equipment and vehicles in the community generate GHG emissions from the mobile combustion of fossil fuels. Off-road fuel usage results from equipment operation for sectors such as agricultural, construction, lawn and garden, or recreational equipment. Community Protocol Equation TR.8 was used to quantify GHG emissions from off-road equipment fuel consumption and is shown under Equation 2.7 below. Table 8 lists the parameters, values, and data sources used to quantify emissions in according with the Community Protocol.

#### **EQUATION 2.7**

#### **TR.8 OFF-ROAD EQUIPMENT SECTOR EMISSIONS**

$$CO_2e_{offroad,j} = EF_j \times \sum_i Fuel_{offroad,i,j} \times AF_i$$

#### Table 8 Emissions Parameters and Data Sources – Community Off-Road Equipment TR.8

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from offroad equipment	CO <sub>2</sub> e <sub>offroad,j</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Annual fuel consumption in the County per sector per fuel type	Fuel <sub>offroad,i,j</sub>	See Table 16	Gallons/year	OFFROAD2021 <sup>1</sup>
Fuel attribution factor per equipment type	AF <sub>i</sub>	See Table 9	Percent	California Department of Finance <sup>2</sup>
Emission factor per fuel type	EFj	See Table 16	MT CO <sub>2</sub> e/gallon	EPA Emission Factors Hub <sup>3</sup>
Equipment Type	i	See Table 9	Categorical	OFFROAD2021
Fuel type	j	Gasoline Diesel Natural Gas	Categorical	OFFROAD2021

Notes: MT CO2e = Metric tons of carbon dioxide equivalent

1. California Air Resource Board (CARB). Mobile Source Emissions Inventory Off-road (OFFROAD2021) v.1.0.5. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-road-documentation-0

2. California Department of Finance. 2023. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2023. Available at: https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-countiesand-the-state-2020-2023/

3. Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

The OFFROAD2021 model is in alignment with Community Protocol standards, though the model only reports offroad equipment fuel consumption on a county-wide basis. Attribution factors per equipment type used to allocate Ukiah off-road fuel usage were determined based on demographic data and land use data relating to population size, number of jobs, and agricultural acreage where applicable. The demographic attribution metrics and percent attribution used for each off-road equipment type is shown in Table 9.

2.7

Table 9	Community Off-road Equipment Sector Attributions
---------	--

Equipment Type	Attribution Metric	Attribution	Data Source
Agricultural	Excluded – Other <sup>1</sup>	0.00%	Not Applicable
Airport Ground Support	Employment <sup>2</sup>	19.07%	California Department of Finance <sup>3</sup>
Cargo Handling Equipment	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Commercial Harbor Craft	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Construction and Mining	Employment	19.07%	California Department of Finance
Industrial	Employment	19.07%	California Department of Finance
Lawn and Garden	Population	17.86%	California Department of Finance
Light Commercial	Employment	19.07%	California Department of Finance
Locomotive	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Ocean Going Vessel	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Oil Drilling	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Outboard Marine Tanks	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Pleasure Craft	Population	17.86%	California Department of Finance
Portable Equipment	Employment	19.07%	California Department of Finance
Transport Refrigeration Unit	Employment	19.07%	California Department of Finance
Recreational	Population	17.86%	California Department of Finance
Military Tactical Support	Excluded - Not Under Jurisdictional Control	0.00%	Not Applicable
Forestry	Excluded - Other	0.00%	Not Applicable

Notes:

1. Agricultural excluded as acres of farmland within Ukiah boundaries are anticipated to be negligible based on incorporated Ukiah land use identified in the General Plan 2040, available here: https://cityofukiah.com/wp-

content/uploads/2023/01/General-Plan-2040-122922\_Signed.pdf

2. The City owns and operates the Ukiah Airport and therefore has jurisdictional control over its operations: https://cityofukiah.com/departments/ukiah-

airport/#:~:text=Ukiah%20Municipal%20Airport&text=The%20airport%20is%20comprised%20of,87%20aircraft%20based%20on% 20site.

3. California Department of Finance. 2023. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2023. Available at: https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-countiesand-the-state-2020-2023/

4. Though forestry occurs withing the County of Mendocino, there appears to be minimal opportunity for forestry within Ukiah's boundaries. Therefore, it is assumed that offroad fuel consumption for forestry activities is negligible and thereby excluded.

### 2.1.4 Solid Waste

GHG emissions associated with the waste sector result from the decomposition of waste at a landfill as well as landfill operation processes. C&S Waste Solutions<sup>10</sup> provides solid waste, recycling, and mixed organic waste collection services for Ukiah. Once collected, solid waste is ultimately processed at the following landfills: Eastlake Sanitary Landfill, Forward Landfill Inc, Potrero Hills Landfill, Recology Hay Road, Redwood Landfill.<sup>11</sup> GHG emissions from waste decomposition were calculated using Community Protocol Method SW.4.1. Equation 2.8 and Table 10 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions in accordance with Community Protocol SW.4.1.

#### **EQUATION 2.8**

#### SW.4.1 SOLID WASTE FUGITIVE EMISSIONS

$$CO_2 e_{Waste, fugitive} = GWP_{CH_4} \times (1 - CE) \times (1 - OX) \times M \times \sum_i P_i \times EF_i$$
2.8

#### Table 10 Emissions Parameters and Data Sources – Community Solid Waste SW.4.1

Definition	Parameter	Value	Unit	Data Source
Annual community generated waste GHG emissions	$CO_2e_{Waste,fugitive}$	3,764	MT CO <sub>2</sub> e/year	Calculated
Methane global warming potential	<i>GWP</i> <sub>CH4</sub>	28		IPCC Fifth Assessment Report <sup>1</sup>
Default LFG collection efficiency	CE	0.75	Fraction	ICLEI Community Protocol
Oxidation rate	OX	0.10	Fraction	ICLEI Community Protocol
Total mass of waste entering landfill	М	9,957	Wet short tons	C&S Waste Solutions <sup>2</sup>
Proportion of total waste material per material type	P <sub>i</sub>	1	Fraction	
Emission factor per material type <sup>3</sup>	EF <sub>i</sub>	0.060	MT CH <sub>4</sub> /wet short ton	ICLEI Community Protocol
Material type	i	Multiple	Categorical	

Notes: MT CO2e = Metric tons of carbon dioxide equivalent

1. Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

2. C&S Waste Solutions 2022 Solid Waste tonnage report provided by the City via email on August 31, 2023

3. For mixed municipal waste streams where the proportion of material type is unknown, ICLEI specifies a default value of 0.060 MT  $CH_4$  per wet short ton may be used.

Landfill process emissions were quantified according to Equation SW.5 of the Community Protocol. Equation 2.9 and Table 11 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions from landfill operations.

<sup>&</sup>lt;sup>10</sup> https://candswaste.com/locations/california/mendocino-county/ukiah-waste-solutions/

<sup>&</sup>lt;sup>11</sup> California Department of Resources Recycling and Recovery (CalRecycle). 2019. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

#### **EQUATION 2.9**

#### SW.5 SOLID WASTE PROCESS EMISSIONS

 $CO_2e_{Waste, process} = M \times EF_p$ 

Table 11	Emissions Parameters and Data Sources – Commu	nity Solid Waste SW 5

Definition	Parameter	Value	Unit	Data Source
Annual landfill process GHG emissions	$CO_2e_{Waste, process}$	110	MT CO <sub>2</sub> e/year	Calculated
Total mass of solid waste that enters the landfill in the inventory year	Μ	9,957	Wet short tons/year	C&S Waste Solutions <sup>1</sup>
Emissions factor for landfill process emissions	EFp	0.011	MT CO <sub>2</sub> e/wet short ton	ICLEI Community Protocol

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent

1. C&S Waste Solutions 2022 Solid Waste tonnage report provided by the City via email on August 31, 2023

### 2.1.5 Water

Water consumption generates GHG emissions from the electricity used to extract, convey, treat, and deliver water to the community. The City provides the entirety of the community's water needs. The City's potable water supply consists of groundwater pumped from the Ukiah Valley Groundwater Basin and surface water sourced from the Russian River. Well pumps used to extract groundwater are located within Ukiah boundaries, while surface wells are located along the Russian River which lies outside of Ukiah's boundaries. Additionally, the City owns and operates a water treatment plant located within Ukiah city limits which treats extracted surface water.<sup>12</sup>

As the City supplies all of the community's water needs and the majority of processes occur within Ukiah city limits, electricity consumption associated with local groundwater and surface water management is anticipated to be included under nonresidential electricity use. Therefore, to avoid double counting water management GHG emissions are excluded from the 2022 Community GHG Inventory. However, GHG emissions associated with City groundwater and surface water management is quantified and presented below for information purposes. Table 12 shows the parameters and data sources associated with Equation 2.10 which were used to quantify GHG emissions from local and imported water sources.

#### **EQUATION 2.10**

#### WW.14 WATER SECTOR EMISSIONS

$$CO_2e_{Water,i} = Vol_i \times \sum_j EI_{i,j} \times EF_{elec,i,j}$$

2.10

<sup>&</sup>lt;sup>12</sup> City of Ukiah. 2021. 2020 Urban Water Management Plan (UWMP). Provided by the City via email on August 31, 2023

#### Table 12 Emissions Parameters and Data Sources – Community Water WW.14

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from water consumption per water district	CO <sub>2</sub> e <sub>Water,i</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Volume of water supplied to the community per water district	Vol <sub>i</sub>	See Table 16	AF	City of Ukiah 2022 Water Production Report <sup>1</sup>
Energy intensity of water distribution per water district	EI <sub>i,j</sub>	See Table 16	kWh/AF	1. City of Ukiah 2020 UWMP <sup>2</sup> 2. ICLEI Community Protocol
Electricity emissions factor per water process stage per source type	EF <sub>elec,i,j</sub>	0.000278	MT CO₂e/kWh	See Table 2
Water district	i	City of Ukiah	Categorical	
Water process stage	j	Extraction Conveyance Treatment Distribution	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; AF = acre-feet; kWh = kilowatt hour; UWMP = Urban Water Management Plan

1. City of Ukiah 2022 Water Production Report provided by the City via email on August 31, 2023

2. City of Ukiah. 2021. 2020 Urban Water Management Plan (UWMP). Provided by the City via email on August 31, 2023.

### 2.1.6 Wastewater

Management of wastewater produces emissions through every stage of the process from collection to final use or discharge. The City owns and operates the City of Ukiah wastewater treatment plant (WWTP) which provides treatment services for Ukiah as well as the Ukiah Valley Sanitation District (UVSD) which lies just outside of the incorporated Ukiah boundaries. The WWTP has a dry-weather capacity of 3.01 million gallons per day (MGD) and a wet weather capacity of 24.5 MGD. The WWTP was upgraded to produce recycled water in 2019 using primary, secondary, and tertiary treatment. This upgrade allows the City to avoid wastewater effluent discharge by either utilizing recycled water for irrigation and agriculture or by storing excess treated wastewater in percolation ponds.<sup>13</sup>

GHG emissions from the City's WWTP operations are a result of stationary combustion of digester gas, process emissions which occur with nitrification/denitrification, and electricity use.<sup>14</sup> As the WWTP is located within Ukiah boundaries, the facility's electricity use is anticipated to be included under nonresidential electricity consumption. To avoid double counting, WWTP electricity use is excluded and only process related emissions are quantified. The set of methods used to quantify stationary combustion emissions is outlined in Equation 2.11 and Table 13 as well as Equation 2.12 and Table 14 below.

#### **EQUATION 2.11**

#### WW.1 WASTEWATER DIGESTER GAS STATIONARY COMBUSTION EMISSIONS (CH<sub>4</sub>)

 $CO_2e_{WW,Stat,CH4,i}$ 

2.11

= (Digester Gas  $\times f_{CH4} \times BTU_{CH4} \times 10^{-6} \times EF_{CH4}$  $\times 365.25 \times 10^{-3}) \times GWP_{CH4}$ 

 <sup>&</sup>lt;sup>13</sup> City of Ukiah. 2021. 2020 Urban Water Management Plan (UWMP). Provided by the City via email on August 31, 2023
 <sup>14</sup> Ibid

Table 13	Emissions Parameters and Data Sources -	<ul> <li>Community Wastewater WW.1.(alt</li> </ul>
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Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by devices designed to combust digester gas	CO <sub>2</sub> e <sub>WW,Stat,CH4</sub>	See Table 16	$MT CO_2e/year$	Calculated
Rate of digester gas volume production	Digester Gas	21,319	std ft³ /day	City of Ukiah 2022 Wastewater Production Report <sup>1</sup>
Fraction of methane in digester gas	f <sub>CH4</sub>	0.60	Fraction	City of Ukiah 2022 Wastewater Production Report
Default higher heating value of methane	BTU <sub>CH4</sub>	1,028	BTU/ft <sup>3</sup>	ICLEI Community Protocol
Conversion factor	$10^{-6}$	0.000001	mmBTU/BTU	
Methane emissions factor	EF <sub>CH4</sub>	0.0032	kg CH₄/mmBTU	ICLEI Community Protocol
Conversion factor	365.25	365.25	Days/year	ICLEI Community Protocol
Conversion factor	$10^{-3}$	0.001	MT/kg	
Global warming potential of methane	GWP <sub>CH4</sub>	28		IPCC Fifth Assessment Report
Wastewater treatment plant (WWTP)	i	Ukiah	Categorical	

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; std ft<sup>3</sup> = standard cubic feet; BTU = British thermal unit; mmBTU = one million British thermal units; kg = kilograms;

1. City of Ukiah. 2023. City of Ukiah 2022 Wastewater Production Report. Provided by the City via email on August 31, 2023.

### **EQUATION 2.12**

#### WW.2 WASTEWATER DIGESTER GAS STATIONARY COMBUSTION EMISSIONS (N<sub>2</sub>O)

2.12

 $CO_2 e_{WW,Stat,N2O,i} = (Digester Gas \times f_{CH4} \times BTU_{CH4} \times 10^{-6} \times EF_{N2O} \times 365.25 \times 10^{-3}) \times GWP_{N2O}$ 

#### Emissions Parameters and Data Sources - Community Wastewater WW.2.(alt) Table 14

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by devices designed to combust digester gas	CO <sub>2</sub> e <sub>WW,Stat,N20</sub>	See Table 16	MT CO <sub>2</sub> e/year	Calculated
Rate of digester gas volume production	Digester Gas	21,319	std ft³day	City of Ukiah 2022 Wastewater Production Report <sup>1</sup>
Fraction of methane in digester gas	f <sub>CH4</sub>	0.60	Fraction	City of Ukiah 2022 Wastewater Production Report
Default higher heating value of methane	BTU <sub>CH4</sub>	1,028	BTU/ft <sup>3</sup>	ICLEI Community Protocol

Definition	Parameter	Value	Unit	Data Source
Conversion factor	$10^{-6}$	0.000001	mmBTU/BTU	
Nitrous Oxide emissions factor	EF <sub>N20</sub>	0.00063	kg N <sub>2</sub> O/mmBTU	ICLEI Community Protocol
Conversion factor	365.25	365.25	Days/year	ICLEI Community Protocol
Conversion factor	$10^{-3}$	0.001	MT/kg	
Global warming potential of nitrous oxide	GWP <sub>N20</sub>	265		IPCC Fifth Assessment Report
Wastewater treatment plant (WWTP)	i	Ukiah	Categorical	

Notes:  $MT CO_2e = Metric tons of carbon dioxide equivalent; std ft<sup>3</sup> = standard cubic feet; <math>BTU = British thermal unit; MMBtu = one million British thermal units; kg = kilograms;$ 

1. City of Ukiah. 2023. City of Ukiah 2022 Wastewater Production Report. Provided by the City via email on August 31, 2023

Equation 2.13 shows the calculation method use to quantify process emissions with nitrification/denitrification in accordance with Community Protocol WW.7. Table 15 show the parameter definitions, default factors, and data sources used.

#### **EQUATION 2.13**

#### WW.7 CENTRALIZED WWTP W/ NITRIFICATION/DENITRIFICATION

 $CO_2 e_{WW,nit/denit,i} = P_i \times F_{ind-com} \times EF_{nit/denit} \times 10^{-6} \times GWP_{N2O}$ 

2.13

#### Table 15 Emissions Parameters and Data Sources – Community Wastewater WW.7

Definition	Parameter	Value	Unit	Data Source
Total annual GHG emitted by WWTP processes	CO2e <sub>WW,nit/denit,i</sub>	29.55	MT CO <sub>2</sub> e/year	Calculated
Population	P <sub>i</sub>	15,929	People	California Department of Finance <sup>1</sup>
Factor for insignificant industrial or commercial discharge	F <sub>ind-com</sub>	1.00		ICLEI Community Protocol
Emissions factor for a WWTP without nitrification or denitrification	$EF_{w/onit/denit}$	7.00	$g N_2 O/person/year$	ICLEI Community Protocol
Conversion factor	10 <sup>-6</sup>	0.000001	mmBTU/BTU	
Global warming potential of nitrous oxide	GWP <sub>N20</sub>	265		IPCC Fifth Assessment Report <sup>2</sup>
Wastewater treatment plant (WWTP)	i	Ukiah WWTP	Categorical	

Notes: MT  $CO_2e =$  Metric tons of carbon dioxide equivalent; std ft<sup>3</sup> = standard cubic feet; BTU = British thermal unit; mmBTU = one million British thermal units; kg = kilograms;

1. California Department of Finance. 2023. E-5 Population and Housing Estimates for Cities, Counties, and the State, 2020-2023. Available at: https://dof.ca.gov/forecasting/demographics/estimates/e-5-population-and-housing-estimates-for-cities-counties-and-the-state-2020-2023/

2. Intergovernmental Panel on Climate Change (IPCC). 2014. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/report/ar5/syr/

# 2.2 2022 Community GHG Emissions Inventory Results

The 2022 community inventory provides Ukiah with current communitywide GHG emissions estimates that follow the Community Protocol and current best practices for GHG accounting. The results of the 2022 community GHG inventory are shown in Figure 1 and Figure 2 summarized in detail in Table 16.



#### Figure 1 2022 Inventory GHG Emissions by Sector

#### Figure 2 2022 Inventory GHG Emissions by Sub-Sector



Ukiah 2022 Community CO<sub>2</sub>e Emissions

	-					
GHG Emissions Sector	GHG Emissions Subsector	Activit	y Data	Emiss	sion Factor	GHG Emissions (MT CO <sub>2</sub> e)
Energy	Residential Electricity	35,413,493	kWh	0.000278	MT CO <sub>2</sub> e/kWh	9,847
	Residential Electricity T&D	1,504,429	kWh	0.000278	MT CO <sub>2</sub> e/kWh	418
	Nonresidential Electricity	69,671,948	kWh	0.000278	MT CO2e/kWh	19,372
	Nonresidential Electricity T&D	2,872,337	kWh	0.000278	MT CO <sub>2</sub> e/kWh	799
	Residential Natural Gas	2,324,152	therms	0.005311	MT CO <sub>2</sub> e/therm	12,345
	Residential Natural Gas Leaks	65,403	therms	0.053067	MT CO <sub>2</sub> e/therm	3,471
	Nonresidential Natural Gas	1,780,588	therms	0.005311	MT CO <sub>2</sub> e/therm	9,458
	Nonresidential Natural Gas Leaks	50,107	therms	0.053067	MT CO <sub>2</sub> e/therm	2,659
Transportation	Passenger VMT	123,285,957	VMT	0.000356	MT CO <sub>2</sub> e/mile	43,890
	Commercial VMT	17,898,549	VMT	0.001228	MT CO2e/mile	21,979
	Bus VMT	323,308	VMT	0.001406	MT CO <sub>2</sub> e/mile	455
	Passenger EVMT	1,079,053	kWh	0.000278	MT CO <sub>2</sub> e/kWh	300
	Commercial EVMT	0	kWh	0.000278	MT CO <sub>2</sub> e/kWh	0
	Bus EVMT	1,584	kWh	0.000278	MT CO <sub>2</sub> e/kWh	0
	Off-road Diesel	166,350	Gallons	0.010471	MT CO <sub>2</sub> e/gal	1,742
	Off-road Gasoline	183,909	Gallons	0.009158	MT CO <sub>2</sub> e/gal	1,684
	Off-road Natural Gas	0	Gallons	0.000000	$MT CO_2e/gal$	0
Solid Waste	Landfill Methane	9,957	Wet short tons	0.378000	MT CO <sub>2</sub> e/ton	3,764
	Process Emissions	9,957	Wet short tons	0.011000	MT CO <sub>2</sub> e/ton	110
Water <sup>1</sup>	Groundwater	860,648	kWh	0.000278	MT CO <sub>2</sub> e/kWh	332
	Surface Water	796,852	kWh	0.000278	MT CO <sub>2</sub> e/kWh	680
Wastewater	Stationary Combustion	7,786,765	scf	0.0000002	MT CO2e/scf	1
	Process N20 Emissions	15,929	people	0.001855	MT CO <sub>2</sub> e/person	30
Total						132.323

#### Table 16 2022 Community GHG Emissions Inventory

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; gal = gallons

1. Water sector activity data is included for informational purposes but is not included in total inventory GHG emissions to avoid double counting
# 3 2005/2010 Community GHG Inventory Update

The Ukiah community GHG Inventory for 2005 and 2010 (2005/2010 Inventory) was completed in support of the Ukiah CAP, a draft of which was prepared on March 12, 2014 but not adopted. Though the 2005/2010 Inventory was completed in accordance with the ICLEI Local Governments for Sustainability Community Protocol, some of the data sources used in Ukiah's 2005/2010 Inventory have recently been updated based on best available information and regulatory updates. These model changes may introduce artificial trends in Ukiah's GHG emissions progress when comparing the 2005/2010 Inventory to the 2022 Community GHG Inventory quantified in the above sections of this report. To allow cross-comparison of Ukiah's GHG inventories, the 2005/2010 Inventory was updated to use the latest data sources and align accounting methods with those used in the Ukiah 2022 Community GHG Inventory. Additionally, fugitive emissions from the closed City landfill were excluded in the process of updating the 2005/2010 Inventory based on best practice GHG accounting and standards set by the Community Protocol. Updating the 2005 and 2010 inventories to align with 2022 Community GHG Inventory methodology provides a more accurate baseline of comparison which is critical for City of Ukiah staff to accurately track Ukiah's progress towards achieving its community GHG emissions reduction goals. The sections below outline the data sources and accounting methods used to update the Ukiah 2005/2010 GHG Inventory.

## 3.1 2005/2010 Community GHG Inventory Updates

## 3.1.1 Global Warming Potential

The 2005/2010 Inventory was completed using GWPs from the IPCC Second Assessment Report.<sup>15</sup> The GWPs used in the inventory are outdated and inconsistent with the AR5 GWPs used in the CARB 2022 Scoping Plan and the 2022 Community GHG Inventory (see Section 2.1.1). Therefore, the 2005/2010 Inventory was updated across all GHG emission sectors to use AR5 GWPs to improve consistency and traceability of emissions with State GHG reduction goals.

## 3.1.2 Energy

## Electricity

The 2005/2010 Community Inventory included electricity consumption from residential and nonresidential buildings as well as electricity transmission and distribution losses, however, emissions factors were calculated using ICLEI default factors and excluding emissions from non-carbon free eligible renewable sources (i.e. geothermal and biomass), which resulted in under-reporting emissions associated with electricity consumption by approximately 50 percent. The CEC includes fossil-based GHG emissions as well as emissions from non-carbon-free renewable energy when determining the emissions factor for an electric grid portfolio.<sup>16</sup> To align with CEC methodology and current best practices used to quantify the 2022 Community GHG Inventory, electricity emissions factors were updated following fuel and feedstock type emissions factor determination methods outlined in Table 2 and using 2005 and 2010 grid mix data as provided the City. The results of the 2005/2010 Community Inventory update for electricity sector emissions is provided in Table 17.

<sup>&</sup>lt;sup>15</sup> Intergovernmental Panel on Climate Change (IPCC). 1995. AR5 Synthesis Report: Climate Change 2014. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\_sar\_wg\_l\_full\_report.pdf

<sup>&</sup>lt;sup>16</sup> California Energy Commission (CEC). 2020. Modification of Regulations Governing the Power Source Disclosure Program. Available at: https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program/power-source-

#### Table 17 2005/2010 Electricity GHG Emissions Update

	GHG Emissions [MT CO <sub>2</sub> e]					
Sector	Original	Update				
2005 Inventory						
Residential Electricity	1,918	3,733				
Residential Electricity T&D <sup>1</sup>	_	131				
Nonresidential Electricity	4,323	8,418				
Nonresidential Electricity T&D <sup>1</sup>	-	295				
2010 Inventory						
Residential Electricity	1,679	3,720				
Residential Electricity T&D <sup>1</sup>	-	130				
Nonresidential Electricity	3,212	7,119				
Nonresidential Electricity T&D <sup>1</sup>	-	249				

Notes:

1. T&D in the original 2005/2010 Community GHG Inventory is included but aggregated into total GHG emissions.

## **Natural Gas**

The 2005/2010 Community Inventory included emissions attributable to the combustion of natural gas, but excluded losses associated with natural gas distribution and end use. Though ICLEI does not provide a recommended methodology for estimating natural gas distribution losses, it is a recommended source of emissions under the Community Protocol to be included in community inventories as it may be directly impacted by community activities. Thus, the 2005/2010 Community Inventory was updated to include natural gas losses associated with distribution and end use in accordance with Equation 2.3 and Equation 2.4 above using natural gas residential and commercial activity data from the Ukiah 2014 Climate Action Plan. A comparison of original inventory natural gas GHG emissions and the results of the 2005/2010 Community Inventory update are summarized in Table 18 below.

#### Table 18 2005/2010 Natural Gas GHG Emissions Update

	GHG Emissions [MT CO2e]					
Sector	Original	Update				
2005 Inventory						
Residential Natural Gas	14,370	14,265				
Residential Natural Gas Leaks	-	4,011				
Nonresidential Natural Gas	9,658	9,587				
Nonresidential Natural Gas Leaks	-	2,696				
2010 Inventory						
Residential Natural Gas	14,490	14,384				
Residential Natural Gas Leaks	-	4,044				
Nonresidential Natural Gas	9,231	9,164				
Nonresidential Natural Gas Leaks	-	2,576				

## 3.1.3 Transportation

## On-road

On-road vehicle transportation emissions in the original 2005/2010 Community Inventory were quantified based on vehicle miles travelled (VMT) data pulled from the 2010 baseline year MCOG Travel Demand model and allocated into speed bins. The inventory used weighted average  $CO_2$  emissions factors from the CARB EMFAC2011 model, while  $CH_4$  and  $N_2O$  emissions factors were sourced from the Community Protocol default factors and weighted according to Community Protocol default vehicle class mix values.

The 2005/2010 Community Inventory was updated to quantify on-road transportation GHG emissions in alignment with methods used in the Ukiah 2022 Community GHG Inventory (see Equation 2.5). Though the model has not been updated since the 2010 version, updated activity data for 2005 and 2010 based on MCOG Travel Demand model was provided by GHD based on current best practices in VMT accounting and allocated to passenger, commercial, and bus vehicle categories according EMFAC2021<sup>17</sup> percent vehicle share of total VMT. Activity data for 2010 was adjusted by GHD to reflect fewer daily trips due to reduced employment during the recession that followed the 2008 financial collapse. Emissions factors pulled from EMFAC2021 per vehicle class type were used to align on-road transportation GHG emissions with the latest vehicle emissions accounting methods. Table 19 summarizes the results of the 2005/2010 inventory updates for on-road transportation emissions.

	GHG Emissions [MT CO <sub>2</sub> e]					
Sector	Original	Update				
2005 Inventory						
Passenger Total VMT		53,592				
Commercial Total VMT	74,477	24,880				
Bus Total VMT		352				
Passenger EVMT	-	2				
Commercial EVMT	-	0				
Bus EVMT	-	0				
2010 Inventory						
Passenger Total VMT		50,580				
Commercial Total VMT	73,896	22,389				
Bus Total VMT		598				
Passenger EVMT	_	3				
Commercial EVMT	_	0				
Bus EVMT	-	0				

#### Table 19 2005/2010 On-road Transportation GHG Emissions Update

## **Off-road**

The 2005/2010 Inventory was developed using the CARB OFFROAD2007 model to estimate GHG emissions in the off-road sector. Emissions from lawn and garden equipment activity data were apportioned to Ukiah based on the proportion of households in Ukiah compared to the county, while construction, industrial, and light commercial equipment were apportioned based on population. The 2005/2010 Inventory was updated to use activity data from the latest OFFROAD2021<sup>18</sup> model and apportion fuel use across all off-road equipment classes according to Table 9 in alignment with the 2022 Community GHG Inventory. GHG emissions were quantified using emissions factors

https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

<sup>&</sup>lt;sup>17</sup> California Air Resources Board (CARB). 2023. EMission FACtor (EMFAC2021 v1.0.1) Model. Available at:

<sup>&</sup>lt;sup>18</sup> California Air Resource Board (CARB). Mobile Source Emissions Inventory Off-road (OFFROAD2021) v.1.0.5. Available at:

provided by the EPA Emission Factors Hub<sup>19</sup> for each equipment category. Table 20 summarizes the results of the 2005/2010 inventory updates for off-road transportation emissions.

Table 20 2005/2010 Off-road Transportation GHG Emissions Up
---

	GHG Emissions [MT CO <sub>2</sub> e]					
Sector	Original <sup>1</sup>	Update				
2005 Inventory						
Diesel		422				
Gasoline	8,530	1,519				
Natural Gas		0				
2010 Inventory						
Diesel		508				
Gasoline	8,436	1,474				
Natural Gas		0				

Notes:

1. GHG emissions includes off-road agricultural equipment which was quantified as a separate sector in the original inventory

## 3.1.4 Solid Waste

The 2005/2010 Community Inventory included fugitive emissions from solid waste generated by the community as well as fugitive emissions from a closed landfill that exists within the boundaries of Ukiah. To avoid double counting emissions, the Community Protocol recommends only including fugitive emissions associated with community waste generation. Therefore, the 2005/2010 Community Inventory was updated to exclude emissions from the closed landfill. Additionally, in the 2005/2010 Community Inventory the EPA LandGEM model was used to quantify fugitive emissions from generated solid waste. Though the EPA's LandGEM model uses the first order decay method as recommended by the Community Protocol, it is inconsistent with the 2022 Community Inventory which utilizes Community Protocol quantification methods and default factors. To establish consistency in Ukiah's waste sector emissions, adhere to Community Protocol recommendations, and align with State emissions reporting methods, the 2005/2010 Community Inventory was updated to quantify fugitive GHG emissions in accordance with Equation 2.8.

The 2005/2010 Community Inventory did not take into consideration landfill process emissions which is a recommended GHG emissions source under the Community Protocol. To align with Community Protocol recommendations and maintain consistency with the 2022 Community Inventory, landfill process emissions were included in the inventory update and quantified according to Equation 2.9. A comparison of the original solid waste GHG emissions estimates and the results of the 2005/2010 Community Inventory update are summarized in Table 21 below.

<sup>&</sup>lt;sup>19</sup> Environmental Protection Agency (EPA). 2022. GHG Emission Factors Hub. Available at: https://www.epa.gov/climateleadership/ghg-emission-factors-hub

#### Table 21 2005/2010 Solid Waste GHG Emissions Update

GHG Emissions [MT CO <sub>2</sub> e]					
Original	Update				
4,722	6,332				
_	184				
36,934	_				
2,641	3,541				
_	103				
30,543	-				
	GHG Emissio Original 4,722 - 36,934 2,641 - 30,543				

### 3.1.5 Water

As described in Section 2.1.5, the City provides the entirety of the community's water needs and therefore GHG emissions from water processes was excluded from the 2022 Community GHG Inventory to avoid double counting with emissions from nonresidential electricity consumption. It is similarly anticipated that nonresidential electricity use reported in the original 2005/2010 Community GHG Inventory includes electricity consumption attributable to City water supply operations. Therefore, water sector GHG emission were removed from the 2005/2010 Community GHG Inventory update to avoid double counting.

## 3.1.6 Wastewater

Prior to completion of its 2019 treatment operation upgrades, the City's wastewater treatment plant processed wastewater using digesters with stationary combustion and treatment processes without nitrification/denitrification. Treated wastewater produced by the plant was discharged as effluent into the Russian river.<sup>20</sup> Wastewater sector GHG emissions in the original 2005/2010 Community GHG Inventory were calculated appropriately according to the Community Protocol and were not updated. However, the population demographic activity data used to quantify GHG emissions from wastewater process N<sub>2</sub>O and effluent discharge was updated to be consistent with demographic data sources used in the 2022 Community GHG Inventory. Table 22 below summarizes the results of the 2005/2010 inventory updates for wastewater emissions.

#### Table 22 2005/2010 Wastewater GHG Emissions Update

	GHG Emissions [MT CO <sub>2</sub> e]					
Sector	Original	Update				
2005 Inventory <sup>1</sup>						
Stationary Combustion		0.7				
Process N20 Emissions	377.3	13.5				
Effluent Discharge Fugitive N2O		309.8				
2010 Inventory						
Stationary Combustion	0.7	0.7				
Process N20 Emissions	15.6	13.5				
Effluent Discharge Fugitive N2O	356.1	308.3				

Notes:

1. Solid Waste emissions for the 2005 inventory were back-casted from total wastewater sector 2010 GHG emissions based on population and housing demographic data and therefore does not report GHG emissions per sector.

<sup>&</sup>lt;sup>20</sup> City of Ukiah. 2021. 2020 Urban Water Management Plan (UWMP). Provided by the City via email on August 31, 2023.

## 3.2 2005/2010 Community GHG Inventory Results



Figure 3 2005 Updated Inventory GHG Emissions by Sector

GHG Emissions Sector	GHG Emissions Subsector	Activ	ity Data	Emissic	on Factor	GHG Emissions (MT CO2e)
Energy	Residential Electricity	32,643,291	kWh	0.000114	MT CO₂e/kWh	3,733
	Residential Electricity T&D	1,143,166	kWh	0.000114	MT CO2e/kWh	131
	Nonresidential Electricity	73,612,798	kWh	0.000114	MT CO <sub>2</sub> e/kWh	8,418
	Nonresidential Electricity T&D	2,576,448	kWh	0.000114	MT CO2e/kWh	295
	Residential Natural Gas	2,685,714	therms	0.005311	MT CO2e/therm	14,265
	Residential Natural Gas Leaks	75,578	therms	0.053067	MT CO2e/therm	4,011
	Nonresidential Natural Gas	1,805,047	therms	0.005311	MT CO <sub>2</sub> e/therm	9,587
	Nonresidential Natural Gas Leaks	50,795	therms	0.053067	MT CO <sub>2</sub> e/therm	2,696
Transportation	Passenger VMT	120,431,986	VMT	0.000445	MT CO <sub>2</sub> e/mile	53,592
	Commercial VMT	19,590,355	VMT	0.001270	MT CO <sub>2</sub> e/mile	24,880
	Bus VMT	226,557	VMT	0.001555	MT CO <sub>2</sub> e/mile	352
	Passenger EVMT	18,599	kWh	0.000057	MT CO <sub>2</sub> e/kWh	2
	Commercial EVMT	0	kWh	0.000057	MT CO <sub>2</sub> e/kWh	0
	Bus EVMT	0	kWh	0.000057	MT CO <sub>2</sub> e/kWh	0
	Off-road Diesel	40,261	Gallons	0.010472	MT CO2e/gal	422
	Off-road Gasoline	166,107	Gallons	0.009146	MT CO <sub>2</sub> e/gal	1,519
	Off-road Natural Gas	0	Gallons	0.000000	MT CO2e/gal	0
Solid Waste	Landfill Methane	16,750	Wet short tons	0.378000	MT CO <sub>2</sub> e/ton	6,332
	Process Emissions	16,750	Wet short tons	0.011000	MT CO <sub>2</sub> e/ton	184
Wastewater	Stationary Combustion	4,140,432	scf	0.0000002	MT CO <sub>2</sub> e/scf	1
	Process N20 Emissions	15,960	persons	0.000848	MT CO <sub>2</sub> e/person	14
	Effluent Discharge Fugitive N2O	15,960	persons	0.019413	MT CO2e/person	310
Water <sup>1</sup>	Groundwater	-	kWh	-	MT CO <sub>2</sub> e/kWh	-
	Surface Water	-	kWh	-	MT CO <sub>2</sub> e/kWh	-
Total						130.743

#### Table 23 2005 Community GHG Emissions Inventory

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; gal = gallons

1. Water sector activity data is included for informational purposes but is not included in total inventory GHG emissions to avoid double counting



Figure 4 2010 Updated Inventory GHG Emissions by Sector

GHG Emissions	GHG Emissions				-	GHG Emissions
Sector	Subsector	Activi	ty Data	Emissi	on Factor	(MT CO <sub>2</sub> e)
Energy	Residential Electricity	36,583,840	kWh	0.000102	MT CO <sub>2</sub> e/kWh	3,720
	Residential Electricity T&D	1,281,379	kWh	0.000102	MT CO₂e/kWh	130
	Nonresidential Electricity	70,017,335	kWh	0.000102	MT CO2e/kWh	7,119
	Nonresidential Electricity T&D	2,450,609	kWh	0.000102	MT CO2e/kWh	249
	Residential Natural Gas	2,708,159	therms	0.005311	MT CO2e/therm	14,384
	Residential Natural Gas Leaks	76,210	therms	0.053067	MT CO2e/therm	4,044
	Nonresidential Natural Gas	1,725,280	therms	0.005311	MT CO <sub>2</sub> e/therm	9,164
	Nonresidential Natural Gas Leaks	48,551	therms	0.053067	MT CO <sub>2</sub> e/therm	2,576
Transportation	Passenger VMT	116,543,060	VMT	0.000434	MT CO <sub>2</sub> e/mile	50,580
	Commercial VMT	18,321,286	VMT	0.001222	MT CO2e/mile	22,389
	Bus VMT	382,721	VMT	0.001562	MT CO2e/mile	598
	Passenger EVMT	26,994	kWh	0.000044	MT CO₂e/kWh	3
	Commercial EVMT	0	kWh	0.000044	MT CO₂e/kWh	0
	Bus EVMT	67	kWh	0.000044	MT CO2e/kWh	0
	Off-road Diesel	48,514	Gallons	0.010473	MT CO2e/gal	508
	Off-road Gasoline	161,156	Gallons	0.009146	MT CO2e/gal	1,474
	Off-road Natural Gas	0	Gallons	0.000000	MT CO2e/gal	0
Solid Waste	Landfill Methane	9,369	Wet short tons	0.378000	MT CO <sub>2</sub> e/ton	3,541
	Process Emissions	9,369	Wet short tons	0.011000	$MT CO_2e/ton$	103
Wastewater	Stationary Combustion	4,119,418	scf	0.0000002	MT CO <sub>2</sub> e/scf	1
	Process N20 Emissions	15,879	persons	0.000848	MT CO <sub>2</sub> e/person	13
	Effluent Discharge Fugitive N2O	15,879	persons	0.019413	$MT CO_2e/person$	308
Water <sup>1</sup>	Groundwater	-	kWh	-	MT CO <sub>2</sub> e/kWh	-
	Surface Water	-	kWh	-	MT CO <sub>2</sub> e/kWh	-
Total						120.905

#### Table 24 2010 Community GHG Emissions Inventory

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; gal = gallons

1. Water sector activity data is included for informational purposes but is not included in total inventory GHG emissions to avoid double counting

# 4 Community GHG Inventories Comparison

The table below presents the comparative summary of GHG emissions results for the Ukiah 2005, 2010, and 2022 Community GHG inventories. Emissions dropped significantly between the years of 2005 and 2010 primarily due to a large decrease in the tons of waste sent to landfill as well as decreased VMT in 2010 that occurred as a result of increased unemployment related to the 2008 economic recession. Notably, community GHG emissions rose to above 2005 levels in 2022 largely as a result of increased electricity sector emissions. This increase is attributable to significant changes in Ukiah's electric utility grid mix in which 46.20 percent of energy was sourced from unspecified power supplies in the 2022 inventory year. The notable rise may be attributable to the passing of Assembly Bill 1110, which changes CEC methodology for classifying unspecified power beginning in the 2019 power disclosure reporting year. According to these changes, unspecified power encompasses electricity that lacks traceability to specific generation sources through an auditable contract trail or equivalent. This includes energy initially obtained as a bundled eligible renewable product, where the associated Renewable Energy Credits (RECs) are subsequently resold separately as unbundled RECs. It also includes electricity from traceable open market transactions which have no upfront contractual intention to procure electricity from a specified resource. Despite diverse electricity sources falling under unspecified power, unspecified power is attributed to an emissions factor akin to that of a natural gas generator by the CEC.<sup>21</sup> Therefore, as Ukiah brings more traceable renewable energy sources online to meet regional renewable portfolio goals, a decrease in Ukiah's future electric grid emissions factor and, thus, a decrease in overall GHG emissions is anticipated.

<sup>&</sup>lt;sup>21</sup> California Energy Commission (CEC). 2023. PSD Frequently Asked Questions. Available at: https://www.energy.ca.gov/programsand-topics/programs/power-source-disclosure-program/psd-frequently-asked-questions

#### Figure 5 Ukiah Community Inventory GHG Emissions Comparison by Sector



Ukiah CO<sub>2</sub>e Emissions Comparison Per Sector

GHG Emissions		GI	HG Emissions (MT C	0 <sub>2</sub> e)
Sector	- GHG Emissions Subsector	2005	2010	2022
	Residential Electricity	3,733	3,720	9,841
	Residential Electricity T&D	131	130	418
	Nonresidential Electricity	8,418	7,119	19,372
<b>France</b>	Nonresidential Electricity T&D	295	249	799
Епегду	Residential Natural Gas	14,265	14,384	12,345
	Residential Natural Gas Leaks	4,011	4,044	3,471
	Nonresidential Natural Gas	9,587	9,164	9,458
	Nonresidential Natural Gas Leaks	2,696	2,576	2,659
	Passenger VMT	53,592	50,580	43,890
	Commercial VMT	24,880	22,389	21,979
	Bus VMT	352	598	455
	Passenger EVMT	2	3	300
Transportation	Commercial EVMT	0	0	0
	Bus EVMT	0	0	0
	Off-road Diesel	422	508	1,742
	Off-road Gasoline	1,519	1,474	1,684
	Off-road Natural Gas	0	0	0
0-1-1-1-1-	Landfill Methane	6,332	3,541	3,764
Solid waste	Process Emissions	184	103	110
	Stationary Combustion	1	1	1
Wastewater	Process N20 Emissions	14	13	30
	Effluent Discharge Fugitive N2O	310	308	-
	Groundwater	-	-	-
water	Surface Water	-	-	-
Total		130,743	120,905	132,323

#### Table 25 Comparative Community GHG Emissions Inventories Summary

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; gal = gallons

	М	Е	Μ	0	R	А	Ν	D	U	М		
Date:	July 30, 20	)24										
To:	City of Uki	ah (Cra	ig Schla	tter, Bla	ike Ada	ıms)						
Via:	email											
From:	Rincon Co	nsultar	nts, Inc.	(Kelsey	Bennet	t, Joani	na Thele	en, Erica	a Linard	)		
Subject:	Final Ukial	h GHG	Forecas	t-Targe	ts Men	norandı	ım					

This memorandum has been prepared for the City of Ukiah (City) and presents the data, methods, and results for the greenhouse gas (GHG) emissions forecast and targets. Included is an analysis of findings and trends in Ukiah communitywide GHG emissions developed to support the 2024 Ukiah Climate Action Plan (CAP).

California (the State) has set Statewide GHG emissions reduction goals to mitigate negative climate change impacts and transition the State to a low-carbon economy. In particular, the State has established goals to reduce Statewide GHG emissions 40 percent below 1990 levels by 2030, as established by Senate Bill (SB) 32 and achieve net zero GHG emissions as soon as possible, but no later than 2045, as established by Assembly Bill (AB) 1279.<sup>1</sup> The California Air Resources Board (CARB) is the agency responsible for addressing these goals and developing strategies to achieve them. Local jurisdictions throughout the State are completing local GHG inventories, forecasts, and CAPs to align with SB 32 and AB 1279.

Local governments play a fundamental role in reducing local GHG emissions and preparing for a more resilient future. Local government policies can influence high-emissions behavior and mitigate climate change effects.<sup>2</sup> To this end, Ukiah is building upon its draft 2014 CAP to develop a 2024 CAP that aligns with SB 32 and AB 1279 goals, increases resilience and climate change preparedness, maintains healthy air and water resources, and improves community health and the local economy. Development of the 2024 CAP also serves to meet climate goals established by the City's *Endorsing Climate Emergency Action Resolution* adopted in 2022.<sup>3</sup> The 2024 CAP will include Ukiah's updated 2005 and 2010 GHG Inventories with current accounting methodologies, the 2022 GHG inventory update,<sup>4</sup> and the associated GHG emissions forecast and targets included in this memorandum.

Based on the 2022 GHG inventory memorandum prepared for by Rincon Consultants, Inc. (Rincon) for the City of Ukiah (City) and dated January 12, 2024, Rincon developed forecasted emission levels in 2030, 2035, 2040, and 2045. The emissions forecast provides an up-to-date projection of how GHG emissions are expected to change for Ukiah based on forecasted changes in population and employment, as well as existing State and federal legislation aimed at reducing GHG emissions through 2045. This memorandum also presents provisional GHG targets and a gap analysis that identifies the level of GHG emissions reduction that will need to be achieved through local action to meet the GHG emissions reduction targets.

Ukiah does not have a 1990 forecast. Therefore, to set Ukiah emissions targets in alignment with State goals, Ukiah GHG emission levels were back cast from the 2022 GHG inventory to estimate a 1990 level. The analysis in this memorandum relies on the best available data and calculation methodologies currently available.

<sup>3</sup> City of Ukiah. 2022. Endorsing Climate Emergency Action Resolution. Available at: https://cityofukiah.com/wpcontent/uploads/2022/10/2022-44-Climate-Resolution.pdf

<sup>&</sup>lt;sup>1</sup> AB 1279 defines net zero GHG emissions as reducing GHG emissions at least 85 percent below 1990 levels. California also set a goal to reach 1990 levels by 2020, as established by AB 32, The 2020 goal set by AB 32 was achieved by the State in 2016. CARB. Frequently Asked Questions – California's 2022 Climate Scoping Plan. https://ww2.arb.ca.gov/sites/default/files/2022-06/2022\_Scoping\_Plan\_FAQ\_6.21.22.pdf

<sup>&</sup>lt;sup>2</sup> CARB. California's 2022 Climate Change Scoping Plan. https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp\_1.pdf

<sup>&</sup>lt;sup>4</sup> Ukiah Community GHG Inventories: Final Greenhouse Gas Emissions Inventories Report. Published January 12, 2024.

## **GHG Forecast**

A GHG emissions inventory sets a reference point for a single year; however, annual GHG emissions change over time due to factors such as population and job growth as well as new technologies and policies. A GHG emissions forecast estimates future GHG emission changes by accounting for projected community growth. Calculating the difference between the GHG emissions forecast and GHG emissions reduction targets set by a jurisdiction determines the gap in GHG emissions that needs to be closed through the implementation of local GHG reduction policies. This section includes an estimate of the future emissions for Ukiah in the years 2030, 2035, 2040 and 2045 in a *business-as-usual scenario* (BAU) forecast and a *legislative adjusted scenario* (adjusted) forecast that are defined as follows:

- **Business-as-usual scenario:** Provides a forecast of how future GHG emissions would change if current activities continued as they did in 2022 absent of any policies or legislation that would reduce local emissions. The BAU forecast is based on growth trends projected in population, housing, employment, and transportation activity over time, consistent with regional projections.
- Legislative-adjusted scenario: Provides a forecast of how currently adopted State legislation would reduce GHG emissions from the business-as-usual scenario. The legislative adjusted scenario represents the State's contribution to reducing local GHG emissions to meet state goals.

## Business-as-usual GHG Forecast Scenario

For the BAU forecast, future GHG emissions were calculated by multiplying projected activity data with the baseline emission factors utilized in the 2022 community GHG emissions inventory. Several indicator growth rates were developed from 2022 activity data and applied to demographic projections to project future activity data. Demographics applied to the growth factors are based on projected estimates provided by GHD for population and employment.<sup>5</sup> GHD estimated Ukiah's 2045 population based on Department of Finance (DOF) 2022 data and population growth rates established in the 2022 Ukiah General Plan.<sup>6</sup> Employment projections from GHD are based on 2022 data from the State of California Employment Development Department (EDD)<sup>7</sup> and projected land use outlined in the 2022 Ukiah General Plan.<sup>8</sup> Household growth was estimated using GHD population projects and assuming the proportion of people per household in 2030, 2035, 2040, and 2045 is consistent with 2022 proportions, approximately 2.42 people per household. Projected number of households were then adjusted to account for the 6<sup>th</sup> Cycle Regional Housing Needs Assessment (RHNA) allocation for Ukiah between 2019 and 2027. As such, the number of households in Ukiah is expected to grow by 239 units between 2019 and 2027 and was applied to 2030-2045 projected number of households.<sup>9</sup>

On-road transportation VMT projections utilize data provided by GHD and allocated to passenger, commercial, and bus vehicle types based on the percent of total vehicle miles travelled (VMT) as provided by the CARB EMission FACtor (EMFAC 2021) model. Off-road fuel use was projected using data provided in the CARB OFFROAD 2021 model. A summary of the demographics and projection metrics for each forecast year in the BAU forecast are provided in Table 1.

<sup>&</sup>lt;sup>5</sup> GHD. Population and employment projections for Ukiah provided via email on May 21, 2024.

<sup>&</sup>lt;sup>6</sup> Ukiah, City of. 2022. Ukiah 2040 General Plan. Available:

https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf

<sup>&</sup>lt;sup>7</sup> Employment Development Department, State of California. Labor Market Information.

https://labormarketinfo.edd.ca.gov/data/labor-force-and-unemployment-for-cities-and-census-areas.html

<sup>&</sup>lt;sup>8</sup> Ukiah, City of. 2022. Ukiah 2040 General Plan. https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf

<sup>&</sup>lt;sup>9</sup> City of Ukiah. 2019. Housing Element Update 2019-2027, Table 3.1. https://cityofukiah.com/wp-content/uploads/2021/11/City-of-Ukiah-2019-2027-Housing-Element-Update-full-CERTIFIED-120519.pdf

Table 1	BAU Forecast Demogra	aphic and Projectior	n Metrics by For	ecast Year
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Metric	Data Source	2022	2030	2035	2040	2045
Population <sup>1</sup>	DOF and GHD	15,929	17,834	19,025	20,216	21,407
Employment <sup>1</sup>	EDD and GHD	6,800	9,632	11,402	13,172	14,942
Service Population <sup>2</sup>	Calculated	22,729	27,466	30,427	33,388	36,349
Households <sup>3</sup>	Calculated with 6th Cycle RHNA Allocation	6,589	7,616	8,109	8,601	9,094
Passenger Annual VMT <sup>4</sup>	GHD	123,285,957	150,757,738	166,979,012	182,605,717	197,679,597
Commercial Annual VMT <sup>4</sup>	GHD	17,898,549	18,643,436	20,053,455	22,060,076	24,622,799
Bus Annual VMT <sup>4</sup>	GHD	323,308	341,396	352,702	364,007	375,312
Off-road gasoline usage (gallons)	CARB OFFROAD2021	183,909	202,942	212,707	222,277	232,457
Off-road diesel usage (gallons)	CARB OFFROAD2021	166,350	170,014	176,372	182,227	189,030
Off-road natural gas usage (gallons)	CARB OFFROAD2021	_	_	_	_	_

Notes: VMT = vehicle miles traveled; RHNA = Regional Housing Needs Allocation; Demographics for 2030 and 2045 are quantified assuming growth rate remains consistent between the years of 2035-2045

1. Projection data for 2030, 2035, and 2040 are determined based on a linear interpolation between 2022 and 2045 data points.

- 2. Service population is calculated as the combined total number of employees and residents.
- 3. Households are estimated based on multiplying the proportion of people per household with GHD provided population projection data. The number of people per household was determined using Department of finance 2022 population and household data (https://dof.ca.gov/forecasting/demographics/estimates/) consistent with the Ukiah 2022 Community GHG Inventory.
- 4. GHD VMT data is reported as an aggregate weekday total VMT across vehicles classes attributable to Ukiah using origindestination methodology. VMT was linearly interpolated between 2022 (407,804 miles/weekday) and 2045 (641,723 miles/weekday) and then annualized using 347 days per year to estimate the total VMT for the years 2030, 2035, and 2040. The total VMT for each year was then allocated to passenger, commercial, and bus vehicle classes based on their respective proportions of VMT in the given year as provided by the EMFAC2021 v1.1 model.

A description of the demographic metrics used to project activity data and associated growth factors for each forecasted GHG emission source in the 2022 community GHG emissions inventory are provided in Table 2.

GHG Emissions Source	Demographic Projection Metric	Growth Factor	Value	Units
Energy <sup>1</sup>				
Residential Natural Gas Consumption	Households	Natural Gas Consumption per Household	353	therms
Non-residential Natural Gas Consumption	Employment	Natural Gas Consumption per Job	262	therms
Residential Electricity Consumption	Households	Electricity Consumption per Household	5,375	kWh
Non-residential Electricity Consumption	Employment	Electricity Consumption per Job	10,246	kWh
Residential Natural Gas Leaks	Households	Natural Gas Leakage per Household	10	therms
Non-residential Natural Gas Leaks	Employment	Natural Gas Leakage per Job	7	therms
Transportation				
On-Road Passenger Vehicles <sup>2</sup>	N/A	N/A	N/A	miles
On-Road Commercial Vehicles <sup>2</sup>	N/A	N/A	N/A	miles
On-Road Buses <sup>2</sup>	N/A	N/A	N/A	miles
Off-Road Equipment <sup>3</sup>	N/A	N/A	N/A	gallons
Water & Wastewater <sup>4</sup>				
Imported Water Supply Electricity Consumption <sup>5</sup>	Service Population	Imported Potable Water Supply Electricity Consumption per Service Person	N/A	kWh
Wastewater Electricity Consumption <sup>6</sup>	Service Population	Wastewater Electricity Consumption per Service Person	N/A	kWh
Wastewater Process and Fugitive Emissions	Service Population	Wastewater Process and Fugitive Emissions per Service Person	0.0014	MT CO <sub>2</sub> e
Solid Waste				
Solid Waste Disposal	Service Population	Solid Waste Disposed per Service Person	0.17	tons

#### Table 2 GHG Emission Sources and Growth Factors for BAU Scenario Forecast

Notes: MT  $CO_2e$  = Metric tons of carbon dioxide equivalent; kWh = kilowatt-hour; VMT = vehicle miles traveled; N/A = Not Applicable; SP = Service Population – the combined total number of employees and residents in Ukiah

1. Electricity T&D growth factor is not included as GHG emissions from electricity T&D are added to each forecasted year's total electricity amount.

2. Annual Vehicle Miles Traveled (VMT) for each forecast year are obtained from GHD's VMT analysis.

3. Fuel consumption for each forecasted year are obtained from the CARB OFFROAD2021 Model. https://arb.ca.gov/emfac/offroad/emissions-inventory/1e9a074105b677b748642cf9845d36da67986744

- 4. According to the Ukiah 2022 Community GHG Inventory Report, electricity emissions associated with local water consumption and wastewater generation are captured within the energy sector, thus GHG emissions were not quantified to avoid double counting. As such, forecasted GHG emissions from water and wastewater are included in the energy sector of this memorandum.
- 5. Imported Water Supply Electricity Consumption was excluded in Ukiah's inventory to avoid double counting.
- 6. Wastewater Electricity Consumption was excluded in Ukiah's inventory to avoid double counting.

Using the above demographic and projection metrics in Table 1, multiplied by the growth factors in Table 2 and the 2022 community GHG inventory emission factors, the BAU forecast can be calculated. In the BAU forecast, GHG emissions are expected to increase through 2045. A summary of the BAU forecast results by GHG emission sector is provided in Table 3.

GHG Emissions Source	2022	2030	2035	2040	2045
Energy	58,368	75,882	86,236	96,591	106,946
Residential Electricity + T&D	10,265	11,866	12,634	13,402	14,170
Nonresidential Electricity + T&D	20,171	28,572	33,822	39,073	44,323
Residential Natural Gas	12,345	14,269	15,192	16,115	17,038
Residential Natural Gas Leaks	3,471	4,012	4,271	4,531	4,790
Nonresidential Natural Gas	9,458	13,396	15,858	18,320	20,781
Nonresidential Natural Gas Leaks	2,659	3,766	4,459	5,151	5,843
Transportation	70,050	81,050	88,768	96,998	105,728
On-road Passenger Vehicles	44,190	54,037	59,851	65,452	70,855
On-road Commercial Vehicles	21,979	22,894	24,626	27,090	30,237
On-road Buses	455	480	496	512	528
Off-road Equipment	3,426	3,639	3,795	3,944	4,108
Water and Wastewater	31	37	41	45	49
Imported Water Supply	N/A	N/A	N/A	N/A	N/A
Wastewater Process and Fugitive Emissions	31	37	41	45	49
Wastewater Electricity + T&D	N/A	N/A	N/A	N/A	N/A
Solid Waste	3,873	4,681	5,185	5,690	6,195
Solid Waste Disposal	3,873	4,681	5,185	5,690	6,195
Total GHG Emissions	132,323	161,649	180,231	199,324	218,918

Table 3	<b>BAU Forecast Results Summary by Emission S</b>	ector

Notes: All values are presented in metric tons of carbon dioxide equivalent (MT CO2e)

## Legislative-adjusted GHG Forecast Scenario

Several federal and State regulations have been enacted that would reduce Ukiah's GHG emissions below the BAU forecasted levels in 2030, 2035, 2040 and 2045. The impact of these regulations was quantified and incorporated into the adjusted forecast to provide a more accurate depiction of future emissions growth and the GHG emission reduction responsibility of Ukiah. State legislation included in the adjusted forecast reduce GHG emissions associated with transportation, building efficiency and renewable electricity. A brief description of each regulation and the methodology used to calculate associated reductions is provided in the following, as well as a description of why specific legislation was included or excluded from this forecast analysis.

### **GHG Reduction Legislation and Programs**

Additional legislative programs are expected to reduce GHG emissions in specific sectors throughout California, as identified in the 2017 Scoping Plan Update. Many of these programs were incorporated into this forecast analysis and are summarized below.

#### Transportation Legislation

#### Advanced Clean Cars Program

In January 2012, the California Air Resources Board (CARB) approved a new emissions-control program (the Advanced Clean Cars program) combining the control of smog, soot causing pollutants, and GHG emissions into a single coordinated package of requirements for passenger cars and light trucks model years 2017 through 2025. The 2012 standards will reduce California's GHG emissions by 34 percent in 2025 and is modeled under the CARB EMFAC2021 Model and included in this GHG forecast.<sup>10</sup>

Advanced Clean Cars II was approved by CARB in August 2022 and expands the program's roadmap so that by 2035 all new cars and passenger trucks will be zero-emission vehicles (ZEV). While these legislations will lead to an expedited timeline for ZEV adoption in California, modeling data is not yet available in CARB's EMFAC Model, and emissions reductions attributable to the Advanced Clean Cars II program were, therefore, excluded from this GHG forecast.

Advanced Clean Trucks was approved by CARB in June 2020 that sets a zero emission vehicle (ZEV) percent-of-sales requirement on medium- and heavy- duty vehicle manufacturers to promote increased truck ZEV sales from 2024 to 2035. EMFAC models the effect of the Advanced Clean Trucks regulation on ZEV truck penetration and associated GHG emissions and is included in this forecast.

#### Assembly Bill 1493

Signed into law in 2002, AB 1493 (Pavley Standards) required vehicle manufacturers to reduce GHG emissions from new passenger vehicles and light trucks from 2009 through 2016. The impacts of the Pavley Standards on zero emission vehicle market penetration were incorporated into the EMFAC model starting in 2014 and is included in this forecast.

#### **Innovative Clean Transit**

Public transit GHG emissions will be reduced in the future through the Innovative Clean Transit (ICT) regulation, which was adopted in December 2018. The effects of the ICT regulation on GHG emissions are modeled in EMFAC2021 and are included in this forecast.

#### **Energy Legislation**

#### <u>Title 24</u>

In December 2022 the California Energy Commission (CEC) published the new Title 24 2022 Building Efficiency Standards.<sup>11</sup> Due to the complexity of the new code there is currently no available model establishing projected efficiency increase as a result of the standard; therefore, the updated 2022 code was not included to provide a conservative estimate of forecasted GHG emissions reductions resulting from efficiency increases and not included in this forecast.

#### Renewables Portfolio Standard, Senate Bill 100, & Senate Bill 1020

Established in 2002 under SB 1078, enhanced in 2015 by SB 350, and accelerated for the first time in 2018 under SB 100, California's Renewable Portfolio Standard (RPS) requires investor-owned utilities, publicly owned utilities, electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 50 percent of total procurement by 2026 and 60 percent of total procurement by 2030. The RPS program further requires that by 2045 that 100 percent of total energy procured be a combination of eligible renewable energy resources and zero-carbon resources.

https://ww2.arb.ca.gov/sites/default/files/2019-12/acc%20summary-final\_ac.pdf

<sup>&</sup>lt;sup>10</sup> California Air and Resource Board (CARB). 2019. Advanced Clean Cars Summary..

<sup>&</sup>lt;sup>11</sup> California Energy Commission (CEC). 2023. 2022 Building Energy Efficiency Standards. https://www.energy.ca.gov/programsand-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency

California's RPS was further accelerated in 2022 by SB 1020 that established additional requirements that procurement from eligible renewable energy resources and zero-carbon resources increase to 90 percent of total procurement by 2035 and 95 percent of total procurement by 2040. The RPS program and SB 1020 were incorporated into this GHG forecast by adjusting the electricity emissions factors for future years.

The City of Ukiah currently provides electricity to Ukiah and is subject to RPS requirements. The City of Ukiah's emission factors adjusted for RPS requirements were used to project emissions through 2045. As the City of Ukiah currently provides all of Ukiah's electricity at a single supply standard, current and forecasted emissions factors remain the same across residential and nonresidential sectors. Table 4 provides the estimated electricity emission factors that would result from SB 100 and SB 1020.

#### Table 4 City of Ukiah Forecasted RPS and Electricity Emission Factors

Metric	2022	2030	2035	2040	2045
Ukiah Renewables Mix	25.9%	60%	90%	95%	100%
Ukiah Emission Factor (MT CO <sub>2</sub> e/kWh)	0.00028	0.00015	0.000038	0.000019	0

Notes: MT CO<sub>2</sub>e = Metric tons of carbon dioxide equivalent; kWh = kilowatt-hour

#### Waste Legislation

#### Assembly Bill 939 & Assembly Bill 341

In 2011, AB 341 set the target of 75 percent recycling, composting, or source reduction of solid waste by 2020 calling for the California Department of Resources Recycling and Recovery (also known as CalRecycle) to take a Statewide approach to decreasing California's reliance on landfills. As actions under AB 341 are not assigned to specific local jurisdictions, potential future reductions from the bill were conservatively not included in this forecast.

#### Assembly Bill 1826

In 2014, AB 1826 set regulations in place requiring California businesses to recycle all of their organic waste starting in April 2016. The bill also required jurisdictions across the State to provide organic waste recycling programs to accommodate diverted waste from local businesses. As Ukiah has already implemented an organics collection program, implementation of AB 1826 compliance is reflected in Ukiah's 2022 community inventory solid waste activity data and is also included in this forecast.

#### Senate Bill 1383

SB 1383 established a methane emission reduction target for short-lived climate pollutants in various sectors of the economy, including waste. Specifically, SB 1383 establishes targets to achieve a 50 percent reduction in the level of the Statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025.<sup>12</sup> Additionally, SB 1383 requires a 20 percent reduction in "current"<sup>13</sup> edible food disposal by 2025. Although SB 1383 has been signed into law, compliance with this Senate Bill must occur at the local jurisdiction level rather than the State level. Due to current limitations in local jurisdictions' ability to comply with organic waste targets set by SB 1383, anticipated emissions reductions attributable to the bill are conservatively excluded from this forecast.

### Legislative-adjusted Scenario Forecast Results

In the adjusted emissions forecast, the electricity sector experiences a strong downward trend, approaching zero in 2045 due to stringent RPS requirements from SB 100 and SB 1020. Natural gas emissions are expected to continue on an upward trajectory until 2045 due to housing and employment growth projections. This trend is partially offset due to the increasingly stringent efficiency requirements for new residential construction from Title 24. Transportation emissions are expected to continue on an upward trajectory until 2045. As most current regulations

<sup>&</sup>lt;sup>12</sup> CalRecycle. California's Short-Lived Climate Pollutant Reduction Strategy. https://calrecycle.ca.gov/organics/slcp/

<sup>&</sup>lt;sup>13</sup> SB 1383 does not specify a baseline year for the 20 percent food recovery target, however, CalRecycle's 2018 Statewide waste characterization studies will be used to help measure the baseline for the State to meet its SB 1383 goals.

https://calrecycle.ca.gov/organics/slcp/faq/foodrecovery/#:~:text=SB%201383%20requires%20the%20state,for%20individual%20ju risdictions%20to%20achieve.

expire in 2025 or 2030, emissions standards will experience diminishing returns while VMT continues to increase, leading to lower rates of emissions reduction in the transportation sector as 2045 is approached. Wastewater emissions and solid waste emissions are projected to increase through 2045. A detailed summary of the projected GHG emissions under the adjusted forecast by sector and year through 2045 can be found in Table 5.

GHG Emissions Source	2022	2030	2035	2040	2045
Energy	58,368	55,303	45,083	46,832	48,031
Residential Electricity + T&D <sup>1</sup>	10,265	5,963	1,541	796	0
Nonresidential Electricity + T&D <sup>1</sup>	20,171	14,070	4,017	2,258	0
Residential Natural Gas	12,345	14,134	14,993	15,851	16,709
Residential Natural Gas Leaks	3,471	3,974	4,215	4,457	4,698
Nonresidential Natural Gas	9,458	13,396	15,858	18,320	20,781
Nonresidential Natural Gas Leaks	2,659	3,766	4,459	5,151	5,843
Transportation	70,050	71,106	71,669	74,301	78,482
On-road Passenger Vehicles	44,190	45,323	46,276	48,323	51,001
On-road Commercial Vehicles	21,979	21,732	21,252	21,738	23,145
On-road Buses	455	412	347	296	227
Off-road Equipment	3,426	3,639	3,795	3,944	4,108
Water and Wastewater	31	37	41	45	49
Imported Water Supply	N/A	N/A	N/A	N/A	N/A
Wastewater Process and Fugitive Emissions	31	37	41	45	49
Wastewater Electricity + T&D	N/A	N/A	N/A	N/A	N/A
Solid Waste	3,873	4,681	5,185	5,690	6,195
Solid Waste Disposal	3,873	4,681	5,185	5,690	6,195
Total GHG Emissions	132,323	131,128	121,979	126,868	132,758

#### Table 5 Legislative-adjusted Scenario Forecast Results

Notes: All values are presented in metric tons of carbon dioxide equivalent (MT CO2e)

1. Emissions are estimated to reduce to zero due to RPS requirements established by SB100 and SB1020 which specify electricity must be procured from 100 percent renewable and carbon free sources by 2045.

#### **Legislative GHG Emissions Reduction Contribution**

A summary of the reductions from the BAU forecast that can be expected under the adjusted forecast are provided in Table 6.

#### Table 6 Summary of Legislative GHG Emission Reductions

Metric	2030	2035	2040	2045
California RPS	17,662	37,529	45,051	53,121
Title 24	3,526	5,608	7,678	9,752
Transportation Legislation (Pavley, Innovative Clean Transit, etc.)	9,334	15,115	19,728	23,287
Total	30,522	58,252	72,456	86,160

Notes: All values are presented in metric tons of carbon dioxide equivalent (MT CO2e)

## **Provisional GHG Emissions Targets**

GHG reduction targets are used in climate action planning to establish metrics that guide the community's commitment to achieve GHG emissions reductions and help gauge progress reducing emissions over time. California has established Statewide GHG reduction goals for 2030 and 2045, relative to a baseline emissions level. The CARB 2022 Scoping Plan encourages local agencies to take ambitious, coordinated climate action that is consistent with and supportive of the State climate goals.<sup>14</sup> Thus, local agencies are recommended to establish equivalent reduction targets at the local level by establishing communitywide GHG reduction goals for climate action that will help California achieve its 2030 and 2045 goals. CARB has issued several guidance documents concerning the establishment of GHG emission reduction targets for Climate Action Plans (CAP) to comply with California Environmental Quality Act (CEQA) Guidelines section 15183.5(b). CARB also recommends that local targets be a part of the process of developing, monitoring, and updating a CAP.

## 1990 Level GHG Emissions Back-Cast

Ukiah does not have a 1990 GHG emissions inventory against which to develop GHG reduction targets consistent with SB 32. However, 1990 GHG emissions can be estimated for the community relative to Ukiah's 2022 inventory using a State-level emissions change metric.

Since the 2022 State inventory has not yet been published, Ukiah 1990 GHG emissions have been calculated using the State 2021 GHG emissions inventory<sup>15</sup> as compared to the State GHG emissions inventory in 1990 to calculate approximate percent reduction in Ukiah between 2022 and 1990. This approach assumes that Ukiah communitywide GHG emissions have generally tracked with State GHG emissions over the same timeframe. The calculation is developed using the published Statewide emissions results from CARB<sup>16</sup> after removing emissions from sectors not included in the Ukiah 2022 inventory (i.e., agriculture, aviation, non-specified, industrial). The 1990 GHG emissions back-cast for Ukiah is shown in Table 7.

#### Table 7 1990 GHG Emissions Back-Cast Calculations

1990 Back-Cast Calculations	
2021 Statewide GHG Emissions (MT CO <sub>2</sub> e)	231,118,393
1990 Statewide GHG Emissions (MT CO <sub>2</sub> e)	281,045,086
2021 to 1990 Statewide GHG Emissions Change (%)	17.76%
2022 Ukiah GHG Emissions (MT CO <sub>2</sub> e)	132,323
1990 Ukiah GHG Emissions (MT CO <sub>2</sub> e)	160,907

## GHG Emissions Reduction Target Setting and Gap Analysis

The purpose of GHG emissions reduction target setting is to develop a trajectory for achieving the State 2030 goal (SB 32) and prepare for the deep decarbonization needed by 2045 in a cost-effective manner by setting an incremental path toward achieving AB 1279 targets. CARB guidance is for jurisdictions to first strive to exceed the SB 32 target of reducing GHG emissions by 40 percent below 1990 levels, while establishing a policy framework to achieve the longer-term target of carbon neutrality by 2045. Target setting is an iterative process that must be informed by the GHG emissions reductions that can realistically be achieved through the development of feasible GHG reduction measures. As part of the ongoing CAP process, Ukiah will develop measures and actions to achieve GHG reductions through regionally applicable and quantifiable strategies. Therefore, targets identified herein should remain provisional until the quantification and analysis of potential GHG reduction measures has been completed.

<sup>&</sup>lt;sup>14</sup> California Air Resources Board. 2022. California's Climate Change Scoping Plan, p.268.

https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

<sup>&</sup>lt;sup>15</sup> The State 2021 GHG emissions inventory was used, given it's the most recent available Statewide inventory from CARB. It is assumed that the 1990-2021 Statewide emissions change is similar to the 1990-2022 Statewide emissions change, therefore it can be used to estimate 1990 level GHG emissions for Ukiah based on the 2022 community GHG emissions inventory.

<sup>&</sup>lt;sup>16</sup> CARB. 2023. California GHG Emission Inventory Program. https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

Achieving established targets will require major shifts in how communities within California obtain and use energy, transport themselves and goods, and how the population lives and builds. CEQA Guidelines Section 15183.5(b) requires qualified GHG reduction plans (i.e., plans that allow for CEQA GHG emissions analysis streamlining) to "Establish a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable". A defensible way (as shown through litigation) to identify such levels is to demonstrate consistency with State targets. To maintain consistency with State targets, Ukiah's provisional GHG emissions reduction targets are:

- Reduce GHG emissions to 40 percent below 1990 levels by 2030 (SB 32 target year)
- Make substantial progress towards carbon neutrality by 2045 (AB 1279 target year)

With GHG emission reduction targets in place, the communitywide GHG emissions reduction gap that Ukiah will be responsible for through local action can be calculated. Ukiah's GHG emissions reduction gap is based on the difference between the adjusted forecast and the established GHG emission reduction targets.

Table 8 provides a summary of the GHG emission reduction targets.

#### Table 8 GHG Emissions Reduction Targets and Gap Analysis

Emissions Forecast or Pathway	2022	2030	2035	2040	2045
Mass Emissions Target Pathway Scenario (M	MT CO <sub>2</sub> e)				
Adjusted Forecast	132,323	131,128	121,979	126,868	132,758
SB 32 Mass Emissions Target Pathway <sup>1</sup>	132,323	96,544	64,363	32,181	0
Remaining Emissions Gap	0	34,583	57,616	94,686	132,758

Notes: MT  $CO_2e$  = Metric tons of carbon dioxide equivalent; Emissions have been rounded to the nearest whole number and therefore sums may not match.

1. The target pathway is calculated by reducing 1990 mass emissions by 40% in 2030 and to 0 in 2045. This provisional target pathway is consistent with both SB 32 and a trajectory set forth to achieve AB 1279.

Figure 1 provides a visual representation of forecasted future GHG emissions along with the effects of established State legislation and the remaining gap that Ukiah will be responsible for in order to meet the GHG emission reduction targets set by the State.



Figure 1 GHG Emissions Forecast and Provisional Target Pathways (Mass Emissions)

# Appendix D

GHG Reduction Measures Methodology, Modeling, and Evidence



## Ukiah Climate Action Plan Appendix D

Greenhouse Gas Emissions Measure Reduction Quantification and Substantial Evidence

prepared for

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## **1** Introduction

This technical report presents the quantification and substantial evidence that supports the greenhouse gas (GHG) emissions reduction potential of Ukiah's **Climate Action Plan (CAP)**. This report also supports the CAP's classification as a qualified GHG reduction plan. The CAP is Ukiah's community plan to reduce GHG emissions and address climate change. It includes **Measures** with numeric targets to reduce GHG emissions and **Actions** under each Measure that the City will implement through 2045 to reduce GHG emissions and make substantial progress towards the State's carbon neutrality goal.

Section 15183.5(b)(1) of the California Environmental Quality Act (CEQA) guidelines establishes several criteria which a plan must meet to be considered a qualified GHG reduction plan and allow for programmatic CEQA streamlining of project GHG emissions. This report details the evidence substantiating the GHG emissions reduction associated with the CAP measures pursuant to Subsection (D) which requires measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified GHG emissions level. This report demonstrates the Measures in the CAP provide the GHG emissions reduction necessary to meet Ukiah's 2030 GHG emission reduction target, which aligns with the State's GHG emission reduction goal established by Senate Bill (SB) 32 and make substantial progress towards the region's 2045 target which aligns with the State's goal established Assembly Bill (AB) 1279.<sup>1</sup>

Mechanisms to monitor the implementation of the CAP and progress toward achieving the Ukiah's GHG emission reduction targets are included in the CAP, as required in CEQA Guidelines Section 15183.5(b)(e). If, based on the tracking of community GHG emissions, Ukiah is not on track to reach the 2030 GHG emissions reduction specified in this report, the CAP as a whole or specific Measures and Actions will be amended. Based on these amendments, a CAP Update will be prepared that includes altered or additional Measures and Actions supported by substantial evidence, that with implementation can achieve the region's 2030 GHG emission reduction target and make substantial progress towards Ukiah's 2045 target.

## 1.1 GHG Emission Reduction Targets

The City of Ukiah's GHG emissions reduction targets align with California's goal to reduce GHG emissions 40 percent below 1990 levels by 2030 (SB 32) and California's goal to achieve carbon neutrality by 2045 (AB 1279) defined as achieving carbon neutrality by reducing GHG emissions at least 85 percent below 1990 levels and removing or sequestering the remaining GHG emissions.

Ukiah's short- and long-term GHG emission reduction targets are:

- Reduce GHG emissions 40 percent below 1990 levels by 2030; and
- Achieve carbon neutrality by 2045.

## 1.2 Measures and Actions Organization

As part of the CAP process, the City of Ukiah has developed a comprehensive set of Measures and Actions to reduce communitywide GHG emissions to achieve the Ukiah's 2030 GHG emission reduction target and make substantial progress towards Ukiah's 2045 target. The Measures are organized around a set of five **Sectors** to reduce GHG emissions. Each **Measure** is then supported by a set of **Actions**. The structure of the mitigation Sectors, Measures, and Actions are as follows:

<sup>&</sup>lt;sup>1</sup> SB 32 established the State goal to reduce GHG emission 40 percent below 1990 levels by 2030. AB 1279 established the State goal to achieve carbon neutrality by 2045. The State defines carbon neutrality as net zero carbon emissions, which is achieved by reducing GHG emissions at least 85 percent below 1990 levels and removing the remaining emissions.

- **Sector**: Sectors define the GHG emissions category in which the GHG reductions will take place and include Building Energy; Transportation; Solid Waste; Water Resources; and Carbon Sequestration.
- **Measures**: Measures are long-range policies that the City has established to ultimately reduce GHG emissions in line with the State's goals.
- Actions: Actions are the discrete steps that the region will take to achieve the established Measures.

The Measures and Actions can be either quantitative or supportive, defined as follows:

- Quantitative: Quantitative Measures result in direct and measurable GHG emissions reductions when their Actions, backed by substantial evidence, are implemented. GHG emissions reductions from these Measures and Actions are justified by case studies, scientific articles, calculations, and other third-party substantial evidence that establish the effectiveness of the reduction Actions. Quantitative Measures can be summed to quantify how the Ukiah will meet its 2030 GHG emission reduction target and demonstrate progress towards the 2045 target.
- Supportive: Supportive Measures may also be quantifiable and have substantial evidence to support their overall contribution to GHG emissions reduction. However, due to one of several factors including a low GHG emission reduction benefit, indirect GHG emission reduction benefit, or potential for double-counting– they have not been quantified and do not contribute directly to achieving and making progress towards the region's GHG emission reduction targets. Despite not being quantified, supportive Measures are nevertheless critical to the overall success of the CAP and provide support so that the quantitative Measures will be successfully implemented.

This report outlines both the quantitative and supportive Measures, detailing how each contributes to achieving Ukiah's 2030 GHG emission reduction target and advancing significant progress toward the City's 2045 target. This report primarily focuses on the quantitative Actions that enable each Measure; however, it does also detail some of the supportive Actions that will aid in implementation. While these supportive Actions do not quantitatively contribute to achieving and making progress towards Ukiah's GHG emission reduction targets, they are nevertheless critical to the overall success of each Measure. Detail on all supportive Actions can be found in the CAP.

## 1.3 GHG Emissions Reductions

Table 1 summarizes the Measures and the GHG emissions reductions they would achieve in 2030 and 2045 upon the implementation of their Actions.

Measure ID	Measure Text	2030 GHG Emissions Reduction Potential (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction Potential (MT CO <sub>2</sub> e)		
Building Energy					
Measure BE-1 <sup>1</sup>	Procure 77% of electricity from renewable and zero-carbon sources by 2030 and 100% renewable and carbon-free no later than 2045	10,971	0		
Measure BE-2	Decarbonize 15% of existing buildings by 2030 and 100% by 2045	4,258	27,920		
Measure BE-3	Decarbonize 95% of new building construction by 2026	2,704	15,608		
Measure BE-4	Decarbonize 50% of municipal buildings by 2030 and 100% by 2045	Supportive	Supportive		
Transportation					
Measure T-1	Increase the total mode share of active transportation to 15% by 2030, and 30% by 2045	373	2,164		
Measure T-2	Increase total public transportation mode share to 5% by 2030, and 20% by 2045	997	5,319		

#### Table 1 CAP GHG Emissions Reduction Summary by Measure

		2030 GHG Emissions Reduction Potential	2045 GHG Emissions Reduction Potential		
Measure ID	Measure Text	(MT CO <sub>2</sub> e)	(MT CO <sub>2</sub> e)		
Measure T-3	Reduce local vehicle miles traveled (VMT) from single passenger vehicles	Supportive	Supportive		
Measure T-4	asure T-4 Achieve zero-emission vehicle adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045		66,664		
Measure T-5	By 2030, electrify or otherwise decarbonize 12% of applicable SORE off-road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N- 79-20	606	1,541		
Measure T-6	Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements	Supportive	Supportive		
Water Resource	s				
Measure WR-1	Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption	Supportive	Supportive		
Solid Waste					
Measure SW-1	Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030	3,511	4,646		
Measure SW-2	Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030	190	228		
Carbon Sequest	Carbon Sequestration				
Measure CS-1	Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045	149	1,635		
Measure CS-2	Pursue opportunities to support the City's sustainable economic development goals with an emphasis on creating green jobs within the region	Supportive	Supportive		
Total		35,606	125,726		

Notes:

SB 100 requires the State's electricity sector to achieve 100% renewable and zero-carbon electricity by 2045. By that time, the electricity emission factor will be 0 MTCO<sub>2</sub>e/kWh. As estimated emissions reductions are based on reductions applicable in the target year, as opposed to cumulative GHG emissions reductions, this results in no additional reductions in 2045 beyond the state-mandated baseline.

Together, the Measures and Actions in the CAP provide Ukiah with the GHG emissions reduction necessary to achieve Ukiah's 2030 GHG emissions reduction target (see Table 2). However, the 2045 GHG emissions reduction quantified at the time of this report are not sufficient to meet Ukiah's 2045 target of carbon neutrality. This projected shortfall<sup>2</sup> is due to a combination of limitations at this time in the regulatory and technological capacity for GHG reductions at this time and future regional growth and the associated GHG emissions.<sup>3</sup> Additionally, the expiration of transportation-related State requirements between 2025 and 2030 results in diminishing returns in GHG emissions reduction, especially as vehicle miles travelled (VMT) continues to increase in the community as a result of expected regional growth. This trend further contributes to the challenge of meeting Ukiah's 2045 carbon neutrality target.

Achieving carbon neutrality will require a combination of new or updated local and state-level policies targeting GHG emissions across all sectors, new direct emissions reduction technologies, implementation of carbon capture and sequestration innovations, and strengthened Measures and Actions that emphasize carbon sequestration, land use management, and insights gained from implementing this CAP. While the CAP may not achieve full carbon neutrality by 2045, it is consistent with the guidance from the Association of Environmental Professionals (AEP) for making "substantial progress" toward long-term GHG reduction targets, as outlined in CEQA Guidelines Section 15183.5.<sup>4</sup> This approach allows CEQA tiering from GHG Reduction Plans that demonstrate substantial progress in reducing emissions on a path toward long-term reduction goals without requiring full compliance with 2045 targets. Future CAP updates will include new Measures and Actions that the City will implement to close the remaining gap to achieve carbon neutrality.

GHG Emissions Forecast or Reduction Target	2030 GHG Emissions (MT CO <sub>2</sub> e)	2045 GHG Emissions (MT CO <sub>2</sub> e)
Projected GHG Emissions (Adjusted Forecast) <sup>1</sup>	131,128	132,758
GHG Emissions Reduction from Measure Implementation	(35,606)	(125,726)
GHG Emissions Remaining <sup>2</sup>	95,522	7,032
GHG Emissions Reduction Target	96,544	0
Forecasted GHG Emissions Gap <sup>3</sup>	(1,022)	7,032
Target anticipated to be met?	Yes	No

#### Table 2 Ukiah GHG Emissions Reductions Pathway

Notes: Numeric numbers denoted in parentheses represent negative numbers.

- 1. See Ukiah Forecast Targets Memorandum, publish on July 30, 2024, for more information on the adjusted forecast.
- 2. GHG Emissions Remaining reflects the subtraction of GHG Emissions Reduction from Measure Implementation from Projected GHG Emissions.
- Forecasted GHG Emissions Gap reflects the difference between GHG Emissions Reduction Target and the GHG Emissions Remaining after measure implementation. Negative values signify that measures achieve GHG reductions beyond the set GHG target.

Figure 1 shows Ukiah's GHG emissions reduction targets in relation to Ukiah's GHG emissions after implementation of the Measures and Actions included in the CAP. A complete description of each Measure and the quantitative Action is included within the remainder of the report.

<sup>&</sup>lt;sup>2</sup> Table 2 shows the projected 2045 GHG emissions reduction shortfall for the City of Ukiah, amounting to 7,032 MT CO<sub>2</sub>e. This shortfall represents just 5.3% of the total GHG emissions forecast for 2045, which the City must address to achieve its carbon neutrality goals. For context, 7,032 MT CO<sub>2</sub>e is equivalent to either a) 2.1 utility scale wind turbines running for a year or b) 42 acres of U.S. forests preserved from conversion to cropland in one year (EPA Greenhouse Gas Equivalencies Calculator). While this projected shortfall poses a challenge, it is relatively manageable and can be addressed by additive GHG emissions reduction and/or carbon sequestration measures not yet incorporated in this document.

<sup>&</sup>lt;sup>3</sup> For more information regarding impacts of projected regional growth on the community's GHG emissions, see the Ukiah GHG Forecast - Targets Memorandum published July 30, 2024.

<sup>&</sup>lt;sup>4</sup> Association of Environmental Professionals (AEP). 2016. Final White Paper, Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California. Available at: https://califaep.org/docs/AEP-2016\_Final\_White\_Paper.pdf



Figure 1 Ukiah GHG Emissions Reduction Pathway

# 2 Sector BE: Building Energy

The City of Ukiah's Building Energy strategy focuses on decarbonizing residential and commercial buildings by leveraging the GHG reduction benefits that come from replacing natural gas with increasingly carbon-free and renewable electricity provided by the City. When coupled with renewable and zero-carbon electricity, all-electric buildings eliminate GHG emissions and transition the building system to a zero-emission operational energy footprint. The first measure emphasizes decarbonizing the City's electricity supply at increasing rates up until 2030, after which the City will support the state in achieving 100% renewable electricity, consistent with the SB 100 regulation.

Electrifying Ukiah's building stock consists of transitioning natural gas appliances—the equipment that traditionally heats our water, heats the spaces we live and work in, cooks our food, and dries our clothes —to efficient electric alternatives. Based on this approach, the CAP's Building Energy strategy consists of the Measures presented in Table 3. The table also indicates which Measures are quantitative and which Measures are supportive. The following subsections detail the substantial evidence and calculation methodologies for the quantitative Measures and the role of the supportive Measures.

Measure ID	Measure	2030 GHG Emissions Reduction (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction (MT CO <sub>2</sub> e)
Measure BE-1 <sup>1</sup>	Procure 77% of electricity from renewable and zero-carbon sources by 2030 and 100% renewable and carbon-free no later than 2045	10,971	0
Measure BE-2	Decarbonize 15% of existing buildings by 2030 and 100% by 2045	4,258	27,920
Measure BE-3	Decarbonize 100% of new building construction by 2026	2,704	15,608
Measure BE-4	Decarbonize 50% of municipal buildings by 2030 and 100% by 2045	Supportive	Supportive
Total		17,934	43,528

#### Table 3 Sector BE: Building Energy GHG Emissions Reduction Summary

Notes:

1. SB 100 requires the State's electricity sector to achieve 100% renewable and zero-carbon electricity by 2045. By that time, the electricity emission factor will be 0 MTCO2e/kWh. As estimated emissions reductions are based on reductions applicable in the target year, as opposed to cumulative GHG emissions reductions, this results in no additional reductions in 2045 beyond the state-mandated baseline.

## Measure BE-1: Procure 77% of electricity from renewable and zerocarbon sources by 2030 and 100% carbon-free no later than 2045.

Measure BE-1 aims to increase the share of electricity supplied to Ukiah that is sourced from renewable and carbonfree sources such that 77 percent of all electricity consumed is zero-carbon by 2030, and 100 percent of all electricity is renewable and carbon-free by 2045. The primary Actions that enable this target are:

- Action BE-1a which commits the City to evaluate utility-scale battery storage solutions;
- Action BE-1b which directs the City to increase local renewable energy supply through increased community adoption of renewable energy solutions, such as residential solar, wind, and battery storage; and,
- Action BE-1c which aims to formalize Ukiah's Electric Utility Department resource plan and renewable energy procurement schedule to meet renewable resource targets for 2030 through 2045.

To monitor progress towards the City's procurement goals the City will track completion of the resource plan identified in Action BE-1c which will aid in planning procurement schedules to meet 2030 and 2045 goals. The City will also track the percent renewable content of their utility electricity mix, which is required to be reported to the California Energy Commission (CEC) annually, as the primary performance standard for this measure.

The City of Ukiah provides electricity to its residents through its municipally owned electricity utility, which operates as a department of the City. Under this Measure, the City is committing to increasing the share of electricity procured from eligible renewable and carbon-free sources to 77 percent by 2030, up from 70 percent under existing conditions.<sup>5,6</sup> Currently, the energy sources supplying Ukiah's grid mix is largely obtained from hydroelectric power generated by the City's own facilities and geothermal energy provided through the Northern California Power Agency (NCPA). The remaining energy needs are supplied by natural gas power plants operated by NCPA, a member utility coalition that includes the City of Ukiah.<sup>7</sup>

The NCPA is a not-for-profit joint powers agency that assists its member communities in delivering reliable, affordable, and sustainable energy. Its mission includes advancing renewable energy procurement and resource planning, with a focus on transitioning to cleaner energy sources. To support long-term resource planning, the NCPA is currently developing an Integrated Resource Plan (IRP), which is anticipated to be released in 2025. Currently, Ukiah primarily relies on NCPA for power procurement outside of the City's hydroelectric generation. However, as a municipally owned utility, Ukiah has the unique flexibility to diversify their energy procurement options. NCPA's IRP will help the City further refine its strategy for achieving an increased renewables energy mix by 2030, though Action BE-1c of this plan includes consideration of additional energy procurement options.

As part of its commitment to increasing renewable energy use, NCPA is actively working to decarbonize its operations by transitioning its natural gas power plants to hydrogen fuel. This effort was recently bolstered by NCPA's selection as a recipient of federal hydrogen hub funding through the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) program<sup>8</sup>. The funding will support the development of on-site hydrogen infrastructure at natural gas power plants to accelerate the transition to hydrogen-based power generation, directly contributing to the City's efforts to reduce emissions associated with the portion of its energy mix currently supplied by natural gas.<sup>9</sup> In addition to this transition, the City plans to achieve its 77 percent renewable and carbon-free energy goal by implementing strategies such as expanding community solar adoption (**Action BE-1b**).

To support the goal of increasing renewable energy procurement, the City is focusing on expanding incentives for the adoption of alternative energy solutions, including solar, wind, and battery storage. Battery storage plays a crucial role in advancing renewable energy goals by enabling the City to store excess energy generated from intermittent sources like solar and wind. This helps maximize the use of renewable energy and ensures grid resilience during extreme weather events or disruptions.<sup>10,11</sup> Increased adoption of battery storage, as well as solar installations, will be supported through **Actions BE-1a**, **BE-1b**, and **BE-1c** which include integrating storage solutions into long-term planning and providing incentives to encourage community-wide participation.

Reducing the cost of solar and battery storage systems is expected to drive greater adoption by making these technologies more accessible, with demand for each likely increasing as adoption of the other grows. According to the National Renewable Energy Laboratory (NREL), the combination of lower battery costs and the high value of backup power are key factors driving the installation of distributed storage systems. This trend illustrates how solar and battery storage technologies mutually reinforce each other's adoption. As battery storage becomes more affordable, solar energy systems become increasingly viable for homeowners and businesses, as storage helps

<sup>&</sup>lt;sup>5</sup> The Ukiah Daily Journal. Renewable energy: Ukiah '70 percent carbon free'. Available at:

https://www.ukiahdailyjournal.com/2015/07/03/renewable-energy-ukiah-70-percent-carbon-free/

<sup>&</sup>lt;sup>6</sup> Ukiah currently procures and generates enough renewable energy to supply 70 percent of Ukiah's grid mix. However, it is important to note that in 2022, the inventory year for Ukiah's Community GHG Inventory, a portion of this supply was designated as unspecified power. Ukiah's power content label is available at: https://cityofukiah.com/wp-content/uploads/2023/09/City-of-Ukiah-2022-PCL.pdf

<sup>&</sup>lt;sup>7</sup> Information about the generation sources and procurement rates supplying Ukiah's electric grid mix is supported by data developed as part of NCPA's member utility Integrated Resource Plan (IRP), which is currently under development and expected to be released in 2025.

<sup>&</sup>lt;sup>8</sup> Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES). 2024. Powering California's Transition to Renewable Energy. Available at: https://archesh2.org/

<sup>&</sup>lt;sup>9</sup> Northern California Power Alliance (NCPA). 2023. California's Alliance for Renewable Clean Hydrogen Energy Systems Awarded Hydrogen Hub Funding by the U.S. Department of Energy. Available at: https://www.ncpa.com/wp-content/uploads/2023/10/NCPA-Press-Release-ARCHES-Decision-10132023.pdf

<sup>&</sup>lt;sup>10</sup> Department of Energy (DOE). 2024. Energy Storage RD&D. Available at: https://www.energy.gov/oe/energy-storagerdd#:~:text=Improved%20stability%20and%20reliability%20of,of%20renewable%20energy%20generation%3B%20and

<sup>&</sup>lt;sup>11</sup> National Renewable Energy Laboratory (NREL). 2019. Grid-Scale Battery Storage, Frequently Asked Questions. Available at: https://www.nrel.gov/docs/fy19osti/74426.pdf

manage the intermittent nature of solar energy and maximizes the value of the energy generated. Similarly, as solar installations increase, the demand for battery storage grows to provide backup power and optimize energy use.<sup>12</sup> As part of **Action BE-1b**, the City will offer financial incentives, such as subsidies for low-income households and small businesses in the form of rebates or vouchers, to encourage technology adoption. Additionally, the City may explore other incentive strategies, including streamlined permitting and installation processes and the development of educational materials. By incentivizing solar and battery storage system installations, particularly through financial supports, the City can foster broader community participation in renewable energy adoption, safeguarding equitable access to clean energy solutions. These actions, combined with careful planning and an energy demand forecast, will create a roadmap for long-term growth while addressing equity and reliability concerns.

Table 4 shows the parameters and data sources that support these clean energy GHG emissions reduction and Table 5 shows the calculations as outlined in Equations 1 through 1.1.

#### **Renewable Energy Procurement Equations**

Equation 1 CO<sub>2</sub>e Reduction<sub>Elec,y,i</sub>=Total Elec<sub>y,i</sub>\*Supply Rate<sub>i</sub>\*(EF<sub>elec,y,i</sub>-EF<sub>CF,y</sub>)

Equation 1.1 Total  $Elec_{y,i}$ =( $Elec_{y,i}$ +Total Elec Converted<sub>y,i</sub>)\*(1+L<sub>T&D</sub>)

Variable	Definition	Value	Unit	Data Source
Equation 1				
CO2e Reduction <sub>Elec,y,i</sub>	Electricity GHG emissions reduction	See Table 5	MT CO <sub>2</sub> e	Calculated
Total Elec <sub>y,i</sub>	Total electricity consumption	See Table 5	kWh	Calculated
Carbon-free Percent <sub>y,i</sub>	Percent of electricity obtained from carbon- free sources	See Table 5	percentage	-
Supply Rate <sub>i</sub>	Percent of electricity supplied by Ukiah	_	_	-
Supply Rate <sub>residential</sub>	_	100.00%	percentage	Ukiah supplies all electric utility
Supply Rate <sub>nonresidential</sub>	-	100.00%	percentage	Ukiah supplies all electric utility
EF <sub>elec,y,i</sub>	Forecasted electricity emission factor	See Table 5	MT CO₂e/kWh	Calculated
EF <sub>CF,y</sub>	Electricity emission factor of carbon-free electricity	_	_	_
EF <sub>CF,2030</sub>	_	0.00008631	MT CO₂e/kWh	Measure BE-1 2030 target of 77% renewable and zero-carbon sources
<i>EF</i> <sub><i>CF,2045</i></sub>	-	0.00	MT CO2e/kWh	Measure BE-1 target, carbon-free by 2045
i	Subsector	Residential or Nonresidential	_	_

#### Table 4 Renewable Energy Procurement Parameters and Data Sources

<sup>&</sup>lt;sup>12</sup> National Renewable Energy Laboratory. 2021. Lower Battery Costs, High Value of Backup Power Drive Distributed Storage Deployment. Available at: https://www.nrel.gov/news/program/2021/lower-battery-costs-high-value-of-backup-power-the-key-drivers-of-distributed-storage-deployment.html
Variable	Definition	Value	Unit	Data Source
Equation 1.1				
Elec <sub>y,i</sub>	Forecasted electricity consumption	See Table 5	kWh	_
Elec Converted <sub>y,i</sub>	Total electricity usage from conversions	See Table 5	kWh	-
L <sub>T&amp;D</sub>	Electricity transmission and distribution loss percentage	4.12%	Percentage	_

Table 5	Renewable Energy	Procurement GHG	<b>Emissions Reduction</b>	n Calculations
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Definition	Definition	Units	Sector	2030	<b>2045</b> <sup>1</sup>
Equation 1.1					
Elec <sub>y,i</sub>	Forecasted electricity	kWh	Residential	41,659,804	48,686,195
consumption	consumption		Nonresidential	91,093,980	135,359,852
Elec Converted <sub>y,i</sub>	Electricity usage from	kWh	Residential	19,678,907	101,481,101
	conversions, including T&D losses (i.e., building energy and transportation measures)		Nonresidential	12,745,534	72,952,897
Total Elec <sub>y,i</sub> Total electricit	Total electricity	kWh	Residential	63,867,440	156,358,042
	consumption		Nonresidential	108,120,367	216,900,580
Equation 1					
Supply Rate <sub>y,i</sub>	Percent of electricity	percentage	Residential	100%	100%
	supplied by Ukiah		Nonresidential	100%	100%
EF <sub>elec,y,i</sub>	Forecasted electricity	MT	Residential	0.0001501	0.00
	emission factor	CO <sub>2</sub> e/kWh	Nonresidential	0.0001501	0.00
CO <sub>2</sub> e	Electricity GHG	MT CO <sub>2</sub> e	Residential	4,074	0
Reduction <sub>Elec,y,i</sub>	emissions reduction		Nonresidential	6,897	0

Notes:

1. SB 100 requires the State's electricity sector to achieve 100% renewable and zero-carbon electricity by 2045. By that time, the electricity emission factor will be 0 MTC02e/kWh. As estimated emissions reductions are based on reductions applicable in the target year, as opposed to cumulative GHG emissions reductions, this results in no additional reductions in 2045 beyond the state-mandated baseline.

# Measure BE-2: Decarbonize 15% of existing buildings by 2030 and 100% by 2045.

Measure BE-2 puts Ukiah on a path to reduce residential and commercial natural gas consumption 15 percent by 2030 and 100 percent by 2045 to reduce GHG emissions through both mandatory and voluntary actions. The primary Actions that enable this level of adoption include:

- Action BE-2a which commits the City to adopt a zero-NOx threshold requiring replacement of water heaters and HVAC appliances in residential and commercial buildings upon burnout by 2026; and,
- Action BE-2b which directs the City to promote and incentives energy efficient solutions including heat pumps, "cool" building strategies, trees, green roofs, and other nature-based solutions.
- Action BE-2d which directs the City to work with PG&E to develop a strategy for the equitable decommissioning of the City's natural gas system by 2045.

As an initial performance standard, the City will monitor that the energy performance standard is implemented by 2026 following local adoption. Additionally, to gauge the measure's performance in reducing GHG emissions, the City will annually track the natural gas reduced by existing buildings via PG&E's Energy Data Request Portal.

# Mandatory Electrification Actions

Action BE-2a commits the City to develop and adopt a zero-nitrogen oxides (zero-NOx) threshold for existing buildings by 2026. A zero-NOx threshold establishes a performance-based emissions limit for existing building systems such as water heating and space heating, requiring these systems to produce no nitrogen oxide emissions<sup>13</sup>. Zero-NOx thresholds developed by the Bay Area Air Quality Management District's (BAAQMD) established limits such that no natural gas appliances currently available on the market meet the threshold.<sup>14</sup> BAAQMD's zero-NOx thresholds underscore this strategy as an effective means of promoting the adoption of all-electric equipment, such as heat pumps for heating and water heating, which inherently produce zero on-site NOx emissions.

The zero-Nox threshold developed under **Action BE-2a** assumes that appliances reaching the end of their useful life will require a retrofit and must comply with the zero-NOx threshold. By regulating emissions rather than banning specific fuel sources, a zero-NOx standard provides a legally robust strategy for reducing GHG emissions in light of the U.S. Court of Appeals for the Ninth Circuit's decision to overturn the City of Berkeley's natural gas regulation.<sup>15</sup> Unlike direct bans, a zero-NOx threshold complies with federal preemption under the Energy Policy and Conservation Act (EPCA) by focusing on the emissions performance of equipment rather than dictating energy type. Additionally, developing a zero-NOx threshold aligns with State initiative as the California Air Resources Board (CARB) is currently developing zero-NOx rules which are anticipated to come into effect by 2030.<sup>16</sup> The zero-emissions reductions, and would establish emissions requirements for water and space heating equipment sold in California. Although the State's standards are still under development, it is anticipated that Measure BE-2 will be aligned with the State's standard and stimulate adoption of zero-emissions technologies for building operations.

The quantification of emissions reduction associated with **Action BE-2a** assesses the impact of electrification of water heating and cooling systems. Although there are a range of electric alternatives (e.g. electric resistance space heating, heat pumps), heat pump HVAC and heat pump water heaters are the most cost-effective option on the market due to their significantly higher efficiency (200 to 400 percent) and resulting lower operating costs.<sup>17,18</sup> **Action BE-2a** is thus assumed to set thresholds that promote installation of electric heat pump HVAC and water heaters at the time of their replacements and save homeowners and property owners costs from duplicative infrastructure upgrades.

Implementing thresholds for electrification of appliances under Measure BE-2 is expected to face challenges with permit compliance, which are required for many energy efficiency improvements (e.g., water heaters, insulation, HVAC systems, duct replacement), as many jurisdictions report that only 8 to 30 percent of HVAC installations are properly permitted.<sup>19,20</sup> This trend in permit evasion means jurisdictions may face issues achieving compliance with

 $<sup>^{13}</sup>$  Nitrogen oxide emissions, specifically in the form of nitrous oxide (N<sub>2</sub>O), have a significant warming potential roughly 300 times more potent than carbon dioxide in terms of contributing to global warming over a 100-year timeframe; meaning that even though it's present in smaller quantities, a single unit of N<sub>2</sub>O has a much greater impact on warming the planet compared to carbon dioxide (CO<sub>2</sub>).

<sup>&</sup>lt;sup>14</sup> Bay Area Air Quality Management District (BAAQMD). 2022. Electric Infrastructure Impacts from Proposed Zero NOx Standards. Available at: https://www.baaqmd.gov/~/media/dotgov/files/rules/reg-9-rule-4-nitrogen-oxides-from-fan-type-residential-central-furnaces/2021-amendments/documents/20221220\_sr\_appd\_rg09040906-

 $pdf.pdf?rev=2c9ddef1ee9e4d5f8fafea0f68c9c932\&sc\_lang=en$ 

<sup>&</sup>lt;sup>15</sup> CRA V. City of Berkeley, No. 21-16278. Accessed at: https://law.justia.com/cases/federal/appellate-courts/ca9/21-16278/21-16278-2023-04-17.html.

<sup>&</sup>lt;sup>16</sup> California Air Resources Board (CARB). 2024. Zero-Emission Space and Water Heater Standards. Available at:

https://ww2.arb.ca.gov/our-work/programs/zero-emission-space-and-water-heater-standards

<sup>&</sup>lt;sup>17</sup> U.S Department of Energy. 2024. Air-Source Heat Pumps. Available at: https://www.energy.gov/energysaver/air-source-heat-pumps?utm\_source=chatgpt.com

<sup>&</sup>lt;sup>18</sup> U.S Department of Energy. 2024. Heat Pump Water Heaters. Available at: https://www.energy.gov/energysaver/heat-pump-waterheaters

<sup>&</sup>lt;sup>19</sup> Alvarez, Emily and Mast, Bruce. BayREN Codes & Standards Program. Local Government Policy Calculator for Existing Single-Family Buildings – User Guide (2021). Accessed at: https://www.bayren.org/sites/default/files/2021-11/bayren-policy-calculatoruser-guide\_10.29.2021.pdf

<sup>&</sup>lt;sup>20</sup> California Public Utilities Commission (CPUC). Final Report: 2014-16 HVAC Permit and Code Compliance Market Assessment (Work Order 6) Volume I – Report (2017). Accessed at:

http://www.calmac.org/publications/HVAC\_W06\_FINAL\_REPORT\_VolumeI\_22Sept2017.pdf

building ordinances and codes. While permit compliance is critical to enforcing building codes and ordinances, it does not directly correlate to the adoption of electric appliances. Market trends indicate substantial growth in electric appliance technology in California. According to Opinion Dynamics' *California Heat Pump Residential Market Characterization and Baseline Study* (2022), electric space heaters have grown from a 5 percent market share in 2009 to a 20 percent market share in 2019. Likewise, electric water heaters have grown from a 6 percent market share in 2009 to a 12 percent market share in 2019.<sup>21</sup> With the growing number of incentives available for electric appliances and State initiatives to encourage electrification through efforts such as establishing zero-NOx thresholds, it is anticipated that market representation of electric alternatives will continue to rise.

To amplify these efforts and increase the efficacy of **Action BE-2a**, incentives provided under **Action BE-2b** will play a critical role in overcoming key barriers to adoption which include upfront costs and low program awareness. <sup>22,23</sup> Studies have shown that financial incentives and demonstrated long-term savings are key motivators for consumer adoption of electric technologies. For instance, a study by the American Council for an Energy-Efficient Economy (ACEEE) found that while only 18 percent of participants were aware of electrification programs, 59 percent of those aware were either participating or planning to participate. Providing financial support, education, and robust program outreach through **Action BE-2b** will help bridge these gaps and align adoption with the zero-NOx thresholds. <sup>24</sup>

These combined efforts—clear performance thresholds, financial incentives, community outreach, and growing market trends—are expected not only to increase the rate of appliance adoption but also to improve permit compliance. Though permits are sometimes used to monitor Measure performance, the City will track reductions in natural gas usage as a more accurate measure of success in achieving the goals of Measure BE-2. To address challenges related to rates of adoption and permit compliance, the GHG emissions associated with Measure BE-2 are estimated using a conservative 85 percent zero-NOx threshold compliance for end-of-life replacement of natural gas appliances in existing buildings. Together, the Actions of Measure BE-2 are anticipated to reduce residential natural gas consumption by 12.5 percent and commercial natural gas consumption by 12.2 percent by 2030 through the adoption and enforcement of the zero-NOx threshold and time of burnout. Table 6 shows the parameters and data sources that support this Action's GHG emissions reduction and Table 7 shows the calculations as outlined in Equations 2 through 2.6.

# **Existing Building Zero-NOx Threshold Equations**

$CO_{2}e \ Reduction_{NG,y,i} = (Fuel \ Avoided_{NG,y,i} * EF_{NG}) + (Fuel \ Avoided_{NGL,y,i} * EF_{NGL}) - (Elec \ Converted_{y,i} * EF_{elec,y,i} * (1 + L_{T\&D}))$
Fuel Avoided <sub>NG,y,i</sub> =Fuel <sub>NG,y,i</sub> *Reduction <sub>NG,y,i</sub>
$Reduction_{NG,y,i} = (EOL_{NG,y,i,wh} * Fuel Share_{NG,i,wh}) + (EOL_{NG,y,i,HVAC} * Fuel Share_{NG,i,HVAC})$
EOL <sub>NG,y,i,wh</sub> =1/LSP <sub>i,wh</sub> *(y-imp.y <sub>i</sub> )*(1-NCR <sub>i</sub> )
EOL <sub>NG,y,i,HVAC</sub> =1/LSP <sub>i,HVAC</sub> *(y-imp.y <sub>i</sub> )*(1-NCR <sub>i</sub> )
Fuel Avoided <sub>NGL,y,i</sub> =Fuel Avoided <sub>NG,y,i</sub> *( $L_{Pipeline NGL+}L_{End-use NGL}$ )
Elec <sub>convert,y,i</sub> = Fuel <sub>AvoidedNG,y,i</sub> *CF <sub>elec</sub> /Eff <sub>elec</sub>

<sup>&</sup>lt;sup>21</sup> Opinion Dynamics. California Heat Pump Residential Market Characterization and Baseline Study (2022). Accessed at: https://pda.energydataweb.com/#l/documents/2625/view.

<sup>&</sup>lt;sup>22</sup> University of California Davis. 2024. Innovative Approaches to Residential Heat Pump Promotion. Available at: https://ucdavis.app.box.com/s/0oa771tyj63qaqi2f8beitora56k78ll

<sup>&</sup>lt;sup>23</sup> American Council for an Energy-Efficient Economy (ACEEE). Marketing and Promoting Electrification Using Behavioral Science: Results from a National Survey. Available at: https://www.aceee.org/research-report/b2406

Variable	Definition	Value	Unit	Data Source
Equation 2				
CO <sub>2</sub> e Reduction <sub>NG,y,i</sub>	Natural gas GHG emissions reduction	See Table 7	MT CO <sub>2</sub> e	Calculated
Fuel Avoided <sub>NG,y,i</sub>	Natural gas consumption avoided	See Table 7	therms	Calculated
EF <sub>NG</sub>	Natural gas emission factor	0.005311	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel Avoided <sub>NGL,y,i</sub>	Natural gas leakage avoided	See Table 7	therms	Calculated
EF <sub>NGL</sub>	Natural gas leakage emission factor	0.053067	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Elec Converted <sub>y,i</sub>	Electricity usage from conversion	See Table 7	kWh	Calculated
EF <sub>elec,y,i</sub>	Forecasted electricity emission factor	See Table 7	MT CO <sub>2</sub> e/kWh	Forecast
LT&D	Electricity transmission and distribution loss percentage	4.12%	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
у	Year	2030 or 2045	year	-
i	Subsector	Residential or Nonresidential	-	-
Equation 2.1				
Fuel <sub>NG,y,i</sub>	Forecasted natural gas consumption after new building electrification	See Table 7	therms	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Reduction <sub>NG,y,i</sub>	Natural gas reduction percent	See Table 7	percentage	-
Equation 2.2				
EOL <sub>NG,y,i,wh</sub>	Percent of water heaters reaching end- of-life	See Table 7	percentage	-
Fuel Share <sub>NG,i,wh</sub>	Percent of sector natural gas consumption from water heaters	-	-	-
Fuel Share <sub>NG,Residential,wh</sub>	Percent of residential natural gas consumption from water heaters	38%	percentage	Decarbonization of Heating Energy Use in California Buildings <sup>1</sup>
Fuel Share <sub>NG,Nonresidential,wh</sub>	Percent of nonresidential natural gas consumption from water heaters	28%	percentage	Decarbonization of Heating Energy Use in California Buildings <sup>1</sup>
EOL <sub>NG,y,i,HVAC</sub>	Percent of HVAC units reaching end-of-life	See Table 7	percentage	_

# Table 6 Existing Building Zero-NOx Threshold Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Fuel Shareng,i,HVAC	Percent of sector natural gas consumption from HVAC units	-	-	-
Fuel Share <sub>NG,i,HVAC</sub>	Percent of residential natural gas consumption from HVAC units	39%	percentage	Decarbonization of Heating Energy Use in California Buildings <sup>1</sup>
Fuel Share <sub>NG,i,HVAC</sub>	Percent of nonresidential natural gas consumption from HVAC units	42%	percentage	Decarbonization of Heating Energy Use in California Buildings <sup>1</sup>
Equation 2.3				
LSP <sub>i,wh</sub>	Average water heater lifespan in sector	-	-	-
LSPresidential,wh	Average residential water heater lifespan	13	years	EIA <sup>2</sup>
LSPnonresidential,wh	Average nonresidential water heater lifespan	10	years	EIA <sup>2</sup>
imp.y <sub>i</sub>	Threshold implementation year	_	_	-
imp. yresidential	Threshold implementation year for residential buildings	2026	year	Measure BE-2 target
imp.ynonresidential	Threshold implementation year for nonresidential buildings	2026	year	Measure BE-2 target
NCRi	Threshold noncompliance rate	15%	percentage	Estimate based on permit evasion rates and strategies to increase building code compliance <sup>2,3,4</sup>
Equation 2.4				
LSP <sub>i,HVAC</sub>	Average HVAC unit lifespan in sector	_	-	-
LSP residential, HVAC	Average residential HVAC unit lifespan	21.5	years	EIA⁵
LSP <sub>nonresidential</sub> ,HVAC	Average nonresidential HVAC unit lifespan	23	years	EIA⁵
Equation 2.5				
LPipeline NGL	Natural gas pipeline leakage percentage	2.3%	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
LEnd-use NGL	Natural gas end-use leakage percentage	0.5%	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Equation 2.6				
CF <sub>elec</sub>	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions <sup>6</sup>

Variable	Definition	Value	Unit	Data Source
Eff <sub>elec</sub>	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute <sup>7</sup>

- 1. Synapse Energy Economics, Inc. Decarbonization of Heating Energy Use in California Buildings (2018). Accessed at: https://www.synapse-energy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf
- 2. 8-29% of HVAC projects are permitted, but implementing certain strategies can help increase permit compliance rate. Assumption is set to 15% non-compliance. See above for further explanation.
- Alvarez, Emily and Mast, Bruce. BayREN Codes & Standards Program. Local Government Policy Calculator for Existing Single-Family Buildings – User Guide (2021). Accessed at: https://www.bayrencodes.org/wpcontent/uploads/2021/11/BayREN-Policy-Calculator-User-Guide\_10.29.2021.pdf
- California Public Utilities Commission (CPUC). Final Report: 2014-16 HVAC Permit and Code Compliance Market Assessment (Work Order 6) Volume I – Report (2017). Accessed at: http://www.calmac.org/publications/HVAC\_WO6\_FINAL\_REPORT\_VolumeL22Sept2017.pdf
- 5. EIA. Updated Buildings Sector Appliance and Equipment Costs and Efficiencies (2023). https://www.eia.gov/analysis/studies/buildings/equipcosts/pdf/full.pdf
- 6. Metric Conversions. Therms (US) to Kilowatt-hours.
- 7. European Copper Institute. Heat Pumps: Integrating technologies to decarbonise heating and cooling (2018). Accessed at: https://www.ehpa.org/wp-content/uploads/2022/10/White\_Paper\_Heat\_pumps-1.pdf

Variable	Definition	Units	Sector	2030	2045
Equation 2.1 & 2.2					
Fuel <sub>NG,y,i</sub>	Forecasted natural gas	therms	Residential	2,501,051	2,525,290
	consumption after new building electrification		Nonresidential	2,169,909	2,239,430
ReductionNG,y,i	Natural gas reduction	tural gas reduction percentage F		16.11%	61.60%
	percent		Nonresidential	15.73%	53.29%
Fuel Avoided <sub>NG,y,i</sub>	N <sub>NG,y,i</sub> Natural gas consumption therms		Residential	402,817	1,555,461
	avoided		Nonresidential	341,298	1,193,422
Equation 2.3 & 2.4					
EOL <sub>NG,y,i,wh</sub>	EOL <sub>NG,y,i,wh</sub> Percent of water heaters p reaching end-of-life since ordinance implementation	percentage	Residential	26.15%	85.00%
			Nonresidential	34.00%	85.00%
EOL <sub>NG,y,i,HVAC</sub>	Percent of HVAC units	percentage	Residential	15.81%	75.12%
	reaching end-of-life since ordinance implementation		Nonresidential	14.78%	70.22%
Equation 2.5					
Fuel Avoided <sub>NGL,y,i</sub>	Natural gas leakage	therms	Residential	11,279	43,553
	avoided		Nonresidential	9,556	33,416
Equation 2.6					
Elec Converted <sub>y,i</sub>	Electricity usage from	kWh	Residential	3,934,178	15,191,671
	conversion		Nonresidential	3,333,347	11,655,751
Equation 2					
EF <sub>elec,y,i</sub>	Forecasted electricity	MT	Residential	0.0001501	0.0000000
	emission factor	CO <sub>2</sub> e/kWh	Nonresidential	0.0001501	0.0000000
CO <sub>2</sub> e Reduction <sub>NG</sub>	Natural gas GHG	MT CO <sub>2</sub> e	Residential	2,123	10,573
	emissions reduction		Nonresidential	1,799	8,112

## Table 7 Existing Building Zero-NOx Threshold GHG Emission Reduction Calculations

# Voluntary Electrification

Based on market trends, the remaining 2.5 percent of residential natural gas consumption and 2.8 percent of nonresidential natural gas consumption that are planned to be reduced by 2030 is assumed to occur through voluntary replacement of gas appliances with electric appliances reaching end of life. Voluntary adoption of electric appliances will be supported by the City through **Action BE-2b**, which calls for pursuing incentives for community adoption. Such incentives may include strategies such as providing subsidies to reduce cost or distributing educational materials to increase community awareness of the availability, benefits, and financial support related to purchasing of electric appliances. Targeted education and outreach programs can increase the likelihood of consumer adoption of energy related technologies, including energy efficiency solutions.<sup>25</sup> Additionally, awareness of energy efficiency solutions such as heat pumps remains low in California, suggesting that investment in outreach campaigns would prove an effective strategy in increasing electric appliance adoption in the community.<sup>26</sup> As previously discussed, awareness of available programs can result in upwards of 59 percent participation in energy efficiency programs, with potential for increased participation with programs tailored to address the availability of financial resources, long-term benefits, and instructions for easy installation.<sup>27</sup>

Currently available incentives will help continue the growth in the adoption of electric appliances and water heaters seen in California over the past decade. According to Opinion Dynamics' California Heat Pump Residential Market Characterization and Baseline Study (2022), electric space heaters have grown from a 5 percent market share in 2009 to a 20 percent market share in 2019. Likewise, electric water heaters have grown from a 6 percent market share in 2009 to a 12 percent market share in 2019.28 Given market trends showing a 5-15 percent growth in electric alternatives over the last 10 years, it is reasonable to assume that market trends will at least achieve the 2.5 percent growth in electric alternatives in the next 5 years. These growth trends are driven by California's decarbonization goals, supported by local equipment emissions thresholds and state-level initiatives like the Building Initiative for Low-Emissions Development (BUILD) and Technology and Equipment for Clean Heating (TECH) programs. Additionally, growing consumer demand for dual-purpose heating and cooling systems, financial incentives, and advancements in heat pump performance are further accelerating adoption.<sup>29</sup> This trend is not only expected to continue through 2030 as electric appliances become more efficient and more cost-effective, but will also be accelerated when coupled with sufficient funding for community members to replace their space and water heating appliances with electric or heat pump alternatives. While the total amount of funding available will change with sunset dates and budget cycles, the currently available federal (i.e., High Efficiency Electric Home Rebate [HEEHRA], Homeowner Managing Energy Savings [HOMES] Rebate, Inflation Reduction Act), state (i.e., TEHC Clean California), and local (i.e., the City of Ukiah's Energy Efficiency Rebates<sup>30</sup>) funding options make it so that low- and middleincome residents in Ukiah can install electric space and water heaters at no additional cost compared to gas space and water heaters. In some cases, such customers will even be able to install the heat pump water heaters for free.<sup>31</sup> Furthermore, it is anticipated that current funding available to Ukiah residents and businesses, as well as Action BE-2b's new incentives, will remove the current hinderance to electrification in Ukiah and thereby help drive the voluntary market trend for electric space and water heating appliances through 2030.

Additionally, the emissions associated with natural gas consumption from PG&E are expected to decrease due to Senate Bill 1440, which mandates gas utilities, including PG&E, to replace pipeline-supplied natural gas with renewable natural gas (RNG). In 2022, the California Public Utilities Commission (CPUC) set RNG supply requirements for California utilities, requiring them to increase the amount of RNG in the pipeline supplied to residential and commercial customers by 12% by 2030.<sup>32</sup> RNG is derived from organic waste materials, such as landfill waste, sewer, and agricultural waste through processes like anaerobic digestion. Because organic waste naturally releases biogenic carbon dioxide during decomposition, conversion of organic waste into RNG means that any carbon dioxide released during combustion of RNG is considered part of the natural carbon cycle and does not contribute a net increase in carbon dioxide emissions to the atmosphere like combustion of fossil derived natural gas

<sup>&</sup>lt;sup>25</sup> Andolfi, Laura and Ortega, Boris. 2024. Smart Choices: The Influence of Energy Literacy on Energy Technology Adoption. Available at: https://www.energy-proceedings.org/wp-content/uploads/icae2024/1732537915.pdf

<sup>&</sup>lt;sup>26</sup> University of California Davis. 2024. Innovative Approaches to Residential Heat Pump Promotion. Available at: https://ucdavis.app.box.com/s/0oa771tyj63qaqi2f8beitora56k78ll

<sup>&</sup>lt;sup>27</sup> American Council for an Energy-Efficient Economy (ACEEE). Marketing and Promoting Electrification Using Behavioral Science: Results from a National Survey. Available at: https://www.aceee.org/research-report/b2406

<sup>&</sup>lt;sup>28</sup> Opinion Dynamics. California Heat Pump Residential Market Characterization and Baseline Study (2022). Accessed at: https://pda.energydataweb.com/#l/documents/2625/view.

<sup>&</sup>lt;sup>29</sup> Ibid

<sup>&</sup>lt;sup>30</sup> City of Ukiah. Energy Efficiency Rebates. Available at: https://www.directefficiency.com/ukiah-electric-rebates/

<sup>&</sup>lt;sup>31</sup> Rincon Consultants, Inc. Installation Costs for Zero-NOx Space and Water Heating Appliances (2024).

<sup>&</sup>lt;sup>32</sup> Pacific Gas and Electric Company's (PG&E). (2022) Draft Renewable Gas Procurement Plan in Compliance with Commission Decision 22-02-02. Available at: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M500/K435/500435651.PDF

does. Production and consumption of RNG still releases non-biogenic GHG emissions, but to a lesser extent than extraction and consumption of fossil derived natural gas.<sup>33</sup> The information on SB 1440 provided here is for informational purposes only. The potential GHG emissions reductions associated with SB 1440's RNG procurement requirements are not included in the adjusted forecast or quantified in this CAP as it is unclear how extensively SB 1440 might affect emissions linked to natural gas sourced from pipelines. This provides a conservative estimate of GHG reductions attributable to the decarbonization of existing buildings in Ukiah.

In addition to direct building decarbonization efforts, as part of this Measure, the City is committed to pursuing the equitable decommissioning of natural gas infrastructure to discourage investments in new natural gas systems, avoid stranded assets and disproportionate cost burdens, and promote the decarbonization of the community's building stock. Decommissioning natural gas pipelines typically involves capping or removing inactive lines and safely retiring infrastructure to prevent methane leaks, a potent GHG that significantly contributes to climate change. **Action BE-2d** aligns with California's regulatory landscape, in which the California Public Utilities Commission (CPUC) is actively limiting new investments in natural gas infrastructure.<sup>34</sup> Additionally, as part of the Gas System Decarbonization Rulemaking (R.20-01-007), the CPUC is investigating short-term steps to decarbonize and equitably decommission natural gas services, supporting the state's broader transition to clean energy.<sup>35,36</sup>

However, along with these efforts, state legislators and the CPUC will need to eliminate the existing utilities' "obligation to serve," which currently requires that utilities invest in and provide natural gas and the required infrastructure to new and existing residences and neighborhoods. To be able to initiate the equitable decommissioning of natural gas infrastructure and discourage further investments in new natural gas systems, cities like Ukiah will need to initiate strategic neighborhood electrification and advocate for the removal of the obligation to serve. Then, the gas utility will be able to decommission the appropriate parts of the system and right size infrastructure to fit the new, smaller number of gas customers.

This process is not without challenges, including overcoming financial barriers and addressing community energy preferences. While decarbonizing the building stock through electrification remains the primary driver of GHG reductions under this Measure, **Action BE-2d** plays a supportive role by fostering community independence from natural gas. As a supportive action, it is not directly included in the calculation of GHG reductions attributable to Measure BE-2 but remains a critical element in achieving the City's broader climate goals.

Table 8 shows the parameters and data sources that support these electrification programs and incentives for voluntary replacement, and Table 9 shows the GHG emissions reductions as outlined in Equation 3 through 3.4. The emissions reductions in Table 9 represent calculations occurring after the ordinance calculations (Table 7), ensuring there is no doubling counting between the two.

# **Existing Building Voluntary Replacement Equations**

- Equation 3  $CO_{2}e \ Reduction_{NG,y,i} = \Sigma((Fuel \ Avoided_{j,y,i} * EF_{NG}) + (Fuel \ Avoided_{j,y,i} * (L_{Pipeline} + L_{End-use}) * EF_{NGL})) (Elec \ Converted_{y,i} * EF_{elec,y,i} * (1 + L_{T&D}))$
- Equation 3.1 Elec Convert<sub>y,i</sub> =  $\Sigma$  (Fuel Avoided<sub>j,y,i</sub>\*CF<sub>elec</sub>/Eff<sub>elec,j</sub>)
- Equation 3.2 Fuel Avoided<sub>j,y,i</sub>=(Fuel<sub>y,i</sub>-Fuel<sub>reduced,y,i</sub>)\*(EOL<sub>NG,j,y,i</sub>\*Fuel Share<sub>j,i</sub>\*MS<sub>elec,j,y</sub>)
- Equation 3.3  $EOL_{NG,j,y,i}=1/LSP_{j,i}*(y-imp.y_i)$
- Equation 3.4  $Eff_{elec,j} = \Sigma Eff_{elec,j,k} * Prop_{elec,j,k}$

<sup>&</sup>lt;sup>33</sup> U.S. Environmental Protection Agency. (2021). An Overview of Renewable Natural Gas from Biogas. Available at:

https://www.epa.gov/sites/default/files/2021-02/documents/lmop\_rng\_document.pdf

<sup>&</sup>lt;sup>34</sup> California Public Utilities Commission (CPUC). 2022. CPUC Creates New Framework To Advance California's Transition Away From Natural Gas. Available at: https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-creates-new-framework-to-advancecalifornia-transition-away-from-natural-gas

<sup>&</sup>lt;sup>35</sup> California Public Utilities Commission (CPUC). 2020. Long-Term Gas Planning Rulemaking. Available at:

https://www.cpuc.ca.gov/industries-and-topics/natural-gas/long-term-gas-planning-rulemaking

<sup>&</sup>lt;sup>36</sup> California Public Utilities Commission (CPUC). 2024. Long-Term Gas Planning Rulemaking Issues Joint Agency White Paper and Draft Scope and Schedule for Comment. Available at: https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/natural-gas/long-term-gas-planning-oir/acr-and-white-paper-one-pager.pdf

Variable	Definition	Value	Unit	Data Source
Equation 3				
CO <sub>2</sub> e Reduction <sub>NG,y,i</sub>	Natural gas GHG emissions reduction	See Table 9	MT CO <sub>2</sub> e	Calculated
Fuel Avoided <sub>j,y,i</sub>	Natural gas consumption avoided	See Table 9	therms	Calculated
EF <sub>NG</sub>	Natural gas emission factor	0.005311	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
EF <sub>NGL</sub>	Natural gas leakage emission factor	0.053067	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Elec Converted <sub>y,i</sub>	Electricity usage from conversion	See Table 9	kWh	Calculated
EF <sub>elec,y,i</sub>	Forecasted electricity emission factor	See Table 9	MT CO <sub>2</sub> e/kWh	Forecast
Lpipeline	Natural gas pipeline leakage percentage	2.3%	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
L <sub>End-use</sub>	Natural gas end-use leakage percentage	0.5%	percentage	See Appendix GHG Inventory, Forecast, and Targets Technical Report
L <sub>T&amp;D</sub>	Electricity transmission and distribution loss percentage	4.12%	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
у	Year	2030 or 2045	year	_
i	Subsector	Residential or Nonresidential	-	_
j	Electric equipment type	HVAC or water heater	_	_
Equation 3.1				
CF <sub>elec</sub>	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions <sup>1</sup>
Eff <sub>elec,j</sub>	Efficiency factor of electric equipment relative to natural gas equipment	See Table 9	unitless	Calculated
Equation 3.2				
Fuel <sub>y,i</sub>	Forecasted natural gas consumption after new building electrification	See Table 9	therms	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel <sub>reduced,y,i</sub>	Natural gas reductions from ordinances	See Table 9	therms	Calculated
EOL <sub>NG,j,y,i</sub>	Percent of equipment reaching end of life	See Table 9	percentage	Calculated
Fuel Share <sub>j,i</sub>	Percent of sector natural gas consumption	_	-	_
Fuel Share <sub>wh,Res</sub>	Percent of residential natural gas consumption from water heaters	38%	percentage	Synapse <sup>2</sup>

# Table 8 Existing Building Voluntary Replacement Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Fuel Sharewh,Nonres	Percent of nonresidential natural gas consumption from water heaters	28%	percentage	Synapse <sup>2</sup>
Fuel Share <sub>HVAC,Res</sub>	Percent of residential natural gas consumption from HVAC units	39%	percentage	Synapse <sup>2</sup>
Fuel Share <sub>HVAC,Nonres</sub>	Percent of nonresidential natural gas consumption from HVAC units	42%	percentage	Synapse <sup>2</sup>
MS <sub>elec,j</sub> ,y	Market share of electric equipment	_	_	_
MS <sub>elec,wh</sub> , 2030	Market share of electric water heaters	12%	percentage	Opinion Dynamics <sup>3</sup>
MS <sub>elec</sub> ,HVAC,2030	Market share of electric space heating units	22%	percentage	Opinion Dynamics <sup>4</sup>
MS <sub>elec,wh</sub> , 2045	Market share of electric water heaters	100%	percentage	Assuming 100% electric market share by 2045 <sup>5</sup>
MS <sub>elec,HVAC,2045</sub>	Market share of electric space heating units	100%	percentage	Assuming 100% electric market share by 2045 <sup>5</sup>
Equation 3.3				
LSP <sub>i,wh</sub>	Average water heater lifespan in sector	_	_	_
LSP <sub>residential,wh</sub>	Average residential water heater lifespan	13	years	EIA6
$LSP_{nonresidential,wh}$	Average nonresidential water heater lifespan	10	years	EIA <sup>6</sup>
LSP <sub>i,HVAC</sub>	Average HVAC unit lifespan in sector	-	_	_
LSP <sub>residential</sub> ,HVAC	Average residential HVAC unit lifespan	21.5	years	EIA <sup>6</sup>
LSP <sub>nonresidential,</sub> HVA C	Average nonresidential HVAC unit lifespan	23	years	EIA <sup>6</sup>
imp.y <sub>i</sub>	Ordinance implementation year	_	_	_
imp.yresidential	Ordinance implementation year for residential buildings	2026	year	BE-2 target
imp.y <sub>nonresidential</sub>	Ordinance implementation year for nonresidential buildings	2026	year	BE-2 target
Equation 3.4				
Eff <sub>elec,HVAC</sub>	Efficiency factor of HVAC systems relative to natural gas equipment	See Table 9	unitless	_
Eff <sub>elec,HVAC,HP</sub>	Efficiency factor of heat pumps	3	unitless	U.S. Department of Energy <sup>7</sup> and European Copper Institute <sup>9</sup>
Eff <sub>elec,HVAC,ER</sub>	Efficiency factor of electric resistance	1	unitless	Energy.gov <sup>8</sup> and Schnackle Engineering <sup>10</sup>

Variable	Definition	Value	Unit	Data Source
Eff <sub>elec,wh,ER</sub>	Efficiency factor of water heaters relative to natural gas	1	unitless	Conservative estimate of 1:1 efficiency of gas and electric water heaters <sup>10,11</sup>
Prop <sub>elec,HVAC,k</sub>	Proportion of electric equipment types making up the electric HVAC market	-	-	_
<b>Prop</b> elec, HVAC, HP	proportion of heat pump technology for HVAC systems	18%	percentage	Calculated based on the combined market share of heat pumps and electric resistance heaters for space heating <sup>4</sup>
<b>Prop</b> elec,HVAC,ER	proportion of electric resistance technology for HVAC systems	82%	percentage	Calculated based on the combined market share of heat pumps and electric resistance heaters for space heating <sup>4</sup>
Prop <sub>elec</sub> ,wh,ER	Electric HVAC technology proportion of electric resistance space heaters	100%	percentage	As high efficiency technology (i.e. solar and heat pumps) is 1% of the market, assume all water heaters are electric resistance as a conservative estimation <sup>3</sup>
k	types of options for a given electric equipment system	e.g. heat pumps, electric resistance	_	_

1. Metric Conversions. Therms (US) to Kilowatt-hours. Available at: https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm

- 2. Synapse Energy Economics, Inc. 2018. Decarbonization of Heating Energy Use in California Buildings, Figure 2. Available at: https://www.synapseenergy.com/sites/default/files/Decarbonization-Heating-CA-Buildings-17-092-1.pdf
- 3. Opinion Dynamics. 2022. California Heat Pump Residential Market Characterization and Baseline Study, Figure 34. Available at: https://pda.energydataweb.com/api/view/2625/OD-CPUC-Heat-Pump-Market-Study-Report\_Final.pdf
- 4. Opinion Dynamics. 2022. California Heat Pump Residential Market Characterization and Baseline Study, Figure 21. Available at: https://pda.energydataweb.com/api/view/2625/OD-CPUC-Heat-Pump-Market-Study-Report\_Final.pdf
- 5. Given the State's robust efforts, policies, and guidelines supporting electrification, it is assumed that electric water heaters and space heating units will achieve full market share dominance by 2045, aligning with broader statewide decarbonization goals.
- 6. U.A. Energy Information Administration (EIA). 2023. Updated Buildings Sector Appliance and Equipment Costs and Efficiencies. Available at: https://www.eia.gov/analysis/studies/buildings/equipcosts/pdf/full.pdf
- 7. U.S Department of Energy. 2024. Air-Source Heat Pumps. Available at: https://www.energy.gov/energysaver/air-source-heat-pumps?utm\_source=chatgpt.com
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  European Copper Institute. 2018. Heat Pumps: Integrating technologies to decarbonize heating and cooling. Accessed at: https://www.ehpa.org/wp-content/uploads/2022/10/White\_Paper\_Heat\_pumps-1.pdf
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- 11. Southface Energy Institute. Water Heater Efficiency, Efficiency of Fuel Types and Alternatives for Heating Water. Available at: https://www.ncelec.org/sites/ncelec/files/documents/waterheater\_efficiency\_041614.pdf
- 12. Pennsylvania State University. 2023. Energy Efficiency of Water Heaters. Available at: https://www.e-education.psu.edu/egee102/node/2009

Definition	Definition	Units	Sector	2030	2045
Equation 3.4					
Eff <sub>elec,wh</sub>	Weighted efficiency factor of	unitless	Residential	1.00	1.00
	water heaters relative to natural gas		Nonresidential	1.00	1.00
Eff <sub>elec,HVAC</sub>	Weighted efficiency factor of	unitless	Residential	1.36	1.36
	gas equipment		Nonresidential	1.36	1.36
Equation 3.3					
EOL <sub>NG,y,i,wh</sub>	Percent of water heaters reaching end-of-life since	percentage	Residential	30.77%	100.00%
	ordinance implementation		Nonresidential	40.00%	100.00%
EOL <sub>NG,y,i,HVAC</sub>	Percent of HVAC units reaching	percentage	Residential	18.60%	88.37%
	implementation		Nonresidential	17.39%	82.61%
Equation 3.2					
Fuel <sub>y,i</sub>	Forecasted natural gas consumption after new building electrification	therms	Residential	2,661,103	3,145,882
			Nonresidential	2,522,151	3,912,581
Fuel <sub>reduced,y,i</sub>	Natural gas reductions from	therms	Residential	562,869	2,176,054
	ordinances		Nonresidential	693,541	2,866,572
Fuel	Natural gas consumption	therms	Residential	29,440	368,535
Avoided <sub>wh,y,i</sub>	avoided (water heaters)'		Nonresidential	24,577	292,882
Fuel	Natural gas consumption	therms	Residential	33,494	334,253
Avoided <sub>HVAC,y,i</sub>	avoided (HVAC)		Nonresidential	29,385	362,920
Equation 3.1					
Elec Converted <sub>wh,i</sub>	Electricity usage from conversion of water heater systems	kWh	Residential	862,587	10,798,07 4
			Nonresidential	720,092	8,581,455
Elec	Electricity usage from conversion	kWh	Residential	719,667	7,181,975
Converted <sub>HVAC,i</sub>	of HVAC systems		Nonresidential	631,385	7,797,931
Equation 3					
EF <sub>elec,y,i</sub>	Forecasted electricity emission	MT	Residential	0.0001501	0.0000000
	tactor	CO <sub>2</sub> e/kWh	Nonresidential	0.0001501	0.0000000
CO <sub>2</sub> e	Natural gas GHG emissions	MT CO <sub>2</sub> e	Residential	180	4,777
Reduction <sub>NG,y,i</sub>	reduction		Nonresidential	156	4,458

Table 9 Existing Building Voluntary Replacement GHG Emission Reduction Calculations

Notes:

1. Natural gas consumption avoided resulting from education, market trends, and voluntary replacement after the energy standard has taken place.

# Measure BE-3: Decarbonize 95% of new building construction by 2026.

Measure BE-3 commits the City to decarbonize new building construction in the community. The primary Action that enables this Measure is:

- Action BE-3a which directs the City to adopt a single margin hourly source energy threshold (EDR1) performance standard for new construction by 2026;
- Action BE-3b which commits the City to incorporate additional climate resilient design requirements as part of any future updates to the City's building code or zoning code; and,
- Action BE-3c which directs the City to continue to remove procedural barriers and establish a more streamlined permitting process for all new electric building construction by 2027.

As an initial performance standard, the City will monitor that the energy performance standard is implemented by 2026 following local adoption. Additionally, to gauge the Actions' performance in achieving Measure goals, the City will annually track the annual number of new building permits achieving EDR1 through electrification as part of **Action BE-3c**.

The City is committed to limiting new natural gas developments in the community where feasible. However, the U.S. Court of Appeals for the Ninth Circuit's decision to overturn Berkeley's natural gas regulation—the ordinance that prohibited the installation of natural gas piping within newly constructed buildings—limits the City's ability to establish regulations to ban new natural gas construction.<sup>37</sup> Despite this, through **Action BE-3a**, the City will adopt a single margin hourly source energy threshold (EDR1) performance standard for new construction, considered a legal alternative as discussed under Measure BE-2. This regulation will be designed to strongly encourage electrification of new construction as an energy consumption threshold. **Action BE-3b** will further influence climate resilient design requirements and **Action BE-3c** will help streamline the process for all new construction.

This shift towards electrification is supported by a clear understanding of key consumer and developer considerations in new building design and purchasing. By establishing a performance standard like the EDR1, the City would make electric buildings the more cost-effective option. This aligns with the fact that developers often prioritize cost efficiency in their decision-making, as the financial feasibility of a project depends heavily on material and energy costs.<sup>38,39</sup> Studies indicate that cost is a major factor in consumer purchasing decisions, with many opting for affordable, long-term solutions even when sustainability is a consideration.<sup>40,41</sup> However, a study by PWC indicates that consumers may be willing to pay a 9.7 percent premium for sustainable goods, even despite inflation concerns for cost-of-living.<sup>42</sup> As such, by making high-GHG building designs more expensive through the EDR1 threshold, developers are financially incentivized to adopt electrification design in new buildings as a lower-cost, sustainable alternative. This strategy not only supports GHG reduction goals but also addresses the market demand for cost-effective, energy-efficient buildings, benefiting both developers and consumers.

A single margin hourly source energy threshold (EDR1) performance standard establishes an energy consumption threshold that all new electric buildings must meet or fall below to comply with the City's energy efficiency requirements. The EDR1 would make building electrification the easiest and most economical pathway to meet the energy standard. However, since the performance standard does not ban natural gas infrastructure outright, it may permit some new construction to include natural gas something that Action BE2-d, decommissioning the city's natural gas pipeline, in part will address. These exceptions are expected to be minimal because of the cost effectiveness of new building electrification and continued natural growth in electric space and water heater installations seen in California over the past decade. Electric space heaters have grown to a 20 percent market share

<sup>&</sup>lt;sup>37</sup> CRA V. City of Berkeley, No. 21-16278. Accessed at: https://law.justia.com/cases/federal/appellate-courts/ca9/21-16278/21-16278-2023-04-17.html.

<sup>&</sup>lt;sup>38</sup> DesignHorizons Team. 2024. Construction Pricing: Factors, Costs, and Methods Explained. Available at: https://designhorizons.org/construction-pricing-factors-costs-and-methods-explained/

<sup>&</sup>lt;sup>39</sup> Construction Management Association of America. Member Communications Experience, Construction Estimating: Everything You Need to Know. Available at: https://www.cmaanet.org/sites/default/files/resource/Construction%20Estimating\_0.pdf <sup>40</sup> Mintel. 2022. One in five Americans struggle to cover day-to-day expenses as inflation soars. . Available at:

https://www.mintel.com/press-centre/one-in-five-americans-struggle-to-cover-day-to-day-expenses-as-inflation-soars/ <sup>41</sup> PWC. 2024. Consumers willing to pay 9.7% sustainability premium, even as cost-of-living and inflationary concerns weigh: PwC 2024 Voice of the Consumer Survey. Available at: https://www.pwc.com/gx/en/news-room/press-releases/2024/pwc-2024-voiceof-consumer-survey.html

in 2019, while electric water heaters have grown to an 11 percent market share in 2019.<sup>43</sup> This trend is not only expected to continue through 2030 because all-electric new construction has proven to be cost-effective in the region for most all buildings types,<sup>44,45</sup> but also be accelerated when coupled with the large amount of funding available for community members to install electric or heat pump space and water heating appliances (see 'Voluntary Electrification' section above for funding options).

For the purpose of quantification of this Measure, it is assumed that the EDR1 standards will encourage 95 percent of new buildings to opt for all-electric construction as the most cost-effective option. Table 10 shows the parameters and data sources that support these electrification ordinance GHG emissions reduction and Table 11 shows the calculations as outlined in Equations 3 through 3.3.

### **All-electric New Building Construction Equations**

Equation 3	$CO_{2}e Reduction_{NG,y,i}=(Fuel Avoided_{NG,y,i}*EF_{NG})+(Fuel Avoided_{NG,y,i}*EF_{NGL})-(Elec Convert_{y,i}*EF_{elec,y,i}*(1+L_{T&D}))$
Equation 3.1	Fuel Avoided <sub>NG,y,i</sub> =(Fuel <sub>NG,y,i</sub> -Fuel <sub>NG,imp,y,i</sub> )*Ord <sub>target,i</sub>
Equation 3.2	Fuel Avoided <sub>NGL,y,i</sub> =(Fuel Avoided <sub>NG,y,i</sub> *(1+L <sub>End-use</sub> ))*(L <sub>Pipeline</sub> +L <sub>End-use</sub> )
Equation 3.3	Elec Convert <sub>.y,i</sub> = Fuel <sub>AvoidedNG,y,i</sub> *CF <sub>elec</sub> /Eff <sub>elec</sub>

Variable	Definition	Value	Unit	Data Source
Equation 3				
CO <sub>2</sub> e Reduction <sub>NG,y,i</sub>	Natural gas GHG emissions reduction	See Table 11	MT CO <sub>2</sub> e	Calculated
Fuel Avoided <sub>NG,y,i</sub>	Natural gas consumption avoided	See Table 11	therms	Calculated
EF <sub>NG</sub>	Natural gas emission factor	0.005311	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel Avoided <sub>NGL,y,i</sub>	Natural gas leakage avoided	See Table 11	therms	Calculated
EF <sub>NGL</sub>	Natural gas leakage emission factor	0.053067	MT CO <sub>2</sub> e/therm	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Elec Converted <sub>y,i</sub>	Electricity usage from conversion	See Table 11	kWh	Calculated
EF <sub>elec,y,i</sub>	Forecasted electricity emission factor	See Table 11	MT CO <sub>2</sub> e/kWh	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

<sup>&</sup>lt;sup>43</sup> Opinion Dynamics. California Heat Pump Residential Market Characterization and Baseline Study (2022). Accessed at: https://pda.energydataweb.com/#!/documents/2625/view.

<sup>&</sup>lt;sup>44</sup> California Energy Codes and Standards. Cost Effectiveness Explorer (2024). Accessed at:

https://explorer.localenergycodes.com/jurisdiction/eureka-city/study-results/1-PGE?only\_study\_type=new-buildings <sup>45</sup> According to the California Energy Codes and Standards' Cost Effectiveness Explorer, all-electric construction is cost effective for all residential building types.

Variable	Definition	Value	Unit	Data Source
LT&D	Electricity transmission and distribution loss percentage	4.12%	Percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
у	Year	2030 or 2045	year	—
i	Subsector	Residential or Nonresidential	_	-
Equation 3.1				
Fuel <sub>NGy,i</sub>	Forecasted natural gas consumption	See Table 11	therms	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel <sub>NG,imp.y</sub>	Forecasted natural gas in implementation year	See Table 11	therms	Calculated
imp.yi	Ordinance implementation year	-	_	-
imp.y,residential	Ordinance implementation year (residential)	2026	year	Measure BE-3 target
imp.y,commercial	Ordinance implementation year (commercial)	2026	year	Measure BE-3 target
%Imp <sub>i</sub>	Effective percent of ordinance implementation	_	_	_
%Imp <sub>residential</sub>	Effective percent of ordinance implementation (residential)	95%	percentage	Assumed due to electric appliance market trends, cost-
% <b>Imp</b> commercial	Effective percent of ordinance implementation (commercial)	95%	percentage	effectiveness, and inclusion of all- electric assumption in CEQA documents.
Equation 3.2				
LPipeline	Natural gas pipeline leakage percentage	2.3%	kWh/therm	Metric Conversions <sup>1</sup>
L <sub>End-use</sub>	Natural gas end-use leakage percentage	0.5%	unitless	Leonardo Energy <sup>2</sup> and European Copper Institute <sup>3</sup>
Equation 3.3				
CF <sub>elec</sub>	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions <sup>1</sup>
Eff <sub>elec</sub>	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	U.S. Department of Energy <sup>2</sup> and European Copper Institute <sup>3</sup>

1. Metric Conversions. Therms (US) to Kilowatt-hours. Available at: https://www.metric-conversions.org/energy-and-

power/therms-us-to-kilowatt-hours.htm U.S Department of Energy. 2024. Air-Source Heat Pumps. Available at: https://www.energy.gov/energysaver/air-source-heat-2.

pumps?utm\_source=chatgpt.com
European Copper Institute. 2018. Heat Pumps: Integrating technologies to decarbonise heating and cooling. Accessed at: https://www.ehpa.org/wp-content/uploads/2022/10/White\_Paper\_Heat\_pumps-1.pdf.

Variable	Definition	Units	Sector	2030	2045
Equation 3.1					
Fuel <sub>NG,y,i</sub>	Forecasted natural	therms	Residential	2,661,103	3,145,882
	gas consumption		Nonresidential	2,522,151	3,912,581
Fuel <sub>NG,imp,y</sub>	Forecasted natural	therms	Residential	2,492,627	2,492,627
	gas in implementation year		Nonresidential	2,151,370	2,151,370
%Imp <sub>i</sub>	Effective percent of	percentage	Residential	95.00%	95.00%
	ordinance implementation		Nonresidential	95.00%	95.00%
Fuel	Natural gas	therms	Residential	160,052	620,592
Avoided <sub>NG,y,i</sub>	consumption avoided		Nonresidential	352,242	1,673,151
Equation 3.2					
Fuel	Natural gas leakage	therms	Residential	4,504	17,463
Avoided <sub>NGL,y,i</sub>	avoided		Nonresidential	9,912	47,082
Equation 3.3					
Elec Convert <sub>y,i</sub>	Electricity usage from	kWh	Residential	1,563,171	6,061,119
	conversion		Nonresidential	3,440,233	16,341,106
Equation 3					
EF <sub>elec,y,i</sub>	Forecasted electricity	MT CO <sub>2</sub> e/kWh	Residential	0.0001501	0.00
	emission factor		Nonresidential	0.0001501	0.00
CO <sub>2</sub> e	Natural gas GHG	MT CO <sub>2</sub> e	Residential	845	4,223
Reduction <sub>NG</sub>	tion <sub>NG</sub> emissions reduction		Nonresidential	1,859	11,385

Table 11 All-electric New Building Construction GHG Emission Reduction Calculat
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# Measure BE-4: Decarbonize 50% municipal buildings by 2030 and 100% by 2045.

Measure BE-4 commits the City to lead by example in decarbonizing municipal buildings and facilities City-wide to educate and promote electric conversions throughout the community. To achieve this, the City plans to adopt a policy requiring the decarbonization of 50% of municipal buildings and facilities by 2030 and 100% by 2045, with a focus on prioritizing critical and public access facilities. Additionally, the City will pursue grant funding and eligible rebates to support the electrification of municipal buildings. While the strategies to decarbonize municipal buildings and facilities will reduce GHG emissions, emissions from municipal building energy are included as a subset of the nonresidential building energy sector in the Ukiah 2022 Community GHG Inventory. This means the associated GHG emissions reduction are included within the community mitigation Measures (i.e., BE-1 through BE-3). Thus, to avoid potential double counting, reductions from this municipal mitigation measure are not counted towards the 2030 and 2045 targets. Nevertheless, the City is committed to demonstrating leadership in building decarbonization to support community-wide GHG reduction efforts and to serve as a model for sustainable practices.

# **3** Sector T: Transportation

The City of Ukiah's Transportation strategy aims to reduce and decarbonize VMT by leveraging renewable and carbon-free electricity (see Sector BE-1) and other renewable fuels to reduce GHG emissions from the transportation system. Reducing VMT consists of transitioning Ukiah residents and visitors out of single-occupancy vehicles and into active transportation mode options (i.e., walking and biking) and public and shared transit options (e.g., public buses, rail, carpools) by improving these modes and adopting policies to discourage single-occupancy vehicle commutes. The remaining VMT will then be decarbonized by increasing the adoption of zero-emission vehicles. When combined with renewable and carbon-free fuels, zero emission vehicles (ZEVs) eliminate GHG emissions from fossil fuel combustion and transition commutes to a zero-emission operational footprint. Additionally, the sector targets small off-road equipment and vehicles for decarbonization in alignment with State regulations. Based on this approach, the CAP's Transportation strategy consists of the following Measures presented in Table 12. The table also indicates which Measures are quantitative and which Measures are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Measures and the role of the supportive Measures.

Measure ID	Measure	2030 GHG Emissions Reduction (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction (MT CO <sub>2</sub> e)
Measure T-1	Increase the total mode share of active transportation to 15% by 2030, and 30% by 2045.	373	2,164
Measure T-2	Increase total public transportation mode share to 5% by 2030, and 20% by 2045.	997	5,319
Measure T-3	Reduce local VMT from single passenger vehicles.	Supportive	Supportive
Measure T-4	Achieve zero-emission vehicle (ZEV) adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045.	11,847	66,664
Measure T-5	By 2030, electrify or otherwise decarbonize 12% of applicable small off-road engines (SORE) off-road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N-79-20.	606	1,541
Measure T-6	Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements.	Supportive	Supportive
Total		13,823	75,688

# Table 12 Sector T: Transportation GHG Emission Reduction Summary

# Measure T-1: Increase the total mode share of active transportation to 15% by 2030, and 30% by 2045.

Measure T-1 aims to increase Ukiah's active transportation mode share to 15 percent by 2030 and to 30 percent by 2045. The primary Actions that enable this Measure are:

- Action T-1a which directs the City to update and implement the Ukiah Bicycle and Pedestrian Master Plan, increase active transportation infrastructure through safe and accessible bikeways and walkways, and develop and pilot a program that provides communitywide access to bicycles;
- Action T-1b which directs the City to establish affordable public transportation options while prioritizing bicycles and other micro-mobility options;

- Action T-1c which commits the City to develop a priority list of active transportation projects from Mendocino Council of Governments' (MCOG) Regional Transportation Plan (RTP) and updated Ukiah Bicycle and Pedestrian Master Plan, as well as identify and pursue necessary resources to implement the top 5 projects identified by 2028;
- Action T-1d which commits the City to further developing safe bike lane transportation corridors by 2027 across Ukiah using available State and federal funding.

To monitor the performance of these Actions in achieving Measure T-1 goals, the City will preliminarily track the amount of grant funding sourced and distributed through active transportation projects. Miles of bike and pedestrian lanes developed will also be tracked as the primary performance standard for determining the efficacy of listed Actions in achieving Measure goals.

Currently, Ukiah has a low bicycle mode share, but a relatively high walking mode share. In 2022 (i.e. Ukiah's GHG Inventory year), Ukiah's bicycle and pedestrian mode shares were 0.2 percent and 10.9 percent, respectively, equating to a 11.1 percent total active transportation mode share <sup>46,47</sup> Ukiah's bicycle network currently lacks safety, accessibility and connectivity. Specifically, major areas of the Ukiah lack designated bicycle facilities.<sup>48</sup> Action T-1a addresses these problems by directing the City to update its Master Plan and increase bicycle infrastructure through safe and accessible bikeways. Action T-1d also addresses these concerns by further developing safe bike lane corridors through State and federal funding. Studies show that investments in active transportation infrastructure have demonstrated significant improvements in active transportation mode shifts and GHG emissions reductions.<sup>49</sup> For example, urban cities that make a strong commitment to bicycle travel can see up to an 11 percent reduction in vehicle miles traveled and associated GHG emissions.<sup>50</sup> Such reductions can be reasonably expected because in 2022, about 16 percent of vehicle trips made nationally were 1 mile or less-a distance easily travelled by foot or bicycle.<sup>51</sup> Action T-1a supports this measure by addressing safety and connectivity concerns, as well as updating the Ukiah Bicycle and Pedestrian Master Plan. Part of this update includes assessing current active transportation conditions and projects occurring in Ukiah, such as the Urban Core Rehabilitation Project (UCRT)<sup>52</sup> and construction of Phases 1-3 of the Great Redwood Trail - Ukiah (GRT-Ukiah).53 The UCRT is a project that will enhance multimodal transportation in Ukiah's urban core, including installing or upgrading 2.9 miles of bike lanes. The GRT-Ukiah is expanding from 1.8 miles long to 3 miles long and 100 feet wide, with existing trail miles running adjacent to downtown Ukiah. The expansion of this trail enhances the efficacy of the project serving as an active transportation trail system as well as a linear park which encourages inclusivity and increased connectivity across Ukiah for residents.

To estimate the mode shift potential of updating Ukiah's Bicycle and Pedestrian Master Plan, other cities' bicycle and road networks were analyzed. The City of Davis leads the state with a 17.5 percent bicycle mode share<sup>54</sup> and 9.2 miles of bike lane per square mile of the city.<sup>55</sup> The City of Berkeley has a 9.7 percent bicycle mode<sup>56</sup> with approximately 4.8 miles of bike lane per square mile of the city.<sup>57</sup> Ukiah's current bicycle mode share is 0.2 percent,<sup>58</sup>

<sup>&</sup>lt;sup>46</sup> US Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?t=Commuting&g=160XX00US0681134

<sup>&</sup>lt;sup>47</sup> U.S. Census Bureau data includes 'Work from home' mode share. Mode share percentages were re-determined to exclude work from home mode share.

<sup>&</sup>lt;sup>48</sup> City of Ukiah. 2040 General Plan (2022). Accessed at: https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf
<sup>49</sup> Glazener, Andrew and Khreis, Haneen. Transforming our Cities: Best Practices Towards Clean Air and Active Transportation
(2019). Accessed at: https://link.springer.com/article/10.1007/s40572-019-0228-1

<sup>&</sup>lt;sup>50</sup> Jacob Mason et al., Institute for Transportation & Development Policy and the University of California, Davis. A Global High Shift Cycling Scenario (2015). Accessed at: https://itdpdotorg.wpengine.com/wp-content/uploads/2015/11/A-Global-High-Shift-Cycling-Scenario\_Nov-2015.pdf

<sup>&</sup>lt;sup>51</sup> National Household Travel Survey. Population Vehicle Trips Statistics (2021). Accessed at: https://nhts.ornl.gov/vehicle-trips

<sup>&</sup>lt;sup>52</sup> City of Ukiah. Urban Core Rehabilitation and Transportation Project (2023). Accessed at: https://cityofukiah.com/ucrt/ <sup>53</sup> City of Ukiah. Great Redwood Trail – Ukiah, Linear Park Master Plan (2020). Accessed at: https://cityofukiah.com/wp-

content/uploads/2022/06/GRT-Park-Master-Plan-Final.pdf <sup>54</sup> US Census Bureau. 2019: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table/ACSST5Y2019.S0801?g=commute&g=160XX00US0618100

<sup>&</sup>lt;sup>55</sup> City of Davis. Accessed at: https://www.cityofdavis.org/city-hall/public-works-engineering-and-transportation/bike-pedestrianprogram/davis-bike-and-pedestrian-infrastructure

<sup>&</sup>lt;sup>56</sup> City of Berkeley. City of Berkeley Bicycle Plan (2017). Accessed at:

https://www.cityofberkeley.info/uploadedFiles/Public\_Works/Level\_3\_-\_Transportation/Berkeley-Bicycle-Plan-2017-Executive%20Summary.pdf

<sup>&</sup>lt;sup>57</sup> Visit Berkeley. Fact Sheet. Accessed at: https://www.visitberkeley.com/media-press/press-kit/fact-sheet/

<sup>&</sup>lt;sup>58</sup> US Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?t=Commuting&g=160XX00US0681134

and has approximately 2.13 miles of bike lane per square mile of the city.<sup>59</sup> With the City adding over 12 additional miles of bike lanes through updates of the Bicycle and pedestrian Master Plan, there would be approximately 4.74 miles of bike lane per square mile of Ukiah.

Bicycle mode share in Ukiah is low partially because of the lack of designated bicycle facilities, making bicycle routes disconnected and inaccessible, as mentioned above. Studies show that increasing the connectivity of bicycle route networks can lead to a higher mode share of bicycle use.<sup>60</sup> Given that Ukiah's projected 4.74 miles of bike lanes per square mile closely aligns with the bike lane networks in cities like Berkeley, where bicycle mode share has reached 9.7 percent, achieving a 4 percent active transportation mode share by 2030 is a realistic and attainable goal, with the increase coming from bicycle mode share while walking mode share is conservatively assumed to remain constant.<sup>61</sup> This assumption provides a conservative and reasonable estimate of bike mode share increase that lies well below similar city references (City of Davis and City of Berkeley, see above), and is supported by the City's efforts to implement 12 miles of new bike lanes.

Like 2030, the 2045 quantification assumes the increases would be attributable to bicycle mode share, while walking mode share remains constant. These active transportation mode share estimates also provide VMT reductions for Ukiah well within the reductions shown in the cited studies. Additionally, the key Actions associated with this Measure (Actions T-1a, 1b, 1c, and 1d) will support this increase in mode share by prioritizing efforts to implement bike share programs, increase access, and incentive mode shifts.

Table 13 shows the parameters and data sources that support the GHG emissions reduction from active transportation mode shifts and Table 14 shows the calculations as outlined in Equations 4 through 4.2.

## Active Transportation Mode Share Equations

Equation 4  $CO_2e Reduction_{i,v} = VMT Reduced_{i,v} * VMT EF_{i,v}$ 

Equation 4.1 VMT Reduced<sub>i,y</sub>=((VMT<sub>i,y</sub>\*TPM<sub>i,y</sub>)/MS<sub>pass,by</sub>)\*TL<sub>i</sub>\*MS Increase<sub>Bike,y</sub>

Equation 5.2 MS Increase Bike, y=MS Target Active, y -MS Bike, by

Variable	Definition	Value	Unit	Data Source
Equation 4				
CO <sub>2</sub> e Reduction	VMT GHG emissions reduction	See Table 14	MT CO <sub>2</sub> e	Calculated
VMT Reduced	VMT reduced	See Table 14	miles	Calculated
VMT EF	VMT emission factor	See Table 14	MT CO2e/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Equation 4.1				
VMT <sub>i,y</sub>	Forecasted VMT	See Table 14	miles	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
TPM <sub>i,y</sub>	Forecasted trips per mile	See Table 14	trips/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

Table 13 Active Transportation Mode Share Parameters and Data Source
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<sup>&</sup>lt;sup>59</sup> Ukiah currently has 9.82 miles of bike lanes (Ukiah 2040 General Plan). Ukaih land area in square miles is 4.6, according to the 2040 General Plan. Accessed at: https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf

<sup>&</sup>lt;sup>60</sup> California Air Pollution Control Officers Association (CAPCOA). Quantifying Greenhouse Gas Mitigation Measures (2010). Accessed at: https://www.aqmd.gov/docs/default-source/ceqa/handbook/capcoa-quantifying-greenhouse-gas-mitigation-measures.pdf

<sup>&</sup>lt;sup>61</sup> The average active transportation trip length used in the quantification is set to 1.5 miles. While average walking trip (1 mile, CARB) is significantly lower than average biking trip (2.1 miles, CARB), a 1.5-mile average was assumed. Increasing biking infrastructure will increase accessibility to biking routes and increase convenience for biking.

Variable	Definition	Value	Unit	Data Source
MS pass,by	Passenger trip mode share in baseline year	88%	percentage	US Census Bureau. ACS 5-Year Estimates Subject Tables (2022) <sup>1</sup>
TLi	Average bicycle trip length	1.5	miles	CARB Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks: Technical Documentation <sup>2</sup>
MS Increase <sub>Bike,y</sub>	Bicycle mode share increase	See Table 14	percentage	Calculated
i	VMT type	Passenger	_	-
у	Year	2030 or 2045	-	-
Equation 4.2				
MS Target <sub>Active,y</sub>	Active transportation mode share target	-	percentage	Conservative estimate based on bicycle mode shares currently seen in Davis and Berkeley. <sup>3,4</sup>
MS Target <sub>Active,2030</sub>	-	15.00%	percentage	Measure T-1 target; City of Davis and Berkeley. <sup>3,4</sup>
MS Target <sub>Active,2045</sub>	-	30.00%	percentage	Measure T-1 target
MS <sub>Walk,by</sub>	Walking mode share in baseline year	10.91%	percentage	US Census Bureau. ACS 5-Year Estimates Subject Tables (2022) <sup>1</sup>
MS <sub>Bike,by</sub>	Bicycle mode share in baseline year	0.22%	percentage	US Census Bureau. ACS 5-Year Estimates Subject Tables (2022) <sup>1</sup>
by	Baseline year	2022	year	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

 US Census Bureau. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex, Ukiah (2022). Available at: https://data.census.gov/table?t=Commuting&g=160XX00US0681134

 CARB. Quantifying Reductions in Vehicle Miles Traveled from New Bike Paths, Lanes, and Cycle Tracks: Technical Documentation (2019). Accessed at: https://ww2.arb.ca.gov/sites/default/files/auctionproceeds/bicycle\_facilities\_technical\_041519.pdf.

 US Census Bureau. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex, Davis (2022). Available at: https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=160XX00US0618100

4. US Census Bureau. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex, Berkley (2022). Available at: https://data.census.gov/table/ACSST5Y2022.S0801?t=Commuting&g=160XX00US0606000

Variable	Definition	Units	VMT Туре	2030	2045
Equation 4.2					
MS Target <sub>Active,y</sub>	Active transportation mode share target	percentage	Passenger	15.00%	30.00%
MS Increase <sub>Bike,y</sub>	Bicycle mode share increase	percentage	Passenger	3.88%	18.88%
Equation 4.1					
VMT	Forecasted VMT	miles	Passenger	150,757,738	197,679,597
ТРМ	Forecasted trips per mile	trips/mile	Passenger	0.126046	0.131863
VMT Reduced	VMT reduced	miles	Passenger	1,255,643	8,386,864
Equation 4					
VMT EF	VMT emission factor	MT CO2e/mile	Passenger	0.000297	0.000258
CO₂e Reduction	VMT GHG emissions reduction	MT CO <sub>2</sub> e	Passenger	373	2,164

## Table 14 Active Transportation Mode Share GHG Emission Reduction Calculations

# Measure T-2: Increase total public transportation mode share to 5% by 2030, and 20% by 2045.

Measure T-2 aims to increase Ukiah's public transit mode share to 5 percent by 2030 and to 20 percent by 2045. The primary Actions that enable this Measure are:

- Action T-2a which directs the City to work with Mendocino Council of Governments (MCOG) and Mendocino Transit Authority (MTA) to implement a transportation system plan to shift travel behavior away from single-occupancy vehicles and encourage use of public and multi-modal transportation options. The plan will include considerations as to:
  - Increasing MTA ridership through improved routes and modifying schedules to increase efficiency and align with rider needs,
  - Increasing micro-transit access to improved public transit network facilities to promote last-mile commute access to alternative transportation methods,
  - o Developing a local electric trolley or bus system that operates year-round;
- Action T-2b which commits the City to require parking management plans (i.e., eliminate parking minimums, develop parking maximums) and transportation demand management plans; and,
- Action T-2c which directs the City to collaborate with MCOG and Mendocino Transit Authority (MTA), Mendocino College, and other key institutional partners to establish free or subsidized local public transit programs that service local residential and commercial areas.

To monitor the performance of these Actions in achieving Measure T-2 goals, the City will preliminarily track the successful completion of the City transportation system plan identified in **Action T-2a**, as well as the implementation of TDM requirements. Annual MTA ridership rates will also be tracked as the primary performance standard for determining Action efficacy in achieving Measure goals.

In 2022 (i.e., Ukiah's GHG inventory year), Ukiah's public transit mode share was 0.87 percent.<sup>62</sup> Key strategies employed by cities looking to increase public transportation mode share include significant expansions of public transportation service lines (**Action T-2a**), designated streets or lanes for bus lines to decrease headways, implementation of taxes to support transit, and reduced parking availability (**Action T-2b**). Studies have shown that expanding transit coverage through services routes and schedules can increase public transit mode share in a city. Specifically, studies which incorporated factors such as elasticity of transit demand and average mode shift factors

<sup>&</sup>lt;sup>62</sup> US Census Bureau. 2022: ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex. Accessed at: https://data.census.gov/table?t=Commuting&g=160XX00US0681134

have estimated that doubling transit coverage in a city can reduce VMT-and associated GHG emissions-up to 4.6 percent.63 Action T-2b specifies identifying high-trafficked areas of Ukiah to eliminate parking minimums, develop parking maximums, and require parking management and transportation demand management (TDM) plans. The intention of this Action is for employers to implement TDM plans that discourage single-occupancy vehicle trips and encourage alternative modes of transportation such as carpooling, transit, walking, and biking, thereby reducing VMT and GHG emissions. Studies show that implementing such plans have the potential to reduce up to 26 percent GHG emissions from project employee commute VMT.<sup>64</sup> Action T-2b also intends to develop parking management plans. Studies have estimated that implementing paid public parking and limited residential parking can reduce GHG emissions up to 30 percent and 13.7 percent, respectively.65 With the focus of Action T-2a and Action T-2c on creating a more connected and reliable network of transit, it is reasonable to estimate that the City can expect a 2.23 percent reduction in passenger VMT in Ukiah which would result from a 4.13 percent increase in public transit mode share.<sup>66</sup> Quantification estimates using third party evidence suggest that a realistic goal set forth by this measure is a public transit mode share of 5 percent by 2030 and 20 percent by 2045. For the purpose of conservatively estimating GHG reductions, these percentages are applied to the remaining VMT after accounting for reductions achieved through active transportation efforts identified in Measure T-1 to determine the expected VMT reduction from public transit actions.

Efforts to increase public transit mode share associated with Action T-2a may lead to more frequent transit operations or route changes, potentially increasing GHG emissions, However, MTA is planning to expand its ZEV bus fleet in alignment with California's Innovative Clean Transit (ICT) regulation, which requires all public transit agencies to transition to zero-emission bus fleets by 2040.<sup>67</sup> The ICT regulation mandates a phased transition schedule: by 2023, large transit agencies must ensure 25% of new bus purchases are zero-emission; by 2026, large agencies must increase this to 50%, with small transit agencies beginning their transition at 25%; and by 2029, all new bus purchases statewide must be zero-emission.<sup>68</sup> Additionally, programs such as the Low Carbon Transit Operations Program (LCTOP), established under Senate Bill 862, provide funding to support this transition.<sup>69</sup> For the purposes of quantification, it is assumed that any new buses required to support expanded service or additional routes under this action would be electric or zero-emission in alignment with State regulations. Using electric buses is anticipated to have continual GHG reduction benefits as emissions from electricity decline as a result of implementation of Measures BE-1 to transition the Ukiah grid to renewable energy. As a result, GHG emissions from potential public transit expansion in Ukiah are anticipated to be negligible and are not included in the guantification of net GHG emissions reductions from this measure. Table 15 shows the parameters and data sources that support the GHG emissions reduction associated with reducing vehicle miles traveled through public transit mode share and Table 16 shows the calculations as outlined in Equations 5 through 5.2.

# Public Transit Mode Share Equations

- Equation 5  $CO_2 e Reduction_{i,y} = VMT Reduced_{i,y} * VMT EF_{i,y}$
- Equation 5.1 VMT Reduced<sub>i,y</sub>= (((VMT<sub>i,y</sub>-VMT<sub>active,y</sub>)\*TPM<sub>i,y</sub>)/MS<sub>public,by</sub>)\*TL<sub>i</sub>\*MS Increase<sub>public,y</sub>
- Equation 5.2 MS Increase<sub>public,y</sub>=MS Target<sub>public,y</sub>-MS<sub>public,by</sub>

<sup>68</sup> California Air Resources Board (CARB). 2024. Innovative Clean Transit (ICT) Regulation Fact Sheet. Available at:

https://ww2.arb.ca.gov/resources/fact-sheets/innovative-clean-transit-ict-regulation-fact-sheet

<sup>&</sup>lt;sup>63</sup> California Air Pollution Control Officers Association (CAPCOA). Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021).

<sup>&</sup>lt;sup>64</sup> CAPCOA. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021). Measure T-6. Accessed at:

https://www.airquality.org/ClimateChange/Documents/Final%20Handbook\_AB434.pdf

<sup>65</sup> CAPCOA. Handbook for Analyzing Greenhouse Gas Emission Reductions. Measure T-24 and T-15.

<sup>&</sup>lt;sup>66</sup> VMT reduction related to transit measures was quantified using CAPCOA T-24, T-25, and T-26 methodology that quantified VMT reduction for the extension of transit network coverage or hours, increase in transit service frequency, and implementation of transit-supportive roadway treatments, respectively.

<sup>&</sup>lt;sup>67</sup> Mendicino Transit Authority (MTA). 2024. Mendocino Transit Authority Short-Range Transit Development Plan 2024 Update. Available at: https://www.mendocinocog.org/files/18849c841/MTA+2024+SRTDP\_Final%28web%29.pdf

<sup>&</sup>lt;sup>69</sup> Caltrans. 2024. Low Carbon Transit Operations Program (LCTOP). Available at: https://dot.ca.gov/programs/rail/low-carbon-transit-operations-program-lctop

Variable	Definition	Value	Unit	Data Source
Equation 5				
CO <sub>2</sub> e Reduction <sub>i,y</sub>	VMT GHG emissions reduction	See Table 16	MT CO <sub>2</sub> e	Calculated
VMT Reduced <sub>i,y</sub>	VMT reduced	See Table 16	miles	Calculated
VMT EF <sub>i,y</sub>	VMT emission factor	See Table 16	MT CO <sub>2</sub> e/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Equation 5.1				
VMT <sub>i,y</sub>	Forecasted VMT after active transportation reductions	See Table 16	miles	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
VMT <sub>active,y</sub>	VMT reduction from active transportation targets	See Table 14	miles	Calculated (See Measure T-1)
TPM <sub>i,y</sub>	Forecasted trips per mile	See Table 16	trips/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
MS <sub>pass,by</sub>	Passenger trip mode share in baseline year	88%	percentage	US Census Bureau. ACS 5-Year Estimates Subject Tables (2022) <sup>1</sup>
TLi	Average public transit trip length	3.8	miles	American Public Transportation Association's Public Transportation Fact Book <sup>2,3</sup>
MS Increase <sub>Public,y</sub>	Public transit mode share increase	See Table 16	percentage	Calculated
i	VMT type	Passenger	-	-
у	Year	2030 or 2045	-	-
Equation 5.2				
MS Target <sub>Public,y</sub>	Public transit mode share target	-	percentage	-
MS Target <sub>Public,2030</sub>	Public transit mode share target (2030)	5%	percentage	Measure T-2 target
MS Target <sub>Public,2045</sub>	Public transit mode share target (2045)	20%	percentage	Measure T-2 target
MS <sub>Public,by</sub>	Public transit mode share in baseline year	0.87%	percentage	US Census Bureau. ACS 5-Year Estimates Subject Tables (2022) <sup>1</sup>
by	Baseline year	2022	year	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

# Table 15 Public Transit Mode Share Parameters and Data Sources

Notes: "-" means either reference not applicable or see references for disaggregated parameter in the following table rows

1. US Census Bureau. ACS 5-Year Estimates Subject Tables. S0801|Commuting Characteristics by Sex, Ukiah (2022). Available at: https://data.census.gov/table?t=Commuting&g=160XX00US0681134

 American Public Transportation Association. Public Transportation Fact Book (2018). Accessed at: https://www.apta.com/wp-content/uploads/Resources/resources/statistics/Documents/FactBook/2018-APTA-Fact-Book.pdf.

3. Note: Regular bus trip length was utilized to remain conservative.

Variable	Definition	Units	VMT Type	2030	2045
Equation 5.2					
MS Target <sub>Public</sub>	Public transit mode share target	percentage	Passenger	5.00%	20.00%
MS Increase <sub>Public</sub>	Public transit mode share increase	percentage	Passenger	4.13%	19.13%
Equation 5.1					
VMT	Forecasted VMT after active transportation reductions	miles	Passenger	150,757,738	197,679,597
VMT <sub>active</sub>	VMT reduction from active transportation targets	miles	Passenger	1,255,643	8,386,864
ТРМ	Forecasted trips per mile	trips/mile	Passenger	0.126046	0.131863
VMT Reduced	VMT reduced	miles	Passenger	3,358,554	20,615,627
Equation 5					
VMT EF	VMT emission factor	MT CO₂e/mile	Passenger	0.000297	0.000258
CO₂e Reduction	VMT GHG emissions reduction	MT CO <sub>2</sub> e	Passenger	997	5,319

Table 16 Public Transit Mode Share GHG Emission Reduction Calculations

# Measure T-3: Reduce local VMT from single passenger vehicles.

Measure T-3 directs Ukiah to develop programs and policies to discourage travel by single-occupancy vehicles. Although this Measure may produce GHG emissions reductions, it is not quantified in this CAP due to the high potential to double count GHG emissions reduction with Measures T-1 and T-2. This Measure does, however, play a critical role in reducing VMT by promoting infill development, supporting increased EV infrastructure development, and supporting the CAP's active and public transportation mode share goals through infrastructure development and increased access.

Measure T-3 seeks to prioritize infill development and/or increased density of residential development in the downtown core, along transit corridors, and within future planned development areas that is compact, mixed use, pedestrian friendly, and transit-oriented where applicable. Increasing residential density and adding mixed-use development to neighborhoods near transit are key actions in reducing VMT, as they create more opportunities for people to live closer to jobs, services, and public transportation, reducing the need for single-occupancy vehicle trips. Higher densities and mixed-use developments near transit corridors are essential for achieving significant VMT reductions.<sup>70</sup> By encouraging sustainable development strategies that emphasize density, connectivity, and quality of affordable housing options along transit routes, this Measure can reduce reliance on cars, facilitate shorter trips, and support a shift to active modes of transportation like walking, biking, and public transit. Studies show that increasing residential density has the potential to reduce up to 31 percent GHG emissions.<sup>72</sup>

In support of reducing single passenger VMT and promoting infill projects, this Measure establishes Reach Code requirements to include EV charging infrastructure and local active and public transit facilities (i.e., dedicated bicycle parking stations, implementation of shared mobility hubs, access to transit stops where viable, etc.) in new multi-family construction. Additionally, the City aims to pursue and implement policies that support accessible, walkable neighborhoods and connected bike networks as part of infill development projects. By coupling increased density and diversity in land use with EV, biking, and walking infrastructure, this Measure helps lay the foundation for achieving Ukiah's VMT reduction goals of Measure T-4 (see below) and complements the active transportation and public transit mode share targets set by Measures T-1 and T-2.

<sup>&</sup>lt;sup>70</sup> Center for Transit-Oriented Development. Transit Oriented Development and the Potential for VMT-Related Greenhouse Gas Emissions Growth Reduction (2010). Accessed at: https://cnt.org/sites/default/files/publications/TOD-Potential-GHG-Emissions-Growth.FINAL\_.pdf.

<sup>&</sup>lt;sup>71</sup> CAPCOA. Handbook for Analyzing Greenhouse Gas Emission Reductions (2021).

<sup>&</sup>lt;sup>72</sup> CAPCOA. Handbook for Analyzing Greenhouse Gas Emission Reductions (2021).

# Measure T-4: Achieve zero-emission vehicle adoption rates of 30% for passenger vehicles and 25% for commercial vehicles by 2030 and 100% for all vehicles by 2045.

Measure T-4 aims to achieve a passenger and commercial ZEV adoption rate of 30 percent and 25 percent, respectively, by 2030, and 100 percent for all vehicles by 2045. The primary Actions that are designed to enable this Measure are:

- Action T-4a which directs the City to complete an inventory of existing EV infrastructure and locations, as well as
  pursue funding opportunities for the installation of around public EV chargers and residential home EV charging
  systems by 2030; and,
- Action T-4b which commits the City to develop a reach code requiring electric vehicle capable charging spaces to promote EV chargers in new development and existing parking spaces. The reach code would require:
  - Single Family CalGreen Tier 2 provisions;
  - Multifamily CalGreen Tier 2 provisions;
  - Non-residential CalGreen Tier 2 provisions;
  - Expansion of EV charging parking spaces to 30% of parking spaces within multi-family residential buildings by 2030;
  - Larger residential rental building owners (more than 20 tenants) to install working electric vehicle chargers in 30% of parking spaces for new and existing buildings at time of renovation if projects are valued at \$250,000 or greater;
  - o Acceleration of EV charger permits; and,
  - o Installation of EV chargers at City-owned facilities.

The State has established a goal of putting 5 million ZEVs on the road by 2030 and, according to executive order N-79-20, 100 percent of passenger vehicle sales are to be zero emission by 2035. This new executive order puts the total number of ZEVs on the road by 2035 at approximately 15 million.<sup>73</sup> Based on the current number of vehicles registered in California and application of a conservative population growth rate of 2 percent per year, 15 million ZEVs accounts for 35 percent of total passenger vehicles in 2035. The State has also established the Advanced Clean Fleets (ACF) rule, which requires the gradual transition of commercial vehicle fleets to ZEVs in California.<sup>74</sup> Starting in 2024, fleets must begin transitioning to ZEVs, with new trucks added to the fleet required to be zeroemission. Currently, the State is anticipated to reach 26 percent ZEV adoption across all vehicles by 2030.<sup>75,76</sup> To verify alignment with State ZEV regulations and the ZEV adoption goals set forth by Measure T-4, the City will monitor performance of the above actions by tracking registration of ZEVs in the community, as well as the number of public EV charging stations installed.

Studies have consistently identified that limited charging infrastructure as one of the primary barriers to electric vehicle adoption.<sup>77, 78</sup> **Actions T-4a** and **T-4b** help address this barrier by requiring the identification of gaps in the current infrastructure, pursuing funding to install additional chargers, implementing a reach code to establish minimum charger installation requirements, and simplifying the installation process by accelerating EV charger permits. Publicly accessible electric vehicles chargers make owning an electric vehicle convenient for all drivers—including those who cannot charge at home or drive daily distances longer than their electric vehicle battery range.

<sup>&</sup>lt;sup>73</sup> Davis, A., Hoang, T., Lopez, T., Lu, J., Nguyen, T., Nolty, B., Rillera, L., Schell, D., and Wofford, M. 2023. California Energy Commission Staff Report, Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment. Available at: https://www.energy.ca.gov/publications/2023/second-assembly-bill-ab-2127-electric-vehicle-charging-infrastructure-assessment <sup>74</sup> CARB. Advanced Clean Fleets Regulation Overview. Accessed at: https://ww2.arb.ca.gov/resources/fact-sheets/advanced-cleanfleets-regulation-overview

<sup>&</sup>lt;sup>75</sup> California Energy Commission (CEC). 2021. Report Shows California Needs 1.2 Million Electric Vehicle Chargers by 2030. Accessed at: https://www.energy.ca.gov/news/2021-06/report-shows-california-needs-12-million-electric-vehicle-chargers-2030 <sup>76</sup> Based on the zero-emission vehicle goals for passenger vehicles established by Executive Order N-79-20, eight million zeroemission vehicles are anticipated statewide by 2030. The City of Ukiah, through the development of this CAP, estimates that these eight million zero-emission vehicles represent 26 percent of the total passenger vehicles expected statewide by 2030 (based on statewide passenger car and light-duty truck counts in 2016 and population estimates for 2016 and 2030).

<sup>&</sup>lt;sup>77</sup> Kumar, Rajeev Ranjan and Kumar Alok. Adoption of Electric Vehicle: A Literature Review and Prospects for Sustainability (2020). Accessed at: https://www.sciencedirect.com/science/article/abs/pii/S095965261934781X

<sup>&</sup>lt;sup>78</sup> Winjobi, Olumide and Kelly, Jarod. Used Plug-in Electric Vehicles as a Means of Transportation Equity in Low-Income Households (2021). Accessed at: https://www.osti.gov/biblio/1658592

To this point, it is expected that 20 percent of electric vehicle charging nationally will occur at publicly accessible chargers in 2030.<sup>79</sup>

Estimation of EV infrastructure necessary to meet this Measure's goal is based on the statewide estimate of electric vehicles per publicly accessible electric vehicle charger. This estimate is based on the U.S. Department of Energy's Electric Vehicle Infrastructure Projection Tool and the numbers of ZEVs in the State as reported by the CEC (see Table 17). The quantification assumes all ZEVs will be EVs to remain conservative in the plan for EV chargers. Table 17 shows the parameters and data sources used to calculate the publicly accessible EV chargers needed in 2030 and 2045 and Table 18 shows the calculations as outlined in Equations 6 through 6.1.

### **Publicly Accessible Electric Vehicle Chargers Equation**

Equation 6 PEV Chargers<sub>y</sub> = EVs<sub>y</sub>/PEV Charger Factor-Existing PEV Chargers<sub>by</sub> Equation 6.1 EVs<sub>y</sub>=Population<sub>y</sub>\*(Vehicles<sub>by</sub>/Population<sub>by</sub>)\*EV Target<sub>Passy</sub>

Variable	Definition	Value	Unit	Data Source
Equation 6				
PEV Chargers <sub>y</sub>	New publicly accessible electric vehicle chargers needed	See Table 18	chargers	Calculated
EVs <sub>y</sub>	Electric vehicles targeted	See Table 18	electric vehicles	Calculated
PEV Charger Factor	Electric vehicles per publicly accessible electric vehicle charger	36	electric vehicles per charger	State-wide estimate based on DOE Infrastructure projection tool and the number of ZEVs in the State as reported by the CEC <sup>1</sup>
Existing EV Chargers <sub>by</sub>	Existing publicly accessible electric vehicle chargers	33	chargers	PlugShare <sup>2</sup>
у	Year	2030 or 2045	year	-
by	Baseline year	2022	year	-
Equation 6.1				
Population <sub>y</sub>	Forecasted population in region	See Table 18	people	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Vehicles <sub>by</sub>	Vehicles in baseline year	27,195	vehicles	Estimate based on Ukiah Zip Code <sup>1</sup>
Population <sub>by</sub>	Population in baseline year	15,929	people	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
EV Target <sub>Pass,y</sub>	Electric vehicle adoption target	See Table 18	percentage	Targeted zero-emission vehicle adoption for Measure T-4.

# Table 17 Publicly Accessible Electric Vehicle Charger Parameters and Data Sources

Notes: "-" means either reference not applicable or see references for disaggregated parameter in the following table rows

1. California Energy Commission. Light-Duty Vehicle Population in California. Accessed at: https://www.energy.ca.gov/datareports/energy-almanac/zero-emission-vehicle-and-infrastructure-statistics-collection/light

2. PlugShare. EV Charging in Ukiah, CA. Accessed at: https://www.plugshare.com/directory/us/california/ukiah.

<sup>&</sup>lt;sup>79</sup> Kampshoff, Philipp et al. Building the Electric-Vehicle Charging Infrastructure America Needs (2022). Accessed at: https://www.mckinsey.com/industries/public-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-americaneeds

Variable	Definition	Units	2030	2045
Equation 6.1				
Population <sub>y</sub>	Forecasted population	people	17,834	21,407
EV Target <sub>Pass,y</sub>	Zero-emission vehicle adoption target	percentage	30%	100%
EVsy	Electric vehicles targeted	electric vehicles	9,134	36,547
Equation 6				
PEV Chargers <sub>y</sub>	New publicly accessible electric vehicle chargers needed	chargers	223	990

Table 18 Publicly Accessible Electric Vehicle Charger Parameters and Data Sources

Through public-private funding and partnerships, the City will facilitate the installation of 223 publicly accessible EV chargers by 2030 to support 9,134 EVs, and 763 additional publicly accessible EV chargers by 2045 for a total of 990 at prioritized locations on City-owned properties and across the community. The City of Ukiah will track the number of EVs in the City based on DMV data and will adjust the number of chargers necessary based on adoption rates. The City will play a key role in identifying strategic sites and providing support through direct funding and establishing streamlined permitting for EV charger installations (**Actions T-4a** and **T-4b**). The majority of these installations will be carried out through existing local (e.g., Ukiah's Electric Vehicle Charger Rebate Program<sup>80</sup>), regional and state (e.g., Sonoma Coast Incentive Project<sup>81</sup>), and federal funding opportunities, as well as the potential pursuit of partnerships with private companies.<sup>82</sup> Additionally, these ZEVs will be supported by private electric vehicle chargers in new developments and existing buildings (**Action T-4b**).

Action T-4b directs the City to implement the Tier 2 voluntary measures of the California Green Building Standards Code-Part 11, Title 24, California Code of Regulations-known as CALGreen. Once locally adopted through a reach code in 2026, these Tier 2 requirements will be mandatory for new commercial and multifamily construction in Ukiah and require such buildings to install the minimum number of EV chargers based on the requirements (i.e., 20 percent of total parking spaces). Additionally, the City will adopt Tier 2 requirements for major commercial and multifamily retrofits through a reach code in 2026. These requirements will require major commercial retrofits to meet Tier 2 requirements for "EV Ready" charging spaces and infrastructure; and major multifamily building retrofits to install the minimum number of EV chargers based on Tier 2 requirements (i.e., 20 percent of total parking spaces).83 Action T-4b will work to increase private EV chargers in new buildings. The City has a Level 2 EV Charger Rebate program in place,<sup>84</sup> and Action T-4a directs the City to identify funding opportunities for multifamily residential vehicle charger installations. These funding options, along with federal and State funding will help cover the upfront costs to purchasing an EV and installing the equipment or infrastructure upgrades needed to charge the EV at home as high costs are one of the barriers to EV adoption for low-income households.85 Action T-4a also directs the City to identify opportunities for accelerated fleet ZEV adoption, supporting commercial vehicle conversions, as regulated by the ACF requirements. These Actions will enable the City to install as many privately owned EV chargers in existing buildings and new developments as practical to support a 30 percent passenger ZEV adoption and a 25 percent commercial ZEV adoption by 2030 and a 100 percent ZEV adoption by 2045. For the purpose of estimating GHG reductions, these percentages are made under the conservative assumption that the VMT reduction from ZEV adoption actions would occur after the active transportation and public transit actions with diminishing returns rather than have an aggregated effect on total VMT.

Table 19 shows the parameters and data sources that support GHG emissions reduction from the zero-emission vehicle adoption and Table 20 shows the calculations as outlined in Equations 7 through 7.2.

<sup>81</sup> CALeVIP. Sonoma Coast Incentive Project. Accessed at: https://calevip.org/incentive-project/sonoma-coast
 <sup>82</sup> Public-private partnerships are expected due to the large amount of state and federal funding available to support California's need for over one million public and shared chargers by 2030 to meet Executive Order B-48-18's ZEV goals.

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<sup>&</sup>lt;sup>80</sup> City of Ukiah. Electric Vehicle Offers & Information. Accessed at: https://ukiah.chooseev.com/promos/

<sup>&</sup>lt;sup>83</sup> Major commercial retrofits include retrofits to commercial buildings with a square footage larger than 10,000 square feet or retrofits with modifications to electric service panels.

<sup>&</sup>lt;sup>84</sup> City of Ukiah. Electric Vehicle Offers & Information. Accessed at: https://ukiah.chooseev.com/promos/

<sup>&</sup>lt;sup>85</sup> Gaillard, Isa. Ingredients for Equitable Electrification: Analyzing Equity in Statewide Electric Vehicle Rebate Programs (2022). Accessed at: https://greenlining.org/wp-content/uploads/2022/10/Greenlining-Ingredients-Equitable-Transportation-WebFINAL.pdf

# Zero-emission Vehicle Adoption Equations

Equation 7 C	$CO_{2}e Reduction_{VMT,i,y} = (VMT Reduced_{ICE,i,y} * EF_{VMT,i,y}) - (Elec Converted_{i,y} * EF_{elec,i,y} * (1 + L_{T&l}) + (1 + L_{T}) +$	5))
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Equation 7.1 Elec Converted<sub>iy</sub> =VMT Reduced<sub>ICE,iy</sub>\*EPM<sub>ZEV,iy</sub>

Equation 7.2 VMT Reduced<sub>ICE,i,y</sub>=(VMT<sub>i,y</sub>-VMT<sub>alt,i,y</sub>)\*(ZEV Adoption<sub>i,y</sub>-ZEV Adoption Baseline<sub>i,y</sub>)

Table 19 Zero-emission vehicle Adoption Parameters and Data Source
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Variable	Definition	Value	Unit	Data Source
Equation 7				
CO2e Reduction <sub>VMT,I,y</sub>	VMT GHG emissions reduction	See Table 20	MT CO <sub>2</sub> e	Calculated
VMT Reduced <sub>ICE,I,y</sub>	Internal combustion engine VMT reduced	See Table 20	miles	Calculated
EF <sub>VMT,I,y</sub>	Forecasted VMT emission factor	See Table 20	MT CO2e/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Elec Converted <sub>i,y</sub>	Electricity from zero- emission vehicle conversion	See Table 20	kWh	Calculated
EF <sub>elec,l,y</sub>	Forecasted residential electricity emission factor	See Table 20	MT CO₂e/kWh	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
L <sub>T&amp;D</sub>	Electricity transmission and distribution loss percentage	4.12%	Percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
i	VMT type	Passenger, commercial	-	-
у	Year	2030 or 2045	_	-
Equation 7.1				
EPM <sub>ZEV,l,y</sub>	Forecasted electricity usage per mile of zero-emission vehicles	See Table 20	kWh/mile	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Equation 7.2				
VMT <sub>iy</sub>	Forecasted total VMT	See Table 20	miles	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
VMT <sub>alt,i,y</sub>	VMT reduction from alternative transit methods	See Table 20	miles	See Measures T-1 and T-2
ZEV Adoption <sub>i,y</sub>	Zero-emission vehicle adoption target	-	_	_
ZEV Adoption <sub>pass,2030</sub>	-	30.00%	percentage	Measure T-4 target
ZEV Adoption <sub>pass,2045</sub>	_	100.00%	percentage	Measure T-4 target
ZEV Adoption <sub>com,2030</sub>	-	25.00%	percentage	Measure T-4 target

Variable	Definition	Value	Unit	Data Source
ZEV Adoption <sub>com,2045</sub>	-	100.00%	percentage	Measure T-4 target
ZEV Adoption Baseline <sub>i,y</sub>	Zero-emission vehicle adoption baseline	See Table 20	percentage	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

Variable	Definition	Units	VMT Type	2030	2045
Equation 7.2					
VMT <sub>i,y</sub>	Forecasted total VMT	miles	Passenger	150,757,738	197,679,597
			Commercial	18,643,436	24,622,799
VMT <sub>alt,I,y</sub>	VMT reduction from	miles	Passenger	4,614,196	29,002,491
	alternative transit methods		Commercial	0	0
ZEV Adoption <sub>i,y</sub>	Electric vehicle adoption	percentage	Passenger	30.00%	100.00%
	target		Commercial	25.00%	100.00%
ZEV Adoption	Electric vehicle adoption	percentage	Passenger	6.58%	9.52%
Baseline <sub>i,y</sub>	baseline		Commercial	4.73%	24.62%
VMT Reduced <sub>ICE,I,y</sub>	Internal combustion engine VMT reduced	VMT	Passenger	34,226,818	168,677,106
			Commercial	3,779,024	24,622,799
Equation 7.1					
EPM <sub>ZEV,I,y</sub>	Forecasted electricity	kWh/mile	Passenger	0.3681	0.3690
	usage per mile of electric vehicles		Commercial	1.2227	1.1606
Elec Converted <sub>i,y</sub>	Electricity from electric vehicle conversion	kWh	Passenger	12,599,302	62,248,262
			Commercial	4,620,477	28,576,654
Equation 7					
EF <sub>elec,I,y</sub>	Forecasted electricity	MT	Passenger	0.0001501	0.0000000
	emission factor	CO <sub>2</sub> e/kWh	Commercial	0.0001501	0.0000000
EF <sub>VMT,I,y</sub>	Forecasted VMT emission	MT	Passenger	0.0002970	0.0002580
	factor	CO <sub>2</sub> e/mile	Commercial	0.0011570	0.0009400
CO <sub>2</sub> e	VMT GHG emissions	MT CO <sub>2</sub> e	Passenger	8,196	43,519
ReductionVMT	reduction		Commercial	3,650	23,145

Table 20	Zero-emission Vehicle Adoption GHG Emission Reduction Calculations
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# Measure T-5: By 2030, electrify or otherwise decarbonize 12% of applicable SORE off-road equipment and replace 35% of fossil diesel consumption with renewable diesel in alignment with EO N-79-20.

Measure T-5 aims for Ukiah to decarbonize 12 percent of small off-road engine (SORE) use in the community by 2030 and 100 percent by 2045 in alignment with CARB's SORE Regulation. The measures also seek to substitute 35% of off-road diesel consumption with renewable diesel by 2030 in compliance with EO N-79-20. The primary Actions that enable this Measure include:

- Action T-5a which directs the City to offer education and incentives for replacement of fossil-fuel based equipment with SORE zero emissions alternatives;
- Action T-5b which commits the City to align with and support CARB's regulations requiring new sale small offroad equipment to be zero emission starting in 2024, and phase 2 of the regulation affecting the manufacture and sale of larger scale equipment such as generators and pressure washers by 2028; and
- Action T-5c which directs the City to develop an outreach strategy to notify affected fleets, identify pathways to enforce and track compliance with the requirement for diesel vehicles over 25 horsepower to use R99 or R100 renewable diesel, such as through reporting requirements, and partner with regional fuel suppliers to procure renewable diesel.

**Action T-5b** directs the City to align with and support CARB's regulations requiring that new sales of SORE be zero emission by 2024, in compliance with AB 1346. As defined by CARB, SORE are those equipment types with rated power at or below 19 kilowatts (i.e., 25 horsepower). Typical off-road vehicle and equipment types that use these engines include lawn and garden equipment, portable generators, and pressure washers.<sup>86</sup> To track compliance with AB 1346 requirements and meeting goals established by Measure T-5, the City will monitor the public's participation in the City's SORE education and incentive program.

In 2030, gasoline and diesel used by these SOREs will comprise over 38 percent of the off-road vehicle and equipment fuel used throughout Ukiah.<sup>87</sup> SORE equipment have a median lifespan of 5 years or less, which means the majority of SORE equipment in Ukiah will likely need to be replaced by 2030.<sup>88</sup> By providing education supporting compliance with AB 1346 (**Action T-5b**), the City will support the electric conversion of SORE off-road equipment at time of replacement. Additionally, the City will provide incentives for residents and businesses to replace their existing SORE equipment to further promote the transition to ZEV equipment alternatives (**Action T-5a**). Given the population of SORE equipment in the community, their median lifespan, and the expectation that only ZEV options will be available for purchase by 2030, a conservative goal of a 12% reduction in SORE fuel consumption is established for Measure T-5. This quantification focuses on 12 percent of applicable SORE rather than the full 38 percent that SORE comprises, to reflect that Action T-5b targets new sales rather than existing equipment across Ukiah.

In 2022, CARB also approved amendments to the In-Use Off-Road Diesel-Fueled Fleets Regulation that incorporates new requirements to use renewable diesel. Beginning January 1, 2024, all California fleets subject to this regulation are required to procure and only use R99 or R100 renewable diesel fuel in all vehicles subject to the Off-Road Regulation, with some limited exceptions. This regulation applies to all self-propelled off-road diesel vehicles 25 horsepower or greater used in California and applies to vehicles that are rented or leased. Exceptions to the regulation include locomotives, commercial marine vessels, marine engines, recreational off-highway vehicles, combat and tactical support equipment, stationary equipment, portable engines, equipment used exclusively for agricultural operations, implements husbandry, and off-road diesel vehicles owned and operated by an individual for personal, non-commercial and non-governmental purposes.<sup>89</sup> To align with the regulation, the City will monitor the retail supply of R99 and R100 as the performance standard for Measure T-5. As part of compliance tracking outlined in Action T-5c, the City may also partner with CARB to verify fleet compliance, leveraging CARB's requirement for fleets to affirm their adherence to the regulation. To further support fleet compliance, the City will develop an education campaign to provide fleets with resources for procuring drop-in renewable diesel fuel (**Action T-5c**).

As the In-Use Off-Road Diesel-Fueled Fleets Regulation is dependent on the availability of renewable diesel and does not require equipment turn-over, and the City will monitor retail supply to ensure only R99/R100 is available locally, it is anticipated that Measure T-5 will transition all of off-road diesel consumption subject to the regulation to the renewable alternative by 2030, or 35% of Ukiah's total off-road diesel consumption. Renewable diesel that meets the

<sup>88</sup> CARB. 2020 Emissions Model for Small Off-Road Engines - SORE2020 (2020). Table 16. Accessed at:

<sup>&</sup>lt;sup>86</sup> California Air Resources Board (CARB). (2021) SORE Applicability Fact Sheet. Accessed at:

https://ww2.arb.ca.gov/resources/fact-sheets/sore-applicability-fact-sheet.

<sup>&</sup>lt;sup>87</sup> Ukiah's SORE fuel usage in 2030 was estimated by filtering CARB OFFROAD2021 model outputs (for Mendocino County in 2030) for horsepower ratings less than or less than 25 and attributing the resulting County-level annual fuel usage to Ukiah based on the attribution methodology used in the GHG inventory and forecast. The results were divided by the total estimated off-road fuel usage in Ukiah in 2030 to estimate the share, or percentage, of fuel usage attributable to SOREs.

https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020\_Technical\_Documentation\_2020\_09\_09\_Final\_Cleaned\_ADA.pdf <sup>89</sup> California Air Resources Board (CARB). (2022). Final Regulation Order Amendments to Sections 2449, 2449.1, and 2449.2 Title 12, California Code of Regulations. Accessed at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/off-roaddiesel/froa-1.pdf

required standards has an emissions factor that is approximately 70 percent lower than fossil-fuel diesel.<sup>90</sup> As renewable diesel has a lower emissions factor, the increased use required by CARB will further help drive down off-road emissions in the Ukiah community.

Table 21 shows the parameters and data sources that support off-road ordinance GHG emissions reduction and Table 22 shows the calculations as outlined in Equations 8through 8.3.

### **Off-road Decarbonization Equations**

Equation 8	CO <sub>2</sub> e Reduction <sub>y</sub> = Fuel Avoided <sub>SORE,y</sub> * Weighted Efy
Equation 8.1	Weighted $EF_y = CO_2e Emissions_y/(Fuel_{Gas, y} + Fuel_{Diesel, y} + Fuel_{NG, y})$
Equation 8.2	$Fuel Avoided_{SORE,y} = (Fuel_{Gas, y} + Fuel_{Diesel, y} + Fuel_{NG, y}) * Prop_{SORE} * Target_{SORE,y}$
Equation 8.3	Fuel Replaced <sub>Diesel,y</sub> = (Fuel <sub>Diesel,y</sub> *(1-Target <sub>SORE,y</sub> ))*Target <sub>Diesel,y</sub>

#### Table 21 Off-road Decarbonization Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 8				
CO2e Reduction <sub>offroad,y</sub>	Offroad fuel GHG emissions reduction	See Table 22	MT CO <sub>2</sub> e	Calculated
Fuel Avoided <sub>SORE,y</sub>	Off-road fuel avoided from applicable SORE equipment	See Table 22	gallons	Calculated
Weighted EF <sub>y</sub>	Weighted emission factor for all off-road fuels	See Table 22	$MT$ $CO_2e/gallon$	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel Replaced <sub>Diesel,y</sub>	Off-road diesel replaced from applicable diesel equipment >25 hp	See Table 22	gallons	Calculated
EF <sub>RDiesel</sub>	Emissions factor of renewable diesel	0.00308	MT CO <sub>2</sub> e/gallon	Neste (as recommended by CARB) <sup>6</sup>
Weighted EF <sub>Diesel</sub>	Emissions factor of fossil fuel diesel	0.01047	MT CO₂e/gallon	Inventory
Equation 8.1				
CO2e Emissionsy	Forecasted off-road GHG emissions	See Table 22	MT CO <sub>2</sub> e	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel <sub>Gas,y</sub>	Forecasted gasoline use	See Table 22	gallon	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel <sub>Diesel,y</sub>	Forecasted diesel use	See Table 22	gallon	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Fuel <sub>NG,y</sub>	Forecasted natural gas use	See Table 22	gallon	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report

<sup>&</sup>lt;sup>90</sup> As of February, 2023, CARB staff identified renewable diesel produced by Neste meets the regulatory requirements and standards for diesel quality (https://ww2.arb.ca.gov/resources/fact-sheets/chc-factsheet-renewable-diesel-r100-or-r99). Estimates in GHG emission reductions based on emission factors provided by Neste accessed at: https://www.neste.com/en-us/products-and-innovation/neste-my-renewable-diesel/product-information

Variable	Definition	Value	Unit	Data Source
Equation 8.2				
Prop <sub>SORE</sub>	Proportion of fuel attributable to SORE equipment	38%	percentage	OFFROAD2021 <sup>1,2</sup>
Target <sub>SORE,y</sub>	Fuel use reduction target for all off-road fuels	_	-	-
Target <sub>SORE,2030</sub>	Fuel use reduction target (2030)	12%	percentage	OFFROAD2021 <sup>1,2</sup> and direction of state goals (i.e., EO N-79-20). <sup>3</sup>
Target <sub>SORE,2045</sub>	Fuel use reduction target (2045)	100%	percentage	Based on compliance with state goals established by EO N-79-20.
Equation 8.3				
Target <sub>Diesel,y</sub>	Fuel reduction target for diesel off-road fuels	-	-	-
Target <sub>Diesel,2030</sub>	Fuel reduction target (2030)	35%	percentage	OFFROAD2021 <sup>1,4</sup> and CARB applicable regulations requiring renewable diesel fuel use (i.e., In-Use Off-Road Diesel-Fueled Fleets Regulation) <sup>5</sup>
Target <sub>Diesel,2045</sub>	Fuel reduction target (2045)	0%	percentage	Based on compliance with state goals established by EO N-79-20.

 California Air Resources Board (CARB). 2024. Off-Road Emissions Inventory (OFFROAD2021). Available at: https://arb.ca.gov/emfac/offroad/emissions-inventory/3f377c1f45fef7c154509eac6354b9086be9cdd9

2. Ukiah's SORE fuel usage in 2030 was estimated by filtering CARB OFFROAD2021 model outputs (for Mendocino County in 2030) for horsepower ratings less than or less than 25 and attributing the resulting County-level annual fuel usage to Ukiah based on the attribution methodology used in the GHG inventory and forecast. The results were divided by the total estimated off-road fuel usage in Ukiah in 2030 to estimate the share, or percentage, of fuel usage attributable to SOREs.

 California Air Resources Board (CARB). SORE Applicability Fact Sheet (2021). Accessed at: https://ww2.arb.ca.gov/resources/fact-sheets/sore-applicability-fact-sheet.

4. Ukiah diesel fuel usage in 2030 was estimated based on attributions established in the Ukiah 2022 GHG Inventory and by filtering CARB OFFROAD2021 model outputs for horsepower ratings greater than or equal to 25 and for equipment categories subject to the In-Use Off-Road Diesel-Fueled Fleets Regulation. The results were divided by the total estimated off-road diesel usage in Ukiah in 2030 to estimate the share, or percentage, of fuel usage subject to the In-Use Off-Road Diesel-Fueled Fleets Regulation which accounted for 35% of all diesel fuel use.

 California Air Resources Board (CARB). (2022). Final Regulation Order Amendments to Sections 2449, 2449.1, and 2449.2 Title 12, California Code of Regulations. Accessed at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/offroaddiesel/froa-1.pdf

Variable	Definition	Units	2030	2045
Equation 8.1				
CO <sub>2</sub> e Emissions <sub>y</sub>	Forecasted off-road GHG emissions	MT CO <sub>2</sub> e	3,639	4,108
Fuel <sub>Gas,y</sub>	Forecasted gasoline use	gallons	202,942	232,457
Fuel <sub>Diesel,y</sub>	Forecasted diesel use	gallons	170,014	189,030
Fuel <sub>NG,y</sub>	Forecasted natural gas use	gallons	-	-
Weighted EFy	Weighted fuel emission factor	MT CO <sub>2</sub> e/gallon	0.009756	0.009747
Equation 8.2				
<b>Prop</b> sore	Proportion of fuel attributable to SORE equipment	percentage	38%	38%
Target <sub>sore,y</sub>	Fuel use reduction target for all off-road fuels	percentage	12%	100%
Fuel Avoided <sub>SORE,y</sub>	Off-road fuel avoided from applicable SORE equipment	gallons	16,787	158,100
Equation 8.3				
Target <sub>Diesel,y</sub>	Fuel use reduction target for all off-road fuels	percentage	35%	0%
Fuel Replaced <sub>Diesel,y</sub>	Off-road fuel replaced from applicable diesel equipment >25 hp	gallons	59,811	0
Equation 8				
CO <sub>2</sub> e Reduction <sub>Fuel</sub>	Fuel GHG emissions reduction	MT CO <sub>2</sub> e	606	1,541

# Table 22 Off-road Decarbonization GHG Emission Reduction Calculations

# Measure T-6: Decarbonize the municipal fleet in compliance with the California Advanced Clean Fleet Rule and EO N-79-20 off-road requirements.

Measure T-6 aims to electrify or otherwise decarbonize Ukiah's municipal fleet in line with the State's Advanced Clean Fleet Rule. To lead by example and align with State requirements, the City will implement its Sustainable purchasing policy by 2025 requiring all new and replacement municipal fleet vehicle purchases to be electric vehicles (EVs) or ZEVs, where commercially viable. The City will also conduct an audit of existing vehicles and their uses to design and implement a replacement schedule to comply with the California Advanced Clean Fleet rule, ensuring that 50% of medium- and heavy-duty vehicle purchases are ZEVs beginning in 2024, and 100% by 2027. Additionally, the City will evaluate opportunities to procure renewable diesel for applicable jurisdiction-owned equipment and replace end-of-life off-road equipment with zero-emission alternatives where feasible in alignment with EO N-79-20 requirements. The City also recognizes the need to provide the necessary infrastructure to support this transition. It plans to obtain resources to install additional ZEV chargers and renewable fueling stations in municipal parking lots for use by the fleet, employees, and the public.

This measure will reduce GHG emissions from municipal operations and demonstrate the feasibility and benefits of transitioning to clean transportation technologies. While the strategies to decarbonize fleet vehicles will reduce GHG emissions, these emissions are already included as a subset of transportation sector emissions within the Ukiah Community GHG Inventory. This means the associated GHG emissions reduction are included within the community mitigation Measures (i.e., T-4 through T-5). Thus, to avoid potential double counting, this municipal mitigation measure is not counted towards the 2030 and 2045 targets.

# **4** Sector WR: Water Resources

The City of Ukiah's Water Resources strategy aims to optimize Ukiah's water resources through sustainable practices in wastewater recycling, water conservation, and water use reduction. This approach includes ongoing updates to the Urban Water Management Plan, where the City's water utility department and the Ukiah Valley Basin Groundwater Sustainability Agency (UVBGSA) will outline demand reduction measures in compliance with the State's Urban Water Management Planning Act established in the California Water Code.<sup>91</sup> As part of this strategy, the City will expand on existing water management policies, collaborate with large water users, enforce landscape irrigation efficiency standards, and engage residents and businesses in sustainable water practices. Through these efforts, the City aims to strengthen water resource resilience and reduce per capita water consumption, ensuring sustainable water access for current and future generations.

Based on this approach, the CAP's Water Resources Sector consists of the following Measure presented in Table 23. The Measure is supportive (i.e., no GHG emissions reductions have been attributed) due to the potential for double counting of indirect GHG emissions reductions with the Building Energy Sector Measures. Energy is used at multiple stages of the water cycle, including extraction, treatment, distribution, and end-use activities like heating. Because of this interconnected relationship, conserving water can indirectly reduce energy demand, offering opportunities for resource efficiency and GHG emissions reductions. However, electricity consumption from residential and commercial building operations in the community is already accounted for under the Building Energy Sector, which will see efficiency upgrades (Measures BE-2 and BE-3) and emissions reductions from cleaner electricity generation and increased renewable energy procurement under Measure BE-1. Attributing GHG reductions from water conservation to the Water Resources Sector would risk double counting reductions already included under the Building Energy Sector. To avoid this overlap, GHG emissions associated with the Water Resources Sector are not quantified. The following subsection details the role of this supportive Measure.

Measure ID	Measure	2030 GHG Emissions Reduction (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction (MT CO <sub>2</sub> e)
Measure WR-1	Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption.	Supportive	Supportive
Total		0	0

## Table 23 Sector WW: Water Resources GHG Emissions Reduction Summary

# Measure WW-1: Continue to implement wastewater recycling and water conservation projects and reduce per capita potable water consumption.

Measure WW-1 focuses on advancing Ukiah's water conservation and wastewater recycling efforts to reduce per capita potable water consumption. Actions to achieve this goal focus on updating the Urban Water Management Plan (UWMP) every 5 years to align with California's Urban Water Management Planning Act,<sup>92</sup> as well as continuing to require low-impact-development (LID) strategies for new development.

The updated UWMP will include demand reduction measures and, as needed, new actions to meet state requirements. Updating the UWMP may also include enhancing regional Water Shortage Contingency Plans<sup>93</sup> to

<sup>&</sup>lt;sup>91</sup> California Department of Resources. 2024. Urban Water Management Plans. Available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

<sup>&</sup>lt;sup>92</sup> California Department of Resources. 2024. Urban Water Management Plans. Available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency/Urban-Water-Management-Plans

<sup>&</sup>lt;sup>93</sup> California Department of Water Resources. 2025. Countywide Drought and Water Shortage Contingency Plans. Available at: https://water.ca.gov/Programs/Water-Use-And-Efficiency/2018-Water-Conservation-Legislation/County-Drought-Planning

enforce water waste restrictions, partnering with large water users to develop on-site reuse plans, and updating the Model Water Efficient Landscape Ordinance (MWELO)<sup>94</sup> in collaboration with builders and developers. Additional strategies involve encouraging dual-plumbing systems in new construction to utilize greywater or recycled water for irrigation, engaging with the community—particularly low-to-moderate-income residents—to promote water-saving incentives and programs, and adjusting water and wastewater rates to promote financial sustainability. Through these comprehensive efforts, Measure WW-1 aims to establish a sustainable approach to water use that supports the City's conservation goals and water security.

Since Ukiah's wastewater treatment plant is located within City limits and all its water comes from local sources, GHG emissions reductions are not quantified under this Measure due to the risk of double counting with Building Energy Sector GHG reductions from renewable and carbon-free electricity. Energy is used at multiple stages of the water cycle—such as treatment, distribution, and end-use—which creates an interconnected relationship where water conservation can reduce energy demand. However, GHG emissions and reductions from water energy consumption and conservation are anticipated to be partially captured through the Building Energy Sector Measures, which address energy efficiency and cleaner electricity procurement. This Measure still directly supports BE 1 – 3 by reducing energy consumption for water distribution and wastewater treatment.

<sup>&</sup>lt;sup>94</sup> City of Ukiah. 2024. ARTICLE 6. MODEL WATER EFFICIENT LANDSCAPE ORDINANCE ADOPTION. Available at: https://www.codepublishing.com/CA/Ukiah/html/Ukiah03/Ukiah0301-0600.html

# 5 Sector SW: Solid Waste

The City of Ukiah's Solid Waste strategy focuses on increasing diversion to reduce the amount of organic waste<sup>95</sup> sent to the landfill and effectively using those diverted resources across the community. The Strategy aims to accomplish these goals by focusing on organic materials, along with the finished end products. In the landfill, organic waste decays without access to light or oxygen and produces methane (CH<sub>4</sub>) gas. In wildfire scenarios and/or when left unmanaged, woody and green waste produces carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), sulfur oxides (SOx), and nitrogen oxides (NOx). Diverting organic waste from the landfill reduces the occurrence of this anaerobic decomposition, providing Ukiah with an important opportunity to reduce solid waste GHG emissions. Proper management of Ukiah's natural resources from a land use and renewable energy perspective, reduces the occurrence of emissions and can contribute to carbon sequestration goals. After diverting and recycling this organic waste, the resulting finished end products (e.g. biochar, compost, blended soil amendments, biogas & digestate) can be utilized throughout the community to sequester carbon and/or provide renewable power. Thus, properly managing organic waste provides an important opportunity to develop Ukiah's circular economy, reduce GHG emissions, and sequester carbon. Based on this approach, the CAP's Solid Waste Sector consists of the Measures presented in Table 24. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Measures.

Measure ID	Measure	2030 GHG Emissions Reduction (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction (MT CO <sub>2</sub> e)
Measure SW-1	Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030.	3,511	4,646
Measure SW-2	Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030.	190	228
Total		3,701	4,874

## Table 24 Sector SW: Solid Waste GHG Emission Reduction Summary

# Measure SW-1: Achieve and maintain SB 1383 requirements to reduce organic waste sent to landfills by 75% by 2030.

Measure SW-1 aims for Ukiah to meet SB 1383 requirements to recover 20 percent of disposed edible food for human consumption and reduce landfilled organic waste—and its associated GHG emissions—75 percent from current levels by 2030. The primary Actions that enable this Measure include:

- Action SW-1a which commits the City to meeting the requirements of SB 1383 to reduce organics in the waste stream by 75% by 2030 through activities such as:
  - o Implementing enforcement and fees for incorrectly sorted materials;
  - Confirming adequate bin signage across commercial and residential areas of acceptable landfill, recyclable, and compostable materials;
  - o Identifying public areas for adding organics collection and recycling bins where needed;
  - Working with C&S Waste Solutions and MSWMA to conduct free food scrap collection pail giveaways and promote curbside organics collection service; and,
  - Identifying long-term and alternate solutions for wastewater bio-solids and develop local, beneficial reuse, as well as obtaining resources to fund MSWMA staffing and capacity.

<sup>&</sup>lt;sup>95</sup> Organic waste, for the purposes of this CAP, includes food waste, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges. Accessed at: https://calrecycle.ca.gov/organics/slcp/collection/#:~:text=Beginning%20in%202022%2C%20SB%201383,biosolids%2C%20digesta te%2C%20and%20sludges.
These Actions encompass the activities the California Department of Resources Recycling and Recovery (CalRecycle) requires jurisdictions to conduct to comply with SB 1383.<sup>96</sup> To monitor the progress toward compliance with SB1383 diversion requirements, the City will track the amount of funding acquired to increase staffing and capacity, as well as work with C&S Solutions and MSWMA to track organics diversion rates.

Currently, Ukiah is working with Cal Recycle to ensure communitywide compliance with SB 1383 requirements. The City of Ukiah, in partnership with its enterprise solid waste hauler, is already incorporating edible food recovery strategies and landfill/organics/recycling collection systems.<sup>97</sup> Between now and 2030, the City needs to expand funding, staff, enforcement and keep developing their current programs. The City intends to identify funding solutions to support implementation of **Action SW-1a**, which aims to increase and expand upon the solutions already in place. Continuing and completing these activities is thus expected to provide the levels of diversion, composting, and food donations needed to reduce Ukiah's landfilled organic waste 75 percent by 2030.<sup>98</sup> This level of landfilled organic waste reduction is expected to directly reduce solid waste disposal GHG emissions 75 percent because nearly all GHG emissions from the natural decay of solid waste in landfills come from organic waste.<sup>99</sup>

Table 25 shows the parameters and data sources that support the landfilled organic waste reduction GHG emissions reduction and Table 26 shows the calculations as outlined in Equation 9.

## Landfilled Organic Waste Reduction Equations

Equation 9  $CO_2e \ Reduction_{LOW,y} = CO_2e \ Emissions_y * Reduction \ Target_{LOW,y}$ 

Variable	Definition	Value	Unit	Data Source
Equation 9				
CO <sub>2</sub> e Reduction <sub>LOW,y</sub>	Landfilled organic waste GHG emissions reduction	See Table 26	MT CO <sub>2</sub> e	Calculated
CO <sub>2</sub> e Emissions <sub>y</sub>	Landfilled organic waste GHG emissions	See Table 26	MT CO <sub>2</sub> e	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Reduction Target <sub>LOW, y</sub>	Landfilled organic waste reduction percent	75	percentage	Estimated based on compliance with CalRecycle's required activities for SB 1383 compliance and GHG emission factors for solid waste. <sup>1,2</sup>
у	Year	2030 or 2045	_	-

### Table 25 Landfilled Organics Reduction Parameters and Data Sources

Notes: "-" means either reference not applicable or see references for disaggregated parameter in the following table rows

 CalRecycle. SB 1383 Jurisdiction Responsibilities. Accessed at: https://www2.calrecycle.ca.gov/Docs/Web/119160#:~:text=Beginning%20in%202022%2C%20SB%201383,is%20automatic ally%20provided%20the%20service

2. According to the ICLEI U.S. Community Protocol, Appendix E, GHG emissions are generated by non-biologic wastes only if they are combusted.

<sup>&</sup>lt;sup>96</sup> CalRecycle. SB 1383 Jurisdiction Responsibilities. Accessed at:

https://www2.calrecycle.ca.gov/Docs/Web/119160#:~:text=Beginning%20in%202022%2C%20SB%201383,is%20automatically%20 provided%20the%20service.

<sup>&</sup>lt;sup>97</sup> C&S Waste Solutions. Ukiah Waste Solutions. Accessed at: https://candswaste.com/locations/california/mendocino-county/ukiah-waste-solutions/

<sup>&</sup>lt;sup>98</sup> While SB 1383 technically mandates jurisdictions to reduce 75 percent of organics waste sent to landfills form 2014 levels by 2025, setting Measure SW-1 to 2030 gives the City time to develop and increase the necessary programs and initiatives to meet compliance.

<sup>&</sup>lt;sup>99</sup> According to the Local Governments for Sustainability (ICLEI) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendix E – Solid Waste Emission Activities and Sources, GHG emissions are generated by nonbiologic wastes only if they are combusted.

Variable	Definition	Units	2030	2045
Equation 9				
CO <sub>2</sub> e Emissions	Landfilled organic waste GHG emissions	MT CO <sub>2</sub> e	4,681	6,195
Reduction TargetLOW, y	Landfilled organic waste reduction percent	percentage	75%	75%
CO <sub>2</sub> e Reduction <sub>LOW</sub>	Landfilled organic waste GHG emissions reduction	MT CO <sub>2</sub> e	3,511	4,646

## Table 26 Landfilled Organics Reduction GHG Emission Reduction Calculations

# Measure SW-2: Achieve SB 1383 procurement requirements (0.08 tons recovered organic waste per person) by 2030.

Measure SW-5 puts Ukiah on a path to meet Ukiah's SB 1383 procurement target by 2030 and maintain it thereafter. SB 1383 requires each jurisdiction in California to procure recovered organics waste products to meet annual procurement targets developed by CalRecycle.<sup>100</sup> Recovered organic waste products include compost, mulch, renewable energy generated from anaerobic digestion (e.g., transportation fuel, electricity, and gas for heating), and electricity generated from biomass conversion. While a jurisdiction has the option to procure any combination of recovered organic waste products to fulfill 100 percent of its procurement target, Ukiah aims to meet their procurement target primarily through the procurement of compost to leverage the carbon sequestration benefits it provides when applied to community lands. The primary Actions that enable this Measure include:

- Action SW-2a which directs the City to establish an implementation plan for meeting procurement requirements through:
  - Enforcing compliance with SB 1383, aiming to exceed baseline requirements by establishing a minimum annual level of compost or mulch application on appropriate land throughout the region;
  - Maintaining procurement policies to purchase recovered organic waste products in accordance with SB 1383 requirements; and,
  - o Expansion/creation of community composting programs paired with community gardens.

This Action will allow the City to establish the supply and procurement of compost to meet their annual procurement targets. To monitor progress toward this goal and determine compliance with SB 1383 requirements, the City will continue to monitor the tons of organics procured and distributed to the community. Table 27 shows the parameters and data sources that support the annual procurement targets and landfilled organic waste reduction GHG emissions reduction associated with this Measure. Table 28 shows the calculations as outlined in Equation 10 through 10.1.

## **Compost Procurement Equations**

Equation 10	CO <sub>2</sub> e Sequestration <sub>y</sub> = (Compost <sub>y</sub> * CSF <sub>Compost</sub> ) * Compliance Target <sub>y</sub>
Equation 10.1	Composty = Populationy * (Ratio <sub>procure</sub> * CF <sub>compost</sub> )

<sup>&</sup>lt;sup>100</sup> CalRecycle. Procurement Targets and Recovered Organic Waste Products. Accessed at: https://calrecycle.ca.gov/organics/slcp/procurement/recoveredorganicwasteproducts/.

· · ·				
Variable	Definition	Value	Unit	Data Source
Equation 10				
CO <sub>2</sub> e Sequestration <sub>y</sub>	Carbon sequestered from compost procurement and application	See Table 28	MT CO <sub>2</sub> e	Calculated
Compost <sub>y</sub>	Compost procurement required to meet organic waste procurement target	See Table 28	compost tons	Calculated
CSF <sub>compost</sub>	Carbon sequestration factor for mixed organic compost application	0.23	MT CO2e/ feedstock ton	CARB <sup>1</sup>
Compliance Target <sub>y</sub>	Compliance target with procurement requirement	100%	percentage	State required compliance with SB 1383 <sup>2</sup>
у	Year	2030 or 2045	-	-
Equation 10.1				
Population <sub>y</sub>	Forecasted population	See Table 28	persons	See references in Appendix GHG Inventory, Forecast, and Targets Technical Report
Ratio <sub>procure</sub>	Organic waste procurement required per capita	0.08	feedstock tons/person	CalRecycle's Procurement Calculator Tool <sup>3</sup>
CF <sub>compost</sub>	Conversion factor of organics to compost tons	0.58	compost tons/organic waste tons	CalRecycle's Procurement Calculator Tool <sup>3</sup>

## Table 27 Compost Procurement Parameters and Data Sources

Notes: "-" means either reference not applicable or see references for disaggregated parameter in the following table rows

1. CARB. Method for Estimating Greenhouse Gas Emission Reductions from Diversion Of Organic Waste from Landfills to Compost Facilities (2017). Accessed at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/waste/cerffinal.pdf.

2. CalRecycle. Procurement Targets and Recovered Organic Waste Products. Accessed at: https://calrecycle.ca.gov/organics/slcp/procurement/recoveredorganicwasteproducts/.

3. CalRecycle. Procurement Calculator Tool. Accessed at: https://calrecycle.ca.gov/organics/slcp/reporting/.

## Table 28 Landfilled Organics Reduction GHG Emission Reduction Calculations

Variable	Definition	Units	2030	2045
Equation 10.1				
Population <sub>y</sub>	Forecasted population	people	17,834	21,407
Ratio <sub>procure</sub>	Organic waste procurement required per capita	tons/people	0.08	0.08
CF <sub>compost</sub>	Conversion factor of organics to compost tons	compost ton/ organic waste ton	0.58	0.58
Composty	Compost procurement required to meet organic waste procurement target	ton	828	993
Equation 10				
Compliance Target <sub>y</sub>	Compliance target with procurement requirement	percentage	100%	100%
CSF <sub>compost</sub>	Carbon sequestration factor for mixed organic compost application	MT CO <sub>2</sub> e/ton	0.23	0.23
CO <sub>2</sub> e Sequestration <sub>y</sub>	Carbon sequestered from compost procurement and application	MT CO <sub>2</sub> e	190	228

## 6 Sector CS: Carbon Sequestration

The City of Ukiah's Carbon Sequestration strategy focuses on enhancing Ukiah's ability to capture and store carbon through natural solutions and community-driven economic development. This includes preserving existing trees and planting at least 200 new trees annually, guided by an Urban Forest Master Plan and regular urban tree canopy studies. Additional efforts involve regenerative land and water management practices to optimize natural carbon storage, restore ecosystems, and conserve biodiversity, alongside pilot projects in carbon farming. To support sustainable economic growth, the strategy integrates climate action with local economic planning, fostering a resilient, circular economy and green job creation. A feasibility study on forest biomass-to-energy will evaluate opportunities for carbon sequestration, wildfire risk reduction, and regional economic benefits. Through this integrated approach, Ukiah strengthens its natural carbon sink capacity while promoting a sustainable, self-sufficient local economy. Based on this approach, the CAP's Carbon Sequestration Sector consists of the Measures presented in Table 29. The table also indicates which Measures are quantitative and which Measures are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Measures and the role of the supportive Measures.

Measure ID	Measure	2030 GHG Emissions Reduction (MT CO <sub>2</sub> e)	2045 GHG Emissions Reduction (MT CO <sub>2</sub> e)
Measure CS-1	Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045.	149	1,635
Measure CS-2	Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region.	Supportive	Supportive
Total		149	1,635

## Table 29 Sector CS: Carbon Sequestration GHG Emissions Reduction Summary

## Measure CS-1: Preserve existing trees and plant at least 200 new trees per year or an equivalent amount of high-emissions reduction potential land cover throughout the community, beginning in 2025 and through 2045.

Measure CS-1 aims for Ukiah to preserve existing trees and plant at least 200 new trees per year, beginning in 2025 and through 2045. The primary Actions that enable this measure are:

- Action CS-1a which directs the City to prepare an Urban Forest Master Plan, update the Tree Management Guidelines and create a Tree Protection Plan to promote public tree health, enhancing resiliency, and increasing the environmental benefits and co-benefits of street trees and shading;
- Action CS-1b which directs the City to optimize natural carbon sequestration through regenerative land and water management; and,
- Action CS-1c which commits the City to conduct carbon sequestration farming pilot projects within the community and across the City's area of interest.

The City will track progress toward tree planting goals established in this measure by annual monitoring of the number of trees planted and removed from urban tree stock. The City is already making progress toward these goals, as it has recently received a \$1.4 million grant to plant 722 trees.<sup>101</sup>

While the measure also includes initiatives to increase and maintain carbon sequestration potential on natural and agricultural lands in addition to urban forestry, carbon sequestration quantification and tracking is a relatively new field of study with extensive science to be done. Therefore, even though carbon sequestration will play large role in meeting state and Ukiah's carbon neutrality goals, communities are taking a conservative approach to carbon sequestration quantification as a starting point while the state develops more specific goals and guidance. Passed in 2022, AB 1757 directs the California Natural Resource Agency to determine carbon sequestration reduction targets by 2024 and develop a methodology to track them by 2025.<sup>102</sup> Once that is completed, the City will integrate those goals and tracking methods within this measure and its associated actions and update them as needed. Until the State provides clear guidance on assessing carbon sequestration from natural and working lands, the GHG reduction potential of this measure is estimated based on the number of urban trees planted.

In the quantification for this Measure, a cumulative benefit of the planted trees was assumed. This is applicable to this Measure specifically, as **Action CS-1a** emphasizes not only the planting of trees, but also the maintenance and retention of the trees (i.e., Urban Forest Master Plan, Tree Management Guidelines, Tree Protection Plan). This Action manages Ukiah's carbon stock, with carbon sequestration benefits increasing cumulatively as more trees are planted each year. Table 30 shows the parameters and data sources that support GHG emissions reduction from the zero-emission vehicle adoption and Table 31 shows the calculations as outlined in Equations 11 through 11.2.

### **Tree Plantings Equations**

Equation 11	CO <sub>2</sub> e Sequestration = Rate <sub>trees</sub> * CSF <sub>Tree</sub> * N <sub>e</sub>
Equation 11.1	$N_e = (Y_n * (Y_n + 1))/2$
Equation 11.2	$Y_n = (Year_T - Year_b) + 1$

Variable	Definition	Value	Unit	Data Source
Equation 11				
CO <sub>2</sub> e Sequestration <sub>y</sub>	Carbon sequestered from tree plantings	See Table 31	MT CO <sub>2</sub> e	Calculated
Rate <sub>trees</sub>	Rate of trees planted per year	200	trees/year	Measure CS-2
CSF <sub>Tree</sub>	Carbon sequestration factor for tree seedlings	0.035	MT CO <sub>2</sub> e/tree/ year	CAPCOA <sup>1</sup>
Equation 11.1				
Ne	Effective number of years carbon is being sequestered <sup>2</sup>	See Table 31	years	Calculated
Equation 11.2				
Yn	Total number of years in which trees are planted	See Table 31	years	Calculated
Year <sub>b</sub>	Baseline tree planting year	2025	year	Measure CS-1

## Table 30 Tree Plantings Parameters and Data Sources

<sup>101</sup> Cal-Fire. 2024. Cal Fire Urban and Community Forestry, 2024 Inflation Reduction Act Awards Summary. Available at:

https://34c031f8-c9fd-4018-8c5a-4159cdff6b0d-cdn-endpoint.azureedge.net/-/media/calfire-website/what-we-do/grants/urbanand-community-forestry/grant-awards/ira\_award-summary\_9-20--

<sup>2024</sup>\_final.pdf?rev=fa68cc4f1e694240ba4b193fd9893b32&hash=82BA6A98AC24F7EEC5E480BA16A9DC9C

<sup>&</sup>lt;sup>102</sup> CARB. Assembly Bill 1757 (2022). Accessed at: https://ww2.arb.ca.gov/2022-assembly-bill-1757-garcia-cristina-california-global-warming-solutions-act-2006-climate-goal

Variable	Definition	Value	Unit	Data Source
Year⊤	Target emissions reduction year	See Table 31	year	-

Notes: MT  $CO_2e$  = metric tons of carbon dioxide; "-" means either reference not applicable or see references for disaggregated parameter in the following table rows.

<sup>1</sup> Default annual CO<sub>2</sub>e sequestration per tree per year with a maximum lifespan of 20 years per tree is 0.0354 MT CO<sub>2</sub>e/tree/year was obtained from CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures.

<sup>2</sup> The effective number of years of carbon sequestration represents the total cumulative years during which a given number of trees sequester carbon. Since the goal is based on the number of trees planted annually, this metric captures the cumulative sequestration time for each annual planting cohort. This calculation leverages the Gaussian summation principle, which simplifies summing sequences by recognizing patterns or symmetry, enabling efficient calculation of consecutive or structured series.

Table 31	Tree Plantings Reduction GHG Emission Reduction Calculations
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Variable	Definition	Units	2030	2045
Equation 11.2				
Yn	Total number of years in which trees are planted	years	6	21
Equation 11.1				
Ne	Effective number of years carbon is being sequestered	years	21	231
Equation 11				
Rate <sub>trees</sub>	Rate of trees planted per year	trees	200	200
CSF <sub>tree</sub>	Carbon sequestration factor for tree seedlings	MT CO <sub>2</sub> e/tree	0.0354	0.0354
CO <sub>2</sub> e Sequestration	Carbon sequestration from tree plantings	MT CO <sub>2</sub> e	149	1,635

# Measure CS-2: Pursue opportunities to support the City's sustainable economic development goals with an emphasis on circularity and creating green jobs within the region.

Measure CS-2 seeks to support Ukiah's sustainable economic development by fostering a circular economy and creating green jobs in the region. This measure emphasizes integrating climate action strategies into Ukiah's long-term economic development goals to build a more resilient, self-sufficient local economy. Actions under Measure CS-2 include conducting a feasibility study to assess the potential of converting organic materials such as food and yard waste, woody biomass, and wastewater sludge to energy. The measure also calls for the development of a sustainable purchasing policy for municipal operations to prioritize local products, along with partnerships with businesses, community organizations, and nearby jurisdictions to establish reuse, refill, and repair programs that maximize resource use and reduce waste. While this Measure combines environmental responsibility with economic resilience, helping Ukiah achieve both climate and economic goals, it will not result in direct GHG emissions reduction, and therefore cannot be quantified. This Measure does still, however, directly support Ukiah's CAP in increasing community responsibility and awareness.

# Appendix E

Climate Change Scientific Context

# Climate Change Science and Impact Context

## The Greenhouse Gas Effect and Climate Change

Earth's climate is primarily driven by energy from the sun. When solar radiation reaches Earth's atmosphere, part of it is reflected back into space, while the rest is absorbed by the planet's surface. The absorbed energy heats the surface, which then radiates heat back toward the atmosphere.<sup>1</sup> Some of this heat escapes into space, but a portion is trapped by gases in the atmosphere known as greenhouse gases (GHGs).<sup>2</sup> This natural process, called the greenhouse effect (see Figure 1), is essential for maintaining temperatures that support life on Earth. However, when elevated levels of specific GHGs prevent more heat from escaping, it leads to what is known as global warming—an effect characterized by hotter-than-average temperatures—and contributes to climate change phenomena such as more intense storms, prolonged droughts, extreme heat events, and rising sea levels.<sup>3</sup>

Human-caused climate change is well understood and widely accepted by the scientific community, with over 97 percent of climate scientists agreeing that the planet is warming and human activities are the root cause.<sup>4</sup> Since the Industrial Revolution, human activities have increased atmospheric GHG concentrations from 280 parts per million (ppm) to over 410 ppm in just 150 years—a rate unprecedented in Earth's history.<sup>5</sup> Current CO<sub>2</sub> levels are now higher than at any point in the past 800,000 years, driven by activities such as burning fossil fuels, deforestation, and industrial processes.<sup>6</sup>

Climate change is already affecting both human and natural systems globally. Scientists have observed shrinking ice sheets, warming and acidifying oceans, rising global temperatures, reduced snow cover, sea level rise, and species extinction. These impacts pose significant risks, including flooding in low-lying areas, diminished freshwater supplies, disruptions to ecosystems, adverse public health outcomes, and a host of other environmental consequences.<sup>7</sup>

<sup>&</sup>lt;sup>1</sup>NASA. "The Causes of Climate Change," Climate Change: Vital Signs of the Planet. Available: https://climate.nasa.gov/causes. <sup>2</sup> UCAR. "The Greenhouse Effect | Center for Science Education," Available: https://scied.ucar.edu/learning-zone/how-climateworks/greenhouse-effect.

<sup>&</sup>lt;sup>3</sup> IPCC. "Summary for Policymakers – Global Warming of 1.5 °C. Available: https://www.ipcc.ch/sr15/chapter/spm/.

<sup>&</sup>lt;sup>4</sup>NASA. "Scientific Consensus: Earth's Climate Is Warming," Climate Change: Vital Signs of the Planet. Available: https://climate.nasa.gov/scientific-consensus.

<sup>&</sup>lt;sup>5</sup> J. Blunden and T. Boyer, "State of the Climate in 2020," *Bulletin of the American Meteorological Society* 102, no. 8. 2021. Available: https://doi.org/10.1175/2021BAMSStateoftheClimate.1. <sup>6</sup> Ibid.

<sup>&</sup>lt;sup>7</sup> IPCC. "Impacts of 1.5°C of Global Warming on Natural and Human Systems," Assessment Report 5. 2018. Available: https://www.ipcc.ch/sr15/chapter/chapter-3/

### Figure 1 Greenhouse Gas Effect



Source: National Resources Defense Council, https://www.nrdc.org/stories/greenhouse-effect-101

Globally, a warming trend is abundantly clear, with twenty-three of the hottest years on record occurring since 2000.<sup>8</sup> The year 2023 was the hottest year on record since record-keeping began in 1880, and these trends are consistent across numerous monitoring agencies and data sets.<sup>9</sup> NASA recorded July 2023 as the hottest month on record since 1880.<sup>10</sup>

 NASA-GISS. "Land-Ocean Temperature Index (C): Global Mean Estimates Based on Land and Ocean Data". Available: https://data.giss.nasa.gov/gistemp/graphs/graph\_data/Global\_Mean\_Estimates\_based\_on\_Land\_and\_Ocean\_Data/graph.txt.
 NASA. "Global Surface Temperature | NASA Global Climate Change," Climate Change: Vital Signs of the Planet. Available: https://climate.nasa.gov/vital-signs/global-temperature.

Climatic Research Unit (CRU). "Land Surface Air Temperature Variations Across the Globe Updated to 2019: The CRUTEM5 Data Set," *Journal of Geophysical Research: Atmospheres* 126, no. 2. 2021. https://doi.org/10.1029/2019JD032352 Accessed: <sup>10</sup> https://www.nasa.gov/news-release/nasa-clocks-july-2023-as-hottest-month-on-record-ever-since-1880/

## Figure 2 Global Temperature Trends



Source: Climate Central, https://www.climatecentral.org/graphic/2023-earths-hottest-year-on-record?graphicSet=Change+in+Global+Temperature+2023&location=CONUS&lang=en

While climate change is a global phenomenon, the impacts are felt acutely at the local level, affecting various aspects of society including health outcomes, access to natural resources, infrastructure resilience, emergency response systems, tourism, and the frequency and severity of disasters. According to the IPCC, achieving carbon neutrality by mid-century is essential to limit global warming to 1.5 degrees Celsius and avoiding the most severe consequences of climate change.<sup>11</sup> To meet this critical goal, coordinated action is needed at all levels of society to significantly reduce GHG emissions.

## **Types of GHG Emissions**

The IPCC lists the following GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), as well as chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, which are collectively called fluorinated gases.<sup>12</sup> Almost all the GHGs emitted in the United States each year consist of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, while fluorinated gases make up the remaining emissions<sup>13</sup>. Because CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O comprise a large majority of GHG emissions at the community level, these are the gases considered in this analysis.

Each GHG has a different propensity for trapping heat in the atmosphere, known as the global warming potential (GWP). GHGs also last for different periods of time in the atmosphere, ranging from a decade to several thousand years. Because all the GHGs have different characteristics, a standard unit is needed to compare the potential impact of different GHGs and allow them to be added up in an analysis. This is achieved by converting all GHGs into the standard unit known as a carbon dioxide equivalent (CO<sub>2</sub>e), based on the amount of heat one metric ton (MT) of CO<sub>2</sub>

<sup>&</sup>lt;sup>11</sup> IPCC. "Summary for Policymakers – Global Warming of  $1.5 \,^{\circ}$ C". Available: https://www.ipcc.ch/sr15/chapter/spm/. <sup>12</sup> Note: Fluorinated gases, which includes four main types: hydrofluorocarbons 8. (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>), are man-made gases that can stay in the atmosphere for centuries and contribute to the GHG effect. Center for Climate and Energy Solutions. "Main Greenhouse Gases". 2021. Available:

https://www.c2es.org/content/main-greenhouse-gases/. Accessed December 2021

<sup>&</sup>lt;sup>13</sup> Note: Ninety-seven percent of the annual GHG emissions consist of CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O and fluorinated gases make up the remaining three percent of GHG emissions. US EPA. "Inventory of U.S. Greenhouse Gas Emissions and Sinks". 2021. Available: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks. Accessed: December 2021; World Resources Institute. "4 Charts Explain Greenhouse Gas Emissions by Countries and Sectors". 2021. Available: https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors.

traps in the atmosphere. GWP for each GHG was drawn from the IPCC fifth Assessment Report (see Figure 3)<sup>14</sup>, which represents the best available scientific consensus and is consistent with the methodology outlined in the California Air Resources Board (CARB) Scoping Plan.

Figure 3 Greenhouse Gas Global Warming Potentials



<sup>&</sup>lt;sup>14</sup> IPCC. Climate Change 2014: Synthesis Report. Available:

https://www.ipcc.ch/site/assets/uploads/2018/02/SYR\_AR5\_FINAL\_full.pdf.; and California Air Resources Board (CARB). "California's 2022 Climate Change Scoping Plan". Available: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-changescoping-plan/2022-scoping-plan-documents.

# Appendix F

Climate Action Plan City Plans Alignment

# Climate Action Plan City Plans Alignment

The Ukiah 2040 General Plan, as well as the 2024 City Council Strategic Plan, set the initial tone for climate action, sustainable development, and conservation of Ukiah's natural resources. The Ukiah 2040 General Plan established a local goal "to create a more resilient community that is prepared for, responsive to, and recoverable from hazards created or made worse by climate change" and calls for the adoption of a Community Climate Action Plan (CAP).<sup>1</sup> The City Council Strategic Plan provides a comprehensive framework that prioritizes focus on core functions and ensures City Departments are working together to meet the needs of our residents and businesses.

The following table lists the relevant 2040 General Plan implementation measures (2040 GP) and City Council Strategic Plan action items (CCSP) that are in direct alignment with emissions reductions Measures established in the Ukiah CAP.

City Plan Alignment <sup>1,2</sup>	Description
2040 GP AG-I	Support Community Gardens. The City shall revise the Zoning code to streamline the regulatory permitting process to support the creation of additional community gardens within the City.
2040 GP AG-M	Local Purchasing. The City shall research and prepare a local preference purchasing policy for future adoption to promote and support local preference purchasing policies for the City of Ukiah, local school districts and other institutions as a means to foster awareness and build relationships across the regional economy.
2040 GP ED-5	To ensure Ukiah's long-term economic success and sustainability by diversifying and expanding tourist attractions.
2040 GP ES-A	The City shall update its Hillside Ordinance periodically to provide regulations and provisions that balance hillside development and preservation. At a minimum the Hillside Ordinance shall: • Protect of natural terrain and hillside areas on the west side of Ukiah; • Promote habitat connectivity and scenic viewsheds; • Include development standards for grading, road and trail improvements, density, structure design and placement, clustering, erosion and sediment control, habitat preservation; and • Promote wildfire safety standards and site development regulations.
2040 GP ES-B	Landscaping Standards The City shall update the Zoning Code to include landscaping standards to require drought-resistant and native plants.
2040 GP ES-C	Open Space Management Revise the Zoning Code to include standards for maintaining open space and green areas within new developments.
2040 GP ES-E	Prepare an Urban Forest Master Plan The City shall prepare an Urban Forest Master Plan that includes the types of trees appropriate for Ukiah and locations where the city would receive the greatest benefits of new trees. This plan should include trees within commercial and residential areas, as well as those at city parks and facilities. This plan shall be updated every five years.
2040 GP ES-F	Tree Protection Ordinance The City shall review its Tree Management Guidelines and study the feasibility of preparing a Tree Protection Ordinance.
2040 GP ES-J	Water Conservation Guidelines The City shall prepare guidelines for drought period water conservation strategies for residential zones.

<sup>1</sup> City of Ukiah. 2022. 2040 General Plan. Available at: https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf

City Plan Alignment <sup>1,2</sup>	Description
2040 GP ES-K	Creek and Stream Protection Zone Establishment for New Development The City shall establish creek and stream protection zones for waterways that extend a minimum of 30 feet (measured from the top of a bank and a strip of land extending laterally outward from the top of each bank), with wider buffers where significant habitat areas or high potential wetlands exist. The City shall prohibit development within a creek and stream protection zones, except as part of greenway enhancement, including habitat conservation, bike and walking paths, wildlife habitat, and native plant landscaping). City approval is required for the following activities within the creek and stream protection zones. 1. Construction, alteration, or removal of any structure; 2. Excavation, filling, or grading; 3. Removal or planting of vegetation (except for removal of invasive plant species); or 4. Alteration of any embankment.
2040 GP ES-L	Erosion Prevention Program The City shall revise the Zoning Code to include design standards for new development that require riparian habitat integration into project design as a means of avoiding potential impacts of river sedimentation and lessening the effects of erosion.
2040 GP ES-M	Adopt a Municipal Climate Action Plan (CAP) The City shall adopt a municipal Climate Action Plan to achieve carbon neutrality for all municipal operations and meet State and City GHG emission reduction goals.
2040 GP HO-1b	Continue the City's Energy Efficiency Public Benefits Fund and renewable energy and energy efficiency rebate programs.
2040 GP HO-1d	Continue providing informational materials to the public through the Green Building Information Center and at the public counter. Provide updated information regarding sustainable and green building practices and materials and provide information on the maintenance of residential units.
2040 GP HO-1e	Develop standards and design guidelines for residential development in the Medium Density Residential (R-2) and High Density Residential (R-3), Community Commercial (C-1) and Heavy Commercial (C-2) zoning districts. Given the significant increase in the City's RHNA over the next eight years, the City proposes to create development standards and design guidelines that would both facilitate development at the allowable densities and provide guidance and certainty in design standards to ensure quality housing is developed in the community.
2040 GP LU-A	Downtown Pedestrian Improvements LU – 3.4 The City shall, in collaboration with interested public agencies and downtown businesses, prepare a study of potential sidewalk and streetscape improvements, including lighting, wider sidewalks, clearly marked pedestrian crossings, benches, landscaping, signage, sidewalk seating areas, and public art, to create a safe, convenient, and pleasant pedestrian environment Downtown.
2040 GP MO-C	Right-of-Way Needs The City shall revise and update the projected street right-of-way needs for completion of the City's future mobility network to ensure provision of complete streets and completion of the planned citywide bicycle and pedestrian networks.
2040 GP MO-D	Vehicle Miles Traveled (VMT) Performance Measures The City shall adopt criteria for assessing significant transportation impacts based on vehicle miles traveled (VMT) consistent with State CEQA Guidelines, incorporating best practices including guidance provided by the Governor's Office of Planning & Research (OPR).
2040 GP MO-E	VMT Modeling The City shall develop a model for assessing VMT for new development consistent with new VMT performance measures.
2040 GP MO-F	TDM Program The City shall, in coordination with Caltrans and the Mendocino Transit Authority, amend the Development Code to include a menu of options to facilitate and encourage alternate modes of travel and transportation.

City Plan Alignment <sup>1,2</sup>	Description
2040 GP MO-J	Short-term Transportation Study The City shall complete a transportation study to make recommendations for the purpose of increasing the provision of multi-modal transportation facilities, enhancing safety, lowering the rate of collisions and reducing travel delays.
2040 GP PI-A	Wastewater Annual Review The City shall annually review the wastewater collection, treatment, and disposal system to ensure the financing structure and viability of the system.
2040 GP PI-E	Solid Waste Reduction The City shall review existing programs, and study the feasibility of new or expanded programs related to waste reduction. These efforts should be coordinated with preparation of the City's Climate Action Plan and incorporated where necessary.
2040 GP SF-U	Cooperative Pest Management The City shall collaborate with state and federal land management agencies on pest and fuel management activities.
2040 GP SF-W	Water Supply Infrastructure The City shall regularly assess the integrity of existing water supply infrastructure through water tests and inspections of water lines and prioritize developments in areas with adequate water supply infrastructure.
CCSP AI-1	Implement a housing plan that works to support the development of sustainable housing for all income levels.
CCSP AI-10	Provide ongoing education and active engagement of City staff, members of committees and commissions, contractors, consultants, residents, and independent community groups in alignment with the goals of improving environmental standards and promoting sustainable policies
CCSP AI-11	Address the climate implications of all policies and actions that come before the Ukiah City Council that have the potential to impact greenhouse gas emissions, carbon sequestration, and disaster preparedness within the City
CCSP AI-12	Continue to support Resolution 2022-44: A Resolution of the City Council of the City of Ukiah Endorsing the Declaration of a Climate Emergency and a Call to Action to Restore a Safe Climateand support the implementation of the related initiatives.
CCSP AI-13	Support the development and implementation of a Climate Action Plan
CCSP AI-14	Determine current conditions, needs and opportunities, and focus on specific capital improvement projects for the following areas: Streets; Sewer; Storm Drains; Water; Electric; Landfill
CCSP AI-15	Conduct regular evaluation of utility rates to ensure sustainability of services
CCSP AI-17	Prioritize the protection of the community's investment in improved infrastructure.
CCSP AI-2	Responsively engage with our neighborhoods to align services with changing needs
CCSP AI-21	Support and implement the participation agreement with the Ukiah Valley Sanitation District
CCSP AI-23	Support newly-developed partnerships with Ukiah Valley water agencies and finalize agreements to consolidate services for improved efficiency, capability and resiliency
CCSP AI-30	Identify and support the development of public infrastructure needed to support growth
CCSP AI-34	Continue to support the implementation of the Downtown Streetscape Improvement Plan
CCSP AI-36	Develop and implement an improved downtown parking plan
CCSP AI-37	Continue to support the development of the Great Redwood Trail
CCSP AI-38	Explore designs and plans to develop enhanced gateways into the city.
CCSP AI-4	Work to preserve, conserve, and protect the natural resources/features of the Ukiah Valley and open space

City Plan Alignment <sup>1,2</sup>	Description
CCSP AI-5	Develop a Complete Streets transportation network that enables safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities.

Note: GP = 2040 General Plan; CCSP = City Council Strategic Plan

- 1. City of Ukiah. 2022. 2040 General Plan. Available at: https://ukiah2040.com/images/docs/202212\_release/UKGP\_EntireGP.pdf
- 2. City of Ukiah. 2024. City Council Strategic Plan. Available at: https://stories.opengov.com/ukiahca/published/XPsHTwWMYs

# **End Notes**

<sup>1</sup> A Mediterranean climate lies between 30° north to 45° south of the equator. It is characterized by a dry and hot summer and a cool and rainy winter. It supports a dense population and robust agricultural activity. Most areas of the Mediterranean climate zone experience mild winters and warm summers with the temperatures changing considerably between the different regions of the climatic zone. It is characterized by irregular rainfall with most of the rainfall occurring in winter.

<sup>2</sup> RESOLUTION 2022- 44 - A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF UKIAH ENDORSING THE DECLARATION OF A CLIMATE EMERGENCY AND A CALL TO ACTION TO RESTORE A SAFE CLIMATE found at: https://cityofukiah.com/wp-content/uploads/2022/10/2022-44-Climate-Resolution.pdf

<sup>3</sup> City of Ukiah 2040 General Plan found at: https://ukiah2040.com/

<sup>4</sup> See Appendix C - Final Greenhouse Gas Emissions Inventories Report for more information regarding the City's GHG emissions

<sup>5</sup> Intergovernmental Panel on Climate Change (IPCC) 6th Assessment, AR6 Synthesis Report: Climate Change (2023) found at:

https://www.ipcc.ch/report/sixth-assessment-report-cycle/

<sup>6</sup> Indicators of Climate Change in California (Fourth Edition, 2022) found at:

https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf

<sup>7</sup> California's Fourth Climate Change Assessment found at https://www.energy.ca.gov/data-reports/reports/californias-fourth-climate-change-assessment

<sup>8</sup> State of California's Priority Action Plan found at https://documentcloud.adobe.com/spodintegration/index.html?locale=en-us

<sup>9</sup> CALIFORNIA'S NATURE-BASED SOLUTIONS CLIMATE TARGETS found at https://documentcloud.adobe.com/spodintegration/index.html?locale=en-us

<sup>10</sup> 2022 Scoping Plan for Achieving Carbon Neutrality found at https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp-es.pdf

<sup>11</sup>U.N Sustainable Development Goals (SDGs) found at: https://sdgs.un.org/goals

<sup>12</sup> California Executive Order N-82-20 (2020) established a state goal of conserving 30% of California's lands and coastal waters by 2030 found at

https://www.gov.ca.gov/wp-content/uploads/2020/10/10.07.2020-EO-N-82-20-.pdf

<sup>13</sup> The Environment and Sustainability Element evaluates environmental, biological, and agricultural resources, air quality, open space, and climate change and sustainability in Ukiah. It establishes policies and actions to protect and manage these resources including an emphasis on climate adaptation and sustainability, to protect the community. Found at *https://ukiah2040.com/images/UKGP\_06\_PRD\_ENV%20Element\_2023%2002%2027.pdf* 

<sup>14</sup> SMART goals are a goal-setting framework that help people plan and achieve their goals. SMART stands for specific, measurable, achievable, relevant, and time-bound.

<sup>15</sup>The City of Ukiah has 5 core values; Professionalism, Service, Teamwork, Innovation, & Safety, found at

https://cityofukiah.com/wp-content/uploads/2023/09/Core-DEI-Statements.pdf

<sup>16</sup> The United Nations 17 Sustainable Development Goals are; 1) No Poverty, 2) Zero Hunger, 3) Good Health & Wellbeing, 4) Quality Education, 5) Gender Equality, 6) Clean Water & Sanitation, 7) Affordable & Clean Energy, 8) Decent Work & Economic Growth, 9) Industry, Innovation, & Infrastructure, 10) Reduced Inequalities, 11) Sustainable Cities & Communities, 12) Responsible Consumption & Production, 13) Climate Action, 14) Life Below Water, 15) Life on Land, 16) Peace, Justice, & Strong Institutions, and 17) Partnerships for the Goals. Found at *https://sdgs.un.org/goals* 

<sup>17</sup> USGBC LEED Rating System found at *https://www.usgbc.org/leed* 

<sup>18</sup> Governor's Office of Planning and Research (OPR), "General Plan Guidelines - Chapter 8: Climate Change," Available: *https://opr.ca.gov/docs/OPR\_C8\_final.pdf* <sup>19</sup> The Regional Targets Advisory Committee (RTAC) established under SB 375 recommends the following accounting of various trip types for VMT purposes 23: Include 100% of internal-internal (I-I) trips Exclude external-external (X-X) trips Count 50% of internal-external (I-X) and external-internal (X-I) trips. Recommendations of the Regional Targets Advisory Committee (RTAC) Pursuant to Senate Bill 375. September 2009.

#### https://www.fresnocog.org/wp-content/uploads/files/SB375/finalreport.pdf

<sup>20</sup> As of December 2024, the U.S. EPA granted California a waiver for its Advanced Clean Cars II (ACC II) regulations, allowing enforcement of 100% zero-emission vehicle sales by 2035. Additionally, a waiver was approved for the Heavy-Duty Omnibus Regulation, mandating stricter emissions standards for heavy-duty vehicles (*https://www.epa.gov/newsreleases/epa-grants-waiver-californias-advanced-clean-cars-ii-regulations*). In January 2025, anticipating potential challenges from the incoming federal administration, the California Air Resources Board (CARB) withdrew a waiver request for the Advanced Clean Fleets rule, which sought to establish timelines for commercial truck operators to transition to zero-emission vehicles (*https://www.sidley.com/en/insights/newsupdates/2025/01/california-with-draws-epa-waiver-request-for-advanced-clean-fleets-regulations#:~:text=0n%20January%2013%2C%202025%2C%20the,Clean%20Fleets%20(ACF)%20regulations) <sup>21</sup> Forecast of solid waste emissions excludes impact of meeting SB 1383 requirements.* 

<sup>22</sup> CARB. 2022 Scoping Plan for Achieving Carbon Neutrality.

https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf

<sup>23</sup> At time of development, 2021 was the most recent State GHG inventory available and was therefore used as the best approximation of

emissions reduction compared to the State's 1990 inventory.

<sup>24</sup> The State carbon neutrality goal established by Assembly Bill 1279 considers carbon neutrality to be at least an 85 percent reduction in GHG emissions with the remaining fraction achieved through removals such as carbon sequestration. However, targets are set on a net-zero pathways to reflect that community-scale strate-gies will need to be employed to achieve sufficient carbon sequestration by 2045 and achieve carbon neutrality.

<sup>25</sup> Kenney et al., (California Energy Commission (CEC). "California Building Decarbonization Assessment". 2021. Available:

https://www.energy.ca.gov/publications/2021/california-building-decarbonization-assessment

<sup>26</sup> Aas et. al., CEC. "The Challenge of Retail Gas in California's Low-Carbon Future - Technology Options, Customer Costs, and Public Health Benefits of Reducing Natural Gas Use". https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf

<sup>27</sup> RMI. "Gas Stoves: Health and Air Quality Impacts and Solutions." 2020. Available: https://rmi.org/insight/gas-stoves-pollution-health/

<sup>28</sup> Projects include the Urban Core Rehabilitation Project (UCRT), construction of Phases 1-3 of the GRT-Ukiah, as well as well as the Downtown Streetscape (Phases 1 & 2).

(Phases I & Z).

<sup>29</sup> Low Impact Development (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat (https://www.epa.gov/nps/nonpoint-source-urban-areas)

<sup>30</sup> Global Covenant of Mayors current guidance is to conduct GHG inventory updates every two years: globalcovenantofmayors.org