The Port of Hueneme
Oxnard Harbor District

Ventura County Air Pollution Control District

CITY OF OXNARD CALIFORNIA

CITY OF VENTURA

City of Thousand Oaks

CITY OF SIMI VALLEY

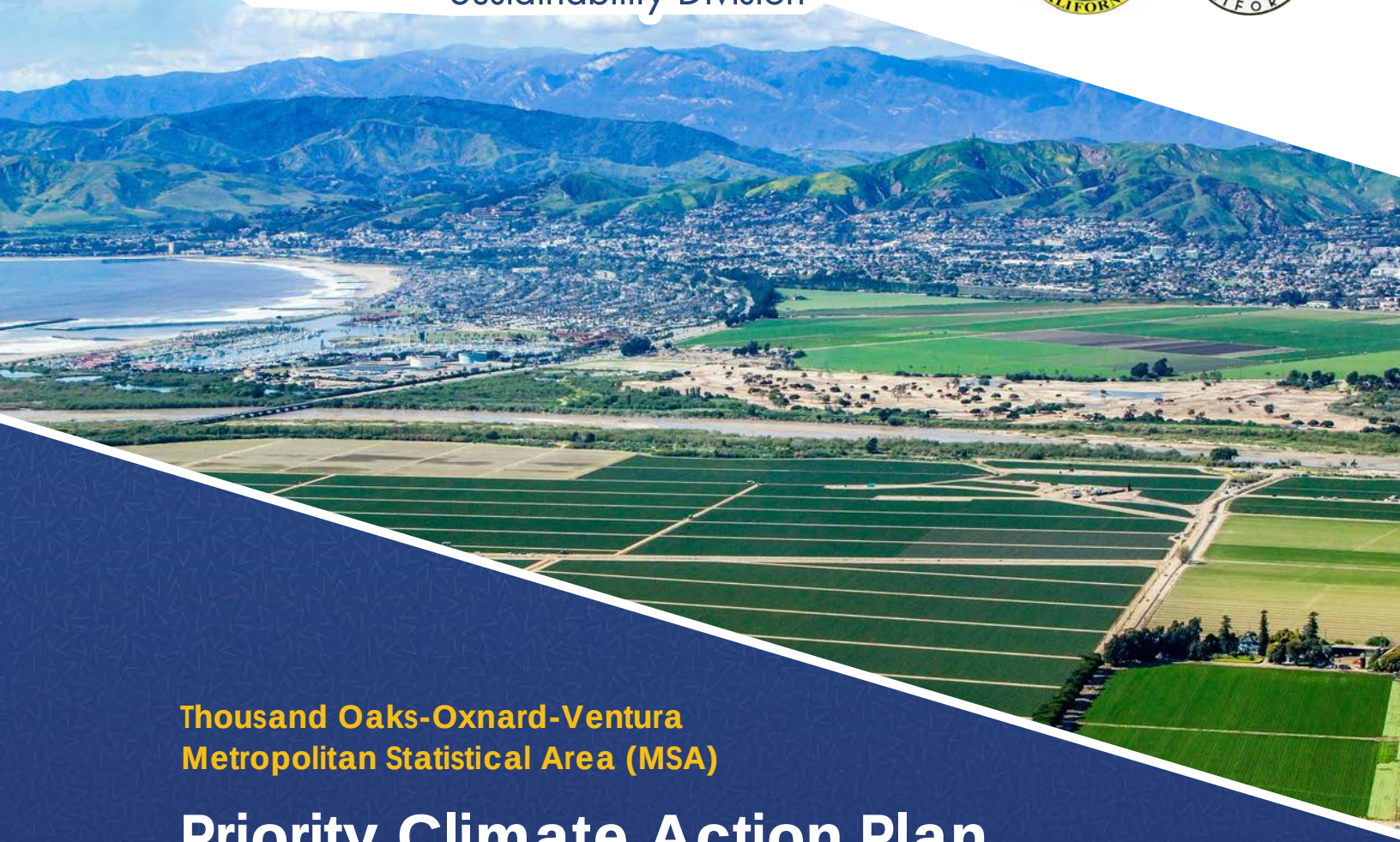
CCCJN
CENTRAL COAST CLIMATE JUSTICE NETWORK

VCTC

COUNTY of VENTURA

County Executive Office

Sustainability Division



Thousand Oaks-Oxnard-Ventura Metropolitan Statistical Area (MSA)

Priority Climate Action Plan

March 2024

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Acknowledgements

The Thousand Oaks-Oxnard-Ventura Metropolitan Statistical Area's (MSA) Priority Climate Action Plan (PCAP) project was funded through the United States Environmental Protection Agency's Climate Pollution Reduction Grants (CPRG) program and developed by the County of Ventura with partnership with the advisory group made up of the agencies listed below. Specifically, the County of Ventura has partnered with the cities of Fillmore, Moorpark, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks, Ventura, and the Central Coast Climate Justice Network (CCCJN), Port of Hueneme, Ventura County Air Pollution Control District (VCAPCD), and Ventura County Transportation Commission (VCTC) to produce this PCAP to support investment in policies, practices, and technologies that reduce pollutant emissions, create high-quality jobs, spur economic growth, and enhance the quality of life for the Ventura County community. This project has been funded wholly or in part by the United States Environmental Protection Agency (EPA) under assistance agreement 5D-98T72801-0 to Ventura County. The PCAP was developed through a collaborative process with input from Tribes, community-based organizations, and community members within the region. However, due to the abbreviated timeline to complete the PCAP, there has not been time to take the plan before City Councils for the jurisdictions, where necessary and relevant, within the County and therefore, this represents an aspirational framework. This PCAP can be considered additive to other Climate Action Plans adopted by other Ventura County jurisdictions. Where conflicts exist between documents, a jurisdiction plan has more stringency and local application. This PCAP provides a roadmap for achieving GHG reduction countywide and does not obligate or bind a local jurisdiction.

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Ventura County CPRG Advisory Group

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Acronyms and Abbreviations

3C-REN	Tri-County Regional Energy Network
AB	Assembly Bill
AEP	Association of Environmental Professionals
BAAQMD	Bay Area Air Quality Management District
BWBS	Blue Whales and Blue Skies
CARB	California Air Resources Board
CALGreen	California Green Building Standards Code
CalEPA	California Environmental Protection Agency
CalRecycle	California Department of Resources Recycling and Recovery
CARE	California Alternate Rates for Energy
CBO	Community Based Organization
CCCJN	Central Coast Climate Justice Network
CCAP	Comprehensive Climate Action Plan
CEJST	Climate and Economic Justice Screening Tool
CEQA	California Environmental Quality Act
CH_4	Methane
CO_2e	Carbon Dioxide Equivalent
CPA	Clean Power Alliance
CPRG	Climate Pollution Reduction Grant
DPM	Diesel Particulate Matter
EO	Executive Order
EPA	United States Environmental Protection Agency
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FERA	Family Electric Rate Assistance
GHG	Greenhouse Gas
GWP	Global Warming Potential
ICLEI	Local Governments for Sustainability International Council for Local Environmental Initiatives
IRA	Inflation Reduction Act
IPCC	Intergovernmental Panel on Climate Change

kWh	Kilowatt Hour
LIDAC	Low-income and Disadvantaged Communities
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MT	Metric Tons
MMT	Million Metric Tons
N_2O	Nitrous Oxide
NO_x	Nitrous Oxides
OPR	Office of Planning and Research
PCAP	Priority Climate Action Plan
PM2.5	Fine Particulate Matter
RPS	Renewables Portfolio Standards
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SCG	Southern California Gas Company
SCS	Sustainable Communities Strategy
SO_x	Sulfur Oxides
T&D	Transmission and Distribution
USDA	United Stated Department of Agriculture
U.S. EPA	United States Environmental Protection Agency
VCAPCD	Ventura County Air Pollution Control District
VCREA	Ventura County Regional Energy Alliance
VCTC	Ventura County Transportation Commission
VMT	Vehicle Miles Traveled
ZEV	Zero Emission Vehicle

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1

Introduction

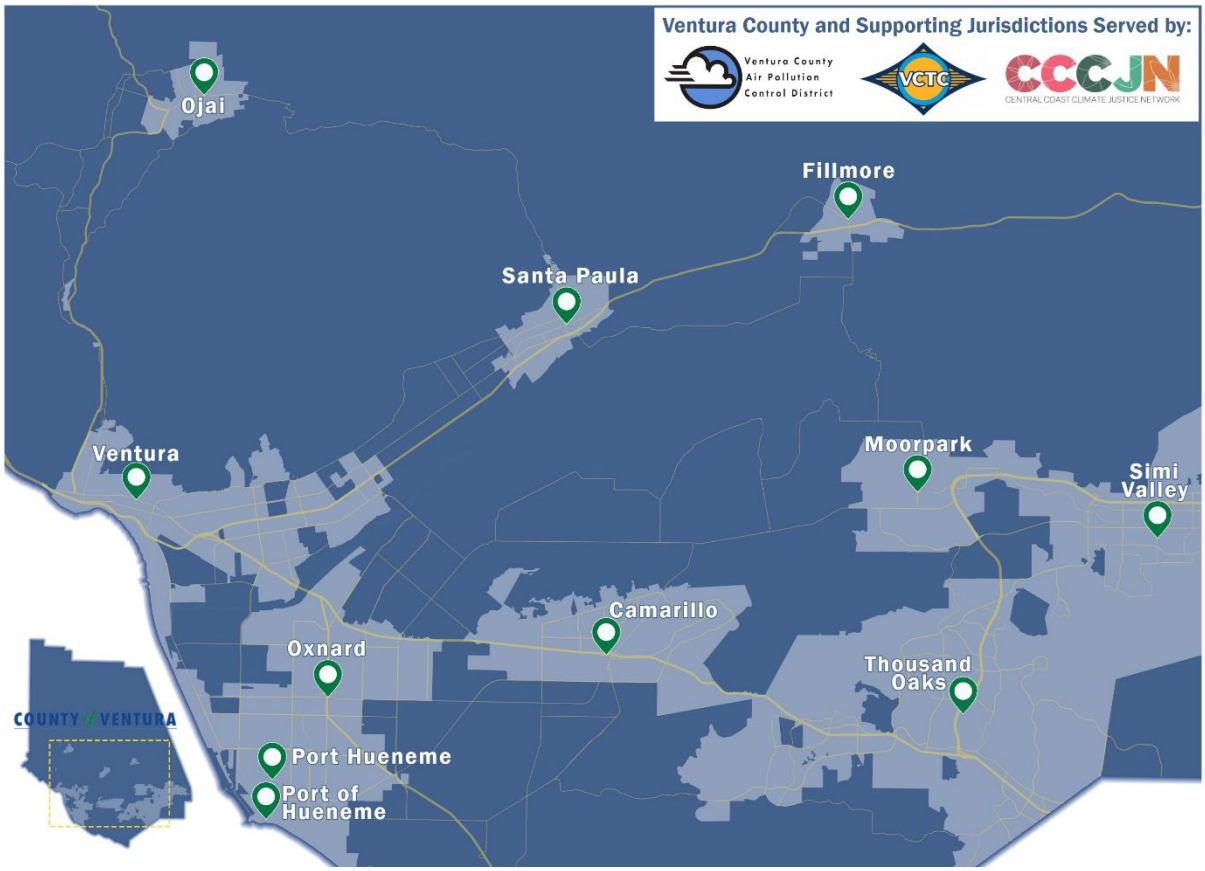
COUNTY of VENTURA
County Executive Office
Sustainability Division

1 Introduction

The County of Ventura Sustainability Division is pleased to receive funds through U.S. EPA's Climate Pollution Reduction Grants (CPRG) Planning Grant to create a Regional Climate Action Plan for the Thousand Oaks-Oxnard-Ventura Metropolitan Statistical Area (MSA/County of Ventura). The County of Ventura is located in California between Santa Barbara and Los Angeles Counties, along the south-central California coastline. The County is diverse, both in geography and population, with land at sea level ranging all the way up to over 8,800 feet at the top of Mt. Pinos and more than 840,000 people.[1] The region is also notable for the 42 miles of coastline[2] and incredibly fertile soil that is suitable for agricultural production of all types. The County is home to the only deep-water port (Port of Hueneme) between Los Angeles and San Francisco, and although it is the smallest port in the State in terms of footprint, it plays a major role in the local economy. Specifically, in 2021, the Port of Hueneme generated $2.2 billion in trade related activity and 20,032 trade related jobs, accounting for 4 percent of Ventura County's total Gross Domestic Product and making up 6 percent of the County's local workforce.[3] The County consists of the unincorporated areas – along with the ten incorporated cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks, and San Buenaventura (Ventura). See Figure 1 for a map of the County and associated jurisdictions. The County's geographic location makes the industries and communities within the region more susceptible to the impacts of climate change as it is located between the mountains and the sea. For example, in the past few years the County has felt impacts of climate change with 1,000-year storms,[4] frequent large wildfires,[5] and coastal flooding.[6]

[1] The United States Census Bureau. Ventura County, California. Available at: https://data.census.gov/profile/Ventura_County,_California?g=050XX00US06111
[2] County of Ventura Executive Office. Available at. https://www.ventura.org/county-executive-office/about-us/
[3] The Port of Hueneme (Oxnard Harbor District). February 23, 2022. Updated Assessment Shows Port of Hueneme's Economic Footprint Reaches All Time Highs in Ventura County. Available at: https://www.portofhueneme.org/economic-report-2022-john-martin/
[4] Smith, Hayley and Toohey, Grace. January 25, 2024. SoCal sees two 'thousand-year' storms within weeks. More could be coming. Available at: https://www.latimes.com/environment/story/2024-01-25/how-perfect-storms-dumped-rain-on-ventura-and-san-diego
[5] California Department of Forestry and Fire Protection. 2024. Thomas Fire. Available at: https://www.fire.ca.gov/incidents/2017/12/4/thomas-fire/
[6] Sharp, Julie. December 28, 2023. Some Ventura County beaches closed as high surf and flooding wreak havoc on the area. Available at: https://www.cbsnews.com/losangeles/news/high-surf-hits-southern-california-coast-some-areas-to-see-15-to-20-foot-sets/

Figure 1 Regional Map of Project Partners



Plans, programs, and policies have been developed and implemented throughout the region to reduce the greatest impacts of climate change and increase our ability to adapt. Recently adopted plans include the County of Ventura Climate Action Plan,[7] City of Oxnard Climate Action & Adaptation Plan,[8] and the Camarillo Sustainability Master Plan for Municipal Operations.[9] Additionally, the City of Ventura[10] has recently released a draft Climate Action Plan for public review and comment. The City of Thousand Oaks also released a draft Climate and Environmental Action Plan,[11] which is anticipated to be adopted in Spring 2024. Ventura County recognizes the importance of integrating more holistic solutions, in a fiscally responsible way, to make the region more sustainable, while utilizing numeric metrics, such as GHG emissions to monitor success. As such, this plan is intended to go beyond the work that has been done previously and establish aspirational goals for the County to move towards. One of the greatest hurdles to greater progress is a dash for limited resources coupled with limited time.

[7] County of Ventura. County of Ventura General Plan, Appendix B: Climate Change. 2020. Available at: https://egeneralplan.vcrma.org/appendix-b-climate-change/

[8] City of Oxnard. Climate Action and Adaptation Plan. December 7, 2022. Available at. https://www.oxnard.org/wp-content/uploads/2023/01/Oxnard-CAAP_2022-12-07_Adopted.pdf

[9] City of Camarillo. 2023. Sustainability Master Plan for Municipal Operations https://cms7files.revize.com/camarilloca/Departments/City percent20Manager/Sustainability/SMP_Final_Approved percent2010-25-23 percent20CCReso2023-83.pdf

[10] City of Ventura. 2022. Climate Action and Resilience Plan: Public Review Draft. Available at: https://static1.squarespace.com/static/5f34bf7ddc1cd21c88c0c407/t/6360533d3e58ef4f4ffcc9a0/1667257170182/VenturaCARP_PUBDRAFT_2022_1031_Reduced2.pdf

[11] City of Camarillo. 2024. Climate and Environmental Action Plan. Available at: https://www.toaks.org/departments/public-works/sustainability/climate-action-planning

The region appreciates the CPRG program and the U.S. EPA's support of the regions PCAP and GHG reduction programs. This will help Ventura County contribute our fair share to meet California's ambitions climate goals and those of the United States under the Paris Agreement.

The contents of this document do not necessarily reflect the views and policies of the U.S. EPA, nor does the U.S. EPA endorse trade names or recommend the use of commercial products mentioned in this document.

The measures contained herein should be construed as broadly available to any entity in the State eligible for receiving funding under the EPA's Climate Pollution Reduction Implementation Grants (CPRG) and other funding streams, as applicable.

This PCAP is organized into seven sections:

1. Introduction
2. Greenhouse Gas (GHG) Emissions Inventory
3. Low-Income/Disadvantaged Community Benefits Analysis
4. Priority Measures
5. Review of Authority to Implement
6. Coordination and Outreach
7. Next Steps

1.1 CPRG Overview

The U.S. EPA CPRG program is a funding opportunity aimed at supporting projects at the State, local government, tribal, and territorial levels to reduce GHG emissions and other harmful air pollution. This grant program seeks to support innovative and effective strategies for mitigating climate change and addressing air pollution. Funding for the CPRG program is sourced from the Inflation Reduction Act (IRA), which provides $370 billion in loans, grants, and other financial support to tackle climate change and transition to a clean energy economy. Under the CPRG program, $5 billion in funding is allocated, with $250 million earmarked for planning grants to develop GHG reduction plans and more than $4.6 billion designated for implementation of the measures outlined in these GHG reduction plans. Ventura County received a planning grant of $1,000,000 on behalf of the Oxnard-Ventura-Thousand Oaks Metropolitan Statistical Area (MSA) for CPRG purposes.

1.2 California Regulatory Context

California remains a global leader in the effort to reduce GHG emissions and combat climate change through its 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 (EO) that put it on course to achieve robust emission reductions and address the impacts of a changing climate. The following is a summary of executive and legislative actions most relevant to this PCAP.

2002 Senate Bill 1078

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

2005 Executive Order S-3-05

Executive Order (EO) S-3-05 was signed in 2005, establishing state-wide GHG emission reduction targets for the years 2020 and 2050. The executive order 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 reduction target would put the State's emissions in line with the worldwide reductions needed to reach long-term climate stabilization as concluded by the Intergovernmental Panel on Climate Change (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," which 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. In addition, AB 32 requires CARB to adopt regulations to require 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_2 equivalent (MMT CO_2e). 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 the first update to the AB 32 Scoping Plan. The 2014 Scoping Plan update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 Statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those 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 fuel providers such as 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 change emissions 40 percent below 1990 levels by 2030, which was set by SB 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 Southern California Association of Governments (SCAG), 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. The SCAG, which the County of Ventura is located in, was assigned targets of an 8 percent reduction in GHGs from transportation sources by 2020 and a 19 percent reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of subregional plans by the subregional Councils of Governments and the County Transportation Commissions to meet SB 375 requirements.

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). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. 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 2013 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_2e by 2030 and two

MT CO_2e by 2050 (CARB 2017). 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.

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 the California Department of Resources Recycling and Recovery (CalRecycle), in consultation with the CARB, to adopt regulations that achieve specified targets for reducing organic waste in landfills.

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 MT CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017). 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 RPS 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

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 pounds 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 percent of Class 2b – 3 truck sales, 75 percent of Class 4 – 8 straight truck sales, and 40 percent 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 (ZEV) Regulation to require an increasing number of ZEVs, 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.

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2

Greenhouse Gas Emissions Inventory

COUNTY of VENTURA
County Executive Office
Sustainability Division

2 Greenhouse Gas Emissions Inventory

The County of Ventura has developed a 2022 countywide inventory of major sources of GHG emissions within the Ventura County community to support the development of the PCAP and associated priority measures. The GHG emissions inventory was developed to quantify community wide GHG emissions within the County of Ventura. This inventory covers all of Ventura County including the unincorporated areas, along with the ten incorporated cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks, and Ventura.

This GHG inventory draws upon readily available activity data from within the County to provide a realistic and current representation of major sources of GHG emissions within Ventura County, including emissions associated with regional transportation, building energy use and solid waste generation. The sectors selected for the PCAP analysis were driven both by being the largest emissions sectors as well as those sectors for which priority GHG emissions reduction actions will be developed as required by the CPRG PCAP Guidelines.

The PCAP inventory focuses on the three GHGs most relevant to the County's operations: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). 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. Ventura County's 2022 GHG emissions inventory was developed in alignment with accounting protocols provided by the Local Governments for Sustainability International Council for Local Environmental Initiatives (ICLEI) as recommended by the U.S. EPA, Association of Environmental Professionals (AEP) and the California Office of Planning and Research (OPR). Use of Community Protocol methodology for GHG accounting aligns with California's GHG inventory methodologies and is consistent with methodologies recommended by the IPCC.[12] The Community Protocol also includes steps to evaluate the relevance, completeness, consistency, transparency, and accuracy of data used in the GHG inventory.

This inventory was prepared using the following high quality data resource(s):

- Clean Power Alliance (CPA)
- Southern California Edison (SCE)
- EPA eGRID
- Southern California Gas (SCG) Natural Gas Report
- EPA Emissions Factors Hub
- IPCC Fifth Assessment Report
- Environmental Defense Fund User Guide for Natural Gas Leakage
- Ventura County Transportation Model
- CARB's 2021 EMission FACtor model (EMFAC2021 v1.0.1)

[12] IPCC (2006), 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T Ngara, and K. Tanabe (eds.). Hayama, Kanagawa, Japan. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/

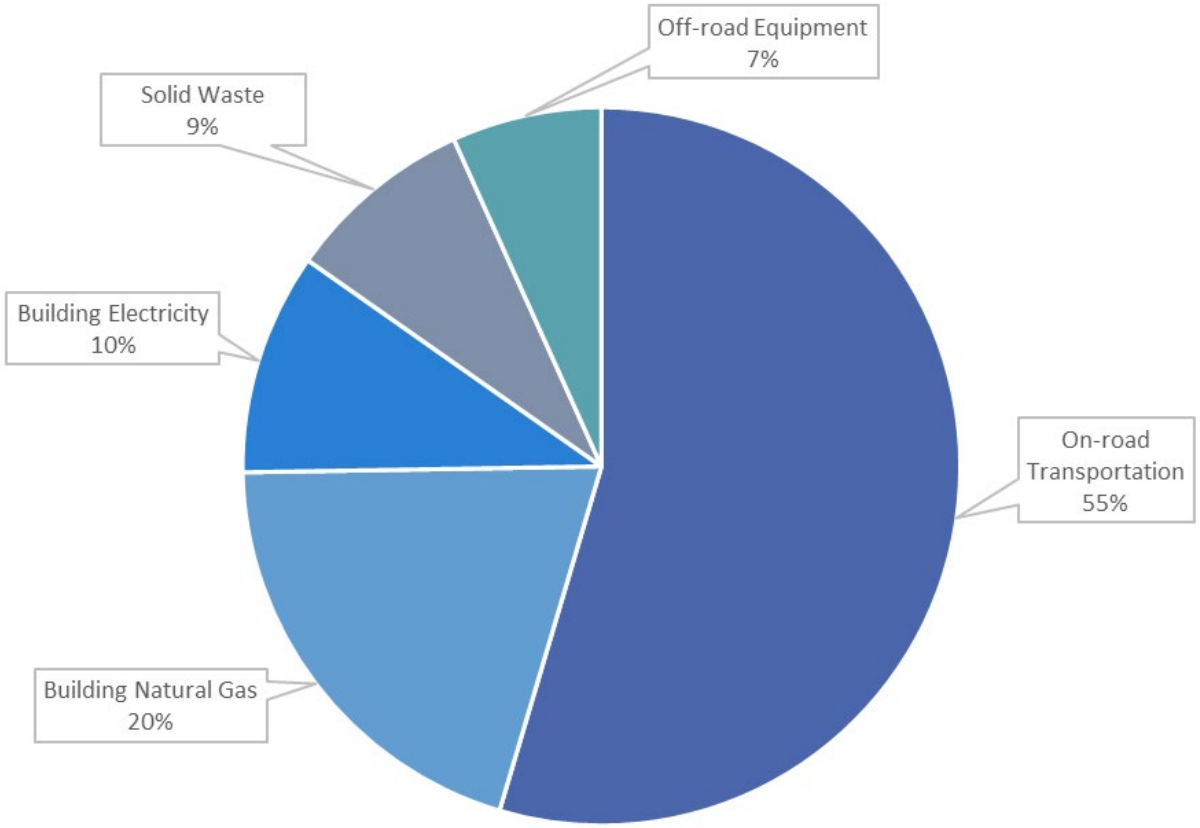
- CARB's OFFROAD model (OFFROAD2021)
- ICLEI Community Protocol
- CalRecycle

Detailed methodology and quality assurance procedures for preparation of this inventory are included in Appendix A.

2.1 GHG Inventory Results

In 2022, GHG emissions in the County totaled 4,993,265 MT CO_2e, primarily driven by on-road transportation (55 percent) and building natural gas (20 percent). The remaining sources of emissions quantified in the PCAP include building electricity (10 percent), solid waste (9 percent), and off-road equipment (7 percent). The results of the 2022 community GHG inventory are shown in Figure 2 and Figure 3 summarized in detail in Table 1.

Figure 2 Ventura County 2022 GHG Emissions by Sector



As shown in Figure 2 and further in Figure 3, on-road transportation resulted in the greatest source of emissions, followed by building natural gas use, building electricity use, solid waste, and off-road emissions. Therefore, the priority emissions reduction measures include initiatives related to reducing these greatest sources, as shown in Table 5 - Table 7.

Figure 3 Ventura County 2022 GHG Emissions by Sub-Sector

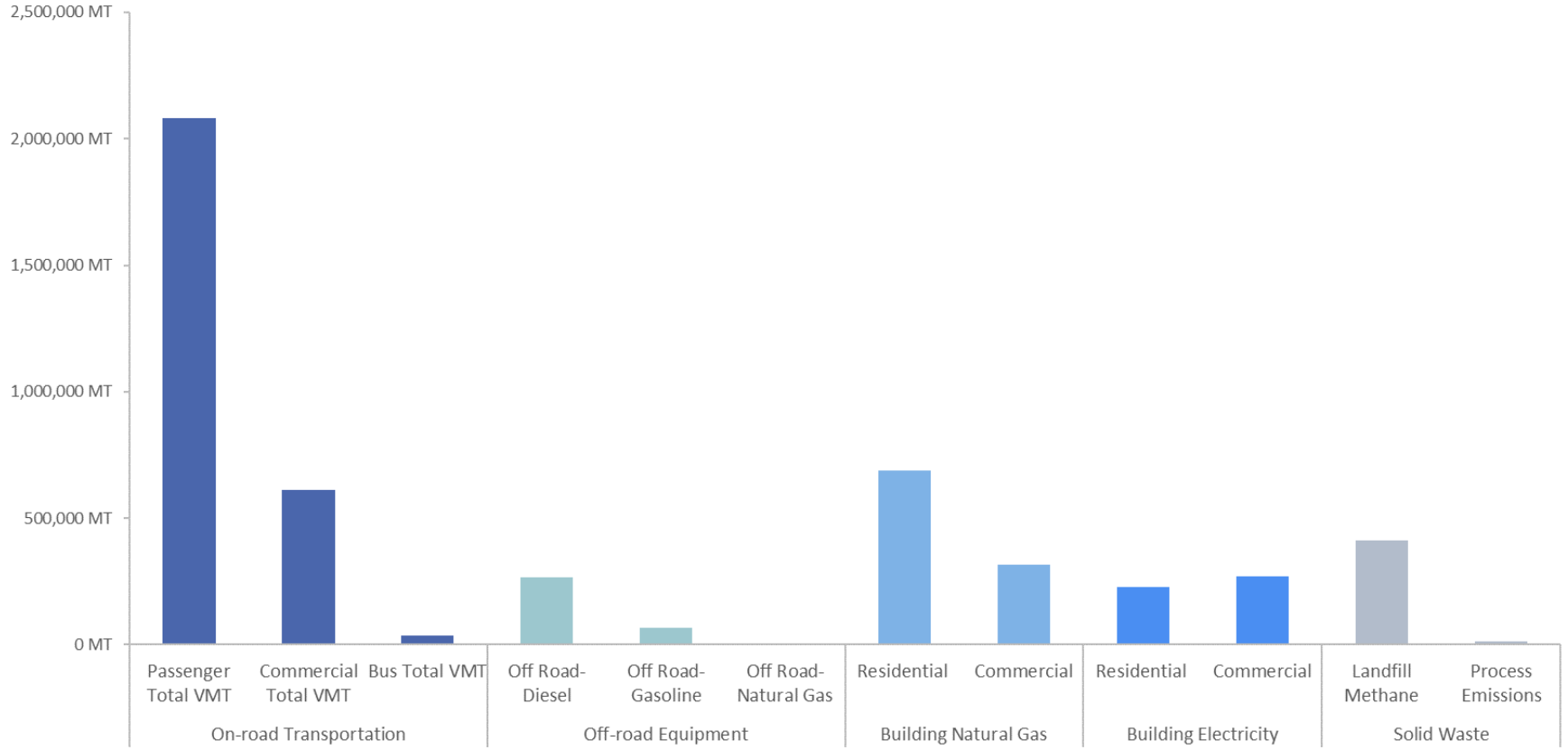


Table 1 Ventura County 2022 Community GHG Emissions Inventory

GHG Emissions Sectors and Subsectors	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Building Energy					
Residential Electricity	1,679,368,208	kWh	0.000131	MT CO_2e/kWh	219,554
Residential Electricity T&D	73,853,919	kWh	0.000131	MT CO_2e/kWh	9,655
Commercial Electricity	1,680,872,327	kWh	0.000154	MT CO_2e/kWh	259,097
Commercial Electricity T&D	71,101,428	kWh	0.000154	MT CO_2e/kWh	10,960
Residential Natural Gas	101,221,916	therms	0.005311	MT CO_2e/therm	537,635
Residential Natural Gas Leaks	2,848,456	therms	0.053067	MT CO_2e/therm	151,159
Commercial Natural Gas	46,651,613	therms	0.005311	MT CO_2e/therm	247,788
Commercial Natural Gas Leaks	1,312,809	therms	0.053067	MT CO_2e/therm	69,667
Total					**1,505,515**
Transportation					
Passenger VMT	6,103,105,747	VMT	0.000339	MT CO_2e/mile	2,070,808
Commercial VMT	611,654,126	VMT	0.000999	MT CO_2e/mile	610,801
Bus VMT	22,232,982	VMT	0.001586	MT CO_2e/mile	35,270
Passenger EVMT	66,587,335	kWh	0.000131	MT CO_2e/kWh	8,705
Commercial EVMT	0	kWh	0.000154	MT CO_2e/kWh	0
Bus EVMT	12,489	kWh	0.000154	MT CO_2e/kWh	2
Off-road Diesel	26,570,480	Gallons	0.010089	MT CO_2e/gal	268,079
Off-road Gasoline	7,429,022	Gallons	0.009115	MT CO_2e/gal	67,718
Off-road Natural Gas	234,436	Gallons	0.005862	MT CO_2e/gal	1,374
Total					**3,062,758**
Solid Waste					
Landfill Methane	1,092,525	Wet short tons	0.378000	MT CO_2e/ton	412,974
Process Emissions	1,092,525	Wet short tons	0.011000	MT CO_2e/ton	12,018
Total					**424,992**
Total					**4,993,265**

See Appendix A for emissions quantification.

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

3

Low-Income and Disadvantaged Communities

COUNTY of VENTURA

County Executive Office

Sustainability Division

3 Low-Income and Disadvantaged Community Analysis

Implementation of the measures included in this PCAP are anticipated to provide significant benefits to low-income and disadvantaged communities (LIDACs). This section identifies each LIDAC within the jurisdiction covered by this PCAP and anticipated impacts of PCAP implementation on LIDACs. Information on how Ventura County engaged with LIDACs in the development of this PCAP and how Ventura County will continue to engage into the future are provided in Section 6 *Coordination and Outreach*.

3.1 Identification of LIDACs

Ventura County identified LIDACs using the White House's Climate and Economic Justice Screening Tool (CEJST) and California SB 535 disadvantaged communities. SB 535 directs at least 25 percent of California Climate Investments to go to projects that provide a direct benefit for disadvantaged communities. Subsequently, AB 1550 directed the California Environmental Protection Agency (CalEPA) to identify disadvantaged communities and established additional funding thresholds for projects in or within ½ mile of these disadvantaged communities. SB 535 also includes more locally relevant data, indicators gathered at the State-level, and helps local jurisdictions meet the requirements of SB 1000 (the Planning for Healthy Communities Act) which requires cities and counties to identify disadvantaged communities within their jurisdiction. Combining federal and State screening tools is consistent with the EPA's allowance to create a more complete and localized picture of communities impacted by climate and environmental inequities.

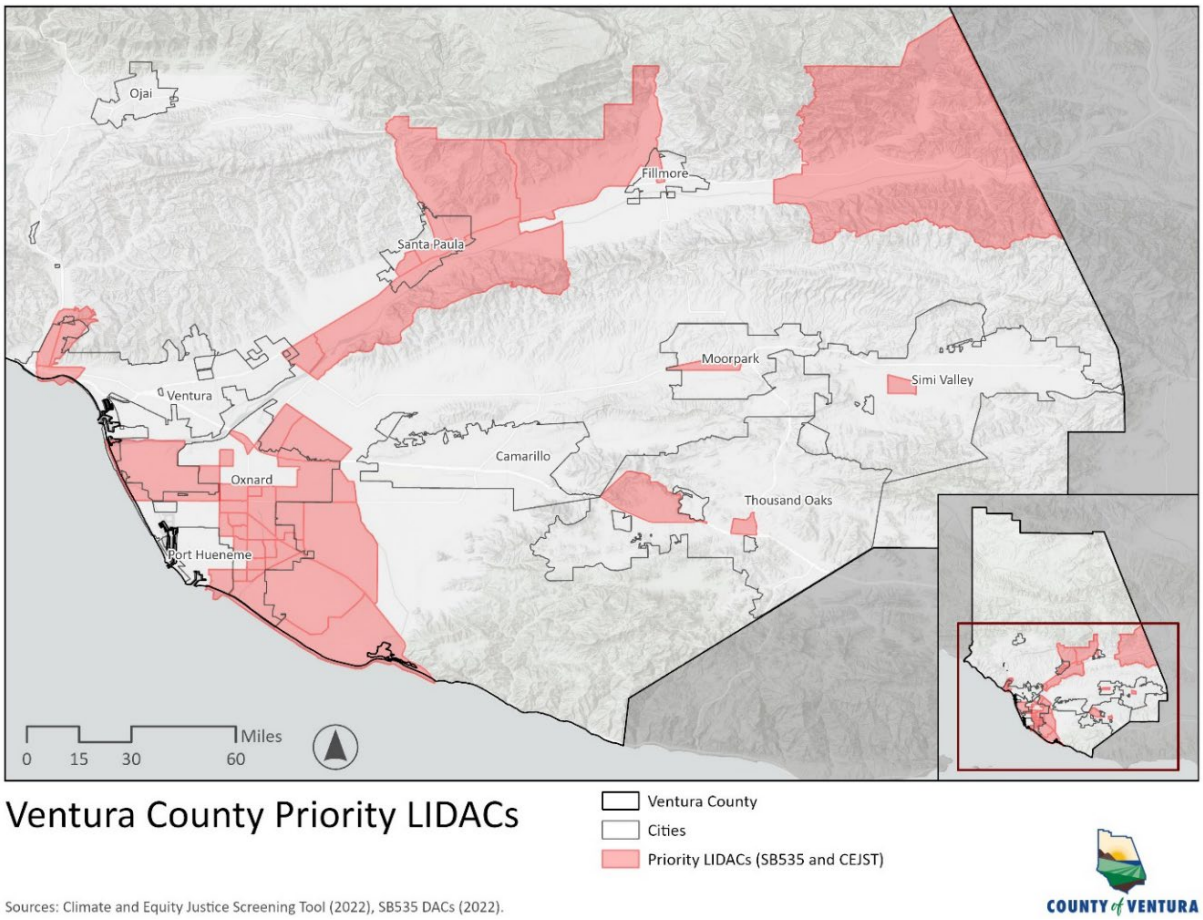
LIDACs were classified into two categories: priority and inclusive disadvantaged communities. The intent behind the two classifications is to: 1) clearly align disadvantaged communities with federal and State funding programs, and 2) create a flexible framework for LIDAC identification that facilitates deeper engagement during the Comprehensive Climate Action Plan (CCAP) process so that disadvantaged communities identified by local jurisdictions and stakeholders can be classified as LIDACs in the future.

Priority LIDACs are intended to capture the communities in Ventura County that experience the most climate inequities and environmental injustices, as identified by the White House and CalEPA. These geographies align with the White House's EO 14008 and California's SB 535. All LIDACs identified in the PCAP are considered Priority LIDACs. Inclusive LIDACs are intended to capture additional communities in Ventura County that experience climate inequities and environmental injustices, as identified by local agencies and jurisdictions. Inclusive LIDACs will be added during the CCAP and will include other locally identified disadvantaged communities, such as those included within adopted General Plans to meet the intent of SB 1000. For more detailed information on the methodology for identifying LIDACs, refer to Appendix B.

Figure 4 shows the Priority LIDACs of Ventura County. Many of the LIDACs are concentrated near Port Hueneme, Oxnard, and in the Santa Clara River Valley near Santa Paula, Fillmore, and east of Fillmore. Common inequities across these cities and nearby communities are housing cost impacts, increased flood and wildfire risks, and linguistic isolation. Additionally, some census tracts in the area experience significant traffic impacts (e.g., air pollution, specifically criteria pollutants and toxic

air contaminants), hazardous waste exposure, and pesticide use at a higher rate when compared to the rest of the State.

Figure 4 Ventura County LIDACs



In total, 206,196 (~24 percent) of Ventura County residents live in LIDACs, compared to the County's overall population. When analyzing the racial/ethnic demographic composition of the census tracts identified as LIDACs, 86 percent of the population within those LIDACs identified as people of color, which is notably higher than the 55 percent of the County's overall population that identified as people of color. Table 2 provides a Summary of jurisdiction LIDAC proportion and demographics and Table 3 includes a list of all the LIDACs identified in this analysis.

Table 2 Summary of Jurisdiction Statistics

Jurisdiction	Total Population	Estimated Population in LIDAC	Percent of Jurisdiction Population in LIDAC	Percent of Jurisdiction BIPOC
El Rio	6,297	7,261*	100%*	84%
Oxnard	208,154	122,528	59%	86%
Port Hueneme	22,156	8,086	36%	72%
San Buenaventura (Ventura)	109,910	17,829	16%	44%
Unincorporated Ventura County area	97,865	2,035	2%	42%
Piru	1,805	2,387*	100%*	91%
Fillmore	15,664	4,279	27%	79%
Santa Paula	30,098	21,195	70%	85%
Thousand Oaks	127,873	12,601	10%	33%
Moorpark	36,372	3,923	11%	45%
Simi Valley	125,842	4,072	3%	41%
Camarillo	68,122	0	0%	43%
Ojai	7,534	0	0%	20%

* The entire community is in LIDACs. Since census geographies do not map exactly to the community's boundaries and since there are large housing developments in the vicinity, the LIDAC population is greater than the community's population.

Table 3 List of Priority LIDACs in Ventura County

Census Tract	City	Population	Percent BIPOC
6111000200	Piru	2,387	91%
6111000304	Fillmore	4,279	76%
6111000400	Santa Paula	6,021	79%
6111000500	Santa Paula	1,697	61%
6111000600	Santa Paula	5,969	93%
6111000701	Santa Paula	7,508	93%
6111001302	San Buenaventura (Ventura)	2,358	68%
6111002200	San Buenaventura (Ventura)	6,350	70%
6111002300	San Buenaventura (Ventura)	6,534	77%
6111002400	San Buenaventura (Ventura)	2,587	40%
6111002905	Oxnard	5,433	79%
6111003011	Oxnard	5,539	89%
6111003012	Oxnard	675	98%
6111003201	Oxnard	4,230	99%
6111003700	Oxnard	6,687	97%
6111003801	Oxnard	5,033	98%
6111003802	Oxnard	2,849	96%
6111003900	Oxnard	6,984	97%
6111004000	Oxnard	7,179	95%
6111004101	Oxnard	6,947	92%
6111004400	Port Hueneme	8,086	72%
6111004503	Oxnard	5,112	89%
6111004504	Oxnard	5,777	96%
6111004506	Oxnard	7,788	97%
6111004600	Unincorporated Ventura County area	2,035	36%
6111004704	Oxnard	1,372	82%
6111004710	Oxnard	5,707	90%
6111004711	Oxnard	3,552	95%
6111004715	Oxnard	5,417	90%
6111004716	Oxnard	5,066	95%
6111004717	Oxnard	3,951	96%
6111004902	Oxnard	5,072	98%
6111005002	Oxnard	3,339	94%
6111005003	El Rio	7,261	85%
6111006100	Thousand Oaks	8,324	62%
6111007000	Thousand Oaks	4,277	64%
6111007611	Moorpark	3,923	89%
6111007800	Simi Valley	4,072	65%
6111008600	Oxnard	7,920	92%
6111008700	Oxnard	6,029	82%
6111009100	Oxnard	4,870	99%

3.2 Impact of PCAP Implementation on LIDACs

Depending on how and where the priority measures in this PCAP are implemented, each measure may provide direct and indirect benefits related to air quality, future climate impacts, and other co-benefits. This section describes the potential qualitative impacts and benefits focused on LIDACs. More information on the LIDAC Benefits Analysis can be found in Appendix B.

BE-1 Anticipated Impacts, Benefits, and Equity Considerations

Leverage federal funds to establish a permanent and equitable cost tiering or rebate program to allow Ventura County to establish 100 percent carbon free and renewable energy requirements for the Ventura County community and avoid detrimental economic impacts.

Measure Analysis

Building Energy Measure 1 aims to create a rate support program (or expand an existing program) to ensure low-income households are included in the County's energy transition efforts. Through collaboration with the load serving entities, residential and commercial customers will be transitioned to 100 percent carbon-free and renewable electricity. Based on 2022 data, countywide energy usage comes from CPA (69 percent), SCE (18 percent), and Direct Access (13 percent), which is a retail electric service option whereby customers may purchase electricity from a competitive non-utility entity called an Energy Service Provider. Of CPA-provided electricity, 61 percent is the carbon-free power option, 5 percent is the CPA's "clean power" option, and 33 percent is the CPA's "lean power" option (CPA reported 0 percent renewable energy for its "lean power" option in 2022).

Discount rate programs for income qualified households, such as the California Alternate Rates for Energy (CARE) and the Family Electric Rate Assistance (FERA) programs, exist. This measure would create opportunities to further lower utility bills for income-qualified households. This program would supplement or expand programs like CARE and FERA and require financial support for income-qualified households. Although successful programs, not all income-eligible households take advantage of programs like CARE/FERA. Continued work by the SCE and SCG to enroll eligible households will complement this measure and aid this transition.

Key to the success of this measure's execution is partnering with CPA to implement existing educational campaigns, particularly in LIDACs. Educational campaigns can include tabling at community events, establishing informational resources on the County's website, which could include regularly posting on social media, and developing energy bill inserts, to highlight the benefits and cost-competitiveness (e.g., rate support programs) of 100 percent renewable energy. These outreach efforts will help to maintain retention in the program and achieve and maintain an opt-out rate of 10 percent or less.

Climate Impacts and GHG Co-Benefits

The transition to renewable energy will lead to improved public health outcomes among residents of Ventura County, and especially in LIDACs. Fossil fuels represent about a quarter of SCE's power mix, as of 2022, and since there are significant local sources of fossil fuel energy generation, then a change to 100 percent renewable energy for residential and commercial may reduce local demand and production of fossil fuel energy, which may decrease residents' exposure to methane, sulfur dioxide, volatile organic compounds, and other forms of health-harming air pollution.[13] Additionally, since Ventura County's existing fossil fuel energy plants are located near LIDACs, a decrease in local production of fossil fuel energy will address health inequities in the region.

Equity Considerations

An important focus area when implementing the rate support program is to ensure that low-income residents do not spend a greater portion of their income during and after the energy transition. The targeted outreach to LIDAC households to highlight barriers to remaining with the CPA can help to more equitably tailor the program to include LIDACs in the energy transition. Furthermore, partnering with the CPA to develop and implement a long-term credit or rebate program using funding from the federal government to equitably provide clean power to LIDACs can alleviate this potential financial disparity.

BE-2 Anticipated Impacts, Benefits, and Equity Considerations

Use federal funds to support the development and deployment of a regional holistic new construction decarbonization program for all of Ventura County by developing a regional indoor air quality zero NO_X regulations that would cover 100 percent of new residential and commercial construction, as well as buildings undergoing substantial improvements costing 50 percent or more of the market value of the structure before the improvement or repair is started (as defined in the California Building Code, Title 24), in both incorporated and unincorporated areas by 2025.

Measure Analysis

Indoor air pollution has been found to have significant impacts on human health. Nitrous oxides and carbon monoxide emissions are common household pollutants related to the indoor combustion of natural gas that can increase one's likelihood of being diagnosed with respiratory diseases, heart disease, and cancer. By working with the VCAPCD, detailed as part of the implementation actions, the regulations developed through this partnership would streamline compliance and enforcement of regulations for new residential and commercial construction, as well as buildings undergoing substantial improvements, that reduce indoor air pollutants from natural gas heating/cooling, water heater, and appliances for cooking and washing/drying. Additionally, providing financial and technical resources, including workforce development training courses for installers, local contractors, and building owners/operators, to discuss the benefits and technical requirements of electrification as a result of proposed regulation can help to connect households, especially those located in LIDACs, to the information necessary to make the electrification change.

[13] Southern California Edison. 2022 Southern California Edison Power Content Label. Available at: https://www.energy.ca.gov/filebrowser/download/6072

Climate Impacts and GHG Co-Benefits

Through this measure, residents and employees in new residential and commercial construction, as well as buildings undergoing substantial improvements, will receive health benefits through the establishment of indoor air pollution regulations, when compared to the existing residential and commercial building stock. In addition, the VCAPCD will be able to establish air quality standards that will regulate emissions from gas-powered appliances. Tenants in the new or substantially improved developments will realize health benefits from improved indoor air quality. More specifically, LIDAC residents who move into new or substantially improved housing developments after 2025 will have access to amenities that provide health benefits, compared to if they moved into existing housing developments without those amenities, which this measure would not regulate.

At the regional level, businesses, community groups, and other interested parties will be engaged regarding the regional holistic building decarbonization program. Installers, local contractors, and building owners/operators will be given financial and technical resources to discuss the benefits and technical requirements of electrification because of proposed regulation.

Equity Considerations

The extent of benefits accruing to LIDACs depends on the geographic distribution of new residential and commercial construction in the County (e.g., where new construction occurs). Even for new residential construction within LIDACs for example, most of the benefits would flow to residents in market-rate units since market-rate units typically account for most new residential units within a mixed-income project. Furthermore, a project developer may pass on the additional costs of the building's green features, increasing the purchase cost or the amount of requested rent in comparison to equivalent new buildings without green features. The measure's implementation action of conducting a socioeconomic impact analysis to evaluate the potential cost increases to LIDAC communities can aid in assessing the equity outcomes of this program. Additionally, organizing meetings with interested parties, especially community groups, is integral to identifying the potential disparate impacts of the program and connecting stakeholders to resources such as workforce development training courses for installers, local contractors, and building owners/operators.

Additionally, many existing low-income households cannot afford new electric heating/cooling systems and appliances. Existing residential and commercial developments in LIDACs will not benefit from this measure since the regulations created will only apply to new residential and commercial developments or buildings undergoing substantial improvements. Building owners/operators of existing residential and commercial buildings may take the initiative to transition their infrastructure and appliances with access to financial and technical resources for electrification. The impacts on existing residential and commercial buildings in LIDACs, however, is unclear since it is not mandated as part of the measure.

BE-3 Anticipated Impacts, Benefits, and Equity Considerations

Leverage federal funds to expand the Tri-County Regional Energy Network (3C-REN) and increase the impact of the regional retrofit program to electrify 100 percent of extremely low-income (</= 30% AMI) renter households by 2030.

Measure Analysis

Many low-income residents cannot afford the additional costs of electrifying heating/cooling systems, water heaters, and appliances for cooking and washing/drying. This measure aims to expand programs, as well as grant funding, rebates, incentives, financing, and philanthropy so the cost to make the energy transition is not passed on to lower-income residents, particularly within affordable housing units. This is an important measure to reduce the funding gap for the decarbonization of existing buildings, especially for those who are low-income.

Climate Impacts and GHG Co-Benefits

Residents who live in affordable housing units will receive upgrades that lower indoor air pollution levels and, thus, provide health benefits. These upgrades will also contribute to a reduction in GHG emissions, which will decrease climate hazard impacts on a global scale (as described in BE-2). This measure spans further to approach decarbonizing existing affordable housing—a sector that was left out in the previous measure and will aid in driving down GHG emissions for the County even further.

Equity Considerations

This measure would directly benefit lower-income households. The extent of benefits accruing to LIDACs, however, depends on the geographic distribution of the affordable housing units across the County and their electrification as part of this project. Since the measure impacts lower income residents, particularly those in affordable housing units, conducting targeted outreach to identify barriers to building electrification is essential to the program's success. As stated in the equity considerations of BE-2, the targeted housing units in this measure will likely not be able to afford the electrical upgrades/appliances and potential increases in rent due to mandated upgrades. To address housing types that may be harder to electrify, such as naturally occurring affordable housing and deed-restricted units within mixed income projects, developing targeted rebates and incentives for landlords of LIDAC households to provide free electrification upgrades without raising costs for renters will be an important implementation action to reaching communities of lower incomes.

Furthermore, ensuring that residential properties address deferred maintenance and health and safety concerns (such as lead, asbestos, mold, etc.) is the first step to increasing the amount of updated housing units in LIDACs ready for decarbonization. If certain affordable housing units are determined to need maintenance/repairs due to health and safety concerns before starting decarbonization updates, then efforts should be made to integrate and streamline construction, repairs, and installation of those two processes so there is minimal disruption and potential displacement for residents. Additionally, tracking housing units that were deemed to need health and safety repairs will also be imperative to ensure those units are not lost in the housing decarbonization process across the region.

As part of the implementation actions of this measure, the County may couple this measure with energy efficiency and the installation of solar plus storage projects for priority populations, such as

medical baseline customers to secure access to electricity during power outages. Furthermore, ensuring these storage projects are resilient during wildfire, flood, and other climate events are crucial for energy system resilience. One important equity consideration is how this measure will impact farmworker housing. Oftentimes, farmworkers live in trailers or other housing types that are not connected to the electrical grid. Evaluating how this specific type of housing will be part of the energy transition process is key to equitable deployment of the climate measures and actions.

T-1 Anticipated Impacts, Benefits, and Equity Considerations

In alignment with the Ventura County Regional Energy Alliance (VCREA) Electric Vehicle (EV) Ready Blueprint, add 2,264 new public EV charging ports that would support the operation of 87,625 EVs within the County by 2030, prioritizing community charging in LIDACs and areas with high ratios of multifamily housing developments and the County's largest workplaces.

Measure Analysis

This measure aims to increase charging stations throughout the County within LIDACs, areas with high ratios of multifamily housing, and at the County's largest workplaces. In conjunction with policies that discourage people from driving, active transportation infrastructure, and transit service improvements (T-2), achieving carbon neutrality will also require a transition to zero-emission vehicles (ZEV) that run on clean energy provided by CPA and/or SCE. State policy requires all light-duty vehicles sold in California to be ZEV starting in 2035 and in 2045 for mid- and heavy-duty vehicles. By investing in expanding the network of charging infrastructure, Ventura County aims to promote the transition to zero-emission vehicles.

Climate Impacts and GHG Co-benefits

LIDACs face higher burdens from the transportation system, including environmental pollution, due partly to their adjacency to highways and high-volume roadways. Cleaner vehicles produce fewer emissions and help reduce the pollution burden. Residents living in LIDACs, living in areas with high ratios of multifamily housing, and/or employed at the County's largest workplaces are expected to receive the environmental and quality of life benefits of increased access to EV charging stations. The transition to ZEVs will decrease regional consumption of gasoline and diesel fuels and will result in a decrease in localized air pollution (i.e., nitrogen oxides and particular matter) across the County. This will generate co-benefits related to respiratory health, especially for LIDACs adjacent to highways and high-volume roadways. Furthermore, the measure's implementation action directed at identifying County-owned land in and near LIDACs to install publicly accessible chargers may help to streamline EV charging accessibility for surrounding communities when compared to assisting multifamily, commercial, and agricultural property owners who may have a much longer timeline.

Equity Considerations

Multifamily housing is located both within and outside of LIDACs and many of the County's largest employers fall outside of these locations. Additionally, there may be a mismatch between well-paying and professional sectors, such as government, healthcare, and biotechnology, and LIDAC residents (jobs-housing mismatch). These professional sectors jobs, however, are supported by service sector jobs in food, janitorial, and construction services who might benefit from free or reduced priced charging. Therefore, targeting limited program resources towards LIDACs and expanding the measure's reach to areas with high ratios of multifamily housing and the County's largest workplaces will improve the equity outcomes associated with this measure.

In the short-term, the County may also focus on the installation of EV charging stations in areas where low-income households may frequent more, such as community health centers and social service agencies. Equity considerations associated with vehicle electrification should also include charging "deserts," accessibility for those with disabilities, costs associated with installing charging infrastructure, and potential electric panel replacement costs. The implementation actions within this measure, such as identifying gaps in the EV charging infrastructure, address one of the listed equity considerations.

T-2 Anticipated Impacts, Benefits, and Equity Considerations

Work with the Ventura County Transportation Commission (VCTC) and local transit agencies (e.g., Gold Coast Transit) to promote and expand equitable, safe, efficient, and affordable multi-modal transportation hubs to decrease single occupancy VMT 10 percent by 2030. Prioritize the expansion of these hubs in LIDACs and the Ventura County Government Center.

Measure Analysis

Disadvantaged communities typically experience longer commute times, increased rates of traffic collisions, and higher exposure to environmental pollution. Low income and disadvantaged populations often rely more heavily on public transportation. This measure aims to focus on promoting and expanding multi-modal transportation hubs in LIDACs and the Ventura County Government Center. The Ventura County Government Center is home to multiple government departments and employs several thousand employees. Increasing transit service levels and types of transit modes would provide more transportation opportunities and lower the cost-burden associated with travel, especially with the measure's associated action of providing discounted fare programs and discounted bike share passes for low-income and underserved populations. Furthermore, expanding alternative vehicle demand-response and ridesharing options, such as GO Now transportation services, and farmworker van share programs, such as CalVans, support the progression of equitable transportation access since low-wage earners, such as restaurant employees, farmworkers, or those in the hospitality industry, frequently need timely access to transportation on a different schedule than 9-5 commuters.

Climate Impacts and GHG Co-benefits

The measure is expected to provide economic benefits, increase mobility options, decrease travel times, and reduce GHG emissions. With an expanded and more reliable, accessible, and cost-effective transportation system, residents will decrease their percentage of trips made by a vehicle and increase their percentage of trips made by public transportation. This decrease in vehicle miles traveled will reduce localized air pollution and improve health and quality of life for communities along local high-volume roadways, which, excluding US 101, are predominantly in LIDACs. Additionally, the measure's investment into expanding first-mile/last-mile connectivity programs and multi-modal connectivity improvements will result in more residents taking advantage of active transportation programs which may boost quality of life and safety throughout the transportation system, especially for LIDACs.

Equity Considerations

Transit offers safe, affordable, timely, and convenient access to places that provides an essential service for lower-income people within limited mobility options. The prioritization of auto travel has created disparities in transit and car travel, safety considerations, and infrastructure that is

inaccessible to people with disabilities are all equity consideration for this transit measure. Further considerations may include the number of jobs held by low-income individuals and the need to access their destination in a timely manner which may include locations outside Ventura County.

T-3 Anticipated Impacts, Benefits, and Equity Considerations

Support the expansion of the existing Reducing Ocean Going Vessel Speeds - Protecting Blue Whales and Blue Skies (BWBS) program to decrease GHG emissions associated with vessel speeds and reduce the risk of fatal ship strikes to endangered whale species and support the recovery of whale populations, which have been shown to be important global players for mitigating climate change through significant contributions to carbon storage and sequestration.

Measure Analysis

The Protecting Blue Whales and Blue Skies Program (Program/ BWBS) is a voluntary Vessel Speed Reduction (VSR) Program along the California coastline that incentivizes companies to adopt sustainable shipping practices across their global supply chain. In turn, the Program aims to protect endangered whales, reduce fuel consumption, lower regional greenhouse gas emissions, and positively impact air quality and health outcomes. According to the VCAPCD, ocean-going vessels make up over 40 percent of the NO_X emission inventory in Ventura County. By the 2026 ozone season, Ventura County must achieve the 2015 National Ambient Air Quality Standard for ozone. By that time, ocean-going vessels will account for 55 percent of the District's NO_X inventory and 90 percent of those emissions are from vessels in transit or anchored along the Ventura County coastline.[14] The measure seeks to expand the geographic scope and scale of the Program by including all areas of the California coast out to approximately 50 nautical miles, lengthening the timeline of the Program from seasonal to year-round, and expanding outreach and enrollment.

The expected benefits of this measure are realized through a reduction in GHG emissions and criteria pollutant emissions such as of NO_x, sulfur oxides (SO_x), diesel particulate matter (DPM), and particulate matter less than 2.5 microns ($PM_{2.5}$). These pollutants are common emissions from shipping vessels which blow onshore from the shipping lanes and negatively impact communities, especially LIDACs, along the coast. Additionally, the Program would aim to reduce ship strikes that occur with marine life who also travel along the California coastline.

Climate Impacts and GHG Co-benefits

Through the Program's anticipated expansion of enrollment to all ocean-going vessels, geographic scope, and outreach efforts, the Ventura County region is expected to experience health benefits due to the reduction in air pollution that drifts onshore from the ocean-going vessels. Ventura County will be able to establish a reduced shipping vessel speed that will result in a reduction in health-harming air pollution and one's likelihood of being diagnosed with adverse health effects such as respiratory illnesses, heart disease, and premature death. Households along the coastline – including LIDACs – are expected to receive the greatest portion of benefits through the implementation of this measure, as they are the communities that are the most impacted by the flow of offshore air reaching their communities first. Furthermore, with the expected decrease in fatal ship strikes between ships and marine life, there is the possibility of a slight increase in carbon sequestration and storage since these animals play an important piece in mitigating climate change.

[14] Ventura County Air Pollution Control District. Health-Based Ambient Air Quality Standards. Available at: http://www.vcapcd.org/air_quality_standards.htm

Regionwide, the reduction of ocean vessel speed will decrease GHG emissions overall. This reduction in GHG emissions, especially NO_X, and air pollution may reduce the likelihood of climate impacts and hazard occurrences. Ventura County residents, especially LIDACs, residing in climate hazard areas will receive the small benefit of a reduction in GHG emissions and its associated climate impacts on a global scale. This measure will also aid in reaching ozone attainment for the County, as it is currently classified as serious or worse federal ozone nonattainment. Additionally, the measure's implementation will result in economic benefits, as the funding for the expansion of the program's outreach and enrollment will create three new jobs within the BWBS Program.

Equity Considerations

An important consideration is that the Vessel Speed Reduction is voluntary and not required for all ocean-going vessels. Therefore, if it is in the corporation's economic interest to leave the Program and return to higher speed levels, this would result in greater air pollution compared to their previous activities. Ensuring there is program retention and expansion is vital for the measure to meet its anticipated positive health and environmental impacts. Potential ideas to increase retention and participation is by publicizing the benefits of the BWBS' Brand Ambassador Initiative, creating a BWBS certification icon (similar to the USDA Organic label or the Marine Stewardship Council label) that corporations are granted usage rights when they join the program, and highlighting corporations who are part of this effort throughout Ventura County at community events.

SW-1 Anticipated Impacts, Benefits, and Equity Considerations

Expand organic waste diversion programs/facilities throughout the County through funding waste diversion projects currently being developed, helping establish new green jobs, and diverting 75 percent of 2022 level organic material by 2030.

Measure Analysis

Diverting organic materials, such as food waste away from landfills can significantly decrease the emission of short-lived climate pollutants and methane – a potent GHG that has a more negative environmental impact than carbon dioxide. A reduction in emissions will help the County meet its long-term GHG emission goals. The measure also embraces circular economy practices, a common practice in reducing waste generation, through the cultivation of compost at the end of the cycle. Ventura County will be able to expand its circular organic waste economy which has added benefits by reducing air pollution from landfills, diversion of organic waste to facilities who can compost the waste, a reduction in the regional carbon footprint, and improvement in the sequestration of carbon in natural systems through the application of compost.

Climate Impacts and GHG Co-benefits

The County will experience economic growth and benefits, environmental pollution reduction, and safety benefits for certain geographic populations through this measure. Organic waste diversion facilities generate revenue and serve an important role in job creation across the County. Increasing locations across the region will create more jobs and increase revenue for Ventura County residents. County residents who live and work near solid waste facilities will experience a reduction in exposure to pollution such as methane, which will lead to health and quality of life benefits. This includes a reduction in emissions from the landfill as well as from truck travel to and from the facility. Finally, through increased coordination efforts with jurisdictions and other regional agencies

to understand how much organic waste recycling facility capacity is needed to process the organic waste estimated to be disposed by organic waste generators, Ventura County residents and businesses will decrease their carbon footprint by diverting a portion of their waste to these facilities. Through the development and expansion of operations for multiple organic waste diversion programs/facilities, the County will create new climate mitigation and adaptation jobs and equip employees with the skills necessary to prosper in an emerging sector, which is consistent with ongoing trends in the job market and the federal government's investment in climate related sectors.

Equity Considerations

Essential to consideration of this measure is the development and location of these waste diversion facilities. Given that many waste facilities are located within LIDACs generally, the measure may worsen equity outcomes if new programs/facilities are sited within or adjacent to a LIDAC. Additionally, if there is an increase in organic waste diversion, emissions of methane from these facilities are assumed to increase. Of the seven referenced organic waste facilities with already established locations in the measure's implementation action, two are in LIDACs, three are located adjacent to LIDACs, one is not located near or in a LIDAC, and one facility's location is unclear. Siting new locations for organic waste diversion far from LIDACs as part of this measure's expansion efforts is crucial to limit the impacts on human health.

As part of SB 1383's (the bill that established organic waste diversion efforts) Environmental Impact Report, the report underscored that more meaningful analysis is necessary for the public to understand whether the compliance responses, such as significant increase in composting, would carry unintended consequences of increasing the risk to human health. Additionally, further analysis was deemed essential to correlate potential risks to areas where higher rates of organics diversion are required.[15] To prevent further harm to communities, especially LIDACs, with already established organic waste diversion facilities and future development of organic waste facilities close to communities, exposure mitigation strategies should be required as part of the facilities' operations and infrastructure. The County should work with these sites to build and integrate these exposure mitigation approaches, secure the proper equipment and water availability to create quality aerobically produced compost, help identify funding sources, and monitor the air quality of the surrounding communities and harmful plant pathogen cultivation to ensure the increased organic waste diversion does not pose a threat to human health.

One important equity consideration when developing actions for this measure is to create a career pathway program that engages residents facing barriers to employment, such as justice-involved adults, people with disabilities, and people who are linguistically isolated. Providing an employment pathway for these marginalized demographic groups can provide residents with economic stability and help the County to advance climate equity and environmental justice.

Another important aspect of SB 1383 is the food recovery objectives of the Bill. As part of SB 1383, some food service businesses are required to donate edible food to food recovery organizations. The green workforce that is expected to be created through this measure can be expanded to create jobs where people assist food generators in connecting with food banks, faith-based institutions, and other organizations that distribute food to food insecure residents.

[15] SB 1383 Short-Lived Climate Pollutants Regulations Final EIR. Available at https://www2.calrecycle.ca.gov/Docs/Web/116058

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4

Priority Measures

COUNTY of VENTURA
County Executive Office
Sustainability Division

4 Priority Measures

The measures in this section have been identified as priority measures for the purposes of pursuing funding through CPRG implementation grants. The measures included have been identified in collaboration with the Ventura County CPRG Advisory Group and represent key actions to help the region, State, and U.S. meet the established GHG reduction commitments and avoid worsening impacts from climate change. This list is not exhaustive of Ventura County's priorities. Instead, the selected priority measures included in this PCAP meet the following criteria:

- The measure is implementation ready, meaning that the design work for the policy, program, or project is complete enough that a full scope of work and budget can be included in a CPRG implementation grant application.
- The measure can be completed in the near term, meaning that all funds will be expended, and the project completed, within the five-year performance period for the CPRG implementation grants.
- The measure advances the following County of Ventura priorities, as outlined in the County's Strategic Plan:[16]
  - Healthy, Safe, and Resilient Communities
  - Fiscal Responsibility and Economic Vitality
  - Reliable Infrastructure and Sustainability
  - Address Homelessness and Uplift the Most Vulnerable
  - Diverse and Innovative Workforce Dedicated to Service Excellence

Table 4 summarizes Ventura County's PCAP priority measures including the estimates of the cumulative GHG emissions reductions from 2025 through 2035 and 2025 through 2050; key implementing agency; and geographic scope. The measures included in this document detail achievable and implementable GHG emissions reduction efforts that will help the County reduce its emissions to meet targets established as part of the Comprehensive Climate Action Plan (CCAP) and in line with the State of California goals of reaching carbon neutrality no later than 2045 and reducing anthropogenic emissions 85 percent percent below 1990 levels by 2045, as well as meeting the interim 2030 goal of reducing emissions by at least 40 percent percent below 1990 levels. The measures and supporting actions are organized by sector and, when implemented, will help put the County on a path towards reaching its climate goals. The strategies are organized in the following framework:

- **Sectors**. Sectors define the GHG emissions category in which the GHG reductions will take place and include Transportation, Building Energy, and Solid Waste.
  - **Measure.** Measures are long-range goals that the County can establish to ultimately reduce emissions and/or improve resilience in line with the State emission reduction goals and local resilience goals.
    - **Action.** Actions are the discrete steps the County will take to achieve the measures.

[16] County of Ventura. County of Ventura Strategic Plan 2024 – 2027. 2023. https://vcportal.ventura.org/CEO/docs/publications/Ventura-County_Strategic-Plan_2024-2027_v20231023.pdf

For the PCAP, the measures that would result in greatest emissions reductions per dollar spent are prioritized, understanding that we must first utilize carbon-free power and then transition equipment effectively, holistically, and thoughtfully to facilitate an equitable and resilient future.

Table 5, Table 6, and Table 7 summarize Ventura County's PCAP priority measures and implementation considerations for each priority sector including:

- Implementation Milestone – Key actions to achieve the measures and associated quantified GHG emissions reductions.
- Implementation Schedule – Phase 1 is to be completed during year 1, Phase 2 during years 2-3, and Phase 3 during years 4-5 of the CPRG implementation grants.
- Metrics – Key metrics for tracking progress of priority measures.
- Cost Estimates– Qualitative cost estimates for implementation. Low indicates up to $500,000, Medium is between $500,000-1,000,000, and High is greater than $1,000,000.
- Impacts on LIDACs – Potential impacts to LIDACs.
- Authority to Implement - Statutory and regulatory authority needed to implement each priority measure.

Appendix A provides the calculations developed to assess the GHG reduction potential for each priority measure, and Appendix B provides additional details on benefits to LIDACs.

Table 4 Ventura County PCAP Priority Measures

Priority Measure	Cumulative GHG Emission Reductions (MT CO_2e)		Implementing Agency or Agencies	Geographic Scope
	2025–2030	2025–2050		
Building Energy Sector GHG Reductions				
BE-1. Leverage federal funds to establish a permanent and equitable cost tiering or rebate program to allow Ventura County to establish 100 percent carbon free and renewable energy requirements for the Ventura County community and avoid detrimental economic impacts.	475,060	1,137,143	Load serving entities, Ventura County	Ventura County
BE-2. Use federal funds to support the development and deployment of a regional holistic new construction decarbonization program for all of Ventura County by developing regional indoor air quality zero NO_X regulations that would cover 100 percent of new residential and commercial construction in both incorporated and unincorporated areas by 2025.	69,235	928,671	Ventura County & Ventura County Air Pollution Control District	Ventura County
BE-3. Leverage federal funds to expand the Tri-County Regional Energy Network (3C-REN) and increase the impact of the regional retrofit program to electrify 100 percent of extremely low-income (</= 30% AMI) renter households by 2030.	97,469	702,237	Ventura County	Ventura County
Transportation Sector GHG Reductions				
T-1. In alignment with the Ventura County Regional Energy Alliance (VCREA) Electric Vehicle (EV) Ready Blueprint, add 2,264 new public EV charging ports that would support the operation of 87,625 EVs within the County by 2030, prioritizing community charging in LIDACs and areas with high ratios of multifamily housing developments and the County's largest workplaces.	432,161	19,008,905	Ventura County	Ventura County
T-2. Work with the Ventura County Transportation Commission (VCTC) and local transit agencies (e.g., Gold Coast Transit) to promote and expand equitable, safe, efficient, and affordable multi-modal transportation hubs to decrease single occupancy VMT 10 percent by 2030. Prioritize the expansion of these hubs in low income and disadvantaged communities (DAC) and the Ventura County Government Center.	750,042	2,531,295	Ventura County & VCTC	Ventura County

Priority Measure	Cumulative GHG Emission Reductions (MT CO_2e)		Implementing Agency or Agencies	Geographic Scope
	2025–2030	2025–2050		
T-3. Support the expansion of the existing Reducing Ocean Going Vessel Speeds - Protecting Blue Whales and Blue Skies (BWBS) program to decrease greenhouse gas emissions associated with vessel speeds and reduce the risk of fatal ship strikes to endangered whale species and support the recovery of whale populations, which have been shown to be important global players for mitigating climate change through significant contributions to carbon storage and sequestration.	312,671	1,354,906	Ventura County Air Pollution Control District	California Coast (out to ~50 nautical miles)
Solid Waste Sector GHG Reductions				
SW-1. Expand organic waste diversion programs/facilities throughout the County by funding waste diversion projects currently being developed, helping establish new green jobs, and diverting 75 percent of 2022 level organic material by 2030.	1,593,720	7,968,602	Ventura County, cities, private entities	Ventura County
Total GHG Reductions for all Sectors	**3,730,357**	**33,631,759**		

Notes: See Appendix A for emissions quantification.

4.1 Building Energy

Electricity

In 2022, electricity use accounted for approximately 10 percent of emissions in the County. The primary driver of these emissions is electricity generated using non-renewable energy, such as fossil fuels. Renewable electricity procurement is essential for decarbonizing the community's emissions from electricity and will create the foundation for a carbon-free future. The focus of Ventura County's energy strategy is procuring 100 percent carbon-free electricity for both residents and businesses as soon as possible. Decarbonizing electricity works together with building electrification and EVs to achieve carbon neutrality in both the building and transportation sectors in the County.

Electricity in Ventura County is provided by Southern California Edison and the Clean Power Alliance (CPA), a Community Choice Aggregation (CCA). CCAs were established in California by Assembly Bill 117 to provide communities with the opportunity make energy decisions locally and reinvest funds back into their communities. While the current CPA defaults all community members in the Cities of Camarillo, Ojai, Oxnard, Thousand Oaks, Ventura, and Unincorporated Ventura County to "100 percent Green Power," which provides 100 percent renewable energy, the City of Moorpark defaults residential and commercial customers to "Clean Power," which only provides 50 percent renewable energy.[17] Additionally, the City of Simi Valley defaults all customers to the "lean power" tier; Santa Paula chose the 100 percent green power and service is anticipated in Spring 2024. Currently, Port Hueneme has yet to choose a default rate; however, service is anticipated to begin in 2025. With the opportunity to receive 100 percent renewable energy available to the entire region, the current limitations across the County is the result of resource limitations and concerns of cost impacts.

To effectively reduce emissions from the energy sector, additional accounts will be required to transition to 100 percent Green Power. This measure helps overcome the key barrier to region wide renewable power by providing access to funding to develop an equitable tiered rate structure that supports low-income community members to transition to renewable energy will catalyze a resilient future for the region by preventing grid disturbances and enable quick recovery after any disturbances.[18] This program would enhance the benefits of other discount rate programs for income qualified households, such as the CARE and the FERA programs. This impact can then amplify the benefits of widespread renewable power by converting to electric-powered appliances, equipment, and EVs. Once 100 percent renewable energy is readily available across Ventura County, buildings can be decarbonized holistically and cost effectively.

Natural Gas

Natural gas usage from existing buildings accounted for 20 percent of emissions in Ventura County in 2022. Currently natural gas is a relatively cheap energy source and has traditionally been connected to most homes and businesses. However, this consumption of fossil fuel generates significant GHG emissions and may become much more expensive as communities begin to transition away from natural gas and fixed costs to maintain and operate the gas system will be spread over a smaller number of natural gas consumers. It is also important to recognize that the

[17] Clean Power Alliance. The Power of Choice is Yours. Available at: https://cleanpoweralliance.org/rateoptions/

[18] The United States Office of Energy Efficiency and Renewable Energy. Energy Resilience. Available at: https://www.energy.gov/eere/energy-resilience#:~:text=Clean%20energy%20can%20help%20prevent,it%20back%20after%20an%20outage.

natural gas market is volatile and experiences impacts from production levels, weather, and environmental policies.[19] Therefore, we foresee that one of the foundational components towards an equitable transition to decarbonization would be equitable access to modern electric appliances. Expanding existing County programs to provide community members with the essential resources required to make a realistic transition and providing a physical location where the community can learn, share, and utilize resources that will help the electrification and energy efficient transition.

After the first phase of transitioning the community to renewable energy is complete, the County will build on the work being done by the Tri-County Regional Energy Network (3C-REN),[20] which is a partnership between the Counties of Ventura, Santa Barbara, and San Luis Obispo to deliver energy-saving programs and industry trainings that help reduce energy use, fortify job markets, and mitigate GHG emissions, to expand the retrofit program to electrify existing buildings throughout the County. The 3C-REN program began in 2019 and was the third of its kind in the State. Currently, through the 3C-REN program, households are offered direct energy savings opportunities through the program, with an emphasis on hard-to-reach and underserved communities and for commercial businesses, the program provides capacity-building services such as workforce training and technical code support.[21] This expanded program would go beyond traditional energy efficiency and support regional electrification. As part of this project, existing hurdles to electrification will be addressed, including creating a water heater loan program to temporarily provide water heaters to residents who need to replace their units, so they have the time to upgrade electrical panels, acquire any required permits, and schedule the work to be complete. In tandem with the transition to carbon-free power, replacing natural gas-powered equipment with electric-alternatives will significantly reduce emissions and create a healthier and more resilient community.

[19]Nasdaq. December 31, 2023. Natural Gas Prices Forecast for 2024: Could Turn Bullish on Sustained Move Over 3.00. Available at: https://www.nasdaq.com/articles/natural-gas-prices-forecast-for-2024:-could-turn-bullish-on-sustained-move-over-3.00

[20] A Regional Energy Network (REN) allows local governments to organize, collaborate, and operate energy efficiency programs. The California Public Utility Commission's (CPUC) decision to approve the REN was a direct response for increased flexibility, innovation, and autonomy in administering energy efficiency programs that reflect regional needs. A REN receives investor-owned utility (IOU) ratepayer funding from the CPUC to design and implement its own programs that will best meet the needs of the local region. RENs are intended to fill gaps where IOUs cannot or will not serve customers; and therefore, focus on serving hard to reach customers. This focus includes, but is not limited to, rural communities, customers with English as a second language, renters, multifamily properties, and low- and middle-income communities. Available at: https://www.slocounty.ca.gov/Departments/Planning-Building/Department-Services/Agriculture,-Water,-and-Energy/Energy-Programs/Tri-County-Regional-Energy-Network.aspx

[21] 3C-REN. 2024. About 3C-REN. Available at: https://www.3c-ren.org/

Table 5 Building Energy Priority Measures and Implementation Considerations

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
BE-1. Leverage federal funds to establish a permanent and equitable cost tiering or rebate program to allow Ventura County to establish 100 percent carbon free and renewable energy requirements for the Ventura County community and avoid detrimental economic impacts.					
Implementing Authority: Cities; Ventura County; Load Serving Entities; and/or coalition of these entities					
BE-1.1. Develop a program to analyze why residents and businesses opt out of CPA 100 percent green power. Include targeted outreach to LIDAC households to identify barriers to remaining with the CPA.	Phase 1	▪ # outreach materials distributed to LIDACs	Low	▪ Improved public health ▪ Reduced energy costs	No additional authority is required
BE-1.2. Partner with the load serving entities to develop and implement a long-term credit or rebate program using funding from the federal government to equitably provide clean power to LIDACs.	Phase 3	▪ Long-term credit/rebate program for LIDACs established ▪ $ distributed to LIDACs	High		
BE-1.3. Work with each city in Ventura County to establish SCE or CPA 100 percent green power as the default choice for community accounts and maintain an opt out rate of 10 percent or less.	Phase 2	▪ CPA opt-out rate	Low		
BE-1.4. Partner with the load serving entities to enhance existing educational campaigns, including tabling at community events, establishing informational resources on the County's website, regularly posting on social media, and developing materials such as energy bill inserts, to highlight the benefits and cost-competitiveness (e.g., rate support programs) of 100 percent renewable energy.	Phase 1	▪ # educational events ▪ # informational postings ▪ # materials distributed	Low		

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
BE-2. Use federal funds to support the development and deployment of a regional holistic new construction decarbonization program for all of Ventura County by developing a regional indoor air quality zero NO_X regulations that would cover 100 percent of new residential and commercial construction in both incorporated and unincorporated areas by 2025.					
Implementing Authority: Cities; Ventura County; Ventura County Air Pollution Control District; and/or coalition of these entities					
BE-2.1. Work with the Ventura County Air Pollution Control District (VCAPCD) to develop indoor air quality regulations by building from BAAQMD's indoor air quality regulation that would cover 100 percent of new residential and commercial construction in both incorporated and unincorporated areas by 2025.	Phase 1	▪ Creation of an indoor air quality regulation	Low	▪ Improved public health ▪ High-road job creation and workforce development	No additional authority is required
BE-2.2. Assist the VCAPCD in conducting a socioeconomic impact analysis confirming GHG emissions reductions and no significant cost increases to LIDAC communities.	Phase 1	▪ MT of CO_2e reduced in LIDAC communities	Medium		
BE-2.3. Organize meetings with businesses, community groups, and other interested parties to discuss issues, exchange information, and encourage communication among the team.	Phase 2	▪ # meetings ▪ # attendees at each meeting ▪ # and type of groups that attend each meeting	Low		
BE-2.4. Provide financial and technical resources, including workforce development training courses for installers, local contractors, and building owners/operators, to discuss the benefits and technical requirements of electrification as a result of proposed regulation. Partner with community-based organizations to connect LIDACs to these training programs.	Phase 2	▪ # people trained total ▪ # of people trained from LIDACs	Medium		

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
BE-3. Leverage federal funds to expand the Tri-County Regional Energy Network (3C-REN) and increase the impact of the regional retrofit program to electrify 100 percent of extremely low-income (</= 30% AMI) renter households by 2030.					
Implementing Authority: Cities and Ventura County					
BE-3.1. Bolster and maintain the virtual building electrification resource center on the 3C-REN website to provide all residents free electrification site assessments, turn-key installations (including panel upgrades) by County-approved contractors, low up-front costs and on-bill financing, and equipment and labor warranties.	Phase 1	▪ # of annual participants in program	Low	▪ Improved public health ▪ High-road job creation and workforce development ▪ Removal of barriers to access equipment and resources ▪ Increased resilience to climate change, including impacts from wildfire smoke and increased temperatures through weatherization	No additional authority is required
BE-3.2. Develop program and maintain a physical building electrification resource center to house and distribute information and products that support transition to electric buildings (e.g., heaters for residents to loan as they replace their natural-gas powered water heaters with electric-powered water heaters; see Action BE-3.3).	Phase 2	▪ # of physical building electrification resource centers	High		
BE-3.3. Implement a water heater loan program where residents who are replacing their natural gas-powered water heaters with electric-powered water heaters can borrow or rent a working natural gas water heater from the County for a specified period of time (e.g., three weeks) to use during any electrical panel upgrade requirements to install an electric water heater. Participation in this program could signify the initiation of the permit request process and serve as a mechanism to support thoughtful residential transition. Consider expanding the loan program to induction stoves as well.	Phase 2	▪ # of water heaters available ▪ # of water heaters requested annually	Medium		
BE-3.4. Partner with the CPA and SCE to review and enhance incentives, rebates, direct payments, and on-bill financing options for procedural equity and equitably distribute the existing/updated incentives to the community through the building electrification resource center to reduce energy bill burdens. Develop targeted rebates and incentives for landlords of LIDAC households to provide free electrification upgrades without raising costs for renters.	Phase 1	▪ $ provided (total) ▪ $ provided to LIDAC households	Medium		

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
BE-3.5. Conduct targeted outreach to identify barriers to building electrification (including equity barriers) and educate property owners on the potential cost savings and other benefits of electrification. Include targeted outreach to low-income households and businesses to identify specific resources needed to support equitable building electrification.	Phase 1	▪ # of people from LIDACs reached	Low		
BE-3.6. Establish a group that includes community-based organizations (CBOs), community members, and other partners to advise on and participate in implementation so that LIDAC members' needs are prioritized.	Phase 1	▪ LIDAC advisory group established	Low		
BE-3.7. Build upon and augment programs that upgrade residential properties to address deferred maintenance and health and safety concerns (such as lead, asbestos, mold, and weatherization etc.) to increase the amount of updated housing units in LIDACs ready for decarbonization; this issue is a critical concern raised by LIDACs that diminishes living conditions and one that must be corrected before energy efficiency and electrification retrofits can proceed.	Phase 3	▪ # of housing units in LIDACs updated and ready for decarbonization	Medium		
BE-3.8. Provide funding for cities to develop streamlined electrification permit requirements.	Phase 1	▪ $ provided per City per capita	Medium		

4.2 Transportation

On-road Transportation

Transportation generates the greatest amount of GHG emissions in the region, which is in alignment with the broader State emissions due to the expansive roadway network and limited safe and reliable public and active transportation options. Traditional land use planning that spreads housing and resources apart results in increased GHG emissions that are attributable to the VMT required to travel to various destinations. These transportation GHG emissions are generated from the use of fossil fuels in vehicles. It has been determined that in metropolitan regions, suburbs emit up to four times the household emissions of their urban cores and homes located in more densely populated neighborhoods have a carbon footprint that is 50 percent below the national average.[22] The combustion of fossil fuels in vehicles is also a significant source of health impacts to the communities living around the transportation infrastructure as it is responsible for nearly 80 percent of NO_x pollution, and 90 percent of diesel particulate matter pollution.[23] Exposure to high levels of poor air quality can result in increased cases of asthma and respiratory illnesses, worsen existing heart and lung conditions, thereby increasing emergency room visits and absences from work and school, as well as premature death.[24] These air pollutants also threaten crops, trees, and vegetation, which is especially impactful in the region that depends so much on agriculture for economic prosperity. Reductions in local crops could cause cascading impacts throughout the Country, which relies heavily on produce grown in this region. To reduce the GHG emissions and the health impacts from other associated air pollutants related to existing transportation, there is a need for increased EV use, increased transit accessibility and operations, and increased active transportation, including biking, walking, skating, and rolling. Additionally, as we continue to refine land use planning, jurisdictions must locate higher density housing near income-matched jobs with access to these multimodal transportation options. Ultimately, to significantly reduce emissions, it will be essential to decrease the number of miles driven in on-road fossil fueled-powered vehicles. California has enacted regulations to reduce GHG emissions from passenger vehicles to the maximum and cost-effective extent feasible and the measures in this sector will support the State's initiatives. The measure(s) in this sector also align with the Ventura Council of Governments (VCOG) and the VCTC's Ventura County CEQA VMT Adaptive Mitigation Program[25], a simplified mitigation program to reduce residual significant VMT impacts with a focus on affordable housing development. While the program provides a template for CEQA VMT mitigation, it can be considered for use with any project that generates VMT.

Upon maximum VMT reduction possible, and a decarbonized energy system, it will be essential to electrify the remaining vehicles on the road so Ventura County can benefit from increasingly clean electricity. Additionally, reducing tailpipe air pollution through EV adoption provides public health benefits as it reduces a major source of outdoor air pollution, which often disproportionately impacts LIDAC communities. The Ventura County Electric EV Ready Blueprint (EV Blueprint) was developed in 2019 through a collaborative process designed to accelerate and support electric

[22] https://www.brookings.edu/articles/its-not-just-cities-suburbs-and-exurbs-need-to-adopt-and-implement-climate-plans-too/
[23] California Energy Commission. 2024. Transforming Transportation. Available at: https://www.energy.ca.gov/about/core-responsibility-fact-sheets/transforming-transportation
[24] U.S. EPA. Learn About Impacts of Diesel Exhaust and the Diesel Emissions Reduction Act (DERA). 2023. Available at: https://www.epa.gov/dera/learn-about-impacts-diesel-exhaust-and-diesel-emissions-reduction-act-dera
[25] Ventura County Transportation Commissions. Ventura County CEQA Vehicle Miles Traveled Adaptive Mitigation Program. 2023. Available at: https://www.goventura.org/wp-content/uploads/2023/09/Ventura-County-AMP-Final-Report_Approved-by-VCTC-05.12.2023.pdf

vehicle and charging infrastructure deployment throughout Ventura County, in alignment with the State of California's goal to deploy 5 million Zero Emission Vehicles (ZEVs) by 2030.[26] The EV Blueprint includes a goal of installing 3,241 EV charging stations by 2025. As of February 2024, the County currently has 1,025 electric vehicle chargers. This lack of accessible charging infrastructure is a primary barrier to EV adoption, especially for community members who live in multi-family houses or are renters and may be unable to install electric vehicle charging equipment onsite.

Providing expanded access to mobility programs and transit service will be a vital part of reducing transportation emissions for Ventura County, as well as improving transportation equity in the region. As such, the PCAP measures will include initiatives to install EV chargers, prioritizing community charging in LIDACs and areas with high ratios of multifamily housing developments and the County's largest workplaces, and promote and expand equitable, safe, efficient, and affordable multi-modal transportation hubs to decrease single occupancy VMT.

Ocean Going Vessels

The Port of Hueneme (Port), located in Ventura County, is the only deepwater port between Los Angeles and San Francisco and handles over $15.8 billion worth of cargo annually, supporting local jobs and economic health.[27] Specifically, in 2021, the Port generated 20,032 jobs and $173.2 million in tax revenue that goes to the local cities and State of California. The Port accounts for approximately four percent of the County's total Gross Domestic Product and makes up approximately six percent of the County's local workforce.[28] Emissions are generated from the Port due to the ocean-going cargo vessels as well as the on-road trucks that transport imported material out of the Port and transport materials to be exported into the Port.

The Santa Barbara Channel, which runs adjacent to Ventura County, is one of the most biologically productive ecosystems found on Earth and provides a conduit for the Hueneme Channel to connect with and ultimately create a cargo thoroughfare.[29] The ecosystem in the Santa Barbara Channel is considered a transition zone and promotes large concentrations of both biomass and species diversity. With unparalleled species density and diversity, the Channel is home to numerous endangered, threatened, and sensitive marine species including blue, gray, and humpback whales. The area also fosters acres of kelp beds and eelgrass meadows that further provide habitat for hundreds of additional marine species. Therefore, an additional initiative is included in the PCAP to support the expansion of the existing program aimed at reducing ocean going vessel speeds. This measure would expand the existing programs reach to capture additional ocean-going vessels, geographically to extend to 50 nautical miles, and expand the implementation timeline into a year-round program, significantly decreasing GHG emissions associated with commercial goods movement into and out of Ventura County.

The funds for this project would allow the partners to direct efforts toward making the program self-sustaining rather than seeking funds each year, as is currently the case. In addition to measurable emission reductions achieved by reducing ocean-going vessel speeds, vessel speed reduction also reduces the risk of fatal ship strikes to endangered whale species and supports the

[26] County of Ventura. Ventura County Electric Vehicle Ready Blueprint. July 2019. Available at: https://s29552.pcdn.co/wp-content/uploads/Ventura-County-EV-Ready-Blueprint_July-2019.pdf
[27] Port of Hueneme. February 5, 2024. Two California State Dignitaries Create A Big Splash During First Visit to The Port of Hueneme. Available at: https://www.portofhueneme.org/two-california-state-dignitaries/
[28] Port of Hueneme. February 23, 2022. Updated Assessment Shows Port of Hueneme's Economic Footprint Reaches All Time Highs in Ventura County. Available at: https://www.portofhueneme.org/economic-report-2022-john-martin/
[29] Santa Barbara ChannelKeeper. 2023. About the Santa Barbara Channel. Available at: https://www.sbck.org/about-us/about-the-santa-barbara-channel/

recovery of whale populations, which have been shown to be important global contributors for mitigating climate change through contributions to carbon storage and sequestration.[30] The program will reduce emissions immediately and can continue to support emission reductions in the long-term. Since 2014, the program has achieved more than 108,000 MT CO_2e in reductions and over 3,200 tons of harmful oxides of nitrogen (NO_X) emission reductions. This program would also increase high-road jobs in the region.

[30] National Oceanic and Atmospheric Administration (NOAA). February 13, 2024. Whales and Carbon Sequestration: Can Whales Store Carbon? Available at: https://www.fisheries.noaa.gov/feature-story/whales-and-carbon-sequestration-can-whales-store-carbon#:~:text=One percent20whale percent20can percent20capture percent20an,a percent20maximum percent20500 percent2Dyear percent20lifespan.

Table 6 Transportation Priority Measures and Implementation Considerations

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
T-1. In alignment with the Ventura County Regional Energy Alliance (VCREA) Electric Vehicle (EV) Ready Blueprint, add 2,264 new public EV charging ports that would support the operation of 87,625 EVs within the County by 2030, prioritizing community charging in LIDACs and areas with high ratios of multifamily housing developments and the County's largest workplaces.					
Implementing Authority: Cities and Ventura County					
T-1.1. Implementation of the EV Blueprint Map by prioritizing EV charging infrastructure installation and site evaluations (i.e., permitting, engineering/metering requirements, equipment, and labor costing). Leverage federal funds to develop an EV charging grant program run by the County. Prioritize shovel ready EV charging infrastructure in LIDACs, including in areas with high ratios of multifamily housing, and areas with significant gaps in EV charging infrastructure such as along Highway 126 and Caltrans and City or jurisdiction established transit corridors.	Phase 1	▪ # of EV chargers installed	Low	▪ Improved public health ▪ High-road job creation and workforce development ▪ Reduced transportation barriers and improved connectivity to the region including access to services, work, school, and parks/green space ▪ Reduced household transportation costs and poverty burdens ▪ Traffic noise reduction	No additional authority is required
T-1.2. Provide technical assistance to multifamily, commercial, and agricultural property owners to install charging stations for residential, workplace, or public use. Technical assistance includes remote or in-person property assessments, feasibility findings and charging installation designs, facilitation of bids, guidance through construction, and incentive application assistance.	Phase 2	▪ # of EV chargers installed	Medium		
T-1.3. Leverage federal and State funding to install publicly accessible chargers on County or government -owned facilities, land, and equipment in and near LIDACs.	Phase 1	▪ # of EV chargers installed	High		

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
T-2. Work with the Ventura County Transportation Commission (VCTC) and local transit agencies (e.g., Gold Coast Transit) to expand equitable, safe, efficient, and affordable multi-modal transportation hubs to decrease single occupancy VMT 10 percent by 2030. Prioritize the expansion of these hubs in low income and disadvantaged communities (DAC) and the Ventura County Government Center.					
Implementing Authority: Cities; Ventura County; Ventura County Transportation Commission					
T-2.1. Implement first-mile, last-mile connectivity improvements, as identified in the Ventura County Transportation Commission Comprehensive Transportation Plan, such as: ▪ Bicycle and pedestrian facility improvements ▪ Micromobility such as e-scooters and e-bikes ▪ EV Charging ▪ Urban greening along pedestrian, bicycle, and transit infrastructure ▪ Other jurisdiction sustainable transportation planning documents	Phase 2	▪ miles of bicycle and pedestrian facility improvements ▪ # of micro mobility projects established ▪ # urban greening projects	High	▪ Improved public health ▪ Improved connectivity to the region, including access to services, work, school, and parks/green space ▪ Reduced transportation costs ▪ Job creation ▪ Traffic noise reduction ▪ Increased safety and convenience to transit ▪ Reduction in urban heat island effect ▪ Reduced traffic congestion ▪ Reduction in poverty burden	No additional authority is required
T-2.2. Multi-modal connectivity improvements, such as: ▪ Solar charging for e-bikes, e-scooters, and EVs ▪ Bike racks/lockers (proper sizing for e-bikes and e-cargo bikes) ▪ Adding e-bike racks to buses ▪ Microtransit service ▪ Transit priority infrastructure improving on-time performance and bus transit access ▪ Improved transit waiting area infrastructure (bus shelters, lighting, etc.) ▪ Improved signage, wayfinding, and real-time information for transit departure ▪ Transit fare coordination and reductions/vouchers ▪ Transit schedule coordination ▪ Shower and changing room facilities	Phase 1	▪ # solar chargers for e-bikes, e-scooters, and EVs ▪ # bike racks/lockers installed ▪ Microtransit service established ▪ # improvements to transit waiting areas ▪ # transit trips taken	High		

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
T-2.3. Leverage federal and State funds to provide E-bike incentives.	Phase 1	▪ # of E-bikes purchased ▪ $ provided in rebates/incentives	Medium		
T-2.4. Provide discounted fare programs and discounted bike share passes for low-income and underserved populations.	Phase 2	▪ # of discounted trips taken	Medium		
T-2.5. Expand GO Now transit services.	Phase 2	▪ # GO trips taken	Medium		
T-2.6. Use CalVans to provide additional transportation for farmworkers in the region using alternative vehicles.	Phase 2	▪ CalVans established in the region	Medium		
T-3. Leverage federal funds to expand the existing Reducing Ocean Going Vessel Speeds - Protecting Blue Whales and Blue Skies (BWBS) program to decrease GHG emissions associated with vessel speeds, reduce the risk of fatal ship strikes to endangered whale species and support the recovery of whale populations, which have been shown to be important global players for mitigating climate change through significant contributions to carbon storage and sequestration.					
Implementing Authority: Ventura County Air Pollution Control District; Port of Hueneme					
T-3.1. Open BWBS program enrollment to all ocean-going vessels that transit the coastal waters off of California and potential for scalability to the whole west coast of the United States.	Phase 1	▪ # of ocean-going vessels that participate	Low	▪ Improved public health	No additional authority is required
T-3.2. Expand the current geographic scope of the BWBS program to include all areas of the California coast out to approximately 50 nautical miles.	Phase 2	▪ # of ocean-going vessels that participate within the additional range	Medium		
T-3.3. Expand the timeline of the program from seasonal (mid-May to December) to year-round.	Phase 1	▪ Program expanded to year-round	Medium		
T-3.4. Initiate discussions between the BWBS program partners and other coastal states regarding implementation of vessel speed reduction programs in their jurisdictions.	Phase 2	▪ # of meetings	Low		
T-3.5. Expand corporate outreach to recruit additional cargo owners, such as manufacturers and retail outlets, to increase the demand-side pressure on ocean going vessel operators to participate in the BWBS program.	Phase	▪ # of additional ocean-going vessels that participate	High		

4.3 Solid Waste

In California, emission reductions in the waste sector will be driven primarily through compliance with SB 1383, which requires all jurisdictions in the State to reduce organic waste disposal by 75 percent and increase edible food recovery by 20 percent relative to 2014 levels by 2025. SB 1383 also requires each jurisdiction to procure a specific quantity (tons) of compost or organic material per year. When organic materials like food scraps and yard waste get sent to landfills, they emit methane as they decompose. Methane is considered a climate super pollutant and is 28 times more potent than carbon dioxide.[31] Landfills are the third largest source of methane emissions in California and emit air pollutants, including $PM_{2.5}$ which are detrimental to human health.[32] California's goals are aspirational and jurisdictions across the State are currently struggling to meet the organic diversion requirements due to limited facilities that provide opportunities for composting. To address this concern in the County of Ventura, several locations have been identified as realistic, feasible future opportunities for regional composting sites. Food scraps from Ventura County homes and businesses participating in organics recycling programs are currently separated from yard clippings and trucked to either Kern County (~110 miles each way) or San Bernardino County (~130 miles each way) for disposal. These extended trips have been necessary because Ventura County has no local facility permitted to compost the materials.

Investing in the development of shovel ready composting facilities and expediting opportunities to process organic materials in the region is crucial to reducing GHG emissions associated with landfilled organics as well as the extensive trips to dispose of materials. Ventura County is home to over 2,150 farms across[33] 98.5 acres of farmland,[34] and in 2021 it was estimated that the gross value of agriculture grown across the County was $2.1M. Approximately 15 percent of Ventura County's agricultural products are produced for local consumption, with the remaining 85 percent shipped out of the County, fostering economic growth. As stated in the Ventura County 2040 General Plan, according to the Census of Agriculture, the average size of farms in Ventura County was 131 acres while the median was 12 acres, indicating that there are many more small farms than large ones. In fact, almost 80 percent of all farms in Ventura County are 49 acres or less. Eleven percent are between 50 and 179 acres, and 11 percent are 180 acres or larger.[35] Farmland and open space is protected in most jurisdictions in the County and all unincorporated area in Ventura County through the Save Open Space & Agricultural Resources (SOAR) voter initiative that was first approved in 1995 and is still in place nearly two decades later.[36] Therefore, funding solutions that will increase local infrastructure to collect materials and create compost will provide long-term GHG emissions reductions and improved air quality due to the reduction in VMT by trucks disposing of and transporting the materials back to the farms, as well as provide opportunities to serve as an example of how organic waste can be managed effectively and efficiently at the regional scale. Additionally, increasing local management of materials would increase the availability of high-road, green jobs.

[31] International Energy Agency. 2021. Methane and climate change. Available at: https://www.iea.org/reports/methane-tracker-2021/methane-and-climate-change
[32] CalRecycle. 2024. California's Short-Lived Climate Pollutant Reduction Strategy. Available at: https://calrecycle.ca.gov/organics/slcp/
[33] County of Ventura. 2020. Ventura County 2040 General Plan: Chapter 9, Agriculture. Available at: https://docs.vcrma.org/images/pdf/planning/plans/VCGPU_09_Adopted_Agriculture_September_2020.pdf
[34] Ventura County Department of Agriculture/Weights & Measures. 2022. Touring Ventura County's Agriculture: 2021 Crop & Livestock Report. https://cdn.ventura.org/wp-content/uploads/2022/07/2021-CR_1.pdf
[35] County of Ventura. 2020. Ventura County 2040 General Plan: Chapter 9, Agriculture. Available at: https://docs.vcrma.org/images/pdf/planning/plans/VCGPU_09_Adopted_Agriculture_September_2020.pdf
[36] Save Open Space and Agricultural Resources (SOAR). 2018. What is SOAR? Available at: https://soarvc.org/about/what-is-soar/

Table 7 Solid Waste Priority Measures and Implementation Considerations

Implementation Milestone	Implementation Schedule	Metrics for Tracking Progress	Qualitative Cost Estimates for Implementation	Impacts on LIDACs	Milestones for Obtaining Authority to Implement
SW-1. Expand organic waste diversion programs/facilities throughout the County through funding waste diversion projects currently being developed, helping establish new green jobs, and diverting 75 percent of 2022 level organic material by 2030.					
Implementing Authority: Cities and Ventura County					
SW-1.1. Coordinate with local jurisdictions and other regional agencies to understand how much organic waste recycling facility capacity is needed to process the organic waste estimated to be disposed by organic waste generators.	Phase 1	▪ # local jurisdictions met with	Low	▪ Improved public health ▪ Job creation ▪ Reduced need for chemical fertilizers on regional agricultural and open space land ▪ Improved support for local farmers by creating a closed loop system	No additional authority is required
SW-1.2. Develop and maintain Ventura County "grant team" staff to pursue significant funding from public and private sources (e.g., CalRecycle Organics Grant Program) for planning, engineering, procurement, and construction. Coordinate and collaborate with Cities/jurisdictions regarding funding opportunities.	Phase 2	▪ # of grants pursued annually	Medium		
SW-1.3. Secure federal grant funding for public and private entities to increase organic waste diversion throughout the County. Focus on funding organic waste diversion facilities that are planned and ready for implementation, specifically established locations such as: ▪ Agromin Limoneira Facility ▪ Agromin Mountain View Facility ▪ Ventura County Ojai Valley Organics Recycling Center ▪ Athens Services Organics Composting Facility ▪ McGrath Family Farms Compost Site ▪ Peach Hill Soils Composting Site ▪ City of Oxnard Materials Reuse Facility	Phase 1	▪ $ of grant dollars received annually ▪ Tons of compost generated annually at each site	Low		

5

Review of Authority

COUNTY of VENTURA
County Executive Office
Sustainability Division

5 Review of Authority

Ventura County has reviewed existing statutory and regulatory authority to implement each priority measure continued in this PCAP. No additional legislation or policies would be required to be adopted and implemented in order to authorize implementation of the measures in the PCAP. The implementing authority for each measure is included in Table 5 through Table 7 in Section 4 Priority Measures.

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6

Coordination and Outreach

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County Executive Office
Sustainability Division

6 Coordination and Outreach

Ventura County conducted intergovernmental coordination and outreach in the development of this PCAP. This section describes coordination and outreach completed for the PCAP. It also includes CCAP planned engagement to support robust and meaningful engagement strategies to ensure comprehensive interested party representation and overcome obstacles to engagement, including linguistic, cultural, institutional, geographic, and other barriers.

6.1 Interagency and Intergovernmental Coordination

Ventura County identified representatives from the following agencies and governments to serve as the Advisory Group for the development of the PCAP:

- City of Fillmore
- City of Moorpark
- City of Oxnard
- City of Port Hueneme
- City of Santa Paula
- City of Simi Valley
- City of Thousand Oaks
- City of Ventura
- Central Coast Climate Justice Network
- Port of Hueneme
- Ventura County Air Pollution Control District
- Ventura County Transportation Commission

Ventura County met monthly with the Advisory Group to provide updates on the PCAP development process and solicit feedback on priority measures for the PCAP. Meetings were hosted beginning in September 2023 through completion of the PCAP (March 2024) and members of the group actively provided information on shovel-ready projects that could be implemented in a way that would provide regional benefits and align with the federal, State, regional, and local goals.

In addition, Ventura County presented on the PCAP process to various groups in the region including the Ventura County Regional Energy Alliance Board and Energy Champions, Ventura County Climate Emergency Council, Southern California Association of Governments (SCAG), Central Coast Climate Justice Network, and the California Air Resources Board.

6.2 Community Survey

Ventura County developed a community survey in English and Spanish to solicit broad feedback on climate actions and co-benefits that are important to the community. Ventura County received 49 responses on the survey, including responses from 6 individuals who identify as Latino and 2 individuals who identify as Asian. Results from the survey were used to inform the priority measures and associated implementation milestones for the PCAP.

6.3 Ongoing Countywide Engagement

There are various efforts in Ventra County that relate to climate action planning and climate resilience and informed this PCAP development. Ventura County used information resulting from the Green New Deal and Promotoras Community Coalition, and related engagement efforts for those initiatives, to inform the PCAP measures.

- Framework for Ventura County Green New Deal – This framework describes a plan to meet the interconnected needs, desires, and concerns of Ventura County communities, especially those that are underserved and marginalized. A Ventura County Green New Deal can drive transformative change that tackles historical and ongoing injustices. Justice-centered and rooted in community values, goals, and dreams, the Framework describes the potential to create an equitable, sustainable, and empowered Ventura County. The Framework is grounded in community ideas. Community input on concerns, goals, and policy proposals was gathered through house meetings. House meetings originate from union organizing and are characterized by small gatherings hosted in homes or familiar spaces where community members can openly and safely share their ideas.
- CARB Led Discussions/Workshop – The County of Ventura participated in State led discussions with the California MSAs that received the CPRG Planning Grant. The discussions facilitated engagement between the many regions and allowed for MSAs to share information and progress on their PCAP. The State also held a public workshop that the County of Ventura participated in and shared information on their PCAP and received feedback from participants.
- Promotoras Community Coalition – The County of Ventura plans to continue outreach efforts during the CCAP process by working with the Promotoras Group. The Promotoras have a history of successfully educating the public on various initiatives and have worked with the County of Ventura Public Health Agency to promote health equity programs and initiatives to LIDACs and communities of color.
- SCAG Focus Group – In February 2024, on behalf of County of Ventura, SCAG hosted a focus group discussion to talk about the PCAP and what equitable components to include for the PCAP and CCAP. The focus group consisted of nonprofits and community-based organizations.

6.4 Upcoming Engagement

Ventura County is planning the following engagement activities to engage communities, especially those historically underrepresented in the civic engagement process and LIDACs as part of the CCAP process. Given many of the LIDACs found through this analysis have been identified to have a large share of households where not one resident speaks English very well, it is imperative that engagement materials and activities regarding the implementation of these measures continue to be accessible to the diverse communities of Ventura County. Actions such as ensuring the housing retrofit work and deliverables are translated into Spanish, Mixtec, Zapotec, and other prominent languages spoken would ensure equitable engagement practices are part of the CCAP. Partnering with organizations in Ventura County that already have established relationships with Indigenous and other minority languages is key.

Online Surveys

Surveys have been found to engage historically underserved and overburdened residents and communities by providing an accessible avenue to gather input and encourage many people to be

part of the climate action process. Oftentimes, low-income and LIDAC communities face barriers to attending conventional public facing city/county engagement forums due to lack of transportation, work schedule conflicts, and other stressors. Online surveys can also request information such as demographics, neighborhood location, and length of tenure in the city from respondents to track which demographic groups are giving their input on the project. By distributing online surveys through various channels, the survey will gather feedback from relevant demographic groups, especially low-income and LIDACs to enhance the CCAP process.

Equity Focus Groups

Equity focus groups can be targeted to various demographic groups that may experience/are experiencing environmental and climate inequities to better tailor the Plan. Some potential focus demographic groups would be youth, Spanish-speaking community members, farmworkers, and low-income/affordable housing residents of the County/jurisdiction. The equity focus groups could also extend to the proposed stakeholders the Plan intends to coordinate with to achieve the measures and goals such as SCE, Economic Development Collaborative, and others. These focus group meetings are recommended to be held virtually or hybrid (option for in-person or online attendance) to maximize engagement.

Climate Action Advisory Committee

The formation of a Climate Action Advisory Committee (CAAC) can bring together engaged and interested parties to gather input related to mitigation measure development. By forming a panel of individuals who come from various backgrounds and demographic groups impacted by the systemic climate inequities, the plan will be better informed by receiving their direct input through frequent meetings and consultations. Potential organizations/community groups that would be important to include as part of the CAAC would be farmworkers, youth, low-income residents, and organizations part of the development of the Ventura County Green New Deal Framework. The CAAC meetings are recommended to be held virtually or hybrid to maximize engagement, especially for those who have varying schedules such as youth and farmworkers.

Educational Forums

Educational forums contain impactful approaches and strategies to create a common vocabulary around complicated issues such as climate change, housing affordability, energy efficiency, and waste reduction. These forums could be utilized to build a solid foundation of knowledge so that community members and residents in LIDACs can understand these issues and give input on effective implementation actions for CCAP measures. It is recommended that the educational forums are held either virtually or hybrid to maximize attendance.

Pop-Ups

In-person pop-up/intercept events can be planned to meet with the community at times and locations that are convenient to them. It is anticipated that these informal workshops will be a resource to share information about the planning effort and gather input through efficient interactive activities. Coordination with the County and jurisdictions to identify areas where community members frequent will be an important aspect of this engagement activity.

Workshops

Workshops can be scheduled to provide community members additional opportunities to gain insights on the planning process, share their perspectives, and contribute to the sustainable development of their communities and the region's clean energy economy. Workshops will feature interactive engagement opportunities designed for a diverse and multi-lingual audience. Similar to pop-up events, collaborating with the Counties and jurisdictions to identify areas frequented by community members will be a crucial aspect of this engagement event.

Capacity Building Trainings

Trainings can be provided to increase the capacity of and better prepare members of the Climate Action Advisory Committee on key topics related to land use, environmental justice, health equity, and related topics. These trainings can be integrated with existing Climate Action Advisory Committee meetings or hosted separately with key community leaders identified by County staff. Given the nature of these trainings and activities, it is recommended these engagement activities be held in-person.

7

Next Steps

COUNTY of VENTURA
County Executive Office
Sustainability Division

7 Next Steps

This PCAP is the first deliverable under the CPRG planning grant awarded to Ventura County. Ventura County and its partners will continue planning, engagement, and action to reduce emissions; invest in sustainable infrastructure, technologies, and practices; build our economy; and enhance the quality of life of the Ventura County community. This PCAP details key climate investments across prominent economic sectors that will rapidly lead to the reduction of GHG emissions and to benefit our most vulnerable communities. These priority measures focus on critical nexus points that will immediately reduce GHG emissions but will contribute to even greater GHG emissions reduction for subsequent efforts such as the comprehensive climate action plan (CCAP). This plan provides cost effective pathways to help the US meet commitments made in the Paris Agreement, while also providing an array of benefits to the Ventura County residents, especially LIDACs.

In 2025, Ventura County will publish a CCAP that establishes equitable and sustainable economic development strategies that reduce emissions across all sectors, not just the priority sectors provided in this PCAP. The CCAP will include near- and long-term emissions projections, a suite of emission reduction measures, a robust analysis of measure benefits, plans to leverage federal, state, and local funding, and a workforce planning analysis. In 2027, Ventura County will publish a status report that details implementation progress for measures included in the PCAP and CCAP, any relevant updates to PCAP and CCAP analyses, and next steps and future budget and staffing needs to continue implementation of CCAP measures.

If you have questions about this PCAP or suggestions for the upcoming CCAP and status report, contact Victor Briones at victor.briones@ventura.org.

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Appendix A

Emissions Inventory and Measure Reduction Supporting Documentation

COUNTY of VENTURA
County Executive Office
Sustainability Division

Oxnard-Thousand Oaks-Ventura Metropolitan Statistical Area Priority Climate Action Plan

2022 Greenhouse Gas Emissions Inventory Report and Measure Reduction Calculations

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1 Introduction

In support of the Priority Climate Action Plan (PCAP) and associated priority measures, this greenhouse gas (GHG) emissions inventory was developed to quantify the major sources of GHG emissions within the Oxnard-Thousand Oaks-Ventura Metropolitan Statistical Area (MSA). This inventory covers the entire Ventura County including the unincorporated areas, along with the ten incorporated cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, Santa Paula, Simi Valley, Thousand Oaks, and San Buenaventura, referred to here-in as Ventura County.

This GHG inventory draws upon readily available activity data from within the county to provide a realistic and current representation of major sources of GHG emissions within Ventura County, including emissions associated with regional transportation, building energy use and solid waste generation. The sectors selected for the PCAP analysis were driven both by being the largest emissions sectors as well as those sectors for which priority GHG emissions reduction actions will be developed as required by the Climate Pollution Reduction Grant (CPRG) PCAP Guidelines. The sections below outline the methodology and data utilized to construct this inventory of priority GHG emissions sectors for Ventura County.

1.1 GHG Inventory Approach

The PCAP GHG emissions inventory was guided by established GHG accounting protocols, the requirements of the CPRG grant, and the Quality Assurance Project Plan (QAPP)[1] submitted by Ventura County on behalf of the MSA in December of 2023. A QAPP provides a blueprint for a project and each specific task and is designed to guide project so that it produces reliable data that can be used to meet the project's overall objectives and goals. Rincon followed the requirements of the QAPP throughout this document. For transparency, under each specific sector, Rincon has provided an analysis of the quality of the data used for the GHG emissions calculations as it pertains to section 2.3 of the QAPP, specifically Table 3.1, which is shown below in Table 1. The majority of data used in this PCAP inventory was of a quality rank of Highest, with only few instances without published data from government agencies that were required to be sourced from Third highest quality data sources.

Table 1 Quality Rank of Source Data

Quality Rank	Source Type
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

[1] See the full Quality Assurance Project Plan (Appendix A) for more information on how data sources were chosen and utilized for the MSA.

Based on the CPRG rules for the PCAP, metropolitan areas may use a variety of available GHG data from national or state level agencies to complete the PCAP. While most of the data leveraged for the PCAP analysis was of the highest quality based on the existing data quality ranking hierarchy, not all data sources were consistent across the MSA based on data availability. A more detailed and consistent inventory will be developed as part of the CCAP as detailed below.

Baseline Inventory Year Selection

A baseline GHG emissions inventory provides a reference from which future inventories can be compared. It is important to establish a baseline inventory as part of the PCAP process to be able to evaluate the future GHG reduction progress made from the implementation of the PCAP measures. 2022 calendar year data was used because it was the most recent year with complete and verified data sets for each priority sector—regional transportation, building energy use and solid waste generation. All selected data were determined by leveraging the highest quality and most recently available data for the County, including data from federal, state, and local government agencies, and public utilities.

GHG Emissions Accounting Protocol

Ventura County's 2022 GHG emissions inventory was developed in alignment with accounting protocols provided by the Local Governments for Sustainability International Council for Local Environmental Initiatives (ICLEI) as recommended by the US EPA, Association of Environmental Professionals (AEP) and the California Office of Planning and Research (OPR).[2] 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 California's GHG inventory methodologies and is consistent with methodologies recommended by the Intergovernmental Panel on Climate Change (IPCC)[3]. 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, and waste) 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 GHG emissions inventory serves to provide an understanding of the community's current GHG emissions. The following sections contain further information on the inventory approach, calculation methodologies, data used, and results.

[2] 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

[3] IPCC (2006), 2006 IPCC Guidelines for National Greenhouse Gas Inventories. The National Greenhouse Gas Inventories Programme, The Intergovernmental Panel on Climate Change, H.S. Eggleston, L. Buendia, K. Miwa, T Ngara, and K. Tanabe (eds.). Hayama, Kanagawa, Japan. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/

Emissions Geographic Boundary

The GHG emissions inventory developed for Ventura County covers the largest emissions sources within the boundary of the county (i.e., county limits) of which Ventura County and local jurisdictions and agencies have some degree of control and influence. Of the six key economic sectors the EPA distinguishes in their Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 report, the PCAP emissions inventory covers transportation and residential/commercial.[4] While GHG emissions from solid waste is not separated out from each economic sector in EPA's GHG emissions inventory, GHG emissions from solid waste generation (landfilling) is given its own category in the PCAP due to the GHG emissions significance of this sector. Sectors where the jurisdiction does not have jurisdictional control were excluded from the 2022 GHG emissions inventory as there is limited opportunity to develop measures to impact associated GHG emissions[5]. This method of exclusion for the emissions boundary aligns with Community Protocol standards as well as guidance by the State of California for counties located in California.[6] Additionally, setting organizational boundaries is in alignment with EPA's guidance for organizational inventory accounting.[7]

Emissions Inventory Scope and Identification of Priority Sectors

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

These sectors are the largest sources of GHG emissions within a standard community, such as Ventura County. While future development of a Comprehensive Climate Action Plant (CCAP) will include an in-depth analysis of water and wastewater sectors, for the purposes of this PCAP the priority sectors of **regional transportation, building energy, and solid waste** sector emissions were assessed. The GHG emissions inventory assessment presented herein provides a realistic representation of the majority of emissions attributable to Ventura County and will serve as the basis for future CCAP GHG emissions inventory development.

[4] GHG emissions sources assessed under transportation included passenger, commercial, and bus vehicle miles traveled (VMT) from internal combustion engines (ICE) and electric vehicles (EV); GHG emissions sources assessed under residential/commercial included building electricity and natural gas combustion.
[5] Excluded subsectors in the 2022 Ventura County inventory include agriculture and industrial, and several off-road emissions sources which are listed in section Regional Transportation: Off-roadRegional Transportation: Off-road under Table 9.
[6] 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
[7] Environmental Protection Agency (EPA). 2023. EPA Center for Corporate Climate Leadership, Determine Organizational Boundaries. Available at: https://www.epa.gov/climateleadership/determine-organizational-boundaries

1.2 Global Warming Potential

The Community Protocol assesses GHG emissions associated with the six internationally recognized GHGs, as outlined in Table 2. The 2022 inventory focuses on the three GHGs most relevant to the County's operations: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The other gases (hydrofluorocarbons, perfluorocarbons, and sulfur hexafluorides) are emitted primarily in private sector manufacturing and electricity transmission and are therefore omitted from this inventory. This approach is consistent with the Community Protocol guidance, as industrial emissions are typically outside of the MSA's jurisdictional control. Table 2 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,[8] which were also used by the State of California and EPA in their latest GHG emissions inventories. 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_2 equivalent (MT CO_2e).

Table 2 2022 Inventory GHGs and GWPs

Greenhouse Gas	Primary Source	100-year GWP
Carbon dioxide (CO_2)	Combustion	1
Methane (CH_4)	Combustion, anaerobic decomposition of organic waste (e.g., in landfills, wastewater treatment plants)	28
Nitrous Oxide (N2O)	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

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

[8] 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 2022 Ventura County GHG Emissions Inventory

2.1 2022 GHG Emissions Inventory Activity Data and Emissions Factors

2.1.1 Building Energy

Building Energy: Residential and Commercial Electricity

Electric utility services for Ventura County are provided by Clean Power Alliance (CPA) and Southern California Edison (SCE). Total, countywide electricity usage for Ventura County—broken out by residential, commercial, industrial, and agricultural customer categories—was provided by SCE and included all electricity from SCE, CPA, and Direct Access (DA) customers[9]. CPA provided CPA-only electricity usage, broken out by customer category and renewable rate option. While SCE offers several renewable energy rate options as part of their utility service to customers, information regarding Ventura County's enrollment rates were not dissagregated by SCE. Therefore, all county-wide SCE electricity activity data, provided directly by SCE, was assumed to be from SCE's 'Power Mix' rate option, which is their baseline rate option and is the most conservative estimate for quantifying electricity emissions. Electricity emission factors (EF) for all rate options were sourced from their respective Power Content Labels (PCLs), as reported through the California Energy Commission's (CEC) Power Source Disclosure Program[10].

DA electricity usage was estimated by subtracting SCE and CPA electricity usage from the total, countywide electricity usage provided by SCE for each customer category (residential and commercial). DA electricity usage was then multiplied by the California and Mexico (CAMX) subregion electricity EF as reported by eGRID[11] due to the unknown power sources of DA electricity. GHG emissions from residential and commercial electricity were calculated using ICLEI's Community Protocol Equation BE.2.1. To account for only electricity 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 commercial electricity 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 2.1.2. All activity and emissions data from CPA, SCE, and eGRID are utilized at the state/federal level and are considered highest quality. Equation 2.1 and Table 3 provide the equation and data sources used to quantify GHG emissions associated with community electricity consumption.

[9] Only residential and commercial electricity were incorporated into the GHG emissions inventory; industrial and agricultural electricity were excluded due to the lack of jurisdictional control Ventura County has over these sectors

[10] 2022 Power Content Labels for CPA and SCE were provided directly by each entity. More information on CEC's Power Source Disclosure Program can be found here: https://www.energy.ca.gov/programs-and-topics/programs/power-source-disclosure-program

[11] CAMX is the grid subregion designated to California. More information and additional GHG emissions data can be found here: https://www.epa.gov/egrid/summary-data

Equation 2.1

BE.2.1 RESIDENTIAL/COMMERCIAL ELECTRICITY SECTOR EMISSIONS

$$CO_2e_{electricity,j} = \sum_i \left(Elec_{i,j} - EV_{i,j}\right) \times EF_{elec,i,j} \quad 2.1$$

Table 3 Emissions Parameters and Data Sources – Electricity Use

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from electricity consumption per building type	$CO_2e_{electricity,j}$	See Table 12	MT CO_2e/year	Calculated
Electricity consumption per building type per energy provider	$Elec_{i,j}$	See Table 12	kWh/year	CPA SCE DA
Attributed electric vehicle electricity consumption	$EV_{i,j}$	See Table 12	kWh/year	EMFAC2021[1]
Electricity emission factor based on energy provider	$EF_{elec,i,j}$	See Table 12	MT CO_2e/kWh	Electricity provider PCLs EPA eGRID[2]
Energy Providers	i	CPA SCE DA	Categorical	–
Building type	j	Residential Commercial	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; kWh = kilowatt hour; PCL = Power Content Label

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

[2] Environmental Protection Agency (EPA). 2024. Frequent Questions About eGRID. Available at: https://www.epa.gov/egrid/frequent-questions-about-egrid

Building Energy: Electricity Transmission and Distribution Losses

Electricity Transmission and Distribution (T&D) losses account for the electricity lost during delivery to the buildings and associated end-uses in Ventura County. Electricity T&D losses occur in the electricity transmission and distribution system and are therefore upstream of the delivery endpoints located within the County's jurisdictional boundaries. This means this electricity is lost before it is counted by retail meters. However, T&D losses are associated with energy usage in Ventura County and thereby directly impacted by the community's electricity consumption. The data utilized for quantifying T&D losses were obtained from state and federal agencies and are therefore considered highest quality. Additionally, emissions from T&D losses are recommended for inclusions in community GHG inventories by the Community Protocol. Equation 2.2 and Table 4 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions associated with community T&D losses from electricity consumption.

Equation 2.2

BE.4 ELECTRICITY T&D LOSS SECTOR EMISSIONS

$$CO_2e_{T\&D,i,j} = \sum_i Elec_{i,j} \times L_{T\&D} \times EF_{elec,i,j} \quad 2.2$$

Table 4 Emissions Parameters and Data Sources – Electricity T&D Loss

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from transmission and distribution losses per building type	$CO_2e_{T\&D,i,j}$	See Table 12	MT CO_2e/year	Calculated
Electricity consumption per energy provider and building type	$Elec_{i,j}$	See Table 12	kWh/year	CPA SCE DA
Electricity emissions factor per energy provider and building type	$EF_{elec,i,j}$	See Table 12	MT CO_2e/kWh	Electricity provider PCLs EPA eGRID
Electricity loss factor	$L_{T\&D}$	4.23%	Percent	EPA eGRID[1]
Energy Providers	i	CPA SCE DA	Categorical	–
Building type	j	Residential Commercial	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; MWh = megawatt hour; PCL – Power Content Label

[1] Environmental Protection Agency (EPA). 2023. Data Explorer, grid loss rates, 2016. Available at: https://www.epa.gov/egrid/historical-egrid-data

Building Energy: Residential and Commercial Natural Gas

Ventura County's natural gas is supplied by Southern California Gas (SCG) and natural gas usage was provided directly by SCG, broken out by residential, commercial, and industrial customer categories. SCG reported that agricultural natural gas usage was accounted for under the commercial category and was therefore removed by subtracting the estimated percentage of agricultural natural gas usage, as provided by SCG.[12] Emissions from residential and commercial natural gas use were calculated using Community Protocol Equation BE.1.1. All activity and emissions data from SCG and EPA are utilized at the state/federal level and are considered highest quality. Equation 2.3 and Table 5 provide the equation used, associated parameters, and data sources used to quantify GHG emissions associated with community natural gas consumption in residential and commercial buildings.

[12] Only residential and commercial electricity were incorporated into the GHG emissions inventory; industrial and agricultural electricity were excluded due to the lack of jurisdictional control Ventura County has over these sectors

Equation 2.3

BE.1.1 RESIDENTIAL/RESIDENTIAL NATURAL GAS SECTOR EMISSIONS

$$CO_2e_{NatGas,i} = Fuel_{NG,i} \times \left[\left(EF_{NG,CO_2} \times GWP_{CO_2}\right) + \left(EF_{NG,CH_4} \times GWP_{CH_4}\right) + \left(EF_{NG,N_2O} \times GWP_{N_2O}\right)\right] \times 10^{-1} \times 10^{-3} \quad 2.3$$

Table 5 Emissions Parameters and Data Sources – Natural Gas Use

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from stationary combustion of natural gas per building type	$CO_2e_{NatGas,i}$	See Table 12	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 12	therms/year	SCG Natural Gas Report
Carbon dioxide emission factor for natural gas combustion	EF_{NG,CO_2}	53.06	kg CO_2/mmBTU natural gas	EPA Emission Factors Hub[1]
Methane emission factor for natural gas combustion	EF_{NG,CH_4}	0.001	kg CH_4/mmBTU natural gas	EPA Emission Factors Hub
Nitrous oxide emission factor for natural gas combustion	EF_{NG,N_2O}	0.0001	kg N_2O/mmBTU natural gas	EPA Emission Factors Hub
Global warming potential of carbon dioxide	GWP_{CO_2}	See Table 2	–	IPCC Fifth Assessment Report[2]
Global warming potential of methane	GWP_{CH_4}	See Table 2	–	IPCC Fifth Assessment Report
Global warming potential of nitrous oxide	GWP_{N_2O}	See Table 2	–	IPCC Fifth Assessment Report
Conversion factor	10^{-1}	0.1	mmBTU/therm	–
Conversion factor	10^{-3}	0.001	MT/kg	–
Building type	i	Residential Commercial	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit; mmBTU = metric million British thermal unit; kg = kilograms

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

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

Building 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 Ventura County and not reflected in reported total natural gas purchased. While natural gas pipeline distribution leakage is technically outside of the County's 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, and in alignment with EPA's inclusion of natural gas distribution and post-meter leakage emissions in their most recent GHG inventory[13], it is best practice to include leakage as part of the natural gas emissions sector and is therefore included in Ventura County's 2022 GHG Emissions Inventory. Methane leaks from end-use discussed previously occur at the point of use in Ventura County and therefore occur within the County'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. Activity data from SCG is utilized at the state level and is considered highest quality. Other parameters used in Equation 2.4 were sourced from peer-reviewed and NGO studies and are considered third highest quality. Higher quality data of exact fit was not publicly available during the development of Equation 2.4. Table 6 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

$$CO_2e_{leak,i} = Fuel_{NG,i} \times EF_{NG\ leak} \times (L_{enduse} + L_{dist}) \qquad 2.4$$

[13] Environmental Protection Agency (EPA). 2022. Natural Gas and Petroleum Systems in the GHG Inventory: Additional Information on the 1990-2020 GHG Inventory. (March 2023) Available at: https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2020-ghg

Table 6 Emissions Parameters and Data Sources – Natural Gas Leaks

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from natural gas distribution leakage per building type	$CO_2e_{leak,i}$	See Table 12	MT CO_2e/year	Calculated
Natural gas consumed per building type	$Fuel_{NG,i}$	See Table 12	therms/year	SCG Natural Gas Report
Emission factor for natural gas leakage	$EF_{NG\ leak}$	0.053067	MT CO_2e/therm	Calculated[1]
Percent natural gas lost during distribution	L_{dist}	2.3%	Percent	Alvarez, Ramón et al. (2018)[2]
Percent natural gas lost during consumer end-use	L_{enduse}	0.5%	Percent	Environmental Defense Fund[3]
Building type	i	Residential Commercial	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; therms = thermal unit

[1] Emission factor is calculated using the following equation:

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

[2] 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

[3] 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

2.1.2 Regional Transportation

Regional 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 California Air Resources Board (CARB)'s 2021 EMission FACtor (EMFAC2021) model[14]. CARB is a state agency and therefore, data obtained from the agency's model is considered highest quality.

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 the Ventura County Transportation Commission (VCTC).[15] VCTC is a local government agency and therefore, data obtained from the agency's model is considered highest quality. VCTC provided daily average VMT data for 2022 for Ventura County derived from the Ventura County Transportation Model (VCTM). VCTC interpolated between the model base year of 2016 and a forecasted year of 2040 to estimate 2022 VMT data. The 2040 forecast year was based on the most recent data from the Southern California Association of Governments (SCAG). For the most realistic estimate of attributable VMT, external VMT from the Santa Barbara County Association of Governments (SBCAG) was also added to the 2022 VCTM profile. The provided VMT data was broken out by Auto (i.e., passenger) and

[14] California Air and Resources Board. 2023. Emission FACtor (EMFAC2021 v1.0.1) Model. Available at: https://arb.ca.gov/emfac/emissions-inventory/5e0cb7d6006cc10661f4b3ffb9c120a486d46ea6

[15] Ventura County Transportation Commission (VCTC). More information available at: https://www.goventura.org/

Truck (i.e., commercial and bus) VMT, and follows SB 375 Regional Targets Advisory Committee (RTAC) origin-destination methodology which is recommended by CARB to help avoid double counting and/or missing VMT in GHG emission inventories.[16] RTAC's origin-destination methodology accounts for 100% of internal-internal (I-I) trips; 50% of external-internal (E-I); 50% of internal-external (I-E) trips; and excludes external-external (E-E) trips for Ventura County. Daily average VMT was annualized[17] to determine 2022 VMT activity data for Ventura County. While the VCTM splits out Auto, or passenger, VMT, it does not differentiate between commercial and bus VMT. For this reason, activity data was allocated to commercial and bus vehicle types based on percent VMT share determined using data provided by CARB's EMFAC2021 model. Equation 2.5 and Table 7 define the equations, parameters, and data sources used to convert resulting VCTM VMT activity data to GHG emissions from on-road transportation fuel combustion.

Equation 2.5

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

$$CO_2e_{onroad,i,j} = (VMT_i \times EF_{onroad,j}) + VMT_i \times \%Share_j \times EF_{onroad,j} \quad 2.5$$

Table 7 Emissions Parameters and Data Sources – On-road Transportation

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road GHG emissions per vehicle class	$CO_2e_{Onroad,i,j}$	See Table 12	MT CO_2e/year	Calculated
Annual VMT following SB 375 RTAC origin-destination methodology	VMT_i	See Table 12	miles	Ventura County Transportation Model (VCTM)[1]
Percent share of total VMT for each vehicle class	$\%Share_j$	See Table 12	%	EMFAC2021 v1.0.1[2]
Emissions factor for on-road vehicles per vehicle class	$EF_{onroad,j}$	See Table 12	MT CO_2e/mile	EMFAC2021 v1.0.1
VMT type	i	Auto Truck	Categorical	–
Vehicle class	j	Passenger Commercial Bus	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; VMT = vehicle miles travelled

[1] Further information regarding the regional transportation model is available at: https://www.goventura.org/work-with-vctc/traffic-model/

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

[16] 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

[17] 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.

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 realistic accounting of on-road transportation trends. This was achieved through modifying Equation 2.5 to account for EV mode share 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. All activity and emissions data are derived from state/local government agencies and are therefore considered highest quality. 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 8 below.

Equation 2.6

ON-ROAD TRANSPORTATION ELECTRIC VEHICLE EMISSIONS

$$CO_2e_{onroad,EV,i} = VMT_i \times \%Share_i \times EV_{share,i} \times EPM_i \times EF_{elec,j} \quad 2.6$$

Table 8 Emissions Parameters and Data Sources – On-road Transportation EV

Definition	Parameter	Value	Unit	Data Source
Total annual community on-road EV GHG emissions per vehicle class	$CO_2e_{Onroad,EV,i}$	See Table 12	MT CO_2e/year	Calculated
Annual VMT following SB 375 RTAC origin-destination methodology	VMT_i	See Table 12	miles	Ventura County Transportation Model (VCTM)[1]
Percent share of total VMT for each vehicle class	$\%Share_i$	See Table 12	%	EMFAC2021 v1.0.1[2]
Percent share of VMT attributable to EVs	$EV_{share,i}$	See Table 12	%	EMFAC2021 v1.0.1
Average rate of electricity consumption per EV-mile per vehicle class	EPM_i	Various[3]	kWh/mile	EMFAC2021 v1.0.1
Weighted average electricity emissions factor per building type	$EF_{elec,j}$	See Table 12	MT CO_2e/kWh	See Table 3
Vehicle class	i	Passenger Commercial Bus	Categorical	–
Building type	j	Residential Commercial	Categorical	–

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent; EV = electric vehicles; VMT = vehicle miles travelled; kWh = kilowatt hour

[1] Further information regarding the regional transportation model is available at: https://www.goventura.org/work-with-vctc/traffic-model/

[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 = 0.3648, Commercial = 0.0000, and Bus = 2.0188

Regional 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 commercial, construction, lawn and garden, or recreational equipment. Gallons of off-road fuel usage attributed to Ventura County was sourced from CARB's OFFROAD model[18] which provides emissions inventories of off-road mobile sources in California by county. Activity and emissions data are from federal/state government agencies and are considered highest quality. 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 9 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

$$CO_2e_{offroad,j} = \sum_i Fuel_{offroad,i,j} \times EF_{i,j} \quad 2.7$$

Table 9 Emissions Parameters and Data Sources – Off-Road Equipment

Definition	Parameter	Value	Unit	Data Source
Annual GHG emissions from offroad equipment	$CO_2e_{offroad,j}$	See Table 12	MT CO_2e/year	Calculated
Annual fuel consumption in the County per sector per fuel type[1]	$Fuel_{offroad,i,j}$	See Table 12	Gallons/year	OFFROAD2021[2]
Emission factor per fuel type	EF_j	See Table 12	MT CO_2e/gallon	EPA Emission Factors Hub[3]
Equipment Type	i	Multiple	Categorical	OFFROAD2021
Fuel type	j	Gasoline Diesel Natural Gas	Categorical	OFFROAD2021

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] While the GHG inventory covers county-wide emissions sources, not all fuel consumption reported by OFFROAD2021 are attributed to Ventura County's 2022 Community GHG Inventory due to the lack of jurisdictional control by the County. Excluded sectors include agricultural, airport, cargo handling equipment, commercial harbor craft, industrial, locomotive, and military tactical support.

[2] 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

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

[18] 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

2.1.3 Solid Waste

GHG emissions associated with the waste sector result from the decomposition of waste at a landfill as well as landfill operation processes. Tons of solid waste activity data was sourced from California's Department of Resources Recycling and Recovery (CalRecycle)[19] which reports facility, jurisdiction, and county-wide waste data across the State of California. Activity data is from a state government agency and is therefore considered highest quality. Other emissions data used to calculate solid waste fugitive emissions were derived from ICLEI, an NGO, and is considered third highest quality. Although there were higher-quality publicly available emissions data, the choice to use ICLEI data was made to maintain consistency with the data sources for Equation 2.8. 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

$$CO_2e_{Waste,fugitive} = GWP_{CH_4} \times (1 - CE) \times (1 - OX) \times M \times \sum_i P_i \times EF_i \quad 2.8$$

Table 10 Emissions Parameters and Data Sources – Solid Waste

Definition	Parameter	Value	Unit	Data Source
Annual community generated waste GHG emissions	$CO_2e_{Waste,fugitive}$	See Table 12	MT CO_2e/year	Calculated
Methane global warming potential	GWP_{CH_4}	See Table 2	–	IPCC Fifth Assessment Report[1]
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	M	See Table 12	Wet short tons	Calrecycle[2,3]
Proportion of total waste material per material type	P_i	1	Fraction	–
Emission factor per material type	EF_i	See Table 12	MT CH_4/wet short ton	ICLEI Community Protocol[4]
Material type	i	Multiple	Categorical	–

Notes: MT CO_2e = 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] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility, Ventura County Single Year Countywide Origin Detail, 2019. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility.

[3] 2022 activity data was derived from 2019 CalRecycle data by taking 2019 landfilled tons/capita and multiplying by 2022 population. 2022 activity data was estimated using this methodology as 2019 CalRecycle data is the most recent, verified data available from a state agency.

[4] 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.

[19] California's Department of Resources Recycling and Recovery (CalRecycle). More information available at: https://www2.calrecycle.ca.gov/LGCentral/Home/slcp/capacityplanning/recycling/DisposalReporting

Landfill process emissions were quantified according to Equation SW.5 of the Community Protocol. Activity data is from a state government agency and is therefore considered highest quality. Other emissions data used to calculate solid waste process emissions were derived from ICLEI, an NGO, and is considered third highest quality. Although there were higher-quality publicly available emissions data, the choice to use ICLEI data was made to maintain consistency with the data sources for Equation 2.9. Equation 2.9 and Table 11 provide the calculation method, associated parameters, and data sources used to quantify GHG emissions from landfill operations.

Equation 2.9

SW.5 SOLID WASTE PROCESS EMISSIONS

$$CO_2e_{Waste,process} = M \times EF_p \qquad 2.9$$

Table 11 Emissions Parameters and Data Sources – Solid Waste

Definition	Parameter	Value	Unit	Data Source
Annual landfill process GHG emissions	$CO_2e_{Waste,process}$	See Table 12	MT CO_2e/year	Calculated
Total mass of solid waste that enters the landfill in the inventory year	M	See Table 12	Wet short tons/year	Calrecycle[1]
Emissions factor for landfill process emissions	EF_p	See Table 12	MT CO_2e/wet short ton	ICLEI Community Protocol[2]

Notes: MT CO_2e = Metric tons of carbon dioxide equivalent

[1] California's Department of Resources Recycling and Recovery (CalRecycle). 2019. Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility, San Benito County Integrated Waste Management Regional Agency, 2017. Available at: https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility

[2] Landfill process emissions were assumed to be a result of primarily compressed natural gas (CNG) combustion from landfill process equipment.

2.2 2022 Ventura County GHG Emissions Inventory Results

The 2022 priority GHG emissions inventory provides Ventura County with emissions estimates following the Community Protocol and current best practices for GHG accounting for the major sources of emissions within Ventura County. 2022 GHG emissions in Ventura County totaled 4,993,265 MT CO_2e, primarily driven by on-road transportation (55%) and building natural gas (20%). The remaining sources of emissions quantified in the PCAP included building electricity (10%), solid waste (9%), and off-road equipment (7%). The results of the 2022 GHG emissions inventory are shown in Figure 1 and Figure 2, and summarized in detail in Table 12.

Figure 1 Ventura County 2022 GHG Emissions by Sector

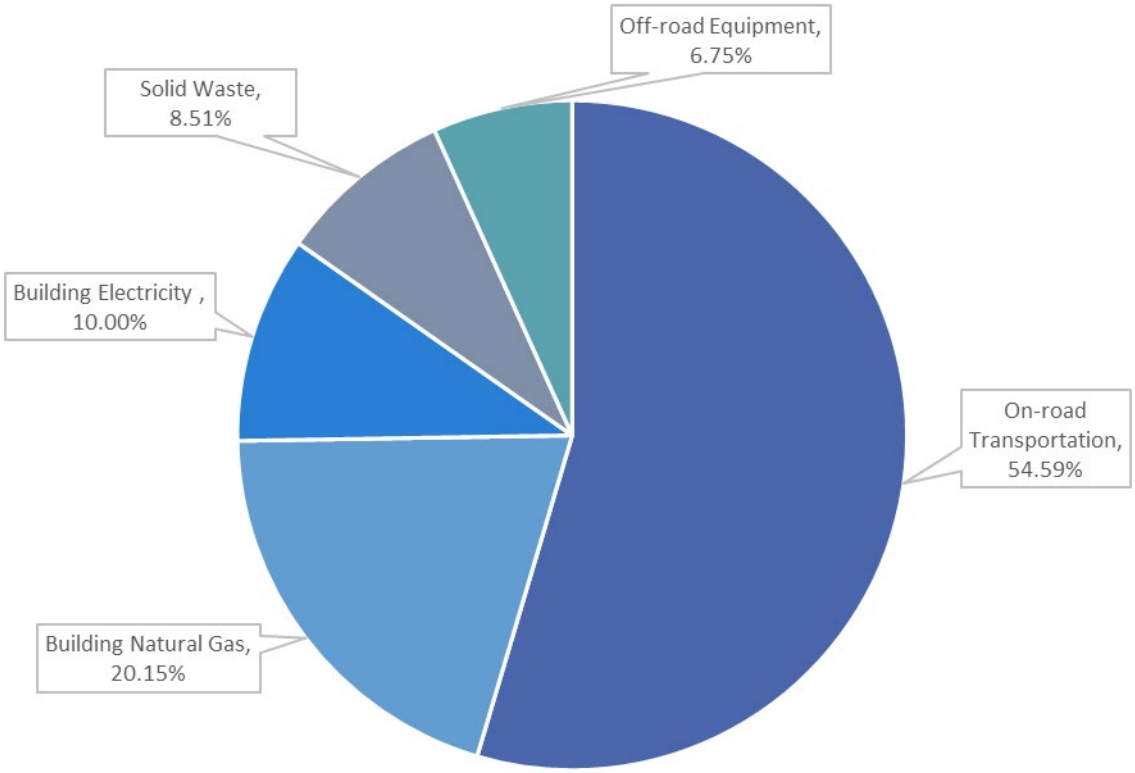


Figure 2 Ventura County 2022 GHG Emissions by Sub-Sector

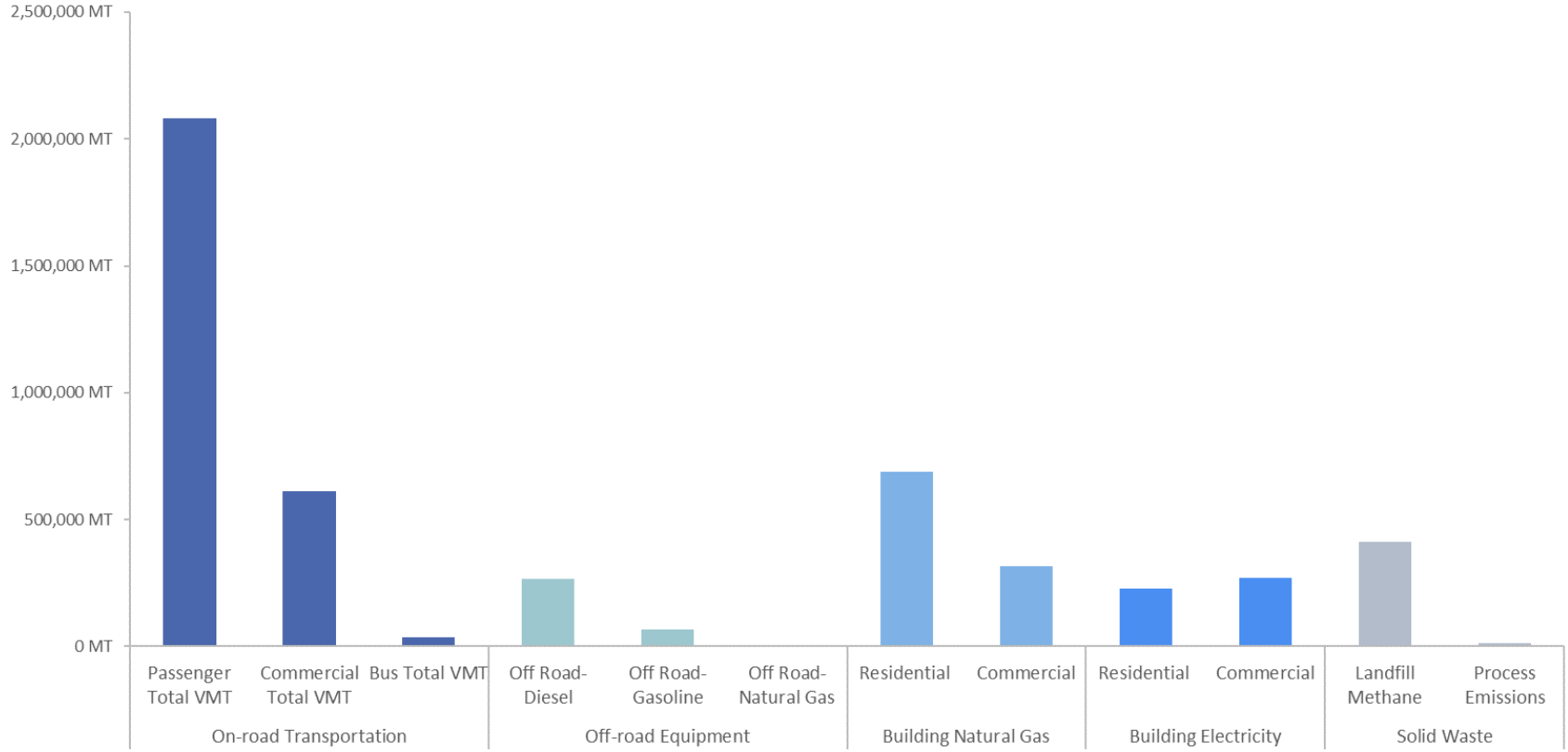


Table 12 Ventura County 2022 GHG Emissions Inventory

GHG Emissions Sector	GHG Emissions Subsector	Activity Data		Emission Factor		GHG Emissions (MT CO_2e)
Building Energy	Residential Electricity	1,679,368,208	kWh	0.000131	MT CO_2e/kWh	219,554
	Residential Electricity T&D	73,853,919	kWh	0.000131	MT CO_2e/kWh	9,655
	Commercial Electricity	1,680,872,327	kWh	0.000154	MT CO_2e/kWh	259,097
	Commercial Electricity T&D	71,101,428	kWh	0.000154	MT CO_2e/kWh	10,960
	Residential Natural Gas	101,221,916	therms	0.005311	MT CO_2e/therm	537,635
	Residential Natural Gas Leaks	2,848,456	therms	0.053067	MT CO_2e/therm	151,159
	Commercial Natural Gas	46,651,613	therms	0.005311	MT CO_2e/therm	247,788
	Commercial Natural Gas Leaks	1,312,809	therms	0.053067	MT CO_2e/therm	69,667
Total						**1,505,515**
Regional Transportation	Passenger VMT	6,103,105,747	VMT	0.000339	MT CO_2e/mile	2,070,808
	Commercial VMT	611,654,126	VMT	0.000999	MT CO_2e/mile	610,801
	Bus VMT	22,232,982	VMT	0.001586	MT CO_2e/mile	35,270
	Passenger EVMT	66,587,335	kWh	0.000131	MT CO_2e/kWh	8,705
	Commercial EVMT	0	kWh	0.000154	MT CO_2e/kWh	0
	Bus EVMT	12,489	kWh	0.000154	MT CO_2e/kWh	2
	Off-road Diesel	26,570,480	Gallons	0.010089	MT CO_2e/gal	268,079
	Off-road Gasoline	7,429,022	Gallons	0.009115	MT CO_2e/gal	67,718
	Off-road Natural Gas	234,436	Gallons	0.005862	MT CO_2e/gal	1,374
Total						**3,062,758**
Solid Waste	Landfill Methane	1,092,525	Wet short tons	0.378000	MT CO_2e/ton	412,974
	Process Emissions	1,092,525	Wet short tons	0.011000	MT CO_2e/ton	12,018
Total						**424,992**

Notes: VMT = vehicle miles traveled; EVMT = electric vehicle miles traveled; kWh = kilowatt hour; MT CO_2e = Metric tons of carbon dioxide equivalent; gal = gallons

Appendix A

Quality Assurance Project Plan

Climate Pollution Reduction Grants Program:

Optional Template for Local / MSA Quality Assurance Project Plans

Guidance for Local / MSA Programs

United States Environmental Protection Agency

Office of Air and Radiation

December 11, 2023

1. Project Management (Group A)

1.1. Title and Approval Page

Quality Assurance Project Plan for
Ventura County Regional Effort for
Climate Action Planning (VCRECAP)

Prepared by:
Victor Briones
County of Ventura CEO Sustainability Division
800 South Victoria Avenue
L#1950
Ventura, Ventura County, CA 93009

Prepared for:
US EPA Region 9
75 Hawthorne St.
San Francisco, CA 94105

12/01/2023

APPROVALS:

Project Manager – Victor Briones, Program Administrator: Date: 12/11/2023

Quality Assurance Manager – Heather Allen, Program Administrator: Date: 12/11/2023

USEPA Region 9 Grants Project Officer: Date: <add date of approval>

Baeza-Castaneda, Gabriela
Digitally signed by Baeza-Castaneda, Gabriela
Date: 2023.12.15 09:32:42 -08'00'

USEPA Region 9 Quality Assurance Manager: Date: <add date of approval>

Audrey L Johnson
Digitally signed by Audrey L Johnson
Date: 2023.12.15 08:46:53 -08'00'

QAPP Revision History

Revision No.	Description	Author	Date
1	Original Version	Victor Briones	10/20/2023
2	Version 2	Victor Briones	12/01/2023

1.2. Table of Contents[1]

[1] For grantees who are not familiar with using MS Word's TOC functions, please review the video at https://www.youtube.com/watch?v=0cN-JX6HP7c. Accessed on 6/23/2023.

List of Tables

List of Exhibits

Abbreviations

CAA	Clean Air Act
CFR	Code of Federal Regulations
CCAP	Comprehensive Climate Action Plan
CPRG	Climate Pollution Reduction Grant
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program (40 CFR Part 98)
ICR	Information Collection Request
NEI	EPA's National Emissions Inventory
OAR	EPA Office of Air and Radiation
PCAP	Priority Climate Action Plan
PM	Project Manager
PO	EPA Project Officer for Grant
POP	Period of Performance

POR	EPA Project Officer's Representative
PWP	Project Work Plan
QA	Quality Assurance
QAM	Quality Assurance Manager
QAMD	Quality Assurance Manager Delegate
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCC	Quality Control Coordinator
LGGIT	Community - GHG Inventory Tool (provided by the EPA)
TL	Task Leader
COVS	County of Ventura County Executive Office Sustainability Division
VCAPCD	Ventura County Air Pollution Control District

1.3. Distribution List

This section presents the primary staff who will be working on the project. These staff will be identifying existing[2] data resources for evaluation and potential use under the project or serving in project-specific roles for implementing the Quality Assurance Project Plan (QAPP). The listing in **Table 1.1** includes staff responsible for implementing independent internal quality management steps and staff serving in external oversight roles.

This QAPP and, as applicable, all major deliverables relying on existing data will be distributed to the staff presented in **Table 1.1.** Additionally, this QAPP will be provided to any unlisted staff who are assigned to perform work under this project. A secured copy of this QAPP will be maintained in the project files under the *G:\CCAP\Climate Action and Adaptation\CPRG\QAPP Directory*.

Table 1.1 QAPP Distribution List

Name	Organization	Role
Gabriela Baeza-Castaneda	US EPA, Region 9	EPA Project Officer (PO) or PO Representative (POR)
Audrey Johnson	US EPA, Region 9	EPA Quality Assurance Manager or Delegate
Alejandra Tellez	COVS	Grantee Sr. Approver, Sustainability Officer
Victor Briones	COVS	Grantee Project Manager, Program Administrator II
As Assigned	COVS or hired consultant	Grantee Task 1 Leader, <Org. Position Title>
As Assigned	COVS or hired consultant	Grantee Task 2 Leader, <Org. Position Title>
As Assigned	COVS or hired consultant	Grantee Task 3 Leader, <Org. Position Title>
As Assigned	COVS or hired consultant	Grantee Task 4 Leader, <Org. Position Title>
As Assigned	COVS or hired consultant	Grantee Task 5 Leader, <Org. Position Title>
Heather Allen	COVS or hired consultant	Grantee Quality Assurance Manager
As Assigned	COVS or hired consultant	Grantee Technical Staff Lead

1.4. Project/Task Organization

The primary personnel responsible for implementation of this project are the County of Ventura Couty Executive Office Sustainability Division (COVS) Project Manager (PM), Quality Assurance Manager (QAM), and Task Leaders (TLs). Their duties are outlined briefly in this section. The project QAM is independent of the unit generating the data.

[2] The term "existing data" is defined by the EPA's *Environmental Information Quality Policy* (CIO 2105.3) as "… data that have been collected, derived, stored, or reported in the past or by other parties (for a different purpose and/or using different methods and quality criteria). Sometimes referred to as data from other sources." The term "secondary data" may also be used to describe "existing data" in historical EPA quality-related documents.

Victor Briones is the COVS PM and will provide senior-level oversight as needed. The PM is responsible for the COVS's technical and financial performance as well as maintaining communications with the EPA to ensure mutual understanding of grant requirements, EPA expectations, and conformity with EPA quality procedures; managing oversight and conduct of project activities including allocation of resources to specific tasks; ensuring that quality procedures are incorporated into all aspects of the project; developing, conducting, and/or overseeing QA plans as necessary; ensuring that any corrective actions are implemented; operating project activities within the documented and approved Quality Assurance Project Plan; and ensuring that all products delivered to the EPA are of specified type, quantity, and quality.

The COVS PM will assign a TL for each technical task with instructions to complete a baseline emissions inventory for the sector(s) under the task, to develop options for potential emissions reductions with estimated reductions per option, and to develop uncertainty estimates for each reduction estimate. Task Leads will be a member of either the consulting team or the CPRG Advisory Group. Expertise and interest in the assigned task will be taken into consideration for choosing the Task Leads. Depending on the sectors selected we will also look at a pool of already established relationships for technical leads. For example, if energy is a task, we will reach out to utilities, energy managers for local governments, and energy program implementers among others. Options for potential emissions reductions with estimated reductions per option will also be developed by the CPRG Advisory Group and hired consultant. **Table 1.1** presents the TLs for each technical task. Each TL is responsible for the day-to-day technical activities under their assigned task, including planning, reporting, and controlling of technical and financial resources allocated to the task by the PM. Accordingly, each TL is primarily responsible for implementing the Quality Program and this QAPP on task-level assignments.

Task-level management system. For each of the major deliverables under each task, the assigned TL will review all QA-related plans and reports and is responsible for transmitting them to the QA Manager (or delegate) for review and approval. Each TL is responsible for ensuring that quality procedures are implemented at the task level and for maintaining the official, approved, task-level QAPP content. Each TL will discuss any concerns about quality or any proposed revisions to task-level QAPP content with the QA Manager (or delegate) to identify, resolve, or preclude problems or to amend task-level plans, if necessary. In addition, each TL will work with the COVS PM and the QA Manager to identify and implement quality improvements. The COVS PM is responsible for ensuring the consistency of similar or related QA measures across tasks, and the TLs are responsible for overseeing task-level work performed by technical staff and providing assurance that all required QA/QC procedures are being implemented.

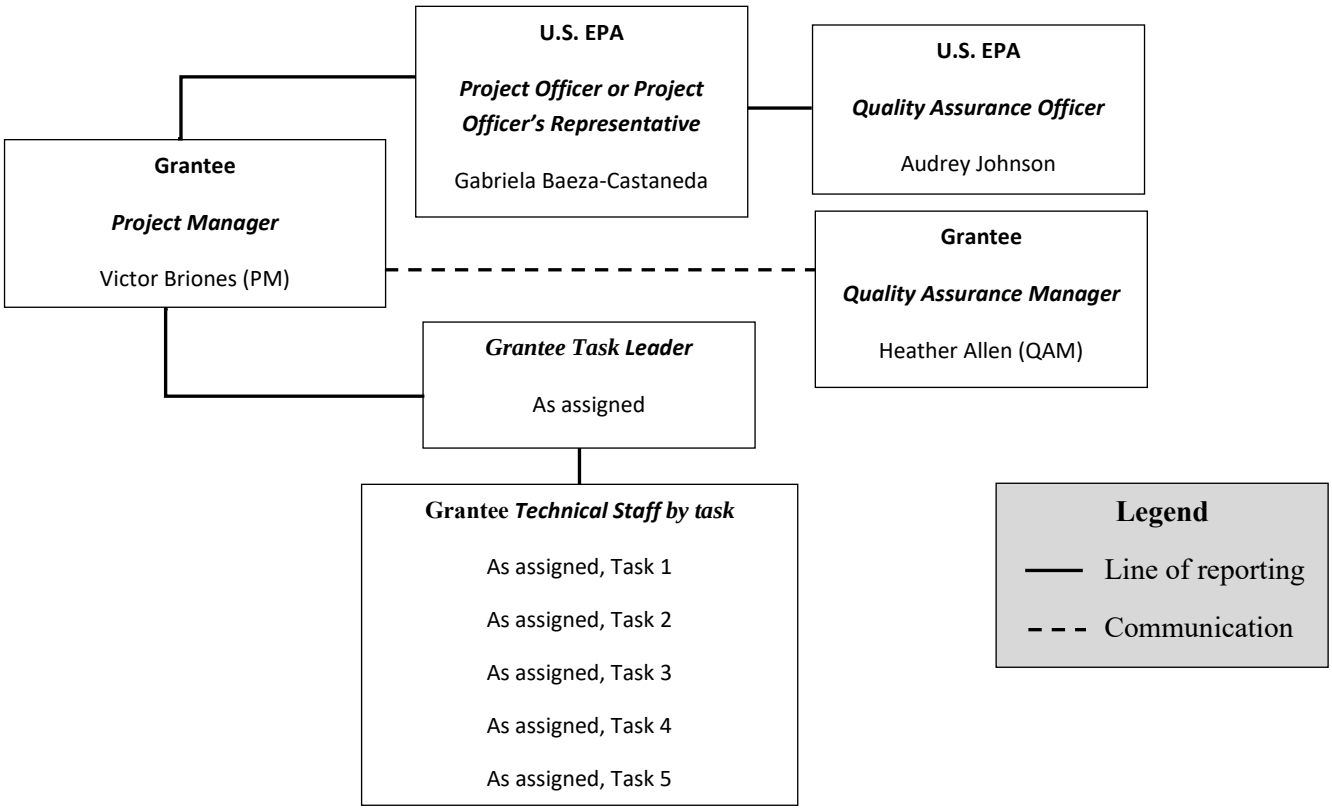
Project-level management system. Tasks are expected to proceed concurrently, in parallel. The PM will maintain close communications with each TL and ensure any difficulties encountered or proposed changes at the task level are reviewed for implications on other similar or related tasks. The PM is also responsible for communicating progress or difficulties encountered (across all tasks) to the EPA PO or POR, who provides the EPA's primary oversight function for this project at EPA OAR/ EPA region 9 and is responsible for review and approval of this QAPP and any future revisions. The PM (with support from TLs and assigned COVS technical staff) will be responsible for consulting with the EPA PO or POR, on planning, scheduling, and implementing the QA/QC for all project deliverables and obtaining required EPA approvals.

The QA Manager, Heather Allen, is responsible for overseeing the quality system, monitoring, and facilitating QA activities on tasks, and generally helping the COVS PM and TLs understand and comply with EPA QA requirements. She will not be involved in data collection or analyses. Data collection or analyses will be performed by the hired consultant with assistance from COVS staff (excluding Heather Allen).. At the request of the COVS PM, Ms. Heather Allen is responsible for

conducting periodic independent audits of this project's QA program, Ms. Heather Allen will produce written documentation of the audit results and recommendations.

In addition, QC functions will be carried out by other technical staff and will be carefully monitored by the PM, who will work with the QA Manager to oversee this plan and implement quality improvements. For work done under this project, technical staff may include persons with expertise in the local residential, commercial, and industrial activities. Technical staff may also include persons with expertise in air pollution engineering, technical reviewers, database specialists, quality auditors, and technical editors. The PM will ensure that technical staff do not review work in a QA capacity for which they were a primary or contributing author. **Exhibit 1** presents the organizational chart for the project.

Exhibit 1. Project Organization[3]



1.5. Problem Definition / Background

Under this project, the COVS will identify, evaluate, and utilize existing data resources[4] to develop a local inventory of the major sources of greenhouse gas (GHG) emissions within the Oxnard-Thousand Oaks-Ventura MSA and use that inventory data to develop a regional climate action plan. This QAPP focuses on the handling of environmental information under sector-specific tasks by technical staff charged with completing the following subtasks in a future planning project implemented in accordance with this QAPP:

[3] Under the EPA's QAPP standard (CIO 2105-S-02.0, section 3) the organization chart must also identify any contractor relationships relevant to environmental data operations.

[4] EPA, *Environmental Information Quality Policy*, CIO 2105.3, 03/07/2023 (p. 8) provides common examples of environmental information used to support the EPA's mission at https://www.epa.gov/system/files/documents/2023-04/environmental_information_quality_policy.pdf.

1. Develop a comprehensive GHG inventory for the largest sources within each sector,
2. Develop options for reducing emissions within each sector,
3. Develop estimates or ranges of estimates for reductions achievable under each option,
4. Develop uncertainty analyses for each option's emissions reduction estimate, and
5. Present these analyses and options in technical reports consistent with the deliverables required under the CPRG planning grants.

The COVS may decide to use their own independent tool or a consultant's tool for the GHG inventory or may utilize the EPA's Local – GHG Inventory Tool (LGGIT),[5] facility-specific GHG data published by the EPA in the Facility Level Information on Greenhouse gases Tool (FLIGHT),[6] data reported to the EPA's Greenhouse Gas Reporting Program (GHGRP),[7] EPA's National Emissions Inventory (NEI),[8] DOE's State and Local Planning for Energy (SLOPE) Platform,[9] the Global Protocol for Community-Scale (GPC) Greenhouse Gas Inventories,[10] the Local Government Operations (LGO) Protocol,[11] and/or 3rd party data or tools (such as those developed by consultants), together with any independent, sector-specific estimates prepared by COVS's hired consultant. If COVS uses a consultant tool, it will us all the data sets listed above and abide by a process to match the outputs of the LGGIT. The FLIGHT and GHGRP datasets can be downloaded and filtered by state, city, county, and/or zip code. Any independent local or MSA estimates or ratios (e.g., electricity usage per customer-by-customer class) will be compared to corresponding federal, state, or local estimates for validation, as available. Significant differences between primary estimates and validation estimates will be evaluated and discussed in the inventory report with the underlying data and methodologies used for the estimates. As applicable, the local inventory will include the following sources and gases (divided into the Residential, Commercial/Institutional, Industrial, and Energy Generation sectors):

LGGIT Source Categories	***Greenhouse Gases (across all sectors)***
1. Mobile Combustion 2. Stationary Combustion 3. Electricity Consumption 4. Solid Waste 5. Urban Forestry 6. Agriculture & Land Management 7. Water Use 8. Waste Generation 9. Wastewater Treatment	carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases (F-gases) including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)

The EPA LGGIT has two modules: the Local Government Operations Module is specific to municipal governments and evaluating GHG emissions by their departments, and the Community Module, which could also include local government information. The LGGIT User Guides state the two modules are companion tools, and any totals estimated in the Government Operations Module can be included in the Community Module. For example, a county could use the Community Module and

[5] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool
[6] Facility Level Information on Greenhouse gases Tool (FLIGHT) at https://ghgdata.epa.gov/
[7] https://www.epa.gov/ghgreporting/data-sets
[8] https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-ne
[9] https://www.energy.gov/scep/slsc/state-and-local-planning-energy-slope-platform
[10] https://ghgprotocol.org/ghg-protocol-cities
[11] https://ww2.arb.ca.gov/sites/default/files/classic/cc/protocols/lgo_protocol_v1_1_2010-05-03.pdf

incorporate data from the Government Operations Modules completed by the cities within the county. Grantees using both modules should conduct a quality check to ensure that emissions do not get double-counted. This template is based on the Community Module.

1.5.1. Rationale for Selection of Sectors

For each sector included in the local inventory, **Table 1.2** briefly describes why the sector was included in the inventory and the relative significance of the sector in terms of the magnitude of air emissions from existing inventories, the associated geographic distribution of the sources, and recent trends in readily available activity data for the source category.

Table 1.2 Rationale for Sector Selection

Sectors Included in Inventory	**Rationale for Including in GHG Inventory**
Transportation	Transportation activities were the largest source (29 percent) of total U.S. greenhouse gas emissions in 2021. From 1990 to 2021, transportation CO_2 emissions from fossil fuel combustion increased by 19 percent. Transportation activities occur in all communities.
Electricity consumption	The electric power sector accounted for 25 percent of total U.S. greenhouse gas emissions in 2021. Power generation and/or consumption occurs among all communities.
Urban forestry[12] (if applicable)	This sector includes fluxes of carbon from activities such as converting forests to agricultural use and practices that remove CO_2 from the atmosphere and store it in long-term carbon sinks like forests. In 2021, the net CO_2 removed from the atmosphere by natural and working lands was 12% of total U.S. greenhouse gas emissions. Between 1990 and 2021, total carbon sequestration in this sector decreased by 14%, primarily due to a decrease in the rate of net carbon accumulation in forests, as well as an increase in CO_2 emissions from urbanization.
Agriculture & land management	Agriculture accounted for about 10 percent of U.S. greenhouse gas emissions in 2021, and agricultural soil management was the largest source of N_2O emissions. Enteric fermentation was the largest source of CH_4 emissions.
Stationary sources (including for commercial and residential heating)	In 2021, the commercial and residential sectors accounted for 7 and 6 percent of total U.S. greenhouse gas emissions, respectively. Emissions from the commercial and residential sectors have increased since 1990. Total residential and commercial greenhouse gas emissions, including direct and indirect emissions, in 2021 have increased by 2% since 1990. In 2021, an increase in heating degree days (0.5 percent) increased energy demand for heating in the residential and commercial sectors, however, a 1.8 percent decrease in cooling degree days compared to 2020 reduced demand for air conditioning in the residential and commercial sectors.
Solid waste and waste	This sector includes landfills, composting, and anaerobic digestion. Landfills were

[12] Under international GHG inventory protocols this category is called “Land use, land-use change, and forestry.”

generation	the third largest source of anthropogenic methane emissions in 2021, and landfills accounted for 1.9 percent of total U.S. greenhouse gas emissions.
Wastewater treatment	Wastewater treatment, both domestic and industrial, was the third largest anthropogenic source of N_2O emissions in 2021, accounting for 5.2 percent of national N_2O emissions and 0.3 percent of total U.S. greenhouse gas emissions. Emissions from wastewater treatment increased by 6.1 MMT CO_2e (41.6 percent) since 1990 as a result of growing U.S. population and protein consumption.
Water	This sector includes indirect emissions associated with the electricity used to deliver water to local communities.

1.5.2. Decisions to be Made

The EPA's recommended tool for local GHG inventories (the LGGIT) covers categories of GHG emissions by source category (e.g., mobile combustion, stationary combustion, electricity consumption, solid waste, etc.). The LGGIT provides many default values to facilitate developing local estimates using methods consistent with the Global Protocol for Community-Scale GHG Emissions.[13] There are four primary decisions to be made under each task of this project for each source category, and each Task Leader will be charged with the following decisions:

1. Determine (for each major activity) if the LGGIT estimate, a different federal estimate or tool, or a non-federal estimate should be used for the local GHG baseline estimate.
2. Determine the best options for reducing emissions of air pollution and achieving the following Congressional objectives under the Inflation Reduction Act:
    a. Reduce climate pollution while supporting creation of good jobs and lowering energy costs for families.
    b. Accelerate work addressing environmental injustice and empowering community driven solutions in overburdened neighborhoods.
    c. Deliver cleaner air by reducing harmful air pollution in places where people live, work, play, and go to school.
3. Develop an estimate or a range of estimates for reductions achievable under each option.
4. Estimate the uncertainty of the emissions reduction estimate(s) or ranges under each option.

1.5.3. Actions to be Taken, Action Limits, and Expected Outcomes

Initially, local estimates will be derived using the LGGIT tool or another local independent tool for each source category. Subsequently, the community may elect to supplement estimates derived using either tool with estimates for each source category from existing local inventories, existing local activity data, or from other EPA or state resources. Calculated estimates derived from local activity data will be compared to federal datasets and/or downscaled state estimates for validation. The rationale for including any emissions estimates that show significant discrepancies from state or federal estimates will be documented in the community's GHG inventory report along with the underlying data and calculation methodology.

When identifying the best options for reducing air pollution, each TL will consider the activities affecting the largest numbers of families, business establishments, recreation areas, and schools. Options may include potential reductions in task-level activities impacting nonattainment areas and impacting residential, commercial, and school districts near the largest sources of air pollution. The COVS expects

[13] https://ghgprotocol.org/sites/default/files/standards/GPC_Full_MASTER_RW_v7.pdf

that each task will produce up to 5 options for sector-specific emissions reduction projects for further consideration by management and policymakers.

1.5.4. Reason for Project

The baseline GHG inventory and options analyses developed under this local community project will be utilized by the COVS and the Ventura County Air Pollution Control District (VCAPCD), and may be utilized by the other municipalities within Ventura County for planning purposes to support the Oxnard-Thousand Oaks-Ventura MSA's development of the following three CPRG planning deliverables:

- Oxnard-Thousand Oaks-Ventura MSA's **Priority Climate Action Plan** (PCAP), which is due March 1, 2024. This plan will include near-term, implementation-ready, priority GHG reduction measures and is a prerequisite for any implementation grant.
- Oxnard-Thousand Oaks-Ventura MSA's **Comprehensive Climate Action Plan** (CCAP), which is due in 2025. This plan will review all sectors that are significant GHG sources or sinks and include both near- and long-term GHG emission reduction goals and strategies.
- Oxnard-Thousand Oaks-Ventura MSA's **Status Report** on progress towards goal, which is due in 2027. This progress report will include updated analyses, plans, and next steps for key metrics.

This QAPP describes in detail the necessary QA and QC requirements and technical activities that will be implemented to ensure the baseline GHG inventory and the sector-specific emissions reduction options are reliable for the PCAP and CCAP. As necessary, revisions to the QA and QC requirements defined in this QAPP will be updated in the 2027 Status Report.

1.5.5. Relevant Clean Air Act Mandates and Authorizations

The inventory produced under this project will support the deliverables required under EPA's Climate Pollution Reduction Planning Grants. The inventory will be used to evaluate opportunities for reducing GHG emissions from all major-emitting sources including both mobile source categories and stationary source categories. This project will include the fundamental research necessary to evaluate and plan new programs (and amendments to existing Clean Air Act [CAA] programs) for reducing emissions from fossil fuel combustion activities. Many activities in the GHG inventory (and subsequent emissions reductions options analyses) include major sources of criteria and toxic pollutants. Accordingly, the purpose of this project (to evaluate and plan for reductions in GHG emissions, including reductions from usage or production of fossil fuels) is also consistent with the following statutory mandates and authorizations under Clean Air Act Title I:

- ***§ 7403. Research, investigation, training, and other activities***
  (a) Research and development program for prevention and control of air pollution
  The Administrator shall establish a national research and development program for the prevention and control of air pollution ….
  (1) conduct, and promote the coordination and acceleration of, research, investigations … and studies related to the causes … extent, prevention, and control of air pollution;
  (2) encourage, cooperate with, and render technical services and provide financial assistance to air pollution control agencies and other appropriate public or private agencies, institutions, and organizations, and individuals in the conduct of such activities ….
  (b) Authorized activities of Administrator in establishing research and development program
  In carrying out the provisions of [paragraph (a)] the Administrator is authorized to–

(1) collect and make available, through publications and other appropriate means, the results of and other information, including appropriate recommendations by him in connection therewith, pertaining to such research and other activities;….
(2) make grants to air pollution control agencies … for purposes … in subsection (a)(1) ….

- ***§ 7404. Research related to fuels and vehicles***
  (a) Research programs; grants; ….
  The Administrator shall give special emphasis to research and development into new and improved methods, having industry-wide application, for the prevention and control of air pollution and control of air pollution resulting from the combustion of fuels… he shall–
  (1) conduct and accelerate research programs directed toward development of improved , cost-effective techniques for–
  (A) control of combustion byproducts of fuels, ….
  (B) improving efficiency of fuels combustion so as to decrease atmospheric emissions ….

- ***§ 7405. Grants for support of air pollution planning and control programs***
  (a) Amounts; limitations; assurances of plan development capability.
  (1)(A) The Administrator may make grants to air pollution control agencies … in an amount up to three-fifths of the cost of implementing programs for the prevention and control of air pollution …. For the purpose of this section, "implementing" means any activity related to the planning, developing, establishing, carrying out, improving, or maintaining of such programs….
  (C) With respect to any air quality control region or portion thereof for which there is an applicable implementation plan under section 7410 … grants under subparagraph (A) may be made only to air pollution control agencies which have substantial responsibilities for carrying out such applicable implementation plan.

1.5.6. Information Provided by the EPA under § 7403(b)(1)

Under authority of CAA § 7403(b)(1) the EPA has provided the following resources to ensure reliable air emissions inventories are produced to support plans for reducing emissions.

- Agency-wide Quality Program Documents
- Quality Assurance-specific Directives
  - CIO 2105.3 – Environmental Information Quality Policy, April 10, 2023
  - CIO 2105-P-01.3 – Environmental Information Quality Procedure, March 7, 2023
  - CIO 2105-S-02.0 – EPA's Environmental Information QA Project Plan (QAPP) Standard
  - EPA Regional Sites for Quality Management Plans and Guidance:
    - Region 1
    - Region 2
    - Region 3
    - Region 4
    - Region 5
    - Region 6
    - Region 7
    - Region 8
    - Region 9
    - Region 10
- QA Guidance
  - EPA QA/G-4 – *Guidance on Systematic Planning Using Data Quality Objectives Process*
  - EPA QA/G-5 – *Guidance for Quality Assurance Project Plans*

COVS will utilize these resources, as applicable, to ensure evaluation of existing data and utilization of those data are consistent with the EPA's relevant directives and guidance.

1.6. Project / Task Description

An example schedule of deliverables for the technical tasks (Tasks 1-5) for GHG inventory QAPPs is presented in **Tables 2.1** through **2.5.** The work to be performed under this project involves preparing a local GHG emissions inventory for the Oxnard-Thousand Oaks-Ventura MSA. The organization of the work is based on the use of the EPA's Local – GHG Inventory Tool (LGGIT)[14] under the following sector-specific tasks:

Task 1: Local inventory of transportation GHG emissions.

Task 2: Local inventory of electric power consumption (indirect) GHG emissions.

Task 3: Local inventory of solid waste GHG emissions.

Task 4: Local inventory of GHG emissions from other sectors may include.

- 4.1 Stationary sources
- 4.2 Agriculture and land management
- 4.4 Waste generation
- 4.5 Water
- 4.6 Wastewater treatment

Task 5: Local inventory of urban forestry resources.

For each sector-specific task, **Tables 2.1–2.5** provide planned activities and a schedule of deliverables for use by communities preparing GHG inventories. The EPA's LGGIT, other resources, and answers to frequently asked questions are also located on the Local GHG Inventory Tool Page Greenhouse Gas Data and Resources webpage.[15] The LGGIT User's Guides provide a summary of required data inputs for each module (Table 1 of each LGGIT User's Guide) for consultant team to utilize if necessary.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	**Schedule**
Task 1. Mobile Combustion (Transportation)	
1. The PM or TL will assign consultant staff to use their local GHG inventory tool and/or download the EPA's Local – GHG Inventory Tool (LGGIT) at https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool and use either tool to estimate emissions from mobile combustion (transportation) sources. COVS will select the tool that has a more accurate representation of GHG emissions in California and more specifically, the geographic area of the Oxnard-Thousand Oaks-Ventura MSA. If the consultant tool is used, staff will default to the consultant's instruction and QC protocol. 2. If utilizing LGGIT, staff will read the [Introduction] worksheet and the [Read Me] worksheet to become familiar with the organization of the tool and the tool's terminology. Staff will become familiar with Rows 42 through 59 of the [Read Me] sheet that reflect a brief summary of the steps necessary to complete the calculations	Within 60 days of QAPP approval by EPA.

[14] https://www.epa.gov/statelocalenergy/local-greenhouse-gas-inventory-tool .
[15] Ibid.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
for each sector. Additionally, staff can reference the LGGIT User's Guide for the Community Module that is included within the downloaded zip file. 3. Staff will complete the four (4) initial setup steps on the [Control Sheet]. 4. Staff will review Chapter 7 - Transportation in the GPC GHG Emissions Inventories, and/or Chapter 7 - Vehicle Fleet in the LGO Protocol. Staff will obtain from a state or local motor vehicle agency, the most recent listing of vehicles registered at addresses located in the local community or MSA including (as available) year-manufactured, make, model, body style, fuel, and description. 5. In the LGGIT: Community Module [community_ghg_inventorytool.xlsm], staff will use the [Mobile-Entry] sheet to load the community's or MSA's population of fossil-fueled motor vehicles. Staff will prepare an aggregated listing (i.e., listing of sets of vehicles with counts by vehicle type, model, year, and fuel) for all of registered vehicles and an estimate of the average fuel consumed for each set of similar vehicles. 6. The PM, TL, or QAM will assign a staff member who did not support steps 1-5 of this task to complete a QC review. Staff will independently review the original source data for all inputs and supporting calculations used to populate the [Mobile-Detail Calcs] sheet. Staff will also complete an independent review of all inputs to the LGGIT and complete independent calculations for at least 2 types of vehicles (as directed by the PM or TL) on the [Mobile-Detail Calcs] sheet. The assigned QC staff member will also be directed to compare the LGGIT-based estimate to the estimate published in the EPA's National Emissions Inventory (NEI) and available using the *Data Queries* tool at https://www.epa.gov/air-emissions-inventories/2020-nei-supporting-data-and-summaries. This NEI query tool provides national, state, county, and tribal emissions estimates for mobile sources. 7. In the GHG inventory report or in a separate report based on the GHG inventory, the COVS will include a listing of options for emissions reductions from this sector that may include one or more of the following components or other components (that are not listed below) that assigned staff may identify during preparation of the inventory in the future during implementation of this task: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an	.

Table 2.1 Technical Task Descriptions for Task 1.

Tasks and Deliverables	Schedule
Task 1. Mobile Combustion (Transportation)	
associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity to major transportation corridors.	

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
1. The PM or TL will assign consultant staff to use their local GHG inventory tool and/or EPA's LGGIT tool [community_ghg_inventorytool.xlsm]. COVS will select the tool that has a more accurate representation of GHG emissions in California and more specifically, the geographic area of the Oxnard-Thousand Oaks-Ventura MSA. If the consultant tool is used, staff will default to the consultant's instruction and QC protocol. If LGGIT tool is used, the assigned staff will verify that the four (4) initial steps required on the [Control Sheet] have been completed. 2. Staff will review Chapter 6.5 - Calculating Emissions from Grid-Supplied Energy Consumption in the GPC GHG Emissions Inventories, and/or Chapter 6.2 - Electricity Use in the LGO Protocol. 3. Staff will obtain total electricity consumption data for the community or MSA from one or more of the following local, state, or federal resources to be used for the baseline estimate or QC validation of the baseline estimate: a. Summaries of metered consumption obtained from the local electric utilities that serve the community or MSA by customer class. b. EIA Form 861 data published by the DOE and available at https://www.eia.gov/electricity/data/eia861/. c. The State and Local Planning for Energy (SLOPE) model datasets available at https://maps.nrel.gov/slope/about. Note these data are published as electricity usage in the units of MMBtu/year for the entire county. Estimates are provided for residential, commercial, and institutional customer classes. These data will be converted to kilowatt-hours per year prior to entry into the LGGIT tool. The projections available in this tool (for future years) may also be used for estimating emissions reductions associated with options listed for the electric utility sector. 4. Staff will use the [Electricity-Entry] sheet of the EPA's LGGIT tool. Staff will read the	Within 60 days of QAPP approval by EPA.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	**Schedule**
Task 2. Electric Power Consumption	

explanation of the *Data Entry & Calculations* starting in cell A3. Staff will enter the data for each chosen entity. These entities may be of any scale as chosen by the grantee (e.g., the entire community by sector; individual building, such as a commercial or institutional facility; or a set of similar facilities (e.g., a group of similar residential units). For groups of similar units, when entering the *Unit Description* in cell C10 of the [Electricity-Entry] sheet, staff will include in the description the number of units that were included when the *electricity purchased (kWh)* value was summed or otherwise calculated for entry into cell C16. Staff will document in the inventory each calculation with associated units of measure for each record added on the [Electricity-Entry] sheet in a manner similar to the following example:

A	B	C		D
Count of Units in Set	**Set Description**	**Avg. Annual kWh Used (per Unit)**		**Annual Usage (All Units)**
1000	Single-family home	750 kWh	=	750,000 kWh
		(Single-family home) (1 Year)		Year

Staff will document the source of the MW-hr usage per customer entered in column C.

5. Staff will determine if EIA Form 861 at https://www.eia.gov/electricity/data/eia861/ includes one of the following types of data that may be useful for estimating or validating the usage per customer entered in column C of step 2:

    a. The community's or MSA's total electricity usage. (See ***Attachment 1*** for some of the service territories included under EIA Form 861),

    b. The service territory or territories that include the community or MSA. (See the EIA Form 861 file entitled [Service_Territory_2020.xlsx] for a listing of the utilities that serve each county in the United States,

    c. A service territory adjacent to the community or MSA with similar usage patterns that may be comparable to the community's or MSA's estimate, or

    d. Make a determination that there are no data under EIA Form 861 that are relevant to estimating or validating local usage per customer in column C of step 2.

6. If the community locates EIA 861 electricity data relevant to estimating or validating local usage, staff will include in the inventory the following values from EIA Form 861 to reflect electricity usage per customer most similar to local usage:

EIA 861 Column Name	**EIA Form 861 Value**
Year of Data	
Utility Name	
Utility Number	

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	**Schedule**
Task 2. Electric Power Consumption	

State	
BA Code	
Residential Sales (MW-hrs)	
Residential Customers	
Commercial Sales (MW-hrs)	
Commercial Customers	
Industrial Sales (MW-hrs)	
Industrial Customers	
Transportation Sales (MW-hrs)	
Transportation Customers	

7. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components:
    a. The specific source categories and activities affected by the proposed option.
    b. Quantity of GHG emissions reduced by the options with an associated uncertainty estimate.
    c. Quantity of criteria emissions reduced by the options with an associated uncertainty estimate.
    d. Quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate.
    e. Number of people living in any nonattainment areas where option would reduce emissions (regardless of pollutant triggering nonattainment).
    f. Description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.

Table 2.3 Technical Task Descriptions for Task 3.

Tasks and Deliverables	Schedule
Task 3. Solid Waste (Landfills)	
1. The PM or TL will assign consultant technical staff to develop estimates for this source using their local GHG inventory tool or the LGGIT's [Solid Waste_Control] and [Solid Waste-Entry] worksheets. (The [Solid Waste-Entry] worksheet only provides locations to enter data after the [Solid Waste-Control] worksheet is populated.) COVS will select the tool that has a more accurate representation of GHG emissions in California and more specifically, the geographic area of the Oxnard-Thousand Oaks-Ventura MSA. If the consultant tool is used, staff will default to the consultant's instruction and QC protocol. 2. If the LGGIT tool is being utilized, staff will review Chapter 8 - Waste in the GPC GHG Emissions Inventories, and/or Chapter 9 - Solid Waste Facilities in the LGO Protocol. 3. On the LGGIT's [Solid Waste_Control] worksheet, staff will enter the total number of landfills in the community, the landfill name, whether or not the landfill has a landfill gas (LFG) collection system, and if the LFG collection system is partial or comprehensive (definitions are provided). 4. On the [Solid Waste_Entry] sheet, staff will enter the following data per landfill type: a. For landfills without a LFG collection system, staff will obtain and enter the annual quantities of waste deposited into the landfill for the life of the landfill, and the opening and closing years of the landfill. The instructions then provide the option to click on a link that takes you to the LGO Protocol Landfill Emissions Tool, where this data is entered. b. For landfills with a comprehensive LFG collection system, staff will obtain and enter the annual amount of landfill gas collected. c. For landfills with a partial LFG collection system, staff will obtain and enter the annual amount of landfill gas collected and the ratio of uncollected surface area over the collected surface area. 5. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would	Within 60 days of QAPP approval by EPA.

Table 2.2 Technical Task Descriptions for Task 2.

Tasks and Deliverables	Schedule
Task 2. Electric Power Consumption	
reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
1. The PM or TL will assign the primary technical staff member(s) to use the EPA's LGGIT tool or the consultant's local tool. COVS will select the tool that has a more accurate representation of GHG emissions in California and more specifically, the geographic area of the Oxnard-Thousand Oaks-Ventura MSA. If the consultant tool is used, staff will default to the consultant's instruction and QC protocol. If using LGGIT, staff will use the following worksheets to develop the primary estimates for other sectors.	Within 60 days of QAPP approval by EPA.

Other Sources	LGGIT Worksheet(s)
Stationary combustion	[Stationary-Entry] [Stationary-Data] [Stationary-Calcs]
Agriculture & land management	[Agriculture & Land Management]
Water	[Water]
Wastewater treatment	[Wastewater-Control] [Wastewater-Entry] [Wastewater-Calcs]
Waste generation (disposal external to community's geopolitical boundary)	[Waste Production]

2. After the primary calculations are complete, the PM, TL or QAM will assign a QC staff member to complete the following steps:
   a. Review the original source(s) of data for all inputs to the tool.
   b. Validate that values from original source(s) were correctly entered into the primary tool.
   c. Populate a blank version of the tool with the inputs in a QC version.

Table 2.4 Technical Task Descriptions for Task 4.

Tasks and Deliverables	Schedule
Task 4. Inventory of GHG Emissions for Other Sources	
d. Compare the outputs of the primary version of the tool versus the QC version of the tool. e. Compare source listing to previous inventories published by community or by neighboring or similar communities to determine if any major sources of GHGs were omitted from the inventory. f. Document findings and submit findings to the PM, TL and QAM for resolution. g. Document steps taken to resolve any findings. 3. In the GHG inventory report or in a separate report based on the GHG inventory, include a listing of options for emissions reductions from this sector that includes the following components: a. The specific source categories and activities affected by the proposed option. b. The quantity of GHG emissions reduced by the options with an associated uncertainty estimate. c. The quantity of criteria emissions reduced by the options with an associated uncertainty estimate. d. The quantity of toxic air pollutant emissions (as defined under applicable local, state or federal rules for air toxics) reduced by the option with an associated uncertainty estimate. e. The number of people living in any nonattainment areas where the option would reduce emissions (regardless of the specific pollutant triggering nonattainment). f. A description of any benefits that the option will impart to communities with known environmental injustice issues such as close proximity of the community to an affected source under the option that emits toxic air pollutants.	

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
1. The PM or TL will assign technical staff to develop estimates for this sector using the LGGIT's [Urban_Forestry] worksheet or the consultants local GHG inventory tool. COVS will select the tool that has a more accurate representation of GHG emissions in California and more specifically, the geographic area of the Oxnard-Thousand Oaks-Ventura MSA. If the consultant tool is used, staff will default to the consultant's instruction and QC protocol. 2. In order to estimate the areas of land with similar percentages of tree cover, staff will use	Within 60 days of QAPP approval by EPA.

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	

a web-based mapping application to develop a listing of tree-covered tracts of land (i.e., polygons) with the following attributes:

a. Identifier describing area (e.g., Area 1 between Crooked Creek and boundary).
b. Sector (residential, commercial/institutional, industrial, energy generation)
c. Total area in square kilometers (km^2).
d. Percentage of area with tree cover based on local estimate.

3. For each sector, staff will calculate weighted percentage tree cover using **Equation 1.**

Equation 1 for weighted percentage of tree cover for a sector:

$$\frac{\sum_{i=1}^{i=30}(km^2\ of\ area\ i)(\%\ tree\ cover\ of\ area\ i)}{\sum_{i=1}^{i=30}(km^2\ i)}$$

Where:

i = 1 to 30	Designates 30 tree covered areas in a sector on local lands.
km^2 of area i	The measured area (in square kilometers) of area *i.*
% tree cover of area i	The estimated percentage of tree cover for area *i*.
$\sum_{i=1}^{i=30}(km^2\ i)$	The denominator is the total combined area of all 30 areas within the sector.

4. For each sector on the LGGIT's [Urban Forestry] worksheet staff will enter total area for the sector in column C rows 11 through 14 and enter weighted % tree cover in Column D.
5. For the two sectors with the largest areas of tree cover, the QAM will assign a QC staff member who did not support steps 1 through 4, to develop independent estimates and to complete the following QC steps:

a. Review the original source(s) of data for all inputs to the primary tool.
b. Validate correct entry of values from original source(s) into the primary tool.
c. Populate a blank version of the tool with the inputs in a QC version.
d. Compare the primary outputs of the tool versus the QC version of the tool.
e. Compare the listing of resources by sector to previous inventories published by the locality or by neighboring or similar localities to identify any major discrepancies.
f. Document findings and submit findings to the PM, TL, and QAM for resolution.
g. Document steps taken to resolve any findings.

6. In the inventory report or in a separate report based on the inventory, include a listing of options for emissions reductions from this sector that includes the following components:

a. Specific source categories and activities affected by the proposed option.
b. Quantity of GHG emissions reduced by option with uncertainty estimate.
c. Quantity of criteria emissions reduced or mitigated (such as by adsorption of

Table 2.5 Technical Task Descriptions for Task 5.

Tasks and Deliverables	Schedule
Task 5. Urban Forestry (Natural Working Lands and Forestry)	
PM2.5 on leaf surfaces) by the option with an associated uncertainty estimate. d. The number of people living in any nonattainment areas where the option would reduce emissions or improve air quality conditions by providing shade to urban heat islands (regardless of the specific pollutant triggering nonattainment). e. A description of any benefits that the option will impart to communities with known environmental injustice issues such as providing windbreaks to communities in close proximity to sources of nuisance dust (e.g., dirt roads used for mining operations). f. The number of schools, miles of roadways, or public traffic counts at major commuting destinations that would be positively affected by options that include planting of trees or other vegetation.	

1.7. Quality Objectives / Criteria

The primary objectives for this project are to develop reliable inventories for each of the GHG-emitting sectors in the Oxnard-Thousand Oaks-Ventura MSA and to identify options for reducing emissions from those sectors. Accordingly, all quality objectives and criteria are aligned with these objectives. The quality system used for this project is the joint responsibility of the COVS PM, Task Leaders, and QA Manager. As discussed in section 1.4, an organizationally independent QA Manager will maintain oversight of all required measures in this QAPP. QC functions will be carried out by technical staff and will be carefully monitored by the responsible Task Leaders, who will work with the QA Manager to identify and implement quality improvements. All activities under this project will conform to this QAPP.

1.7.1. Data Quality, Management, and Analyses

For this project, the COVS will use a variety of QC techniques and criteria to ensure the quality of data and analyses. Data of known and documented quality are essential components for the success of the project, as these data will be used to inform the decision-making process for the PCAP and CCAP as discussed in Section 1.5.4. The table in **Appendix A** lists by task the specific QC techniques and criteria that are part of this QAPP.

The data quality objectives and criteria for this project are accuracy, precision, bias, completeness, representativeness, and comparability. *Accuracy* is a measure of the overall agreement of a measurement to a known value. It includes a combination of random error (precision) and systematic error (bias). *Precision* is a measure of how reproducible a measurement is or how close a calculated estimate is to the actual value. *Bias* is a systematic error in the method of measurement or calculation. If the calculated value is consistently high or consistently low, the value is said to be biased. Our goal is to ensure that information and data generated and collected are as accurate, precise, and unbiased as possible within project constraints. It is not anticipated that this project will include primary data collection. Generally, existing data and tools provided by the EPA and other qualified sources will be used for project tasks. A subject matter specialist familiar with technical reporting standards (such as a permit writer or compliance engineer with knowledge of the community's facilities operating in the sector) will be used to QA all data utilized for developing the local GHG inventory. The COVS will verify the accuracy of all

data by checking for logical consistency among datasets. All existing environmental data shall meet the applicable criteria defined in CFR and associated guidance, such as the validation templates provided in the *EPA QA Handbook Volume II*.

Uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific project activity being evaluated.

When available, data originally gathered using published methods whose applicability, sensitivity, accuracy, and precision have been fully assessed, such as EPA reference methods, will be preferred and considered to be of acceptable quality. Project decisions may be adversely impacted if, for example, existing data were used in a manner inconsistent with the originator's purpose. Metadata can be described as the amount and quality of information known about one or more facets of the data or a dataset. It can be used to summarize basic information about the data (e.g., how, why, and when the existing data were collected), which can make working with specific data or datasets easier and provides the user with more confidence. Metadata are valuable when evaluating existing data, as well as when planning for collection primary data that may be required in the future. However, the effort needed to locate and obtain original source materials can be costly. Accordingly, a graded approach to planning will be applied and ongoing discussions with the EPA will be held to determine what magnitude and rigor of QA effort are appropriate and affordable for the project.

For the data analysis completed under this project, analytical methods will be reviewed to ensure the approach is appropriate and calculations are accurate. Spreadsheets will be used to store data and complete necessary analyses. Design of spreadsheets will be configured for the intended use. All data and methodologies specific to each analysis will be defined and documented. Tables and fields will be clearly and unambiguously named. Spreadsheets will be checked to ensure algorithms call data correctly and units of measure are internally consistent. Hand-entered or electronically transferred data will be checked to ensure the data are accurately transcribed and transferred.

The draft inventory will be evaluated for GHG-emitting-sector and geographic completeness. The COVS will utilize the framework of sectors in the EPA's LGGIT tool, previous local inventories, or previous inventories completed by similar communities to ensure that the inventory prepared under this project includes all major GHG-emitting sectors. To ensure the inventory is geographically complete, the draft inventory will also be submitted for review by COVS staff within the community who are familiar with all activities subject to local or federal standards issued under Title I of the CAA to ensure that all major-emitting, local activities are included in the inventory.

Representativeness is a qualitative term that expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. The COVS will use the most complete and accurate information available to compile representative data for the community's GHG-emitting activities.

Data comparability is a qualitative term that expresses the measure of confidence that one dataset can be compared to another and can be combined for the decision(s) to be made. The COVS will compare datasets when available from different sources to check for the quality of the data. This QA step will also ensure that any highly correlated datasets or indicators are identified. Supporting data, such as

information on reference methods used and complete test reports, are important to ensure the comparability of emissions data.

1.7.2. Document Preparation

All documents produced under this project will undergo internal QC review, as well as technical review and an editorial review, prior to submission to the EPA PO. QC will be performed by an engineer, scientist, or economist, as appropriate, with sufficient knowledge. The technical reviewer will review the document for accuracy and integrity of the technical methodologies, analyses, and conclusions.

An editorial review of all final documents will be performed. Editors will verify clarity, spelling, and grammatical correctness, and ensure documents are free of typographical errors. Editors will verify that references are cited correctly. This will include a comparison against the original documents.

The *QC Documentation Form* (**Appendix B**) will be used to track the approval process. The form must be completed and signed for all document deliverables. The signatures required include those of the TL and technical and editorial reviewers. Completion of this form certifies that technical review, editorial review, and all required QC procedures have been completed to the satisfaction of the TL and QAM. Copies of these signed forms will be maintained in the project files.

1.8. Special Training / Certifications

All COVS staff assigned to work on this project shall have appropriate technical and QA training to properly perform their assignments. COVS staff serving in the QAM role under this project will have completed a training course on QA/QC activities similar to the course available at https://www.epa.gov/quality/training-courses-quality-assurance-and-quality-control-activities. The PM and all TLs under this project will have completed an online training course on air emissions inventories on the Air Knowledge website at https://airknowledge.gov/EMIS-SI.html.

No additional technical training is required unless otherwise specified.

If training is required for new staff or for particular segments of the GHG inventory, the PM in coordination with the associated TL will identify available training resources for the inventory segment and incorporate the required training into the project schedule.

1.9. Documents and Records

The COVS will document in electronic form (and/or hard copy) QC activities for this project. The TL is responsible for ensuring that copies of all completed QC forms, along with other QA records (including this QAPP), will be maintained in the project files. Project files will be retained by the COVS for 5 years after the completion of the completion of the PCAP. The types of documentation that will be prepared for this project include:

- Planning documentation (e.g., QAPP)
- Implementation documentation (i.e., Review/Approval Forms and QC records)
- Assessment documentation (i.e., audit reports and independent calculations).

Detailed documentation of QC activities for a specific task or subtask will be maintained using the *QC Documentation Form* shown in **Appendix B**. This form will document the completion of the QC techniques planned for use on this project as listed in the table in **Appendix A**. One or more completed versions of these forms, as necessary, will be maintained in the project files. The types of documents and activities for which QC will be conducted and documented may include raw data, data from other sources

such as data bases or literature, data entry into the LGGIT tool, calculations necessary to transform raw data into forms required for LGGIT entry, and comparisons of primary estimates with QC estimates.

Technical reviews will be used along with other technical assessments (i.e., QC checks) and QA audits to corroborate the scientific defensibility of any data analyses. A technical review (i.e., internal senior review) is a documented critical review of a specific technical work product. It is conducted by subject matter experts who are collectively equivalent (or senior) in technical expertise to those who performed the work. Given the nature of the deliverables under this project, a technical review is an in-depth assessment of the assumptions, calculations, extrapolations, alternative interpretations, and conclusions in technical work products. Technical review of proposed methods and associated data will be documented in the *QC Documentation Form* shown in **Appendix B**. The form will include the reviewer's charge, comments, and corrective actions taken.

Additionally, the COVS has developed and instituted document control mechanisms for the review, revision, and distribution of QAPPs. Each QAPP has a signed approval form, title page, table of contents, and an EPA-approved document control format (see header at top of the page). The distribution list for this QAPP was presented in **Table 1.1**. During the course of the project, any revision to the QAPP will be circulated to everyone on the distribution list, as well as to any additional staff supporting this project. Any revision to the QAPP will be documented in a QAPP addendum, approved by the same signatories to this QAPP, and circulated to everyone on the distribution list by the COVS PM.

At this time, the COVS does not know if the project will collect or handle personally identifiable information (PII) subject to the Privacy Act of 1974. However, if during the course of this project technical staff determine that PII is required to support project objectives, the COVS will meet all requirements of the Privacy Act of 1974. **Appendix C** indicates the status of our determination regarding applicability of the Privacy Act of 1974 under this project.

2. Existing Data Acquisition and Management Protocols (Group B)

2.1. Sampling Process Design

2.1.1. Need and Intended Use of Data Used

As indicated in **Tables 2.1 – 2.5**, a wide range of data for a diverse set of GHG-emitting activities is necessary to prepare a local inventory. Existing data resource may include sector-specific or facility-specific GHG emissions estimates, emissions factors, or activity data for use with emissions factors. The experimental design for this inventory project relies on local, state, and national data together with independent estimates prepared by COVS and consultant assigned QC staff. Existing data resources (including but not limited to data from previously completed inventories) will be utilized to develop GHG emissions estimates. Subsequently, estimates for each source category will be compared to available federal or state data by assigned QC staff.

2.1.2. Identification of Data Sources and Acquisition

The following data sources will be evaluated for use under each task to develop estimates for the major-emitting sectors in the Oxnard-Thousand Oaks-Ventura MSA or for use in validation of estimates:

- Task 1:
  - Vehicle registration data from the California Department of Motor Vehicles (DMV).
  - State or federal averages on vehicle miles traveled and miles per gallon from the U.S. Department of Transportation.
  - National Emissions Inventory (NEI) county-level estimates for mobile sources.
  - VMT data from local sources such as the Ventura County Transportation Commission (VCTC), local travel demand models, and the California Air Resources Board
- Task 2:
  - U.S. Department of Energy's (DOE's) SLOPE Platform which reports county-level electricity usage in million British thermal units.
  - DOE's EIA Form 861 which reports sub-county-level usage in MWh and customer counts as reported by the different distribution utilities operating within each county.
  - Electricity consumption by customer class obtained directly from Southern California Edison (SCE) and Clean Power Alliance (CPA).
- Task 3:
  - Number of community landfills and information on landfill gas (LFG) collection systems, as applicable, from E J Harrison & Sons Inc., Athens Services (local solid waste management authority(ies)), and others as applicable.
  - Landfill emissions data reported to the EPA's GHGRP.
- Task 4:
  - Data published by the EPA under the Greenhouse Gas Reporting Program for fossil fuel consumption by customer class from Southern California Gas (SoCal Gas).
  - County-level natural gas consumption data from DOE's SLOPE Platform;
  - Wastewater management data from local water utility(ies).
- Task 5:
  - Area calculations from web-based map applications.

- Tree cover estimates from local surveys or forestry databases.

2.2. Quality Control

All data operations conducted for this project will involve existing, non-direct measurement data. All data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use. In addition to reviewing and assessing the data collected, all data entered into spreadsheets and all calculations completed for analyses will be reviewed by a senior technical QC reviewer. The QC reviewer will evaluate the approach to ensure the methods are appropriate and have been applied correctly to the analysis. The QC reviewer will also confirm all data were entered correctly and that calculations are complete and accurate. Calculations will be checked by repeating each calculation, independently, and comparing the results of the two calculations. Any data entry and calculation errors will be identified and corrected. Data tables prepared for the draft and final reports will be checked against the spreadsheets used to store the data and complete the analysis.

Where calculations are required to assess the data/datasets, QC calculations will be performed using computer spreadsheets and calculators to reduce typographical or translation errors–mathematical/ statistical calculations are performed using spreadsheets or software programs with predefined formulas and functions. The COVS will ensure that any manipulations performed on the data/dataset were done correctly. Such calculations could involve statistical checks to look for data outliers. One approach, for example, that may be used to identify outliers or unusual data points is sorting a datasheet for one or more data variables. This approach is a simple but effective way to highlight unusually high or low values. Graphing data using boxplots, histograms, and scatterplots is another method that may be used to identify gaps in the data (missing data), outliers, or unusual data points. Another approach that may be used is the use of Z-scores, which can quantify the unusualness of an observation when data follow a normal distribution. A Z-score for a particular value indicates the number of standard deviations above and below the mean that the value falls. For example, a Z-score of 2 indicates that an observation is two standard deviations above the average while a Z-score of -2 indicates the value is two standard deviations below the mean. A Z-score of zero represents a value that equals the mean. As appropriate, we will also use hypothesis tests to find outliers, or an interquartile range (IQR) to calculate boundaries for what constitutes minor and major outliers. The methods used will be driven by the scale and type of data. The COVS will determine outlier detection methods to be used based on the initial review of the data. Identified outliers will be highlighted to the PM, TL, QAM, or delegate with options for treatment.

2.3. Non-direct Measurements for GHG Inventory and Options Identification

All data operations conducted on this project will involve existing, non-direct measurement data. All existing data received will be reviewed by a senior technical staff member to assess data quality and completeness before their use.

Consistent with the EPA's QA requirements, this QAPP describes the procedures that will be used to ensure the selection of appropriate data and information to support the goals and objectives of this project. Specific elements addressed by this QAPP include:

- Identifying the sources of existing data,
- Presenting the hierarchy for data selection,
- Describing the review process and data quality criteria,
- Discussing quality checks and procedures should errors be identified, and

- Explaining how data will be managed, analyzed, and interpreted.

Data presented in the GHG inventory will be traced to its source (e.g., database input and output). Key resources include data collected by the EPA (e.g., GHGRP data), and data from EPA-approved data sources (e.g., Department of Energy and other federal data sources). These sources may include primary literature (i.e., peer-reviewed journal articles and reports) or databases. We may also use approved existing sources (e.g., handbooks, databases). Original sources for all information and data contained in the document will be included in a list of references with appropriate citations. When peer-reviewed literature or EPA-approved data sources cannot be used, we will document any significant limitations to the data sources used.

We will document information regarding each dataset and our rationale/selection criteria for selecting the data sources used in the inventory. The TL will be responsible for overseeing and confirming the selection of the data for the project tasks.

Table 3.1 provides a hierarchy for data quality when identifying and reviewing available sources of data and information. When evaluating data resources, efforts will be made to identify and select data sources that most closely conform to the highest ranked criteria. Data quality metrics and documentation may not be provided by each source, and as necessary, we may consult with subject matter experts from permitted facilities or trade associations operating in the Oxnard-Thousand Oaks-Ventura MSA to qualify data for use to meet project objectives.

Any available data quality information will be reviewed by the COVS and project advisors to ensure that the data represent full-scale designs and commercial processes, and that they are applicable to economic and regulatory conditions in the United States. The COVS will document data sources used and any significant limitations of utilized data or information to ensure that the data are appropriate for their intended use. An internal technical reviewer will review the approach for selecting and compiling data; the review will include examination of the data sources and the intended use of the data. The specific QC techniques used will depend on the technical activity or analysis to which they are applied. The COVS TL is responsible for verifying the usability of data and related information.

Table 3.1 Existing Data Quality Ranking Hierarchy

Quality Rank	**Source Type**
Highest	Federal, state, and local government agencies
Second	Consultant reports for state and local government agencies
Third	NGO studies; peer-reviewed journal articles; trade journal articles; conference proceedings
Fourth	Conference proceedings and other trade literature: non-peer-reviewed
Fifth	Individual estimates (e.g., via personal communication with vendors)

The COVS and hired consultant will work with EPA to ensure that all data used for the project are appropriate for their intended use. The main criteria that will be used in the selection of the data are the vintage and quality of the data (based on peer review). The quality of the data will consider the credibility of the source, and the QA documentation provided by the data source. Senior technical staff

will also evaluate the availability of alternative datasets, suitability of the selected data for the intended purpose, and agreement with LGGIT estimates.

The COVS will use the Secondary Data Quality Ranking Hierarchy when identifying and reviewing available sources of data and information. The source types in **Table 3.1** appear in the order in which they are likely to meet the data quality criteria. For example, federal government data are more likely to be from a credible source, thoroughly reviewed, suitable, available, and representative, and any exceptions to these data criteria are likely to be noted in the government data, providing transparency. Data from individuals are expected to be less reliable, not peer reviewed, and may not be suitable or representative of local activities.

If it is determined that data meeting the fourth (i.e., conference proceedings and other trade literature: non-peer-reviewed) or fifth (i.e., individual estimates such as personal communications with vendors) level compose the best or only available data source, the TL will include in the inventory a description of these data with associated limitations for review and approval by the PM and QAM.

These measures of data quality will be used to judge if the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will include in the inventory a discussion for review and approval by the PM and QAM explaining how emissions estimates that relied on such data compare to LGGIT estimates.

We will also consider, for example, the age (i.e., date of the source dataset) and the representativeness of the data and will include in the inventory report for review and approval by the PM and QAM any quality concerns or uncertainties introduced with use of these data, such as data gaps or inconsistencies with other sources. Any data source utilized that is older than 10 years will specifically be flagged in the inventory report.

Representativeness will be evaluated by determining that the emissions or activity data are descriptive of conditions in the United States, that the data are current, and that the data are descriptive of similar processes within the Oxnard-Thousand Oaks-Ventura MSA. Any incomplete datasets will be identified, and deficiencies will be evaluated to determine if data are missing or confusing and if they meet secondary-use quality objectives.

Key screening criteria will be used to screen the sources identified. The COVS TL will provide oversight to the screening process to ensure sources collected are the most relevant and meet quality requirements. Available data and information from the selected sources will be compiled and relevant summary information will be extracted out of the information sources to develop the required output for each of the project tasks.

2.3.1. Criteria for Accepting Existing Data for Intended Use

The criteria for determining if the data are acceptable for use in developing the local inventory will be based on a comparison of the primary emissions estimates to independent emissions estimate produced using the EPA's LGGIT or other reliable sources of activity data. While some differences between the primary calculations and independent calculations are expected, differences of more than 10 percent must be accompanied by an explanation subject to approval by the PM and QAM prior to using the estimate in the community's inventory.

2.3.2. Criteria for Options Identification

Review of activities under each task and identification of options for emissions reductions to be considered by policymakers will be based on the following criteria:

1. Quantity of reductions in emissions of climate pollution under the option.
2. Number of jobs likely to be created by the option.

3. Environmental justice benefits of the project including the number of people living in overburdened neighborhoods that will benefit from the option.
4. Quantity of reductions in criteria and toxic air pollutants that can be achieved by option.
5. Number of people living, working, recreating, and going to school in the area(s) benefiting from the option.

2.4. Data Management

Data management procedures include file storage and file transfer. All project and data files will be stored on the COVS project servers. Files will be organized and maintained by the TL in folders by project, task, and function, including a system of file labeling to ensure version control. Any files containing confidential business information will be stored on secure computers. The TL will make sure that staff are trained and adhere to the project file organization and version control labeling to ensure that files are placed in consistent locations. All files will be backed up each night to avoid loss of data. Data are stored in various formats that correspond to the software being used. As necessary, data will be transferred using various techniques, including email, File Transfer Protocol, or shared drives. Typically, records will be archived once the project is completed. Record retention times will be based on contractual and statutory requirements or will follow COVS practices for storing materials of up to 5 years after the end of the period of performance (POP). Multiple project staff are granted access rights to the archived file system for each project. Records may be retrieved from archived file system by the TL, PM, or other project staff with access during the records retention period. As soon as allowed by applicable regulations or the grant agreement, records will be destroyed according to COVS policies and procedures. For any sensitive information that is gathered under the project, the COVS's policy is consistent with EPA–recommended methods of destruction, which include degaussing, reformatting, or secure deletion of electronic records; physical destruction of electronic media; recycling; shredding; incineration; and pulping. Should the grant specify some other manner of disposition (e.g., transfer to the client), the COVS will comply with that directive. As noted above, the COVS has developed a file naming convention/nomenclature for electronic file tracking and record keeping. Foremost, all files must be given a short but descriptive name. For those records and files gathered or provided to the COVS, the filename may include the identification of "original" in its filename.

Similarly, files that have undergone a review by an independent, qualified person will include, at the end of the filename, the initials of the reviewer or the suffix "rev" (in lieu of initials) if more than one reviewer reviewed the file, along with the date reviewed and version number, as a way to track which staff person(s) reviewed the file and when. Filenames of draft versions will follow an incremental, decimal numbering system. More specifically, each successive draft of a document is numbered sequentially from version 0.1, 0.2, 0.3… until a final version is complete. Final versions will be indicated by whole numbers (e.g., version 1.0). Final versions of documents that undergo revisions will be labeled version X.1 for the first set of revisions. While the document is under review, subsequent draft versions will increase incrementally (e.g., 1.2, 1.3, 1.4) until a revised final version is complete (e.g., version 2.0).

In the event data retrieval is requested and to prevent loss of data, all draft and final file versions will be retained electronically—that is, superseded versions will not be deleted.

Note that changes made to deliverables will be documented using the software's *track changes* feature, which allows a user to track and view all changes that are made to the document version. All deliverable reviews will be documented in a QC Documentation Form (see **Appendix B**) for the project. This form will be maintained in the project files.

For this project, it is not anticipated that any special hardware or software will be used. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work (described in **Tables 2.1 – 2.5)** for this project.

3. Assessment and Oversight (Group C)

The COVS is committed to preparing a comprehensive and reliable inventory of GHG emissions for the Oxnard-Thousand Oaks-Ventura MSA. Under this project our senior management team has dedicated the necessary resources to ensure we deliver an inventory that can be relied upon for future policy decisions. Accordingly, under this project, we will concurrently implement existing quality management systems that the COVS has previously utilized for submissions to the EPA under Title I of the Act where task-level deliverables will be subjected to required, regular reviews (e.g., quarterly) to ensure that technical, financial, and schedule requirements of this project are consistent with the EPA PO's and QAM's expectations for handling and producing deliverables that reflect high-quality environment data. This section discusses Elements C1 (assessments and response actions) and C2 (reporting) applicable to this project.

3.1. Assessments and Response Actions

The QA program includes periodic review of data files and draft deliverables. The essential steps in the QA program are as follows:

1. Identify and define the problem
2. Assign responsibility for investigating the problem
3. Investigate and determine the cause of the problem
4. Assign and accept responsibility for implementing appropriate corrective actions
5. Establish the effectiveness of and implement the corrective action
6. Verify that the corrective action has eliminated the problem.

The TL will provide day-to-day oversight of the quality system. Periodic project file reviews will be carried out by the QA Manager, at least once per year to verify that required records, documentation, and technical review information are maintained in the files. The QAM will ensure that problems found during the review are brought to the attention of the TL and are corrected immediately. All nonconforming data will be noted, and corrective measures to bring nonconforming data into conformance will be recorded.

The TLs and QA Manager are responsible for determining if the quality system established for the project is appropriate and functioning in a manner that ensures the integrity of all work products. All technical staff have roles and will participate in the corrective action process. Corrective actions for errors found during QC checks will be determined by the TL and, if necessary, with direction from the QA Manager or PM, as appropriate. The originator of the work will make the corrections and will note on the QC form that the errors were corrected. A reviewer or TL, not involved in the creation of the work, will review the corrections to ensure the errors were corrected. Any problems noted during audits will be reviewed and corrected by the QA Manager and discussed with the TL as needed. Depending on the severity of the deficiency, the TL may consult the QA Manager and stop work until the cited deficiency is resolved. Deficiencies identified and their resolution will be documented in monthly project reports, as applicable. The QA Manager and TL will comply and respond to all internal and EPA audits on the project, as needed. The QA Manager will produce a report outlining any corrective actions taken.

3.2. Reports to Management

The periodic progress reports (to the EPA PO) required in the grant agreement will be reviewed by the PM and the PM's manager (Alejandra Tellez, Sustainability Officer) to ensure the project is meeting milestones and that the resources committed to the project are sufficient to meet project objectives. These periodic progress reports will describe the status of the project, accomplishments during the reporting period, activities planned for the next period, and any special problems or events including

any QA/QC issues. Reports to the EPA will be drafted by the TL or other project staff familiar with project activities during the reporting period.

Any QC issues impacting the quality of a deliverable, the project budget, or schedule will be identified and promptly discussed with the assigned TL and the PM or QAM as appropriate. All significant findings will be included in monthly reports with the methods used to resolve the specific QC issue or the recommendations for resolution for consideration by the EPA's PO or designee.

Based on the technical work completed during the reporting period, progress reports will be reviewed internally by an independent, qualified technical person (equivalent or senior to the TL), prior to submitting to the PM. The PM will conduct a final review of the report before transmitting the progress report to the EPA PO, and the PM's manager will be cc'd on all progress reports.

4. Data Validation and Usability (Group D)

4.1. Data Review, Verification, Validation

All work conducted under this project will be subject to technical and editorial review. When existing data for the same GHG-emitting activity are available from multiple sources, the background information documents will be reviewed for all sources to determine the dataset that is the most representative of local operations. Additionally, the inventory report will include the vintage of the existing data resource and preference will be given to the most recent dataset that is representative of similar GHG-emitting local activities. Reviews will be conducted by an independent, qualified person—or a person not directly involved in the production of the deliverable. The term "validation" refers to whether the data meet the QAPP-defined user requirements while the term "verification" refers to whether conclusions can be correctly drawn from the data. The quality of data used and generated for the project will be reviewed and verified at multiple levels by the project team. This review will be conducted by the COVS TL or a senior technical reviewer with specific, applicable expertise. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all units of measure will be checked for consistency. Any potential issues identified through this review process will be evaluated and, if necessary, data will be corrected, and analysis will be revised as necessary, using corrected data. These corrections will be documented in project records. These measures of data quality will be used to judge whether the data are acceptable for their intended use. In cases where available data do not or may not meet data quality acceptance criteria, the TL will document these findings in the inventory along with corrective actions or use of alternative data sources.

4.2. Verification and Validation Methods

As a standard operating procedure, all data (retrieved and generated) will be verified and validated through a review of data files by an independent, qualified technical staff member (i.e., someone other than the document originator), and ultimately, the COVS TL. A checklist of QC activities for deliverables under this project is provided as **Appendix A**. Forms for documenting QC activities and review of deliverables are included in **Appendix B**. Documentation of calculations will be included in spreadsheet work products and in supporting memoranda, as appropriate.

The TL is responsible for day-to-day technical activities of tasks, including planning, data gathering, documentation, reporting, and controlling technical and financial resources. The TL is the primary person responsible for quality of work on tasks under this project and will approve all-related plans and reports. These reports will be transmitted by the TL to the QAM for final review and approval.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Reviews of analyses will include a thorough evaluation of content and calculated values. All original and modified data files will be reviewed for input, handling, and calculation errors. Additionally, all measurement units will be checked for consistency. Any potential issues identified through this review process will be evaluated, errors corrected, and analysis repeated using the corrected data. All corrections will be documented in project records.

Source data will be verified and validated through a review of data files by the technical staff, and ultimately the TL. Typical data verification reviews can include checks of the following:

- Data sources are clearly documented,
- Calculations are appropriately documented,

- All relevant assumptions are clearly documented,
- Conclusions are relevant and supported by results,
- Text is well-written and easy to understand.

The documented review process will be stored with deliverables for the project. For the narrative describing the methodologies used for the inventory, all comments on drafts will be clearly and concisely summarized including a description of how substantive issues raised by commenters were resolved.

As discussed in Section 1.7, QC objectives include verification that data in database tables are stored and transferred correctly, algorithms call data correctly, units are internally consistent, and reports pull the required data. These data management issues will be addressed as part of the QC checks of data acquisition and document preparation.

For this project, it is not anticipated that any special data validation software will be required. However, where calculations are required to assess the data/datasets, calculations will be performed using computer spreadsheets (like Excel spreadsheets with predefined functions, or formulas) and calculators to reduce typographical or translation errors. General software available through the Microsoft Suite including Excel, PowerPoint, Access, and Word will be sufficient to perform the work as described in Section 1.6 for this project.

4.3. Reconciliation with User Requirements

All data (retrieved and generated) and deliverables in this project will be analyzed and reconciled with project data quality requirements. To ensure deliverables meet user requirements, the TL or senior technical lead will review all data and deliverables throughout the project to ensure that the data, methodologies, and tools used meet data quality objectives, are clearly conveyed, and represent sound and established science.

The COVS will review each project with the EPA at the planning stage to ensure the approach is fundamentally sound and will meet the project objectives. The TL or senior technical lead will evaluate data continuously during the life term of the project to ensure they are of sufficient quality and quantity to meet the project goals. Prior to submission of draft and final products, the TL or senior technical lead will make a final assessment to determine if the objectives have been fulfilled in a technically sound manner. Assumptions made in preparing project analyses will be clearly specified in the inventory.

As discussed in Section 1.7.1, uncertainty can be evaluated using a few different approaches. The most useful uncertainty analysis is quantitative and is based on statistical characteristics of the data such as the variance and bias of estimates. In a sensitivity analysis, the effect of a single variable on the resulting emissions estimate generated by a model (or calculation) is evaluated by varying its value while holding all other variables constant. Sensitivity analyses will help focus on the data that have the greatest impact on the output data. Additional statistical tests may be utilized depending on the need for more or less rigorous tools and on the specific inventory activity being evaluated.

5. References

EPA, Chief Information Officer's Policy Directive on Information Technology / Information Management available at EPA IT/IM Directive: Environmental Information Quality Policy, Directive # CIO 2105.3

EPA, *Chief Information Officer's Policy Directive on Information Technology / Information Management: Quality Assurance Project Plan (QAPP) Standard*, Directive # CIO 2105-S-02.0. Available at https://www.epa.gov/irmpoli8/quality-assurance-project-plan-qapp-standard. Accessed on 7/24/2023.

EPA, EPA-454/B-17-001, *Quality Assurance Handbook for Air Pollution Measurement Systems, Ambient Air Quality Monitoring Program, Volume II*. Available at https://www3.epa.gov/ttnamti1/files/ambient/pm25/qa/Final%20Handbook%20Document%201_17.pdf. Accessed on 6/23/2023.

EPA, Fact Sheet: Areas where differences between state GHG inventories and the EPA's Inventory of U.S. GHG Emissions and Sinks by State: 1990-2020 estimates may occur. Available at https://www.epa.gov/system/files/documents/2022-03/fact-sheet-differences-epa-and-offical-state-ghgi.pdf. Accessed on 6/23/2023.

EPA, US GHG Inventory by State. Available at https://www.epa.gov/ghgemissions/state-ghg-emissions-and-removals. Accessed on 6/23/2023.

EPA, GHG Reporting Program Facility-level Local Information. Available at https://ghgdata.epa.gov/ghgp/main.do. Accessed on 7/18/2023.

EPA, Data reported to EPA's Greenhouse Gas Reporting Program (GHGRP) at https://www.epa.gov/ghgreporting/data-sets

EPA, National Inventory at https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021

EPA, Publications, Tools, and Data for State, Local, and Tribal Governments at https://www.epa.gov/statelocalenergy/publications-tools-and-data-state-local-and-tribal-governments. Accessed on 7/27/2023.

EPA, Fuel heating values and CO2 emission factors at eCFR :: 40 CFR Part 98 -- Mandatory Greenhouse Gas Reporting

EPA, Global warming potentials at https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A?toc=1

USDA, Forest Service at https://www.fs.usda.gov/research/treesearch/62418

US DOT, Federal Highway Administration Transportation Statistics at https://www.fhwa.dot.gov/policyinformation/statistics/2021/vm1.cfm

Appendix A: Example Check Lists of Quality Control Activities for Deliverables

Tasks and Deliverables	Quality Control Procedures

Task 1. Mobile Combustion (Transportation)

Local inventory of GHG emissions from mobile sources with documentation of the following QC activities:

(1) narrative report describing data sources and QC measures for data acquisition steps,

(2) description of methodology and QC measures for validated proper implementation of methodology, and

(3) documentation of QAPP implementation.

(4) listing of emissions reductions options are present with documentation of rationale for each option.

1. Comparison of local estimate of average miles travelled per year and average miles per gallon (by vehicle type) versus state and national averages.

Vehicle Type	Local Avg Miles/yr	QC Avg Miles/yr	MPY Statistics*	Local Avg Miles/gal	QC Avg Miles/gal	MPG Statistics
Passenger Car (Gasoline)			Signed Bias ±X.XX%		24.1	Signed Bias ±X.XX%
Passenger Truck (Gasoline)			Variance Y.YY%		18.5	Variance Y.YY%
Heavy-duty (Gasoline)					10.1	
Motorcycle (Gasoline)					50	
Passenger Car (Diesel)					32.4	
Passenger Truck (Diesel)					22.1	
Heavy-duty (Diesel)					13.0	

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the LGGIT value taken as the audit value.

2. For any values used in local inventory that differ from the state average MPY or the national average MPG by more than 5%, the community will provide an explanation of why local factors may differ from state or national averages.

3. Ensure the GWPs used for the local estimate and the LGGIT estimate are on the same basis. The LGGIT tool uses AR5 GWP (e.g., methane GWP = 28).

4. Review by TL or senior technical reviewer—analytical methods / results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate.

5. Editor review—verify or remediate draft deliverables to ensure clear, error-free writing.

Tasks and Deliverables	**Quality Control Procedures**
Task 2. Electric Power Consumption	
Local inventory of GHG emissions from electric power consumption with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Compare (a) the local estimate in inventory *versus* (b) data from SLOPE[16], state averages, or other data resources available from DOE such as Form EIA 861 data. Use a table similar to the table below to assess precision and bias of the local estimates versus estimates derived from SLOPE, state averages, or representative EIA 861 data, if available: 2. SLOPE data are provided in million British thermal units (MMBtu's) of electricity usage, EIA 861 usage data are provided in megawatt-hours (MWh), but the LGGIT inputs for electricity usage must be in kilowatt-hours (kWh). When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison. 3. Ensure the GWPs used for the local estimate and the independent estimate are on the same basis. 4. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate. 5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate) 6. Editor review—writing is clear, free of grammatical and typographical errors.

Power Consuming Sector	Initial Local Estimate (Metric Tons CO_2e)	QC Estimate based on <selected data source> (Metric Tons CO_2e)	Statistics*
Residential			Signed Bias ±X.XX% Variance Y.YY%
Commercial			
Industrial			
Transportation			
Other			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

[16] National Renewable Energy Laboratory. "[Data Set Title (e.g., Battery Storage Capital Costs)]," *State and Local Planning for Energy*, accessed 7/22/2023, https://maps.nrel.gov/slope.

Tasks and Deliverables	Quality Control Procedures
Task 3. Solid Waste (Landfills)	
Local inventory of GHG emissions from landfills with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Comparison of (a) independent local inventory *versus* (b) landfill data from FLIGHT. Use a table similar to the table below to assess precision and bias of the local inventory versus QC estimates:

Solid Waste (Landfills)	Initial Local Estimate (Metric Tons CO_2e)	FLIGHT Data (Metric Tons CO_2e)	Statistics* for Area Comparisons
North Elm Landfill			Signed Bias ±X.XX%
East Hill Landfill			
Landfill No. 1 (closed)			Variance Y.YY%
…			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

2. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison.
3. Ensure the GWPs used for the local estimate and independent estimate are on the same basis.
4. Ensure data are appropriate for intended use, data are complete and representative and current, data sources are documented, analytical methods are appropriate, and calculations are accurate. Include any QC findings and reconciliation.
5. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of technical detail is appropriate)
6. Editor review—writing is clear, free of grammatical and typing errors.

Tasks and Deliverables	Quality Control Procedures
Task 4. GHG Emissions for Other Sources	
Local inventory of GHG emissions from the community's other sources with documentation of the following QC activities: (1) narrative report describing data sources and QC measures for data acquisition steps, (2) description of methodology and QC measures for validated proper implementation of methodology, and (3) documentation of QAPP implementation. (4) listing of emissions reductions options are present with documentation of rationale for each option.	1. Comparison of (a) local emissions estimates in inventory *versus* (b) available federal or state estimates for the same source categories (e.g. SLOPE, FLIGHT, etc.). 2. For any values used in local inventory that are inconsistent with federal or state values, the table below will be utilized to assess precision and bias of the local inventory versus the federal or state estimates: 3. When comparing any two datasets, ensure that the units of measure are converted to a consistent basis prior to making the comparison. 4. Ensure the GWPs used for the local estimate and independent estimate are on the same basis. 5. Technical review of methods, calculations, and underlying datasets—data are appropriate for intended use, data are complete and representative and current, data sources documented, analytical methods are appropriate, and calculations are accurate. 6. Review by TL or senior technical reviewer—analytical methods and results are explained clearly, technical terms are defined, conclusions are reasonable based on information presented, and level of detail appropriate. 7. Editor review: writing is clear, free of grammatical and typographical errors.

Other Sectors	Initial Local Estimate (Metric Tons CO_2e)	QC Estimate (Metric Tons CO_2e)	Statistics*
Stationary combustion			Signed Bias ±X.XX% Variance Y.YY%
Agriculture & land management			
Waste generation			
Water			
Wastewater treatment			
Other			

* Precision and bias calculations will be in accordance with the EPA's Data Assessment Statistical Calculator (DASC) Tool available at https://www.epa.gov/sites/default/files/2020-10/dasc_11_3_17.xls with the community's estimate taken as the measured value and the SIT value taken as the audit value.

Appendix B: Example QC Documentation Form

<Grantee Org.>

Documentation of QA Review and Approval of Electronic Deliverables

Approvals on this form verify that all technical and editorial reviews have been completed and the deliverable meets the criteria for scientific defensibility, technical, and editorial accuracy, and presentation clarity as outlined in the Quality Assurance (QA) Project Plan, QA Narrative, Quality Management Plan, and/or according to direction from the EPA PO.

Client:	EPA Region <X>
Grant Number:	<enter grant number>
EPA Project Officer:	<enter EPA PO>
Project Number:	<enter internal Project ID>
Project Name:	<enter internal project name>
Grantee Org. Project Manager	<enter grantee's project manager>

QA Form Details

Item Number	File Name (Copy the name of the File Reviewed)	Deliverable Description	Date Sent to Client	Deliverable (Draft)	Deliverable (Final)	Document Originator	QA Review Information (Review Type)	(Reviewer Name)	(Date Review was Performed)	(Brief Summary of Review Findings and Other Notes)	QA Review Information (Have all Findings Been Resolved)	(Originator Signature)	(Reviewer Signature)	(File Location) *Copy Long Folder Path Name*
01				☐	☐		***Technical***				☐ Yes			
							Technical				☐ Yes			
02				☐	☐		***Technical***				☐ Yes			
							Technical				☐ Yes			
03				☐	☐		***Technical***				☐ Yes			
							Technical				☐ Yes			
04				☐	☐		***Technical***				☐ Yes			
							Technical				☐ Yes			

Attachment 1: Example Local Electric Power Consumption Data Available from DOE / EIA Form 861

	City and County Utility Characteristics				RESIDENTIAL		COMMERCIAL		INDUSTRIAL		TRANSPORTATION		TOTAL	
					Sales	Customers	Sales	Customers	Sales	Customers	Sales	Customers	Sales	Customers
State	Utility Name	Service Type	Ownership	BA	MW-hrs	Count	MW-hrs	Count	MW-hrs	Count	MW-hrs	Count	MW-hrs	Count
AL	City of Huntsville - (AL)	Bundled	Municipal	TVA	2,466,405	167,883	2,018,809	22,104	435,703	26	0	0	4,920,917	190,013
AL	Baldwin County El Member Corp	Bundled	Cooperative	AEC	975,575	73,397	465,430	6,682	0	0	0	0	1,441,005	80,079
AL	City of Athens - (AL)	Bundled	Municipal	TVA	658,618	42,991	352,764	7,297	199,702	13	0	0	1,211,084	50,301
AL	City of Florence - (AL)	Bundled	Municipal	TVA	603,983	41,250	397,349	9,208	97,150	8	0	0	1,098,482	50,466
AL	City of Dothan - (AL)	Bundled	Municipal	SOCO	379,940	26,040	401,163	5,040	162,395	12	0	0	943,498	31,092
AL	City of Opelika - (AL)	Bundled	Municipal	SOCO	138,656	11,365	194,418	2,163	95,544	20	.	.	428,618	13,548
AL	City of Troy - (AL)	Bundled	Municipal	SOCO	90,657	6,530	33,919	1,393	291,688	151	.	.	416,264	8,074
AL	City of Andalusia	Bundled	Municipal	AEC	41,548	3,677	56,747	1,020	279,565	2	.	.	377,860	4,699
AL	City of Scottsboro	Bundled	Municipal	TVA	94,119	6,835	123,976	1,535	86,280	7	0	0	304,375	8,377
AL	City of Muscle Shoals	Bundled	Municipal	TVA	97,920	6,735	107,018	1,861	79,376	8	0	0	284,314	8,604
AL	City of Bessemer Utilities	Bundled	Municipal	TVA	111,751	9,463	154,025	1,767	8,955	1	0	0	274,731	11,231
AL	City of Hartselle	Bundled	Municipal	TVA	59,490	4,368	54,272	1,236	25,642	2	0	0	139,404	5,606
AL	City of Russellville - (AL)	Bundled	Municipal	TVA	48,333	3,971	62,568	1,112	15,194	1	0	0	126,095	5,084
AL	City of Tuscumbia	Bundled	Municipal	TVA	52,194	4,017	27,399	884	11,935	2	0	0	91,528	4,903
AL	City of Tarrant	Bundled	Municipal	TVA	28,024	2,144	28,691	598	7,016	1	0	0	63,731	2,743
AL	City of Courtland	Bundled	Municipal	TVA	7,576	570	13,947	205	0	0	0	0	21,523	775
AR	Mississippi County Electric Co	Bundled	Cooperative	MISO	55,473	3,254	18,834	760	3,030,294	824	0	0	3,104,601	4,838
AR	City Water and Light Plant	Bundled	Municipal	MISO	476,633	33,019	315,207	5,399	533,466	34	.	.	1,325,306	38,452
AR	City of North Little Rock - (AR)	Bundled	Municipal	MISO	357,546	34,001	240,206	5,020	253,391	142	160	1	851,303	39,164
AR	City of Bentonville - (AR)	Bundled	Municipal	P	258,259	22,451	383,467	3,421	.	.	.	.	641,726	25,872
AR	City of West Memphis - (AR)	Bundled	Municipal	AECI	136,456	10,196	114,843	1,539	107,518	48	.	.	358,817	11,783
AR	Clay County Electric Coop Corp	Bundled	Cooperative	MISO	108,567	10,544	82,762	2,513	88,476	13	0	0	279,805	13,070
AR	City of Siloam Springs - (AR)	Bundled	Municipal	P	73,169	7,193	19,166	868	173,057	222	.	.	265,392	8,283
AR	City of Benton - (AR)	Bundled	Municipal	MISO	146,750	12,387	72,145	1,843	39,189	21	.	.	258,084	14,251
AR	City of Hope	Bundled	Municipal	MISO	63,315	5,822	101,324	1,040	40,961	1	.	.	205,600	6,863
AZ	Electrical Dist No3 Pinal County	Bundled	Subdivision	AZPS	347,873	25,097	180,463	1,764	190,796	340	.	.	719,132	27,201
AZ	City of Mesa - (AZ)	Bundled	Municipal	C	157,195	14,447	169,191	2,564	0	0	0	0	326,386	17,011
AZ	SolarCity Corporation	Bundled	Behind the Meter	AZPS	276,309	24,437	42,093	367	0	0	0	0	318,402	24,804
AZ	Electrical Dist No2 Pinal County	Bundled	Subdivision	C	55,706	4,384	147,315	971	49,198	16	.	.	252,219	5,371
AZ	SolarCity Corporation	Bundled	Behind the Meter	TEPC	101,018	8,865	11,183	416	0	0	0	0	112,201	9,281
AZ	SolarCity Corporation	Bundled	Behind the Meter	SRP	84,259	6,761	25,917	49	0	0	0	0	110,176	6,810
AZ	SolarCity Corporation	Bundled	Behind the Meter	C	1,856	166	0	0	0	0	0	0	1,856	166
CA	City of Santa Clara - (CA)	Bundled	Municipal	CISO	264,731	49,672	102,987	6,901	3,372,379	1,821	917	1	3,741,014	58,395
CA	City of Riverside - (CA)	Bundled	Municipal	CISO	792,707	98,914	422,771	11,335	929,201	908	.	.	2,144,679	111,157
CA	City of Anaheim - (CA)	Bundled	Municipal	CISO	554,067	103,366	686,272	17,446	845,556	290	.	.	2,085,895	121,102
CA	SolarCity Corporation	Bundled	Behind the Meter	CISO	865,971	125,949	309,427	6,227	0	0	0	0	1,175,398	132,176
CA	City of Roseville - (CA)	Bundled	Municipal	BANC	496,889	56,467	404,507	7,009	248,703	31	.	.	1,150,099	63,507
CA	City of Vernon	Bundled	Municipal	CISO	352	74	400,187	1,323	720,301	502	.	.	1,120,840	1,899
CA	City of Burbank Water and Power	Bundled	Municipal	P	274,690	46,098	744,681	6,932	.	.	.	.	1,019,371	53,030
CA	City of Glendale - (CA)	Bundled	Municipal	P	404,362	76,700	560,913	13,307	17,486	23	.	.	982,761	90,030
CA	City of Pasadena - (CA)	Bundled	Municipal	CISO	347,504	56,492	622,206	8,456	.	.	7,865	1	977,575	64,949

Data from EIA Form 861, *Annual Electric Power Industry Report, [Sales_Ult_Cust_2020.xlsx]*
Available at https://www.eia.gov/electricity/data/eia861/. Accessed 7/18/2023.

Attachment 2: Informational Table of Local GHG Emitting Activities

City- and County-owned Facilities that Report to the EPA's GHGRP

FACILITY STATE	FACILITY COUNTY	FACILITY ZIP	PARENT COMPANY NAME	FACILITY NAME	FACILITY NAICS CODE
AR	CONWAY COUNTY	72032	CITY OF CONWAY	CITY OF CONWAY LANDFILL & MRF	562212
AR	CONWAY COUNTY	72110	CITY OF MORRILTON AR	MORRILTON SANITARY LANDFILL	562212
AR	CRAIGHEAD	72403	CITY WATER & LIGHT PLANT OF THE CITY OF JONESBORO	CITY WATER & LIGHT - CITY OF JONESBORO	221112
AR	CRAIGHEAD COUNTY	72403	CRAIGHEAD COUNTY SOLID WASTE DISPOSAL AUTHORITY	CRAIGHEAD COUNTY SOLID WASTE DISPOSAL	562212
AR	CRITTENDEN COUNTY	72301	CRITTENDEN COUNTY AR	CRITTENDEN COUNTY LANDFILL	562212
AR	INDEPENDENCE	72562	CITY OF WEST MEMPHIS AR	INDEPENDENCE	221112
AR	INDEPENDENCE	72562	CITY OF OSCEOLA	INDEPENDENCE	221112
AR	INDEPENDENCE	72562	CITY WATER & LIGHT PLANT OF THE CITY OF JONESBORO	INDEPENDENCE	221112
AR	JEFFERSON	72132	CITY WATER & LIGHT PLANT OF THE CITY OF JONESBORO	WHITE BLUFF	221112
AR	JEFFERSON	72132	CITY OF WEST MEMPHIS AR	WHITE BLUFF	221112
AR	MISSISSIPPI COUNTY	72315	MISSISSIPPI COUNTY	MISSISSIPPI COUNTY LANDFILL	562212
AR	PULASKI COUNTY	72206	CITY OF LITTLE ROCK	LITTLE ROCK CITY SW LANDFILL	562212
AR	SEBASTIAN COUNTY	72916	CITY OF FT SMITH	FORT SMITH SANITARY LANDFILL	562212
AZ	COCONINO COUNTY	86004	CITY OF FLAGSTAFF	CITY OF FLAGSTAFF - CINDER LAKE LANDFILL	562212
AZ	LA PAZ COUNTY	85344	LA PAZ COUNTY	LA PAZ COUNTY LANDFILL	562212
AZ	MARICOPA COUNTY	85326	CITY OF PHOENIX	SR 85 LANDFILL	562212
AZ	MARICOPA COUNTY	85331	COUNTY OF MARICOPA	CAVE CREEK MSW LANDFILL	562212
AZ	MARICOPA COUNTY	85301	CITY OF GLENDALE	CITY OF GLENDALE - LANDFILL	562212
AZ	MARICOPA COUNTY	85211	CITY OF MESA	CITY OF MESA	221210
AZ	MARICOPA COUNTY	85009	CITY OF PHOENIX	CITY OF PHOENIX 27TH AVE LANDFILL	562212
AZ	MARICOPA COUNTY	85027	CITY OF PHOENIX	CITY OF PHOENIX - SKUNK CREEK LANDFILL	562212
AZ	MARICOPA COUNTY	85242	COUNTY OF MARICOPA	QUEEN CREEK MSW LANDFILL	562212
AZ	MARICOPA COUNTY	85281	ELECTRICAL DISTRICT NO 4 PINAL COUNTY	SALT RIVER PROJECT - T & D EQUIPMENT	221121
AZ	MARICOPA COUNTY	85281	CITY OF MESA	SALT RIVER PROJECT - T & D EQUIPMENT	221121
AZ	MARICOPA COUNTY	85281	ELECTRICAL DISTRICT NO 3 PINAL COUNTY	SALT RIVER PROJECT - T & D EQUIPMENT	221121
AZ	MARICOPA COUNTY	85281	ELECTRICAL DISTRICT NO 2 PINAL COUNTY	SALT RIVER PROJECT - T & D EQUIPMENT	221121
AZ	MOHAVE	86404	CITY OF LAKE HAVASU	LAKE HAVASU LANDFILL	562212
AZ	MOHAVE COUNTY	86426	COUNTY OF MOHAVE	MOHAVE VALLEY LANDFILL	562212
AZ	PIMA COUNTY	85658	PIMA COUNTY	TANGERINE LANDFILL	562212
AZ	PIMA COUNTY	85756	CITY OF TUSCON ENVIRONMENTAL SERVICES	LOS REALES LANDFILL	562212
CA	BUTTE COUNTY	95969	COUNTY OF BUTTE	NEAL ROAD RECYCLING AND WASTE FACILITY	562212
CA	FRESNO COUNTY	93612	CITY OF CLOVIS	CITY OF CLOVIS LANDFILL	562212
CA	FRESNO COUNTY	93630	COUNTY OF FRESNO	AMERICAN AVENUE LANDFILL	562212
CA	HUMBOLDT COUNTY	95503	CITY OF HUMBOLDT	CUMMINGS ROAD LANDFILL	562212
CA	KERN COUNTY	93220	COUNTY OF KERN	BAKERSFIELD METROPOLITAN SANITARY LANDFILL	562212
CA	LAKE COUNTY	95422	COUNTY OF LAKE	EASTLAKE SANITARY LANDFILL	562212
CA	LOS ANGELES	91201	CITY OF GLENDALE	GRAYSON POWER PLANT	221112
CA	LOS ANGELES	90803	CITY OF LOS ANGELES	HAYNES GENERATING STATION	221112
CA	LOS ANGELES	91105	CITY OF PASADENA	GLENARM	221112

This table is provided for informational purposes only and presents data that is available from the EPA's GHGRP that lists major emitting GHG sources, including those owned by city and county governments.
Available at https://www.epa.gov/system/files/other-files/2022-10/ghgp_data_parent_company_10_2022.xlsb . Accessed 7/18/2023.
Emissions data for the facilities owned by city or county governments is also available on the same EPA website at https://www.epa.gov/system/files/other-files/2022-10/2021_data_summary_spreadsheets.zip. Accessed 7/18/2023.

Appendix B

Measure Reduction Calculations

Measure Quantification

Results Summary

2030 Goals Assessment by Measure [MT CO_2e]

Sector	Measure Identifier	Measure	Subsector	Measure Reductions (2030)	Measure Reductions (2050)
Building Energy	BE-1	100% Carbon-free and Renewable Electricity Countywide	Residential & Commercial	475,060	1,137,143
	BE-2	Regional Building Decarbonization Program	Residential & Commercial	69,235	928,671
	BE-3	Extremely Low-income Renter Household Electrification	Residential	97,469	702,237
Transportation	T-1	EV Charging Infrastructure and Adoption	Passenger and Commercial VMT	432,161	19,008,905
	T-2	Multi-modal Transportation Hubs	Passenger VMT	750,042	2,531,295
	T-3	Ocean Going Vessel Speed Reductions	Off-road transportation	312,671	1,354,906
Solid Waste	SW-1	Organic Waste Program and Facilities Expansion	Residential & Commercial	1,593,720	7,968,602
Total				**3,730,357**	**33,631,759**

Note: Quantification assesses cumulative GHG emissions reductions from expected implementation year (2025) of each program through 2050.

Building Energy

100% Carbon-free and Renewable Electricity Countywide

Inputs, Targets, and Assumptions

Variable	Definition	Value	Unit	Data Source	Link
$EF_{weighted\text{-}elec,y,i}$	Weighted electricity emissions factor by sector	See calculation table	MT CO2e/kWh	Calculated	N/A
$Opt_{i,2022}$	Current opt-out of carbon-free electricity				
$Opt_{residential,2022}$	Current residential opt-out of carbon-free electricity	53%	percentage	County CAAP	N/A
$Opt_{nonresidential,2022}$	Current nonresidential opt-out of carbon-free electricity	63%	percentage	County CAAP	N/A
Opt_{i}	Opt-out rate target of carbon-free electricity				
$Opt_{residential}$	Residential opt-out rate target of carbon-free electricity	10%	percentage	County CAAP	N/A
$Opt_{nonresidential}$	Nonresidential opt-out rate target of carbon-free electricity	10%	percentage	County CAAP	N/A
Implementation Start		2026	year		
Implementation Target Year		2030	year		
Annual Rate $_{residential}$		9%			
Annual Rate $_{nonresidential}$		11%			
$EF_{elec,base,i,y}$	Base utility provider emissions factor				
$EF_{elec,base,residential,2030}$	Base utility provider emissions factor (2030)	0.00013074	MT CO2e/kWh	Multiple	See "Emissions Factors" Tab for calculation of recalibrated EF
$EF_{elec,base,residential,2050}$	Base utility provider emissions factor (2050)	0.00000000	MT CO2e/kWh	Assumption	See "Emissions Factors" Tab for calculation of recalibrated EF
$EF_{elec,base,y}$	Base utility provider emissions factor				
$EF_{elec,base,non\text{-}residential,2030}$	Base utility provider emissions factor (2030)	0.00015414	MT CO2e/kWh	Multiple	See "Emissions Factors" Tab for calculation of recalibrated EF
$EF_{elec,base,non\text{-}residential,2050}$	Base utility provider emissions factor (2050)	0.00000000	MT CO2e/kWh	Assumption	See "Emissions Factors" Tab for calculation of recalibrated EF
$EF_{elec,choice,y}$	Utility provider of choice emissions factor				
$EF_{elec,choice,2030}$	Utility provider of choice emissions factor (2030)	0.00000000	MT CO2e/kWh	Multiple	See "Emissions Factors" Tab for calculation of recalibrated EF
$EF_{elec,choice,2050}$	Utility provider of choice emissions factor (2050)	0.00000000	MT CO2e/kWh	Assumption	See "Emissions Factors" Tab for calculation of recalibrated EF
y	Year	2030 or 2050	year	N/A	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A	N/A
j	Utility Provider	Base or Choice			
	Cumulative 2030 Emission Reductions	**475,060**	**MT CO2e**	Calculated	N/A
	Cumulative 2050 Emission Reductions	**1,137,143**	**MT CO2e**	Calculated	N/A

Emissions Reductions Calculations

Definition	Units	Sector	2022	2025	2026	2026	2028	2029	2030	2031	2032
Opt-out rate target of carbon-free electricity		Residential	53%	53%	44%	36%	27%	19%	10%	10%	10%
	%	Nonresidential	63%	63%	53%	42%	31%	21%	10%	10%	10%
Existing Electricity Usage + T&D Losses		Residential	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47
	kWh	Nonresidential	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72
Base utility provider emissions factor		Residential	0.00013	0.00011	0.00010	0.00010	0.00009	0.00008	0.00007	0.00007	0.00006
	MT CO2e/kWh	Nonresidential	0.00015	0.00013	0.00012	0.00011	0.00010	0.00010	0.00009	0.00008	0.00007
Utility provider of choice emissions factor		Residential	-	-	-	-	-	-	-	-	-
	MT CO2e/kWh	Nonresidential	-	-	-	-	-	-	-	-	-
Weighted provider emission factor based on opt-out change		Residential	0.00013	0.00011	0.00009	0.00008	0.00007	0.00005	0.00004	0.00004	0.00003
	MT CO2e/kWh	Nonresidential	0.00015	0.00013	0.00011	0.00009	0.00007	0.00006	0.00004	0.00004	0.00003
Emission Reductions		Residential	-	-	15,890.33	29,625.96	41,206.88	50,633.10	57,904.61	50,806.02	43,707.43
	MT CO2e	Nonresidential	-	-	22,616.16	42,260.13	58,931.94	72,631.56	83,359.01	72,326.37	61,293.73

Definition	Units	Sector	2033	2034	2035	2036	2037	2038	2039	2040	2041
Opt-out rate target of carbon-free electricity		Residential	10%	10%	10%	10%	10%	10%	10%	10%	10%
	%	Nonresidential	10%	10%	10%	10%	10%	10%	10%	10%	10%
Existing Electricity Usage + T&D Losses		Residential	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47
	kWh	Nonresidential	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72
Base utility provider emissions factor		Residential	0.00005	0.00004	0.00003	0.00003	0.00002	0.00002	0.00002	0.00001	0.00001
	MT CO2e/kWh	Nonresidential	0.00005	0.00004	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002	0.00001
Utility provider of choice emissions factor		Residential	-	-	-	-	-	-	-	-	-
	MT CO2e/kWh	Nonresidential	-	-	-	-	-	-	-	-	-
Weighted provider emission factor based on opt-out change		Residential	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
	MT CO2e/kWh	Nonresidential	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001
Emission Reductions		Residential	36,608.85	29,510.26	22,411.67	20,170.51	17,929.34	15,688.17	13,447.00	11,205.84	8,964.67
	MT CO2e	Nonresidential	50,261.09	39,228.45	28,195.81	25,376.22	22,556.64	19,737.06	16,917.48	14,097.90	11,278.32

Definition	Units	Sector	2042	2043	2044	2045	2046	2047	2048	2049	2050
Opt-out rate target of carbon-free electricity		Residential	10%	10%	10%	10%	10%	10%	10%	10%	10%
	%	Nonresidential	10%	10%	10%	10%	10%	10%	10%	10%	10%
Existing Electricity Usage + T&D Losses		Residential	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47	1,819,809,462.47
	kWh	Nonresidential	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72	1,751,986,243.72
Base utility provider emissions factor		Residential	0.00001	0.00001	0.00000	-	-	-	-	-	-
	MT CO2e/kWh	Nonresidential	0.00001	0.00001	0.00000	-	-	-	-	-	-
Utility provider of choice emissions factor		Residential	-	-	-	-	-	-	-	-	-
	MT CO2e/kWh	Nonresidential	-	-	-	-	-	-	-	-	-
Weighted provider emission factor based on opt-out change		Residential	0.00000	0.00000	0.00000	-	-	-	-	-	-
	MT CO2e/kWh	Nonresidential	0.00000	0.00000	0.00000	-	-	-	-	-	-
Emission Reductions		Residential	6,723.50	4,482.33	2,241.17	-	-	-	-	-	-
	MT CO2e	Nonresidential	8,458.74	5,639.16	2,819.58	-	-	-	-	-	-

Regional Building Decarbonization Program

Inputs, Targets, and Assumptions

				Data Source	Notes
Household End use	**Included in Regulation**	**% of total households with end use using natural gas**	**Average natural gas consumption by end use (MMBtu/household)**		
Natural Gas Space Heating	Yes	0.51754386	23.5700	https://www.eia.gov/consum	Number of homes with space heating (main and secondary)/ total number of homes - assumes new home construction would follow same trend
Natural Gas Water Heating	Yes	0.370614035	19.5700	https://www.eia.gov/consum	Number of homes with natural gaswater heater/ total number of homes - assumes new home construction would follow same trend as most recent year of construction surveyed (2020)
Natural Gas Cooking	No	0.390350877	2.0200	https://www.eia.gov/consum	Number of homes with natural gas cooking appliances/ total number of homes - assumes new home construction would follow same trend
Gas dryer	No	0.117647059	2.1300	https://www.eia.gov/consum	Number of homes with natural gas dryer/ total number of homes - assumes new home construction would follow same trend as most recent year of construction surveyed (2020)
Average for all Households			19.45142544		
Commercial End use	**Included in Regulation**	**% of buildings using natural gas**	**Average natural gas energy intensity by end use (scf/sf in buildings)**		
Natural Gas Space Heating	Yes		26.2000		
Natural Gas Water Heating	Yes		4.7000		
Natural Gas Cooking	No	0.50253464	13.7000		
Average for all Commercial Buildings			15.5283		

$l_{pipline\ NG,}$	Natural gas pipeline leakage percentage	2.3%	percentage	Inventory & Forecast	N/A
$l_{End\ use\ NG,}$	Natural gas end-use leakage percentage	0.5%	percentage	Inventory & Forecast	N/A
	Natural gas leakage EF	0.53067	MT CO2e/MMBtu		
	Natural gas combustion EF	0.05311	45 MT CO2e/MMBtu		
	Natural gas therms to scf conversion	97.25	scf/therm	Conversion	
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions	https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm
$Eff_{HP,elec}$	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute. Heat	https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-
$L_{T\&D}$	Electricity transmission and distribution loss percentage	4.23%	percentage	Inventory & Forecast	N/A
	Year of implementation	2025	year		PCAP action for establishing regulation sets date to 2025
	Cumulative 2030 Emission Reductio	**69,235**	MT CO2e	Calculated	N/A
	Cumulative 2050 Emission Reductio	**928,671**	MT CO2e	Calculated	N/A

Note: Actions state to develop indoor regs that will cover 100% of new buildings - measure only quantifies avoided emissions with new building regulation; BAAQMD regs target water heaters and space heating equipment - current reductions also assume regs target those uses - can increase to assume reduction of all natural gas from buildings

Emissions Reductions Calculations

Definition	**Units**	**Sector**	**2022**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**
			0%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Number of New Households	Residential	-	3,360.00	4,480.00	5,600.00	6,720.00	7,840.00	8,960.00	10,080.00	11,200.00	12,320.00	13,440.00	14,560.00	15,680.00	16,800.00	17,920.00	19,040.00	20,160.00	21,280.00	22,400.00	23,520.00	24,640.00	25,760.00	26,880.00	28,000.00	29,120.00	30,240.00	31,360.00
Forecasted Growth	New Commercial Square Footage	Nonresidential	-	4,340,594.52	5,787,459.36	7,234,324.20	8,681,189.04	10,128,053.88	11,574,918.72	13,021,783.55	14,468,648.39	15,915,513.23	17,362,378.07	18,809,242.91	20,256,107.75	21,702,972.59	23,149,837.43	24,596,702.27	26,043,567.11	27,490,431.95	28,937,296.79	30,384,161.63	31,831,026.47	33,277,891.31	34,724,756.15	36,171,620.98	37,618,485.82	39,065,350.66	40,512,215.50
		Residential	-	65,356.79	91,797.54	114,746.93	137,696.31	160,645.70	183,595.08	206,544.47	229,493.85	252,443.24	275,392.62	298,342.01	321,291.39	344,240.78	367,190.16	390,139.55	413,088.93	436,038.32	458,987.70	481,937.09	504,886.47	527,835.86	550,785.24	573,734.63	596,684.01	619,633.40	642,582.78
Avoided Natural gas usage	MMBtu	Nonresidential	-	34,752.58	46,336.77	57,920.97	69,505.16	81,089.36	92,673.55	104,257.74	115,841.94	127,426.13	139,010.32	150,594.52	162,178.71	173,762.91	185,347.10	196,931.29	208,515.49	220,099.68	231,683.87	243,268.07	254,852.26	266,436.45	278,020.65	289,604.84	301,189.04	312,773.23	324,357.42
		Residential	-	1,829.99	2,570.33	3,212.91	3,855.50	4,498.08	5,140.66	5,783.25	6,425.83	7,068.41	7,710.99	8,353.58	8,996.16	9,638.74	10,281.32	10,923.91	11,566.49	12,209.07	12,851.66	13,494.24	14,136.82	14,779.40	15,421.99	16,064.57	16,707.15	17,349.74	17,992.32
Avoided Natural gas leakage	MMBtu	Nonresidential	-	973.07	1,297.43	1,621.79	1,946.14	2,270.50	2,594.86	2,919.22	3,243.57	3,567.93	3,892.29	4,216.65	4,541.00	4,865.36	5,189.72	5,514.08	5,838.43	6,162.79	6,487.15	6,811.51	7,135.86	7,460.22	7,784.58	8,108.94	8,433.29	8,757.65	9,082.01
		Residential	-	6,653,188.28	9,344,802.97	11,681,003.72	14,017,204.46	16,353,405.20	18,689,605.95	21,025,806.69	23,362,007.43	25,698,208.18	28,034,408.92	30,370,609.66	32,706,810.41	35,043,011.15	37,379,211.89	39,715,412.64	42,051,613.38	44,387,814.13	46,724,014.87	49,060,215.61	51,396,416.36	53,732,617.10	56,068,817.84	58,405,018.59	60,741,219.33	63,077,420.07	65,413,620.82
Conversion to Electricity (includes T&D)	kWh	Nonresidential	-	3,537,742.08	4,716,989.45	5,896,236.81	7,075,484.17	8,254,731.53	9,433,978.89	10,613,226.25	11,792,473.61	12,971,720.98	14,150,968.34	15,330,215.70	16,509,463.06	17,688,710.42	18,867,957.78	20,047,205.14	21,226,452.51	22,405,699.87	23,584,947.23	24,764,194.59	25,943,441.95	27,122,689.31	28,301,936.68	29,481,184.04	30,660,431.40	31,839,678.76	33,018,926.12
		Residential	0.000131	0.00010	0.00009	0.00007	0.00006	0.00005	0.00004	0.00003	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-	-	-	-	-	-	-
Forecasted Electricity Emission Factor	MT CO2e/kWh	Nonresidential	0.000154	0.00012	0.00010	0.00008	0.00007	0.00005	0.00004	0.00004	0.00003	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00001	-	-	-	-	-	-	-
		Residential	-	4,442.51	6,239.78	7,799.72	9,359.67	10,919.61	12,479.56	14,039.50	15,599.45	17,159.39	18,719.33	20,279.28	21,839.22	23,399.17	24,959.11	26,519.06	28,079.00	29,638.95	31,198.89	32,758.83	34,318.78	35,878.72	37,438.67	38,998.61	40,558.56	42,118.50	43,678.45
Avoided Natural Gas Emissions	MT CO2e	Nonresidential	-	2,362.25	3,149.66	3,937.08	4,724.49	5,511.91	6,299.32	7,086.74	7,874.15	8,661.57	9,448.98	10,236.40	11,023.82	11,811.23	12,598.65	13,386.06	14,173.48	14,960.89	15,748.31	16,535.72	17,323.14	18,110.55	18,897.97	19,685.39	20,472.80	21,260.22	22,047.63
		Residential	-	728.76	878.31	928.37	927.22	883.15	804.48	794.09	759.04	699.34	614.99	505.97	490.41	467.05	435.92	397.00	350.29	295.80	233.53	163.47	85.63	-	-	-	-	-	-	-
New Electricity Emissions	MT CO2e	Nonresidential	-	455.22	508.65	522.92	504.04	458.00	390.82	381.48	359.21	324.01	275.88	214.81	208.20	198.29	185.07	168.55	148.72	125.58	99.14	69.40	36.35	-	-	-	-	-	-	-
		Residential	-	3,712.76	5,361.47	6,871.36	8,432.45	10,036.46	11,675.08	13,245.41	14,840.40	16,460.05	18,104.35	19,773.30	21,348.82	22,932.11	24,523.20	26,122.06	27,728.71	29,343.15	30,965.36	32,595.37	34,233.15	35,878.72	37,438.67	38,998.61	40,558.56	42,118.50	43,678.45
Total Emission Reductions	MT CO2e	Nonresidential	-	1,907.03	2,641.01	3,414.16	4,220.46	5,053.91	5,908.50	6,705.26	7,514.94	8,337.56	9,173.11	10,021.59	10,815.61	11,612.94	12,413.58	13,217.52	14,024.76	14,835.31	15,649.16	16,466.32	17,286.79	18,110.55	18,897.97	19,685.39	20,472.80	21,260.22	22,047.63

Extremely Low-income Renter Household Electrification

Inputs, Targets, and Assumptions

Parameter	Value	Source
Total households	294,989	2022 GHG emissions inventory
Residential NG consumption (therms)	101,221,916	2022 GHG emissions inventory
Residential NG leaks (therms)	2,848,456	2022 GHG emissions inventory
Total extremely low-income (<⁄= 30% AMI) households in Ventura County	13,155	https://www.buildersbpatch.com/housingcount/counties/ventura-county-california
Target % of units electrified	100%	Provisional
Implementation year	2025	Year in which EPA grant is awarded
Target year	2030	Provisional
Total years for implementation (including 2030)	6	Provisional
Electric to natural gas equipment efficiency ratio (Coefficient of Performance of heat pump)	3	https://help.leonardo-energy.org/hc/en-us/articles/20304785-How-efficient-is-a-heat-pump

Note: It is assumed that each low-income household consumes natural gas a rate equivalent to the household average for Ventura County, and electric equipment is approximately 3 times more efficient than natural gas equipment (conservative assumption). It is assumed that electrification will occur evenly/linearly through the target year of 2030

Emissions Reductions Calculations

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Average NG consumption (therms/household)	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343	343
Average NG leaks (therms/household)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Number of households electrified	2,193	4,385	6,578	8,770	10,963	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155	13,155
Total NG consumption avoided (therms)	752,330	1,504,660	2,256,990	3,009,320	3,761,650	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980	4,513,980
Total NG leaks avoided (therms)	21,171	42,342	63,513	84,684	105,855	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027	127,027
NG consumption EF (MT CO2e/therm)	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531	0.00531
NG leaks EF (MT CO2e/therm)	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307	0.05307
Total NG emissions avoided (MT CO2e)	5,119	10,239	15,358	20,478	25,597	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717	30,717
New electricity consumption from housing electrification (kWh)	7,554,527	15,109,053	22,663,580	30,218,106	37,772,633	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159	45,327,159
Weighted electricity EF (MT CO2e/kWh)	0.00011	0.00009	0.00008	0.00007	0.00005	0.00004	0.00004	0.00003	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Emissions from new electricity usage (MT CO2e)	829	1,420	1,801	1,999	2,040	1,951	1,712	1,473	1,234	994	755	680	604	529	453	378	302	227	151	76	0	0	0	0	0	0
Total Reductions (MT CO2e)	4,291	8,819	13,557	18,479	23,557	28,766	29,005	29,244	29,483	29,722	29,962	30,037	30,113	30,188	30,264	30,339	30,415	30,490	30,566	30,641	30,717	30,717	30,717	30,717	30,717	30,717

Regional Transportation

Zero-Emission Vehicles and Charging Stations

Inputs, Targets, and Assumptions

Parameter	Value	Source
Total VMT	6,736,992,859	2022 GHG emissions inventory
Total Vehicles	682,484	2022 vehicle count from California Energy Commission (CEC)
Average VMT/vehicle	9,871.28	Calculated

Parameter	2022	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Source
% of passenger vehicles that are EV	2.99%	6.56%	7.75%	8.93%	10.12%	11.31%	12.50%	16.88%	21.25%	25.63%	30.00%	34.38%	38.75%	43.13%	47.50%	51.88%	56.25%	60.63%	65.00%	69.38%	73.75%	78.13%	82.50%	86.88%	91.25%	95.63%	100.00%	VCREA EV Ready Blueprint (EV % share 2030 target)
% of commercial vehicles that are EV	0.00%	2.08%	4.17%	6.25%	8.33%	10.42%	12.50%	16.88%	21.25%	25.63%	30.00%	34.38%	38.75%	43.13%	47.50%	51.88%	56.25%	60.63%	65.00%	69.38%	73.75%	78.13%	82.50%	86.88%	91.25%	95.63%	100.00%	VCREA EV Ready Blueprint (EV % share 2030 target)
Forecasted passenger % EV share	-	5.20%	5.72%	6.21%	6.68%	7.14%	7.58%	7.98%	8.34%	8.66%	8.94%	9.19%	9.41%	9.59%	9.75%	9.89%	10.00%	10.09%	10.17%	10.24%	10.29%	10.34%	10.38%	10.41%	10.44%	10.46%	10.48%	EMFAC2021
Forecasted commercial % EV share	-	0.81%	1.46%	2.42%	3.72%	5.37%	7.32%	9.52%	11.90%	14.40%	17.01%	19.71%	22.23%	24.53%	26.63%	28.54%	30.29%	31.89%	33.34%	34.63%	35.79%	36.82%	37.71%	38.50%	39.18%	39.76%	40.25%	EMFAC2021

Note: It is assumed that % EV share in Ventura County will increase linearly through 2030 in alignment with VCREA's EV Ready Blueprint target of 12.5% EV share by 2030, and linearly through 2050 with a provisional target of 100% EV share by 2050

Emissions Reductions Calculations

Parameter	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	
Passenger VMT	6,172,621,679	6,195,793,657	6,218,965,634	6,242,137,611	6,265,309,589	6,288,481,566	6,311,653,543	6,334,825,521	6,357,997,498	6,381,169,476	6,404,341,453	6,427,513,430	6,450,685,408	6,473,857,385	6,497,029,363	6,520,201,340	6,543,373,317	6,566,545,295	6,589,717,272	6,612,889,249	6,636,061,227	6,659,233,204	6,682,405,182	6,705,577,159	6,728,749,136	6,751,921,114	
Passenger VMT EF (MT CO2e/VMT)	0.000314	0.000306	0.000299	0.000293	0.000287	0.000282	0.000277	0.000273	0.000269	0.000265	0.000262	0.000260	0.000258	0.000257	0.000255	0.000254	0.000252	0.000251	0.000251	0.000250	0.000249	0.000249	0.000248	0.000248	0.000248	0.000248	
EV adoption beyond baseline	1.36%	2.03%	2.72%	3.44%	4.17%	4.92%	8.90%	12.91%	16.97%	21.06%	25.18%	29.34%	33.53%	37.75%	41.99%	46.25%	50.53%	54.83%	59.14%	63.46%	67.79%	72.12%	76.47%	80.81%	85.17%	89.52%	
Emission Reduction from EV increased adoption (MT CO2e)	26,339	38,422	50,672	62,883	75,084	87,227	155,508	223,063	289,874	356,544	423,171	489,887	557,058	626,984	695,500	764,717	834,712	905,413	976,895	1,049,100	1,121,951	1,195,511	1,269,744	1,344,611	1,420,208	1,496,542	
EV electricity usage (kWh/mile)	0.3676	0.3678	0.3680	0.3682	0.3684	0.3686	0.3688	0.3690	0.3691	0.3692	0.3693	0.3694	0.3695	0.3695	0.3696	0.3696	0.3697	0.3697	0.3698	0.3698	0.3698	0.3698	0.3698	0.3698	0.3698	0.3698	
EV electricity usage from increased EV adoption (kWh)	30,876,126	46,187,834	62,280,055	79,026,259	96,341,691	114,116,239	207,090,366	301,773,485	398,132,670	496,093,397	595,622,529	696,663,418	799,166,583	903,057,914	1,008,274,057	1,114,746,272	1,222,402,936	1,331,158,591	1,440,967,518	1,551,768,612	1,663,515,306	1,776,184,027	1,889,741,014	2,004,161,955	2,119,436,989	2,235,554,587	
Weighted electricity EF (MT CO2e/kWh)	0.00011	0.00009	0.00008	0.00007	0.00005	0.00004	0.00004	0.00003	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	Accounts for implementation of B-1 (increase 100% carbon-free electricity)
Emissions from electricity usage for Evs (MT CO2e)	3,387	4,341	4,950	5,227	5,203	4,912	7,821	9,805	10,835	10,883	9,923	10,446	10,651	10,531	10,079	9,286	8,146	6,653	4,801	2,585	0	0	0	0	0	0	
Total Reductions (MT CO2e)	22,952	34,080	45,722	57,656	69,881	82,315	147,687	213,259	279,039	345,661	413,248	479,442	546,407	616,453	685,421	755,431	826,566	898,760	972,093	1,046,515	1,121,951	1,195,511	1,269,744	1,344,611	1,420,208	1,496,542	
Commercial VMT	619,004,966	621,455,246	623,905,526	626,355,806	628,806,086	631,256,366	633,706,646	636,156,926	638,607,206	641,057,486	643,507,766	645,958,045	648,408,325	650,858,605	653,308,885	655,759,165	658,209,445	660,659,725	663,110,005	665,560,285	668,010,565	670,460,845	672,911,125	675,361,405	677,811,685	680,261,965	
Commercial VMT EF (MT CO2e/VMT)	0.000961	0.000946	0.000930	0.000910	0.000888	0.000864	0.000839	0.000815	0.000789	0.000764	0.000740	0.000718	0.000698	0.000685	0.000669	0.000655	0.000643	0.000632	0.000623	0.000615	0.000609	0.000603	0.000599	0.000596	0.000594	0.000593	
EV adoption beyond baseline	1.27%	2.70%	3.83%	4.61%	5.05%	5.18%	7.35%	9.35%	11.22%	12.99%	14.66%	16.52%	18.60%	20.87%	23.34%	25.96%	28.74%	31.66%	34.74%	37.96%	41.31%	44.79%	48.38%	52.07%	55.87%	59.75%	
Emission Reduction from EV increased adoption (MT CO2e)	7,573	15,905	22,243	26,292	28,199	28,228	39,096	48,452	56,508	63,616	69,841	76,580	84,193	93,006	101,997	111,523	121,600	132,209	143,537	155,396	167,951	181,192	195,153	209,754	225,106	241,137	
EV electricity usage (kWh/mile)	0.8859	0.8770	0.8731	0.8748	0.8789	0.8832	0.8865	0.8883	0.8874	0.8850	0.8819	0.8796	0.8790	0.8856	0.8865	0.8878	0.8894	0.8912	0.8930	0.8950	0.8970	0.8990	0.9012	0.9036	0.9061	0.9088	
EV electricity usage from increased EV adoption (kWh)	6,981,828	14,738,231	20,889,159	25,275,057	27,915,038	28,868,097	41,293,887	52,839,538	63,590,918	73,667,708	83,200,548	93,850,723	105,990,666	120,319,273	135,152,338	151,125,683	168,231,099	186,389,548	205,738,589	226,082,906	247,495,072	269,952,962	293,400,001	317,757,525	343,108,257	369,387,056	
Weighted electricity EF (MT CO2e/kWh)	0.00013	0.00011	0.00009	0.00007	0.00006	0.00004	0.00004	0.00003	0.00002	0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	Accounts for implementation of B-1 (increase 100% carbon-free electricity)
Emissions from electricity usage for Evs (MT CO2e)	898	1,589	1,853	1,801	1,549	1,196	1,484	1,610	1,588	1,436	1,166	1,184	1,188	1,180	1,136	1,059	943	784	577	317	0	0	0	0	0	0	
Total Reductions (MT CO2e)	6,674	14,316	20,391	24,491	26,650	27,032	37,612	46,843	54,919	62,180	68,676	75,396	83,005	91,825	100,861	110,464	120,657	131,425	142,961	155,079	167,951	181,192	195,153	209,754	225,106	241,137	
Passenger and Commercial Total Reductions (MT CO2e)	29,626	48,396	66,113	82,147	96,531	109,347	185,299	260,101	333,958	407,841	481,924	554,838	629,412	708,278	786,282	865,895	947,223	1,030,185	1,115,054	1,201,594	1,289,901	1,376,703	1,464,897	1,554,365	1,645,314	1,737,679	

EV Charger Calculations (2030 target year)

Parameter	Value	Source
Total EVMT	864,967,241	2022 GHG Emissions Inventory and EMFAC2021
Average VMT/vehicle	9,871.28	Calculated
Total EVs	87,625	Calculated
Total EV Charging Ports Needed	73,999	US DOE Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite: https://afdc.energy.gov/evi-pro-lite
Total Public EV Charging Ports Needed	2,264	US DOE Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite: https://afdc.energy.gov/evi-pro-lite

Multi-modal Transportation Hubs

Inputs, Targets, and Assumptions

Parameter	Value	Source
Total Annual Passenger VMT	6,103,105,747	2022 GHG emissions inventory
Total Daily Passenger VMT	17,588,201	2023 GHG emissions inventory
Number of Passenger Vehicles	682,484	2022 California Energy Commission (CEC) Vehicle Count
% of Low Income Households	36%	Based on household incomes below $75,000 (https://data.census.gov/table/ACSST1Y2022.S1901?t=Income%20and%20Poverty&g=050XX00US06111) & (https://www.hcavventura.org/housing/income_limits.php)
% of Ventura County Employees that are Farmers	5%	https://data.census.gov/table/ACSDT1Y2023.B24050?t=Industry,Occupation&g=050XX00US06111
Existing Transit Mode share (2022)	0.7%	https://data.census.gov/table?q=Ventura%20County,%20California&d=Commuting
Average transit trip lenth (miles)	3.8	https://www.apta.com/wp-content/uploads/Resources/resources/statistics/Documents/FactBook/2018-APTA-Fact-Book.pdf
Existing bicycle mode share (2022)	0.4%	https://data.census.gov/table?q=Ventura%20County,%20California&d=Commuting
Average bike trip length (miles)	2.2	Table T-9.1 - Riverside(https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf)
Existing Single Occupancy Commute (2022)	70%	https://data.census.gov/table?q=Ventura%20County,%20California&d=Commuting
Existing vehicle mode share (2022)	81%	https://data.census.gov/table?q=Ventura%20County,%20California&d=Commuting
Average Vehicle Trip Length (miles)	11.7	Table T-9.1 - Riverside(https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf)
Average Vehicle Commuter Trip Length (miles)	18.62	Table T-10.1 - Riverside(https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf)

Strategy Reduction Quantification

Strategy	Subsector	Target Input for 2030	Target Units	% Reduction in Passenger VMT	Source
Subsidized or Discounted Transit Program for Low Income	Trip Reduction Program	75%	% subsidy	-0.04%	T-8 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Provide end-of-trip bicycle facilites	Trip Reduction Program	NA	NA	-0.36%	T-9 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Employer-sponsored vanpool for Farmers	Trip Reduction Program	50%	% participation of famers	-5%	T-10 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Improve Street Connectivity	Land Use	25%	% increase in intersection density	-4%	T-16 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Pedestrian Network Improvements	Neighborhood Design	1.25	ratio of sidewalk-to-street	-1%	T-17 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Bicycle Network Improvements	Neighborhood Design	75%	% of community VMT on parallel roadway	-0.025%	T-18- A[https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf] T-20-B
EV Carshare	Neighborhood Design	500	number of EV deployed in program	-0.12%	[https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Bike Share	Neighborhood Design	100%	% of residents with access to bikeshare	-0.02%	T-21-A [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
E-Bike Share	Neighborhood Design	100%	% of residents with access to e-bikeshare	-0.05%	T-21-B [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Scootershare	Neighborhood Design	100%	% of residents with access to scootershare	-0.05%	T-21-C [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Extend Transit Network Coverage/Hours	Transit	25%	% increase in transit coverage	-0.07%	T-24 [https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
Increase Transit Frequency	Transit	100%	% increase in transit frequ		
	Transit	25%	% level of implementation	-0.06%	[https://www.airquality.org/ClimateChange/Documents/Handbook%20Public%20Draft_2021-Aug.pdf]
	Trip Reduction Programs			-5.1%	
	Land Use			-3.5%	
	Neighborhood Design			-1.5%	
	Transit Reduction			-0.1%	
All Strategies Combined				**-10.3%**	

Emissions Reductions Calculations

	2022	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	Source
% of passenger VMT reduction	0.00%	3.85%	5.13%	6.41%	7.69%	8.97%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	10.26%	
Forecasted Passenger VMT	6,103,105,747	6,172,621,679	6,195,793,657	6,218,965,634	6,242,137,611	6,265,309,589	6,288,481,566	6,311,653,543	6,334,825,521	6,357,997,498	6,381,169,476	6,404,341,453	6,427,513,430	6,450,685,408	6,473,857,385	6,497,029,363	6,520,201,340	6,543,373,317	6,566,545,295	6,589,717,272	6,612,889,249	6,636,061,227	6,659,233,204	6,682,405,182	6,705,577,159	6,728,749,136	6,751,921,114	
Forecasted Passenger EF (MT CO2e/VMT)	0.000339304	0.000309895	0.000300478	0.000292061	0.000283738	0.000275943	0.000268653	0.000255532	0.000239057	0.000224844	0.000211187	0.000197863	0.000185171	0.000172842	0.000161351	0.000149451	0.00013772	0.0001262	0.000114606	0.000103156	9.1741E-05	8.03395E-05	6.93865E-05	5.84784E-05	4.76051E-05	3.67626E-05	2.59408E-05	Modified EMFAC2021 EF to account for Measure T-1 EV inclusion
Avoided Emissions (MT CO2e)	0	73561.84131	95458.88844	116414.6898	136222.3361	155133.8713	173250.6665	164101.3429	155300.4481	146601.2496	138198.6923	129949.6904	122054.3581	114338.2457	107120.0539	99575.25084	92086.19429	84629.85737	77175.78644	69710.2045	62214.44258	54673.42	47384.45319	40074.18559	32736.08438	25367.05462	17961.66972	
Cumulative 2030 Emission Reduction	**750,042**																											
Cumulative 2050 Emission Reduction	**2,531,295**																											

Note: Assumed 2030 target stays constant through 2050 since Measure does not specify 2050 target

Ocean-going Vessel Speed Reductions

Inputs, Targets, and Assumptions

Parameter	Value	Source
Average ocean-going vessel speed 1 (knots)	24	Notteboom, Theo & Cariou, Pierre. (2009). Fuel surcharge practices of container shipping lines: Is it about cost recovery or revenue-making. 24-26.
Average ocean-going vessel speed 2 (knots)	21	
% decrease in vessel speed	12.5%	Calculated
Fuel consumption per day @ speed 1 (tons)	225	Notteboom, Theo & Cariou, Pierre. (2009). Fuel surcharge practices of container shipping lines: Is it about cost recovery or revenue-making. 24-26.
Fuel consumption per day @ speed 2 (tons)	150	
% decrease in fuel consumption from 12.5% reduction in vessel speed	33.3%	Calculated

Note: The average ocean-going vessel from the source study is assumed to be around 8,000 Twenty-foot Equivalent Units (TEU).

Note: It is assumed that ocean-going vessel fuel consumption and fleet cooperation remains consistent through 2050

Emissions Reductions Calculations

Parameter	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Baseline fuel consumption (gal)	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127	18,728,127
Fleet cooperation (%)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Reduced speed fuel consumption (gal)	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960	13,733,960
Avoided fuel consumption from reduced speeds (gal)	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167	4,994,167
Diesel emission factor (MT CO2e/gal)	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043	0.01043
Emissions from avoided fuel consumption (MT CO2e)	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112	52,112

Solid Waste

Organic Waste Diversion

Organic Waste Diversion Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source	Link
Organic Waste Diversion					
$CO_2 e$ *Reduction* $_y$	Landfilled organic waste GHG emission reductions	See calculation table	MT CO2e	Calculated	N/A
CO2e Emissions $_y$	Landfilled organic waste GHG emissions	See calculation table	MT CO2e	Calculated	N/A
Reduction Target $_{LOW, y}$	Landfilled organic waste reduction target	75%	percentage	Assume SB 1383 Requirement	N/A
Implementation Year	Year in which program is implemented	2025	Year	Year in which EPA grant is awarded	

Organic Waste Diversion Emission Reduction Calculations

Variable	Definition	Units	Sector	2030	2050
Organic Waste Diversion					
CO2e Emissionsy	Landfilled organic waste GHG emissions	MT CO2e	Community	424,992	424,992
Reduction TargetLOW, y	Landfilled organic waste reduction target	percentage	Community	75%	75%
CO2e Reductiony	**Landfilled organic waste GHG emission reductions**	**MT CO2e**		**1,593,720**	**7,968,602**

Note: Quantification assesses cumulative GHG emissions reductions based on annual diversion targets

Note: Quantification assumes all GHG emissions from landfilled waste are the result of organic waste which would be diverted by SB 1383

Appendix B

LIDAC Benefits Analysis

CITY OF OXNARD CALIFORNIA

CITY OF SIMI VALLEY

CCCJN CENTRAL COAST CLIMATE JUSTICE NETWORK

City of Thousand Oaks

CITY OF VENTURA

The Port OF Hueneme Oxnard Harbor District

Ventura County Air Pollution Control District

COUNTY of VENTURA

Qualitative LIDACs Analysis Memo

February 14, 2024

To: County of Ventura Executive Office (CEO) Sustainability Division

From: Raimi + Associates

Subject: Low Income and Disadvantaged Communities (LIDAC) Benefits Analysis

This memorandum summarizes the county of Ventura's low income and disadvantaged communities benefits analysis for the Priority Climate Action Plan (PCAP). The analysis includes three primary components: 1) background on potential impacts to low income and disadvantaged communities (LIDACs); 2) identification of the spatial distribution of LIDACs across both incorporated and unincorporated areas of Ventura County; and 3) a preliminary, qualitative assessment of the potential climate impacts and benefits associated with PCAP greenhouse gas (GHG) reduction measures within those identified LIDACs.

Additional analysis to refine and confirm LIDACs and to provide more detailed analysis of GHG mitigation benefits will be completed through the Comprehensive Climate Action Plan (CCAP) process. To that end, a brief overview of a recommended engagement approach and potential engagement activities with residents and representatives of LIDACs is included to inform CCAP development and implementation.

Impacts to LIDACs

Climate change is expected to create a series of shocks and burdens that Ventura County's LIDACs will experience more acutely due to their limited options and resources for avoiding, recovering from, or adapting to the damage caused by climate change. Understanding how place, demographics, and socioeconomic status contribute to climate change vulnerability helps identify avenues for policy and/or programmatic interventions to relieve the burden on those groups.

Overall, there are many social, economic, and environmental factors that influence community and individual vulnerability to climate impacts and their ability to adapt to climate change. For example, outdoor workers are at greater risk of heat stroke and related illnesses from extreme heat events, lower income residents have fewer resources to repair flood or fire damage and may live in poor housing conditions, and people with limited English language proficiency are less likely to access programs that could help during or after an extreme weather event. Moreover, individual biological factors, such as age or health status, can amplify a population's sensitivity to climate change.

LIDACs are often burdened with multiple, overlapping factors that cumulatively impact their ability to adapt or respond to climate change. The following describe at a high-level anticipated climate changes in Ventura County and their potential impacts to LIDACs. These potential impacts may compound existing burdens, like rent burden or health issues among these groups.

- **Extreme Heat and Warm Nights.** Increased frequency of extreme heat days may result in increased public health risks, which tend to be disproportionate for vulnerable populations such as those experiencing homelessness, outdoor workers, older adults, children, and individuals with underlying chronic diseases. These include increased likelihood of heat-related illnesses such as heat stroke, dehydration, and mortality. Portions of the county closer to the Pacific Coast will have fewer heat days. Warm nights can exacerbate the risk of heat illness. The body may not have the ability to cool after a day of heightened temperatures, which may be mitigated with at home cooling systems including fans, air conditioning, and proper insulation. Since the cost of acquiring and utilizing these systems may be expense, or only available in newer, more high-quality housing, the burdens are experienced by those with economic disadvantages.

  Likewise, there will also be a greater demand placed on energy infrastructure and water supplies across the county. Residents are expected increase their energy consumption to combat the heat, adding more of a financial burden on LIDAC residents due to energy providers attempts to curtail energy use during peak energy periods by increasing the cost of using energy during those times.
- **Drought.** Ventura County may experience significant impacts to their water supply and an increase in the length of precipitation dry spells. Drought can affect LIDACs as it can suppress economic productivity throughout the Ventura region. Vulnerabilities for agricultural productivity and natural resources can be stressed, with sustained drought conditions potentially leading to dry, dusty conditions which can impact respiratory health. Furthermore, when water providers attempt to curtail water use during droughts by increasing the cost of water, it oftentimes makes water unaffordable for low-income residents.
- **Wildfire.** The occurrences of wildfires have increased within California in frequency and intensity over the past two decades. For Ventura County, this trend is projected to continue, with conditions exacerbated by heat, drought, and precipitation changes, as well as land management practices. Wildfires pose serious direct threats to the built and natural environments and LIDACs. Wildfires can create risk of injury, death, or financial hardship if personal property is damaged. Smoke from wildfires creates respiratory issues for LIDACs and affects indoor areas without adequate air filtration systems.
- **Air Quality.** Ventura County residents will experience changes in air pollution because of climate change. Dust, smog, and wildfire smoke are examples of pollutants that may increase the concentration of toxins in the air breathed. Residents of LIDACs will experience the same impacts of air pollution with access to adequate air filtration systems being important.
- **Flooding.** Climate change may cause low-lying areas throughout Ventura County to experience more frequent flooding and potentially increase the extent of 100-year floods. Flooding has the potential to have serious infrastructure impacts across Ventura County. During events of extreme rainfall or inefficient stormwater drainage systems, jurisdictions in the county can experience riverine flooding, localized flooding, and levee failure flooding. Furthermore, households not located in flood zones may not be able to purchase flood insurance, leaving residents displaced or incurring expensive repair bills. The expected climatic impacts of increased temperatures will increase the potential of flash flooding and debris flow. During flooding events, LIDAC residents may not be able to afford the financial costs of household repairs after flooding or be able to access

other resources to take shelter, leaving individuals and families displaced and/or in poor/deteriorating housing conditions.

- **Sea Level Rise.** The effects of sea level rise in Ventura County include regular rising tides, coastal erosion, wave impact, storm flooding, and fluvial flooding. Climate change is expected to increase the rate of sea level rise dependent on the extent of warming temperatures and ice melting. Residents of LIDACs in areas expected to be impacted by sea level rise will experience impacts to infrastructure and potential losses of homes and businesses. Recovering from the impacts to infrastructure may be difficult, financially, for LIDAC residents who have fewer resources to cope.

While the direct impacts of climate change are described above, there are numerous cascading impacts resulting climate change. For example, road closures due to flooding may limit access to jobs or schools. Power outages from wildfire or public power safety shutoffs may impact people using certain types of medical devices. Like may of the direct impacts of climate changes, these indirect impacts often fall on the most burdened populations.

Tools for Identifying Disadvantaged Communities

Central to the U.S. Environmental Protection Agency's (EPA) Climate Pollution Reduction Grants program is to address environmental and climate inequities in low income and disadvantaged communities. An initial first step is to identify those communities within the county. The EPA recommends using the White House's Climate and Economic Justice Screening Tool (CEJST)[1] and the EPA's environmental justice screening tool (EJ Screen) to identify LIDACs using the following definitions:

- Any census tract that is included as disadvantaged in the Climate and Economic Justice Screening Tool (CEJST); and/or,
- Any census block group that is at or above the 90th percentile for any of EJScreen's Supplemental Indexes when compared to the nation or state, and/or any geographic area within Tribal lands and Indigenous areas as included in EJScreen.

This LIDAC analysis for the Ventura County PCAP uses the CEJST tool but substitutes California Senate Bill (SB) 535 disadvantaged communities for EJScreen.[2] For the purposes of this PCAP, the LIDAC analysis was conducted at the census tract level due to concerns regarding the data accuracy of conducting the analysis at the smaller block group scale. Since EJScreen's Supplemental Indexes are at the block group level, they have greater margins of error than the CEJST and SB 535 tools which are at the census tract level. Additionally, SB 535 is more applicable for the PCAP because it includes more locally relevant data through indicators gathered at the state-level, and it helps local jurisdictions meet the requirements of California's Senate Bill 1000 (the Planning for Healthy Communities Act) which requires cities and counties to identify disadvantaged communities within their jurisdiction that will capture relevant LIDACs in the County.[3]

[1] Federal Climate and Economic Justice Screening Tool. Retrieved from https://screeningtool.geoplatform.gov/
[2] California Senate Bill 535, Disadvantaged Communities. Retrieved from https://oehha.ca.gov/calenviroscreen/sb535
[3] California Senate Bill 1000, Planning for Healthy Communities Act. https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1000

Like federal Executive Order (EO) 14008,[4] which aims to deliver 40 percent of federal investments to disadvantaged communities, SB 535 directed at least 25 percent of California Climate Investments to go to projects that provide a direct benefit for disadvantaged communities. Subsequently, Assembly Bill 1550 directed the California Environmental Protection Agency (CalEPA) to identify disadvantaged communities and established additional funding thresholds for projects in or within ½ mile of these disadvantaged communities.[5] Combining federal and State screening tools is consistent with the EPA's allowance to create a more complete and localized picture of communities impacted by climate and environmental inequities.

Types of Disadvantaged Communities

LIDACs were classified into two categories: priority and inclusive disadvantaged communities. The intent behind the two classifications is to: 1) clearly align disadvantaged communities with federal and State funding programs, and 2) create a flexible framework for LIDAC identification that facilitates engagement during the CCAP process so that disadvantaged communities identified by local jurisdictions and stakeholders can be classified as LIDACs in the future.

Priority LIDACs are intended to capture the communities in Ventura County that experience the most climate inequities and environmental injustices, as identified by *the White House and CalEPA*. These geographies align with the White House's EO 14008 and California's SB 535. All LIDACs identified in the PCAP are considered Priority LIDACs. **Inclusive LIDACs** are intended to capture additional communities in Ventura County that experience climate inequities and environmental injustices, as identified by *local agencies and jurisdictions*. Inclusive LIDACs will be added during the CCAP and will include other locally-identified disadvantaged communities, such as those included within adopted General Plans to meet the intent of SB 1000.

- **CEJST:** The burdens are organized into eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development.
    - A census tract is considered disadvantaged if they are (1) at or above the threshold for one or more environmental, climate, or other burdens, and (2) at or above the threshold for an associated socioeconomic burden.
    - A census tract that is surrounded by disadvantaged communities and is at or above the 50% percentile for low income is also considered disadvantaged.
- **SB 535:** Census tracts are considered disadvantaged if they meet one of the following criteria:
    - Tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0.
    - Tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores.

[4] Executive Order 14008: Tackling the Climate Crisis at Home and Abroad. Retrieved from https://www.regulations.gov/document/EPA-HQ-OPPT-2021-0202-0012

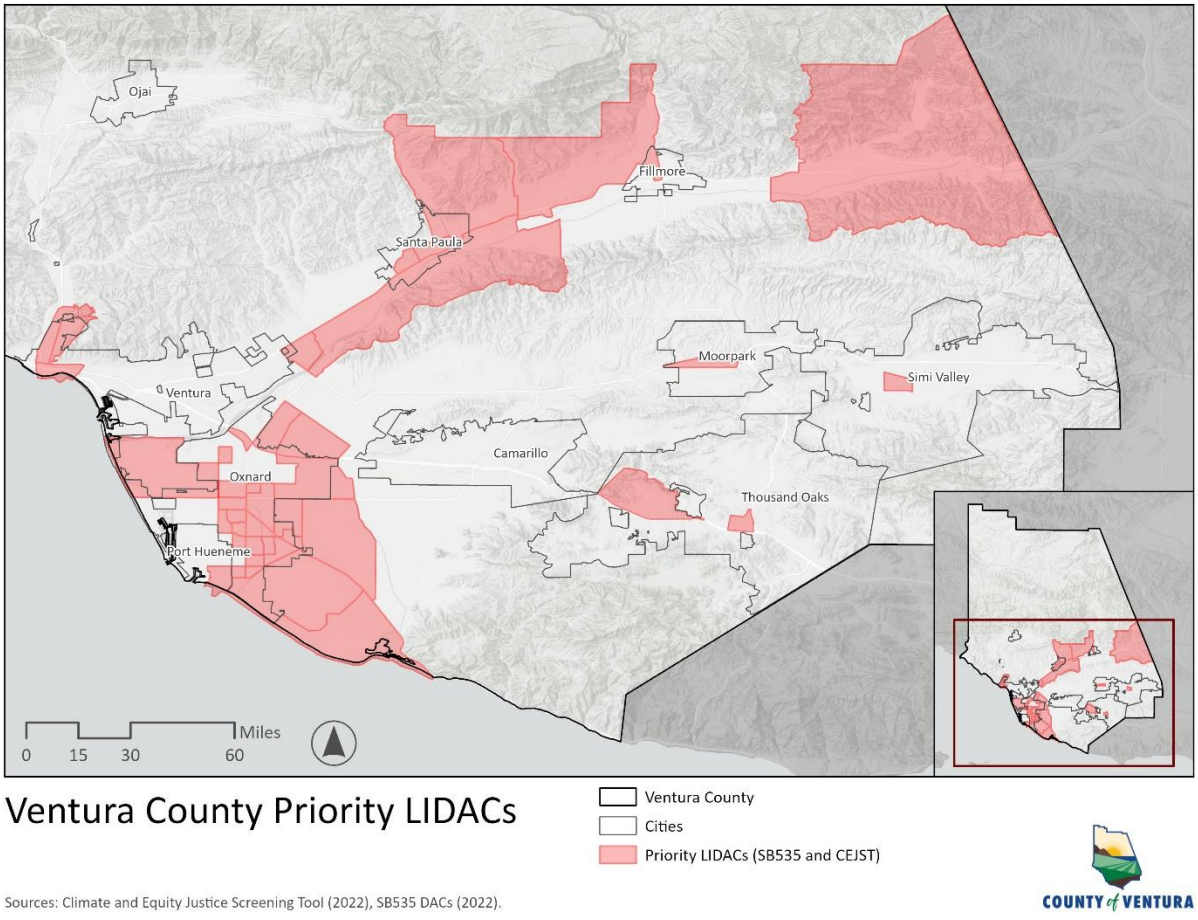
[5] California Assembly Bill 1550. Retrieved from https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1550

- Census tracts identified in CalEnviroScreen 3.0 as disadvantaged, regardless of their scores in CalEnviroScreen 4.0.
- Lands under the control of federally recognized Tribes. For purposes of this designation, a Tribe may establish that a particular area of land is under its control even if not represented as such on CalEPA's disadvantaged communities map and therefore should be considered a disadvantaged community

LIDAC Results

Figure 1 shows the Priority LIDACs of Ventura County. A total of forty-one census tracts were identified as Priority LIDACs; forty were identified through CEJST and eleven were identified under SB 535. Many of the LIDACs are concentrated near Port Hueneme and Oxnard. Common inequities across these cities and nearby communities are housing cost impacts, increased flood and wildfire risks, and linguistic isolation. Some census tracts experience significant traffic impacts, hazardous waste exposure, and high pesticide use at a higher rate when compared to the rest of the state.

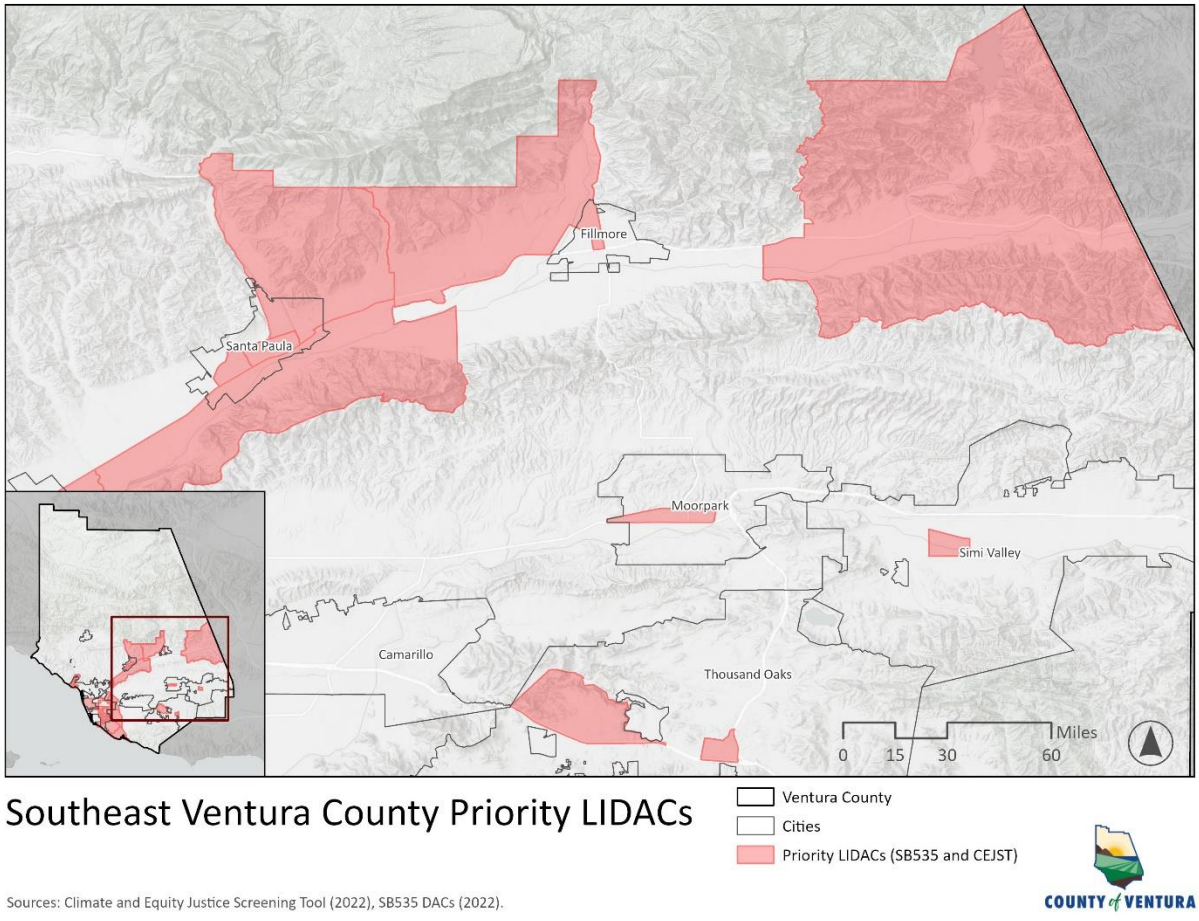
Figure 1. Ventura County LIDACs



In total, **206,196 (24%)** of Ventura County residents live in LIDACs, compared to the county's overall population of 847,263. When analyzing the racial/ethnic demographic composition of the census tracts identified as LIDACs, **86%** of the population within those LIDACs identified as people of color, which is notably higher than the 55% of the county's overall population that identified as people of color.[6]

This memo provides descriptions of the LIDAC analysis results for priority LIDACs. See Table 1 for a Summary of jurisdiction LIDAC proportion and demographics and Table 2 for a list of all the LIDACs identified in this analysis.

Figure 2. Southeast Ventura County LIDACs

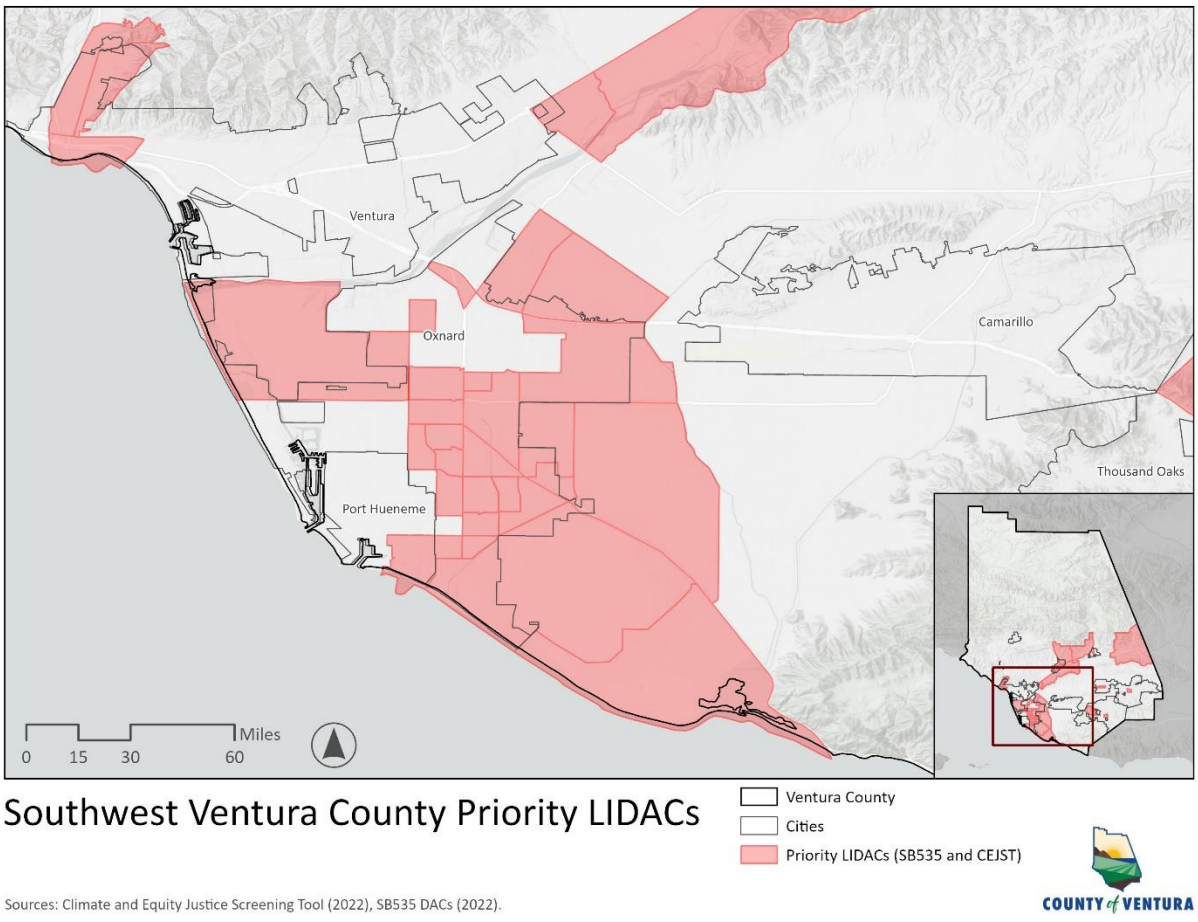


In southeast Ventura County shown in **Figure 2**, a common theme between the census tracts in this area are the expected climate change impacts such as expected building loss rate from natural hazards, flood risk, and wildfire risk. Almost all the census tracts highlighted in Figure 2 rank above the 90th percentile of having a significant share of households where no one over the

[6] "People of color" includes all the following race and ethnicity categories from the U.S. Census Bureau: Asian, American Indian and Alaska Native, Black or African American, Hispanic, or Latino, Native Hawaiian and Other Pacific Islander, and Two or More Races.

age of fourteen speaks English very well. Linguistic isolation has been found to have significant impacts on workforce development.

Figure 3. Southwest Ventura County LIDACs



In **Figure 3**, the census tracts identified in this area are recognized as overburdened by pollution due to the presence of hazardous waste facilities, toxic releases, and exposure to pesticides. The exposure to these pollutants impacts the surrounding groundwater and waterbodies for the county. Some of the census tracts score high in traffic impacts and exposure to diesel particulate matter. An increased exposure to these pollutants could have a significant impact on one's health. Some census tracts in the area are identified to be experiencing severe housing cost impacts. The share of households making less than 80% of the area median family income and spending more than 30% of income on housing places many tracts above the 90th percentile under the CEJST criteria.

Qualitative Description of Impacts and Benefits

The PCAP includes a series of GHG reduction measures to help the County minimize climate pollution and align with the State's goals of reaching carbon neutrality no later than 2045. Depending on how and where measures are implemented, each measure may provide direct and indirect benefits related to air quality, future climate impacts, and other co-benefits. This section summarizes the potential qualitative impacts and benefits focused on LIDACs.

Building Energy

BE-1: Leverage federal funds to establish a permanent and equitable cost tiering or rebate program to allow Ventura County to establish 100% carbon free and renewable energy requirements for the Ventura County community and avoid detrimental economic impacts.

Measure Analysis: Building Energy Measure 1 aims to create a rate support program (or expand an existing program) to ensure low-income households are included in the county's energy transition efforts. Through collaboration with the Clean Power Alliance (CPA) and Southern California Edison (SCE), residential and commercial customers will be transitioned to 100% carbon-free and renewable electricity. Using CPA-provided electricity data and SCE electricity data for residential and commercial totals, 44% of the total countywide electricity usage is through CPA carbon-free power, 28% is through CPA lean/green rate (not very low in carbon intensity compared to SCE 50% green rate), and 19% is through SCE. Currently, households and businesses pay a rate premium for renewable energy through the CPA's 100% Green Power and SCE Green Rate programs. Because of the rate premium, many low-income households cannot afford to make the transition to renewable energy sources.

Discount rate programs for income qualified households, such as the California Alternate Rates for Energy (CARE) and the Family Electric Rate Assistance (FERA) programs, exist. This measure would create opportunities to further lower utility bills (or at least not increase bills) for income-qualified households who cannot afford the rate premiums associated with renewable energy—assuming economies of scale do not decrease the cost of renewable energy. This program would supplement or expand programs like CARE and FERA and require financial support for households who cannot afford to make the energy transition before 2045 – after 2045, all electricity is assumed to be renewable. Although successful programs, not all income-eligible households take advantage of programs like CARE/FERA. Continued work by the SCE and the Gas Company to enroll eligible households will complement this measure and aid this transition.[7]

Key to the success of this measure's execution is partnering with CPA to implement existing educational campaigns, particularly in LIDACs. Educational campaigns can include tabling at community events, establishing informational resources on the County's website, regularly posting on social media, and developing energy bill inserts, to highlight the benefits and cost-competitiveness (e.g., rate support programs) of 100% renewable energy. These outreach efforts

[7] Decision on large investor-owned utilities and Marin Clean Energy's California Alternate Rates For Energy (care), Energy Savings Assistance (ESA), and Family Electric Rate Assistance (FERA) program applications for program years 2021-2026.

will help to maintain retention in the program and address the high opt out rate that is currently being experienced.

Climate Impacts and GHG Co-Benefits: The transition to renewable energy will lead to improved public health outcomes among residents of Ventura County, and especially in LIDACs. Fossil fuels represent about a quarter of SCE's power mix, as of 2021, and since there are significant local sources of fossil fuel energy generation, then a change to 100% renewable energy for residential and commercial may reduce local demand and production of fossil fuel energy, which may decrease residents' exposure to methane, sulfur dioxide, volatile organic compounds, and other forms of health-harming air pollution.[8] Additionally, since Ventura County's existing fossil fuel energy plants are located near LIDACs, a decrease in local production of fossil fuel energy will address health inequities in the region.

Equity Considerations: An important focus area when implementing the rate support program is to ensure that low-income residents do not spend a greater portion of their income during and after the energy transition. Therefore, a program designed to make 100% renewable energy equivalent in cost to other program tiers (e.g., CPA's Clean Power tier) or SCE's standard portfolio would likely be cost neutral for program participants. The targeted outreach to LIDAC households to highlight barriers to remaining with the CPA can help to more equitably tailor the program to include LIDACs in the energy transition. Furthermore, partnering with the CPA to develop and implement a long-term credit or rebate program using funding from the federal government to equitably provide clean power to LIDACs can alleviate this potential financial disparity.

BE-2: Use federal funds to support the development and deployment of a regional holistic new construction decarbonization program for all of Ventura County by developing a regional indoor air quality zero NO_X regulations that would cover 100% of new residential and commercial construction in both incorporated and unincorporated areas by 2025.

Measure Analysis: Indoor air pollution has been found to have significant impacts on human health. Nitrous oxides, carbon monoxide, and formaldehyde emissions are common household pollutants that can increase one's likelihood of being diagnosed with respiratory diseases, heart disease, and cancer.[9] By working with the VCAPCD, detailed as part of the implementation actions, the regulations developed through this partnership would streamline compliance and enforcement of regulations for new residential and commercial construction that reduce indoor air pollutants from heating/cooling, water heater, and appliances for cooking and washing/drying. Additionally, providing financial and technical resources, including workforce development training courses for installers, local contractors, and building owners/operators, to discuss the benefits and technical requirements of electrification as a result of proposed regulation can help to connect households, especially those located in LIDACs, to the information necessary to make the electrification change.

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[8] 2021 Southern California Edison Power Content Label. Retrieved from https://www.sce.com/sites/default/files/custom-files/Web%20files/2021%20Power%20Content%20Label.pdf

[9] Indoor Air Quality. Retrieved from https://www.epa.gov/report-environment/indoor-air-quality#:~:text=Health%20effects%20associated%20with%20indoor,%2C%20heart%20disease%2C%20and%20cancer

Climate Impacts and GHG Co-Benefits: Through this measure, residents and employees in new residential and commercial construction will receive health benefits through the establishment of indoor air pollution regulations, when compared to the existing residential and commercial building stock. Through this measure, the VCAPCD will be able to establish air quality standards that will regulate emissions from gas-powered appliances and other sources of indoor air pollution. Tenants in the new developments will realize health benefits from improved indoor air quality. More specifically, LIDAC residents who move into new housing developments after 2025 will have access to amenities that provide health benefits, compared to if they moved into existing housing developments without those amenities, which this measure would not regulate.

At the regional level, businesses, community groups, and other interested parties will be engaged regarding the regional holistic building decarbonization program. Installers, local contractors, and building owners/operators will be given financial and technical resources to discuss the benefits and technical requirements of electrification because of proposed regulation.

Equity Considerations: The extent of benefits accruing to LIDACs depends on the geographic distribution of new residential and commercial construction in the county, e.g., where new construction occurs. Even for new residential construction within LIDACs for example, most of the benefits would flow to residents in market-rate units since market-rate units typically account for most new residential units within a mixed-income project. Furthermore, a project developer may pass on the additional costs of the building's green features, increasing the purchase cost or the amount of requested rent in comparison to equivalent new buildings without green features. The measure's implementation action of conducting a socioeconomic impact analysis to evaluate the potential cost increases to LIDAC communities can aid in assessing the equity outcomes of this program. Additionally, organizing meetings with interested parties, especially community groups, is integral to identifying the potential disparate impacts of the program and connecting stakeholders to resources such as workforce development training courses for installers, local contractors, and building owners/operators.

Additionally, many existing low-income households cannot afford new electric heating / cooling systems and appliances. Existing residential and commercial developments in LIDACs will not benefit from this measure since the regulations created will only apply to new residential and commercial developments. Building owners/operators of existing residential and commercial buildings who are engaged with through meetings and provided with financial and technical resources to discuss the benefits and technical requirements of electrification because of the proposed regulation may take the initiative to transition their infrastructure and appliances. The impacts on existing residential and commercial buildings in LIDACs, however, is unclear since it is not mandated as part of the measure.

BE-3: Leverage federal funds to expand the Tri-County Regional Energy Network (3C-REN) and increase the impact of the regional direct install/retrofit program to electrify 100% of affordable housing units by 2030.

Measure Analysis: Many low-income residents cannot afford the additional costs of electrifying heating/cooling systems, water heaters, and appliances for cooking and washing/drying. This measure aims to expand programs, like the direct install program, and grant funding, rebates, incentives, financing, and philanthropy so the cost to make the energy transition is not passed on to lower-income residents, particularly within affordable housing units. This is an important measure to reduce the funding gap for the decarbonization of existing buildings, especially for those who are low-income.

Climate Impacts and GHG Co-Benefits: Residents who live in affordable housing units will receive upgrades that lower indoor air pollution levels and, thus, provide health benefits. These upgrades will also contribute to a reduction in GHG emissions which will decrease climate hazard impacts on a global scale (as described in the BE-2). This measure spans further to approach decarbonizing existing affordable housing—a sector that was left out in the previous measure and will aid in driving down GHG emissions for the county even further.

Equity Considerations: This measure would directly benefit lower-income households. The extent of benefits accruing to LIDACs, however, depends on the geographic distribution of the affordable housing units across the county and their electrification as part of this project. Since the measure impacts lower income residents, particularly those in affordable housing units, conducting targeted outreach to identify barriers to building electrification is essential to the program's success. As stated in the equity considerations of BE-2, the targeted housing units in this measure will likely not be able to afford the electrical upgrades/appliances and potential increases in rent due to mandated upgrades. To address housing types that may be harder to electrify, such as naturally occurring affordable housing and deed-restricted units within mixed income projects, developing targeted rebates and incentives for landlords of LIDAC households to provide free electrification upgrades without raising costs for renters will be an important implementation action to reaching communities of lower incomes.

Furthermore, ensuring that residential properties address deferred maintenance and health and safety concerns (such as lead, asbestos, mold, etc.) is the first step to increasing the amount of updated housing units in LIDACs ready for decarbonization. If certain affordable housing units are determined to need maintenance/repairs due to health and safety concerns before starting decarbonization updates, then efforts should be made to integrate and streamline construction, repairs, and installation of those two processes so there is minimal disruption and potential displacement for residents. Additionally, tracking housing units that were deemed to need health and safety repairs will also be imperative to ensure those units are not lost in the housing decarbonization process across the region.

As part of the implementation actions of this measure, the County may couple this measure with energy efficiency and the installation of solar plus storage projects for priority populations, such as medical baseline customers to secure access to electricity during power outages. Furthermore, ensuring these storage projects are resilient during wildfire, flood, and other climate events are crucial for energy system resilience. One important equity consideration is how this measure will impact farmworker housing. Oftentimes, farmworkers live in trailers or

other housing types that are not connected to the electrical grid. Evaluating how this specific type of housing will be part of the energy transition process is key to equitable deployment of the climate measures and actions.

Transportation

T-1: In alignment with the Ventura County Regional Energy Alliance (VCREA) Electric Vehicle (EV) Ready Blueprint, add 2,264 new public EV charging stations that would support the operation of 87,625 EVs within the County by 2030, prioritizing community charging in LIDACs and areas with high ratios of multifamily housing developments and the County's largest workplaces.

Measure Analysis: This measure aims to increase charging stations throughout the county within LIDACs, areas with high ratios of multifamily housing, and at the County's largest workplaces. In conjunction with policies that discourage people from driving, active transportation infrastructure, and transit service improvements (T-2), achieving carbon neutrality will also require a transition to zero-emission vehicles (ZEV) that run on clean energy provided by CPA and/or SCE. State policy requires all light-duty vehicles sold in California to be ZEV starting in 2035 and in 2045 for mid- and heavy-duty vehicles. By investing in expanding the network of charging infrastructure, Ventura County aims to promote the transition to zero-emission vehicles.

Climate Impacts and GHG Co-benefits: LIDACs face higher burdens from the transportation system, including environmental pollution, due partly to their adjacency to highways and high-volume roadways. Cleaner vehicles produce fewer emissions and help reduce the pollution burden. Residents living in LIDACs, living in areas with high ratios of multifamily housing, and/or employed at the County's largest workplaces are expected to receive the environmental and quality of life benefits of increased access to EV charging stations. The transition to ZEVs will decrease regional consumption of gasoline and diesel fuels and will result in a decrease in localized air pollution (i.e., nitrogen oxides and particular matter) across the county. This will generate co-benefits related to respiratory health, especially for LIDACs adjacent to highways and high-volume roadways. Furthermore, the measure's implementation action directed to identifying County-owned land in and near LIDACs to install publicly accessible chargers may help to streamline EV charging accessibility for surrounding communities when compared to assisting multifamily, commercial, and agricultural property owners who may have a much longer timeline.

Equity Considerations: Multifamily housing is located both within and outside of LIDACs and many of the county's largest employers fall outside of these locations. Additionally, there may be a mismatch between well-paying and professional sectors, such as government, healthcare, and biotechnology, and LIDAC residents (jobs-housing mismatch). These professional sectors jobs, however, are supported by service sector jobs in food, janitorial, and construction services who might benefit from free or reduced priced charging. Therefore, targeting limited program resources towards LIDACs and expanding the measure's reach to areas with high ratios of multifamily housing and the county's largest workplaces will improve the equity outcomes associated with this measure.

In the short-term, the County may also focus on the installation of EV charging stations in areas where low-income households may frequent more, such as community health centers and social service agencies. Equity considerations associated with vehicle electrification should also include charging "deserts", accessibility for those with disabilities, costs associated with installing charging infrastructure, and potential electric panel replacement costs. The implementation actions within this measure, such as identifying gaps in the EV charging infrastructure, address one of the listed equity considerations.

T-2: Work with the Ventura County Transportation Commission (VCTC) and local public transportation regional bus service providers to promote and expand equitable, safe, efficient, and affordable multi-modal transportation hubs to decrease single occupancy VMT 10% by 2030. Prioritize the expansion of these hubs in low income and disadvantaged communities (DAC) and the Ventura County Government Center.

Measure Analysis: Disadvantaged communities typically experience longer commute times, increased rates of traffic collisions, and higher exposure to environmental pollution. Low income and disadvantaged populations often rely more heavily on public transportation. This measure aims to focus on promoting and expanding multi-modal transportation hubs in LIDACs and the Ventura County Government Center. The Ventura County Government Center is home to multiple government departments and employs several thousand employees. Increasing transit service levels and types of transit modes would provide more transportation opportunities and lower the cost-burden associated with travel, especially with the measure's associated action of providing discounted fare programs and discounted bike share passes for low-income and underserved populations. Furthermore, expanding demand-response and ridesharing options such as GoNow transportation services and farmworker vanshare programs support the progression of equitable transportation access since low-wage earners, such as restaurant employees, farmworkers, or those in the hospitality industry, frequently need timely access to transportation on a different schedule than 9-5 commuters.

Climate Impacts and GHG Co-benefits: The measure is expected to provide economic benefits, increase mobility options, decrease travel times, and reduce GHG emissions. With an expanded and more reliable, accessible, and cost-effective transportation system, residents will decrease their percentage of trips made by a vehicle and increase their percentage of trips made by public transportation. This decrease in vehicle miles traveled will reduce localized air pollution and improve health and quality of life for communities along high-volume roadways, which predominantly are in LIDACs. Additionally, the measure's investment into expanding first-mile/last-mile connectivity programs and multi-modal connectivity improvements will result in more residents taking advantage of active transportation programs which may boost quality of life and safety throughout the transportation system, especially for LIDACs.

Equity Considerations: Transit offers safe, affordable, timely, and convenient access to places that provides an essential service for lower-income people within limited mobility options. The prioritization of auto travel has created disparities in transit and car travel, safety considerations, and infrastructure that is inaccessible to people with disabilities are all equity consideration for this transit measure. Further considerations may include the number of jobs held by low-income individuals and the need to access their destination in a timely manner which may include locations outside Ventura County. Low wage earners, such as restaurant employees frequently need timely access to transportation on a different schedule than 9-5 commuters.

T-3: Support the expansion of the existing Reducing Ocean Going Vessel Speeds - Protecting Blue Whales and Blue Skies (BWBS) program to decrease greenhouse gas emissions associated with vessel speeds and reduce the risk of fatal ship strikes to endangered whale species and support the recovery of whale populations, which have been shown to be important global players for mitigating climate change through significant contributions to carbon storage and sequestration.

Measure Analysis: The Protecting Blue Whales and Blue Skies Program is a voluntary Vessel Speed Reduction (VSR) Program along the California coastline that incentivizes companies to adopt sustainable shipping practices across their global supply chain.[10] In turn, the Program aims to protect endangered whales, reduce fuel consumption, lower regional greenhouse gas emissions, and positively impact air quality and health outcomes. According to the Ventura County Air Pollution Control District, ocean-going vessels make up over 40% of the NOx emission inventory in Ventura County.[11] By the 2026 ozone season, Ventura County must achieve the 2015 National Ambient Air Quality Standard for ozone. By that time, ocean-going vessels will account for 55% of the District's NOx inventory and 90% of those emissions are from vessels in transit or anchored along the Ventura County coastine.[12] The measure seeks to expand the geographic scope and scale of the Program by including all areas of the California coast out to approximately 50 nautical miles, lengthening the timeline of the Program from seasonal to year-round, and expanding outreach and enrollment.

The expected benefits of this measure are realized through a reduction in GHG emissions and criteria pollutant emissions such as of NOx, sulfur oxides (SOx), diesel particulate matter (DPM), and particulate matter less than 2.5 microns ($PM_{2.5}$). These pollutants are common emissions from shipping vessels which blow onshore from the shipping lanes and negatively impact communities, especially LIDACs, along the coast. Additionally, the Program would aim to reduce ship strikes that occur with marine life who also travel along the California coastline.

Climate Impacts and GHG Co-benefits: Through the Program's anticipated expansion of enrollment to all ocean-going vessels, geographic scope, and outreach efforts, the Ventura County region is expected to experience health benefits due to the reduction in air pollution that drifts onshore from the ocean-going vessels. Ventura County will be able to establish a reduced shipping vessel speed that will result in a reduction in health-harming air pollution and one's likelihood of being diagnosed with adverse health effects such as respiratory illnesses, heart disease, and premature death. Households along the coastline – including LIDACs - are expected to receive the greatest portion of benefits through the implementation of this measure, as they are the communities that are the most impacted by the flow of offshore air reaching their communities first. Furthermore, with the expected decrease in fatal ship strikes between ships and marine life, there is the possibility of a slight increase in carbon sequestration and storage since these animals play an important piece in mitigating climate change.

[10] Protecting Blue Whales and Blue Skies. Retrieved from https://www.bluewhalesblueskies.org/.

[11] Comments on the At Berth Regulation - Interim Evaluation Report. Retrieved from https://ww2.arb.ca.gov/sites/default/files/2023-03/VCAPCD%20At%20Berth%20Regulation%20Comment%2020230308.pdf

Regionwide, the reduction of ocean vessel speed will decrease GHG emissions overall. This reduction in GHG emissions, especially NOx, and air pollution may reduce the likelihood of climate impacts and hazard occurrences. Ventura County residents, especially LIDACs, residing in climate hazard areas will receive the small benefit of a reduction in GHG emissions and its associated climate impacts on a global scale. This measure will also aid in reaching ozone attainment for the County, as it is currently classified as serious or worse federal ozone nonattainment.[12] Additionally, the measure's implementation will result in economic benefits, as the funding for the expansion of the program's outreach and enrollment will create three new jobs within the BWBS Program.

Equity Considerations: An important consideration is that the Vessel Speed Reduction is voluntary and not required for all ocean-going vessels. Therefore, if it is in the corporation's economic interest to leave the Program and return to higher speed levels, this would result in greater air pollution compared to their previous activities. Ensuring there is program retention and expansion is vital for the measure to meet its anticipated positive health and environmental impacts. Potential ideas to increase retention and participation is by publicizing the benefits of the BWBS' Brand Ambassador Initiative, creating a BWBS certification icon (similar to the USDA Organic label or the Marine Stewardship Council label) that corporations are granted usage rights when they join the program, and highlighting corporations who are part of this effort throughout Ventura County at community events.

Solid Waste

SW-1: Expand organic waste diversion programs/facilities throughout the County by funding waste diversion projects currently being developed, helping establish new green jobs, and diverting 75% of 2022 level organic material by 2030.

Measure Analysis: Diverting organic materials, such as food waste away from landfills can significantly decrease the emission of short-lived climate pollutants and methane – a potent greenhouse gas that has a more negative environmental impact than carbon dioxide. A reduction in emissions will help the county meet its long-term GHG emission goals. The measure also embraces circular economy practices, a common practice in reducing waste generation, through the cultivation of compost at the end of the cycle. Ventura County will be able to expand its circular organic waste economy which has added benefits by reducing air pollution from landfills, diversion of organic waste to facilities who can compost the waste, a reduction in the regional carbon footprint, and improvement in the sequestration of carbon in natural systems through the application of compost.

Climate Impacts and GHG Co-benefits: The county will experience economic growth and benefits, environmental pollution reduction, and safety benefits for certain geographic populations through this measure. Organic waste diversion facilities generate revenue and serve an important role in job creation across the County. Increasing locations across the region will create more jobs and increase revenue for Ventura County residents. County residents who live

[12] Health-Based Ambient Air Quality Standards. Retrieved from http://www.vcapcd.org/air_quality_standards.htm

and work near solid waste facilities will experience a reduction in exposure to pollution such as methane, which will lead to health and quality of life benefits. This includes a reduction in emissions from the landfill as well as from truck travel to and from the facility. Finally, through increased coordination efforts with jurisdictions and other regional agencies to understand how much organic waste recycling facility capacity is needed to process the organic waste estimated to be disposed by organic waste generators, Ventura County residents and businesses will decrease their carbon footprint by diverting a portion of their waste to these facilities. Through the development and expansion of operations for multiple organic waste diversion programs/facilities, the County will create new climate mitigation and adaptation jobs and equip employees with the skills necessary to prosper in an emerging sector, which is consistent with ongoing trends in the job market and the federal government's investment in climate related sectors.

Equity Considerations: Essential to consideration of this measure is the development and location of these waste diversion facilities. Given that many waste facilities are located within LIDACs generally, the measure may worsen equity outcomes if new programs/facilities are sited within or adjacent to a LIDAC. Additionally, if there is an increase in organic waste diversion, emissions of methane from these facilities are assumed to increase. Of the seven referenced organic waste facilities with already established locations in the measure's implementation action, two are in LIDACs, three are located adjacent to LIDACs, one is not located near or in a LIDAC, and one facility's location is unclear. Siting new locations for organic waste diversion far from LIDACs as part of this measure's expansion efforts is crucial to limit the impacts on human health.

As part of SB 1383's (the bill that established organic waste diversion efforts) Environmental Impact Report, the report underscored that more meaningful analysis is necessary for the public to understand whether the compliance responses, such as significant increase in composting, would carry unintended consequence of increasing the risk to human health.[13] Additionally, further analysis was deemed essential to correlate potential risks to areas where higher rates of organics diversion are required.[14] To prevent further harm to communities, especially LIDACs, with already established organic waste diversion facilities and future development of organic waste facilities close to communities, exposure mitigation strategies should be required as part of the facilities' operations and infrastructure. The County should work with these sites to build and integrate these exposure mitigation approaches, secure the proper equipment and water availability to create quality aerobically produced compost, help identify funding sources, and monitor the air quality of the surrounding communities and harmful plant pathogen cultivation to ensure the increased organic waste diversion does not pose a threat to human health.

One important equity consideration when developing actions for this measure is to create a career pathways program that engages residents facing barriers to employment, such as justice-involved adults, people with disabilities, and people who are linguistically isolated. Providing an employment pathway for these marginalized demographic groups can provide residents with economic stability and help the County to advance climate equity and environmental justice.

[13] SB 1383 Short-Lived Climate Pollutants Regulations Final EIR. Retrieved from https://www2.calrecycle.ca.gov/Docs/Web/116058

Another important aspect of SB 1383 is the food recovery objectives of the Bill. As part of SB 1383, some food service businesses are required to donate edible food to food recovery organizations. The green workforce that is expected to be created through this measure can be expanded to create jobs where people assist food generators in connecting with food banks, faith-based institutions, and other organizations that distribute food to food insecure residents.

Engaging with Low Income and Disadvantaged Communities

Tailoring engagement according to jurisdictional demographics and past successful engagement approaches is crucial to gathering input from a wide range of community members. The list below details R+A's recommended list of engagement activities that can be utilized to identify strategies to engage communities, especially those historically underrepresented in the civic engagement process and LIDACs. Some jurisdictions will require more engagement than others, depending on whether or not they have already identified disadvantaged communities through SB 1000.

Early and frequent engagement throughout the CCAP process is vital to identifying LIDACs at the jurisdictional level and gathering input on what would make Ventura's CCAP successful. All feedback received should be incorporated into the planning process and the CCAP to ensure the outlined priorities are community-driven and any anticipated disbenefits to LIDAC residents are minimized.

Additionally, given many of the LIDACs found through this analysis have been identified to have a large share of households where not one resident speaks English very well, it is imperative that engagement materials and activities regarding the implementation of these measures be accessible to the diverse communities of Ventura County. Actions such as ensuring the housing retrofit work and deliverables are translated into Spanish, Mixtec, Zapotec, and other prominent languages spoken would ensure equitable engagement practices are part of the CCAP. Partnering with organizations in Ventura County that already have established relationships with Indigenous and other minority languages is key.

As part of the PCAP process, Ventura County led a survey effort that engaged the community on climate action planning and asked respondents what they would like to see addressed in the PCAP. The responses were incorporated into the PCAP and will be used to build on County's CCAP. The outlined community engagement activities found below aim to refine the LIDAC Benefits Analysis within CCAP process.

Potential Engagement Activities

Online Surveys

Surveys have been found to engage historically underserved and overburdened residents and communities by providing an accessible avenue to gather input and encourage many people to be part of the climate action process. Oftentimes, low-income and LIDAC communities face barriers to attending conventional public facing city/county engagement forums due to lack of transportation, work schedule conflicts, and other stressors. Online surveys can also request information such as demographics, neighborhood location, and length of tenure in the city from respondents to track which demographic groups are giving their input on the project. By distributing online surveys through various channels, the survey will gather feedback from relevant demographic groups, especially low-income and LIDACs to enhance the CCAP process.

Equity Focus Groups

Equity focus groups can be targeted to various demographic groups that may experience/ are experiencing environmental and climate inequities to better tailor the Plan. Some potential focus demographic groups would be youth, Spanish-speaking community members, farmworkers, and

low-income/affordable housing residents of the County/jurisdiction. The equity focus groups could also extend to the proposed stakeholders the Plan intends to coordinate with to achieve the measures and goals such as SCE, Economic Development Collaborative, and others. These focus group meetings are recommended to be held virtually or hybrid (option for in-person or online attendance) to maximize engagement.

Climate Action Advisory Committee

The formation of a Climate Action Advisory Committee (CAAC) can bring together engaged and interested parties to gather input related to mitigation measure development. By forming a panel of individuals who come from various backgrounds and demographic groups impacted by the systemic climate inequities, the plan will be better informed by receiving their direct input through frequent meetings and consultations. Potential organizations/community groups that would be important to include as part of the CAAC would be farmworkers, youth, low-income residents, and organizations part of the development of the Ventura County Green New Deal Framework. The CAAC meetings are recommended to be held virtually or hybrid to maximize engagement, especially for those who have varying schedules such as youth and farmworkers.

Educational Forums

Educational forums contain impactful approaches and strategies to create a common vocabulary around complicated issues such as climate change, housing affordability, energy efficiency, and waste reduction. These forums could be utilized to build a solid foundation of knowledge so that community members and residents in LIDACs can understand these issues and give input on effective implementation actions for CCAP measures. It is recommended that the educational forums are held either virtually or hybrid to maximize attendance.

Pop-Ups

In-person pop-up/intercept events can be planned to meet with the community at times and locations that are convenient to them. It is anticipated that these informal workshops will be a resource to share information about the planning effort and gather input through efficient interactive activities. Coordination with the County and jurisdictions to identify areas where community members frequent will be an important aspect of this engagement activity.

Workshops

In-person pop-up/intercept events can be planned to meet with the community at times and locations that are convenient to them. It is anticipated that these informal workshops will be a resource to share information about the planning effort and gather input through efficient interactive activities. Coordination with the County and jurisdictions to identify areas where community members frequent will be an important aspect of this engagement activity.

Capacity Building Trainings

Trainings can be provided to increase the capacity of and better prepare members of the Climate Action Advisory Committee on key topics related to land use, environmental justice, health equity, and related topics. These trainings can be integrated with existing Climate Action Advisory Committee meetings or hosted separately with key community leaders identified by County staff. Given the nature of these trainings and activities, it is recommended these engagement activities be held in-person.

Table 1: Summary of Jurisdiction Statistics

Jurisdiction	Total Population	Estimated Population in LIDAC	Percent of Jurisdiction Population in LIDAC	Percent of Jurisdiction BIPOC
El Rio	6,297	7,261*	**100%***	**84%**
Oxnard	208,154	122,528	**59%**	**86%**
Port Hueneme	22,156	8,086	**36%**	**72%**
San Buenaventura (Ventura)	109,910	17,829	**16%**	**44%**
Other Unincorporated Ventura County area[14]	89,763	2,035	**2%**	**42%**
Piru	1,805	2,387*	**100%***	**91%**
Fillmore	15,664	4,279	**27%**	**79%**
Santa Paula	30,098	21,195	**70%**	**85%**
Thousand Oaks	127,873	12,601	**10%**	**33%**
Moorpark	36,372	3,923	**11%**	**45%**
Simi Valley	125,842	4,072	**3%**	**41%**
Camarillo	68,122	0	**0%**	**43%**
Ojai	7,534	0	**0%**	**20%**

* The entire community is in LIDACs. Since census geographies do not map exactly to the community's boundaries and since there are large housing developments in the vicinity, the LIDAC population is greater than the community's population.

[14] This category does not include the census designated places of El Rio and Piru because they have been included as their own row in the table

Table 2: List of Priority LIDACs in Ventura County

Census Tract #	City	Population	Percent BIPOC
6111000200	**Piru**	2,387	**91%**
6111000304	**Fillmore**	4,279	**76%**
6111000400	**Santa Paula**	6,021	**79%**
6111000500	**Santa Paula**	1,697	**61%**
6111000600	**Santa Paula**	5,969	**93%**
6111000701	**Santa Paula**	7,508	**93%**
6111001302	**San Buenaventura (Ventura)**	2,358	**68%**
6111002200	**San Buenaventura (Ventura)**	6,350	**70%**
6111002300	**San Buenaventura (Ventura)**	6,534	**77%**
6111002400	**San Buenaventura (Ventura)**	2,587	**40%**
6111002905	**Oxnard**	5,433	**79%**
6111003011	**Oxnard**	5,539	**89%**
6111003012	**Oxnard**	675	**98%**
6111003201	**Oxnard**	4,230	**99%**
6111003700	**Oxnard**	6,687	**97%**
6111003801	**Oxnard**	5,033	**98%**
6111003802	**Oxnard**	2,849	**96%**
6111003900	**Oxnard**	6,984	**97%**
6111004000	**Oxnard**	7,179	**95%**
6111004101	**Oxnard**	6,947	**92%**
6111004400	**Port Hueneme**	8,086	**72%**
6111004503	**Oxnard**	5,112	**89%**
6111004504	**Oxnard**	5,777	**96%**
6111004506	**Oxnard**	7,788	**97%**
6111004600	**Unincorporated Ventura County area**	2,035	**36%**
6111004704	**Oxnard**	1,372	**82%**

6111004710	**Oxnard**	5,707	**90%**
6111004711	**Oxnard**	3,552	**95%**
6111004715	**Oxnard**	5,417	**90%**
6111004716	**Oxnard**	5,066	**95%**
6111004717	**Oxnard**	3,951	**96%**
6111004902	**Oxnard**	5,072	**98%**
6111005002	**Oxnard**	3,339	**94%**
6111005003	**El Rio**	7,261	**85%**
6111006100	**Thousand Oaks**	8,324	**62%**
6111007000	**Thousand Oaks**	4,277	**64%**
6111007611	**Moorpark**	3,923	**89%**
6111007800	**Simi Valley**	4,072	**65%**
6111008600	**Oxnard**	7,920	**92%**
6111008700	**Oxnard**	6,029	**82%**
6111009100	**Oxnard**	4,870	**99%**