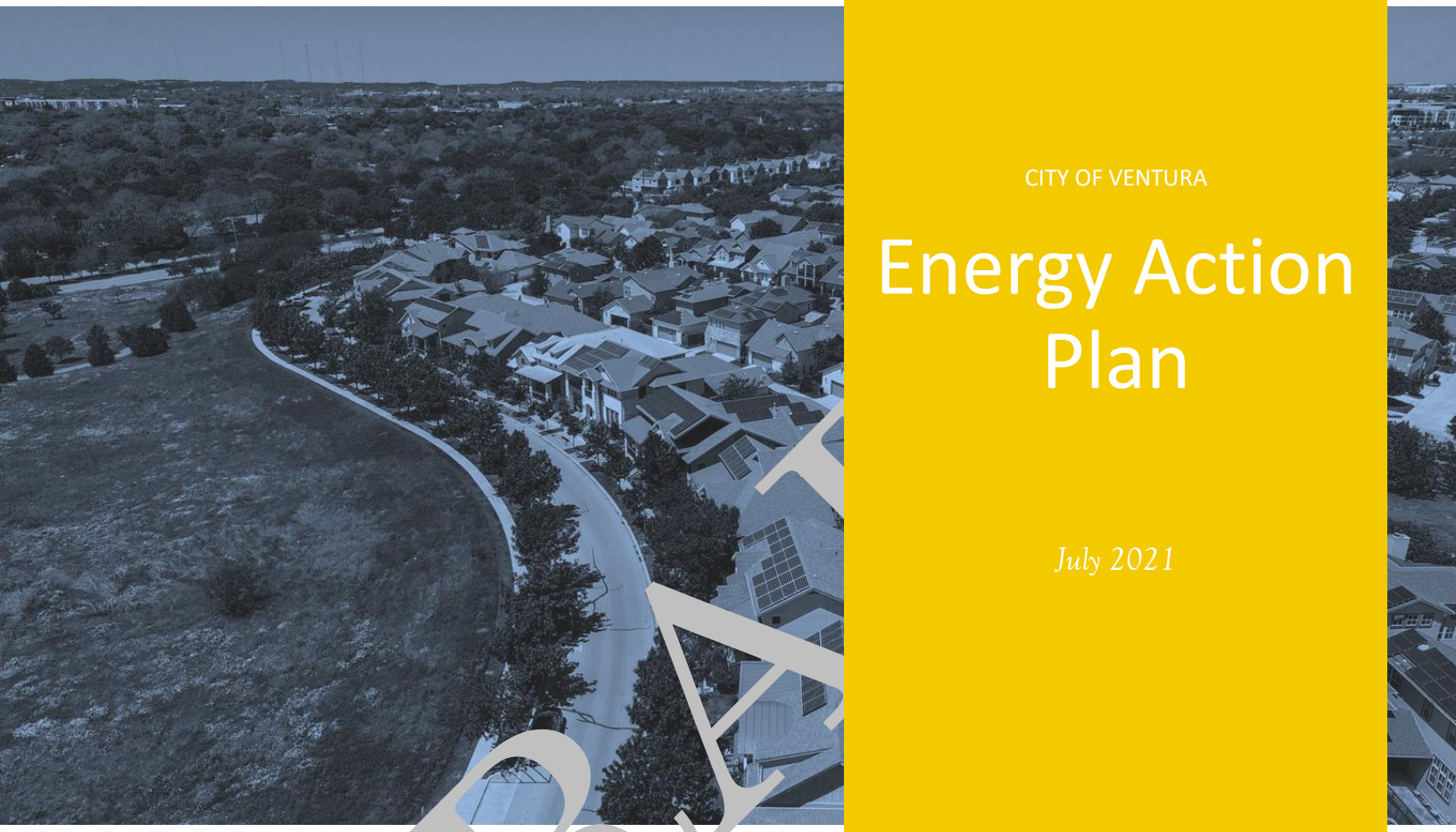

CITY OF VENTURA

Energy Action Plan

July 2021

This Energy Action Plan (EAP) was developed as a collaborative effort with the ***City of Ventura***, ***Ventura County Regional Energy Alliance***, *and* ***Community Environmental Council***.

The EAP is funded by the Local Government Challenge, which is a partnership between the California Energy Commission and local governments to develop innovative solutions that will improve energy performance in California's communities. Funding was also provided by the Strategic Plan Program administered by Southern California Edison and Southern California Gas under the auspices of the California Public Utilities Commission and paid for by California utility customers.

Disclaimer:

This document is a Working Draft of the Energy Action Plan which includes a Greenhouse Gas Inventory, emissions forecasts, proposed goals, and potential strategies for meeting those goals. The proposed strategies represent a range of easy and low-cost efforts to aspirational and potentially higher cost programs to implement. As a Working Draft, the strategies have not been finalized and approved by City Staff. The findings in this EAP will be reviewed and solidified during the development of the Climate Action and Resilience Plan (CARP). The costs, benefits, and impacts of each strategy may be updated and further reviewed as the CARP is finalized and proposed to City Council for approval.

ACKNOWLEDGEMENTS

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ACRONYM LIST

- AB: Assembly Bill
- ABAU: Adjusted Business-as-usual
- AIA: American Institutes of Architects
- ARFVTP: Alternative and Renewable Fuel and Vehicle Technology Program
- AR5: EPA's Fifth Climate Assessment Report
- ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers
- BAU: Business-as-usual
- CAA: Clean Air Act
- CAFE: Corporate Average Fuel Economy
- CAGR: Compound Annual Growth Rate
- CALGreen: California Building Standards Code, Title 24, Part 11
- CalRecycle: California Department of Resources Recycling and Recovery
- CAP: Climate Action Plan
- CARP: Climate Action and Resilience Plan
- CARB: California Air Resources Board
- CBO: Community Based Organization
- CCE: Community Choice Energy
- 3CE: Central Coast Community Energy
- CEC: California Energy Commission
- CEESP: California Long Term Energy Efficiency Strategic Plan
- CFCs: Chlorofluorocarbons
- CH_4: Methane
- CNG: Compressed Natural Gas
- CO_2e: Carbon Dioxide Equivalent
- CPA: Clean Power Alliance
- CVRP: Clean Vehicle Rebate Program
- DAC: Disadvantaged Community
- DC: Direct Current
- DER: Distributed Energy Resources
- DGE: Diesel Gallon Equivalent
- DSL: Diesel
- EAP: Energy Action Plan
- EDRP: Energy Data Request Portal
- EMFAC: Emission FACtors
- EO: Executive Order
- ESS: Environmental Sustainability Strategy
- EV: Electric Vehicle
- g/mile: Gallons Per Mile
- GCTD: Gold Coast Transit District
- GGRF: Greenhouse Gas Reduction Fund
- GHG: Greenhouse Gas
- GIS: Geographic Information System
- GWP: Global Warming Potential
- HDT: Heavy Duty Transportation
- HERS: Home Energy Rating System
- HFCs: Hydrofluorocarbons
- HGWP: High Global Warming Potential
- HVAC: Heating, Ventilation, and Air Conditioning
- ICLEI: International Council for Local Environmental Initiatives
- IOU: Investor Owned Utility
- kW: Kilowatt
- kWh: Kilowatt-hour
- LADWP: Los Angeles Department of Water and Power

LCFS: Low Carbon Fuel Standard

LED: Light-emitting Diode

LEED: Leadership in Energy and Environmental Design

LM: Light-medium Vehicles

LGEP: Landfill Gas Energy Project

LP: Liquid Petroleum

MPG: Mile Per Gallon

MPGGe: Mile Per Gallon Gasoline Equivalent

MPO: Metropolitan Planning Organization

MMT: Million Metric Ton

MT: Metric Ton

N_2O: Nitrous Dioxide

NOx: Nitrous Oxide

PACE: Property Assessed Clean Energy

PFCs: Perfluorocarbons

PFE: Photofragment Emissions

RHNA: Regional Housing Needs Assessment

RLF: Revolving Loan Fund

RPS: Renewable Portfolio Standard

RTAC: Regional Transportation Advisory Committee

RTP/SCS: Regional Transportation Plan/Sustainable Communities Strategy

SB: Senate Bill

SCAG: Southern California Association of Governments

SCE: Southern California Edison

SCF: Standard Cubic Feet

SF_6: Sulfur Hexafluoride

SGIP: Self-Generation Incentive Program

SLCP: Short-lived Climate Pollutants

SoCalGas: Southern California Gas Company

SoCalREN: Southern California Regional Energy Network

SRP: Solar Rooftops Program

SSP: Shared Solar Program

std ft^3/day: Standard Cubic Feet of Digester Gas Produced Per Day

3C-REN: Tri-county Regional Energy Network

TOU: Time-of-Use

UCLA: University of California, Los Angeles

VCREA: Ventura County Regional Energy Alliance

VCTC: Ventura County Transportation Commission

VCTM: Ventura County Traffic Model

VUSD: Ventura Unified School District

VMT: Vehicle Miles Traveled

WWTP: Wastewater Treatment Plant

ZEV: Zero Emission Vehicle

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EXECUTIVE SUMMARY

The City of Ventura has developed this Energy Action Plan (EAP) in partnership with the Ventura County Regional Energy Alliance (VCREA) and the Community Environmental Council with funding from the California Energy Commission (CEC), Southern California Edison (SCE), and Southern California Gas Company (SoCalGas). The EAP serves to assist the City in planning for greenhouse gas (GHG) emissions reductions associated with the generation and consumption of energy, including electricity and natural gas, over the next ten years. The EAP includes goals, strategies, and actions for the City to plan for increased renewable energy development, energy conservation measures, and energy efficiency implementation. The plan also includes goals, strategies, and actions to increase the adoption of electric vehicles (EV), and to shift towards electrification of natural gas burning appliances in buildings. These strategies were developed to reduce community-wide emissions; however, specific strategies are included to reduce emissions associated with City operations.

EAP Goals

This EAP is intended to initiate the development of a City of Ventura Climate Action and Resilience Plan (CARP). Therefore, the EAP includes a comprehensive GHG inventory from a baseline year of 2010 and an updated inventory for 2015. These inventories inform the EAP's GHG reduction goals and strategies and can also be applied to the development of the City of Ventura's CARP. The City set a GHG reduction goal to match state policy, Senate Bill (SB) 32, which requires a statewide reduction of 40 percent below 1990 GHG emissions by 2030. The City does not have emissions data from 1990, but if local emissions follow state emissions patterns, the City estimates that a 44 percent emissions reduction from the 2010 baseline is equivalent to a 40 percent reduction from 1990 levels by 2030.

Reaching the City's 44 percent emissions reduction goal by 2030 is expected to be achievable through implementing state and federal policies that will reduce emissions across all sectors, combined with local action to reduce emissions within the City. The federal and state emissions reduction policies alone are expected to result in a 28.6 percent reduction in City emissions by 2030 as shown in the Adjusted Business-as-usual (ABAU) model. This EAP discusses additional local action, specifically within the energy sector, to reduce emissions. The City of Ventura has already taken significant steps to reduce energy-related emissions by joining the Clean Power Alliance (CPA), which is forecast to reduce emissions by 10 percent by 2030. The EAP lays out additional Community and Municipal Operations strategies that are forecast to achieve an additional 5 percent in emissions reductions. The combination of federal and state climate policies, joining CPA, and implementing the proposed EAP strategies is expected achieve a 44.37 percent reduction in emissions from the 2010 baseline, exceeding the City's goal for total emissions reductions.

Although the City appears to be slightly ahead of current state emissions targets discussed above, the process of developing a CARP will identify strategies to further reduce emissions to proactively plan to approach carbon neutrality. Planning for carbon neutrality by 2045 is in-line with state Executive Order (EO) B-55-18, and the general trend towards tightening climate goals in state. Therefore, when the City develops their CARP, decisionmakers may adopt a GHG emissions goal that goes beyond the state's Senate Bill (SB) 32 goal. A more aggressive goal is feasible since the CARP will include emissions reductions strategies from sectors not included in this EAP. Specifically, it is expected that the CARP will address GHG emissions associated with the transportation sector, which is approximately 44 percent of City's 2010 baseline inventory, and therefore poses significant opportunity for emissions reductions beyond those planned for by state and federal climate policy.

GHG Inventories

The City chose the 2010 calendar year as a baseline for GHG emissions from Community and Municipal Operations. The Community inventory is divided into the following seven categories: transportation and mobile sources; residential energy; commercial energy; industrial energy; process and fugitive emissions; solid waste; and wastewater treatment. As shown in Figure ES1 and Table ES1, the City of Ventura emitted approximately 635,413 metric tons (MT) carbon dioxide equivalent (CO_2e) in the baseline year (2010). Transportation and mobile sources were the largest contributor to emissions (43.97%), producing approximately 279,382 $MTCO_2e$. The residential energy sector was the second largest contributor to emissions (23.17%), producing approximately 147,219 $MTCO_2e$. Nonresidential energy contributed 146,949 $MTCO_2e$ (23.13%). The remaining sectors made up the remaining 9.73 percent of the emissions (Descriptions of the sectors can be found in Chapter 3, Table 4).

Figure ES1. 2010 Baseline Community GHG Emissions Inventory

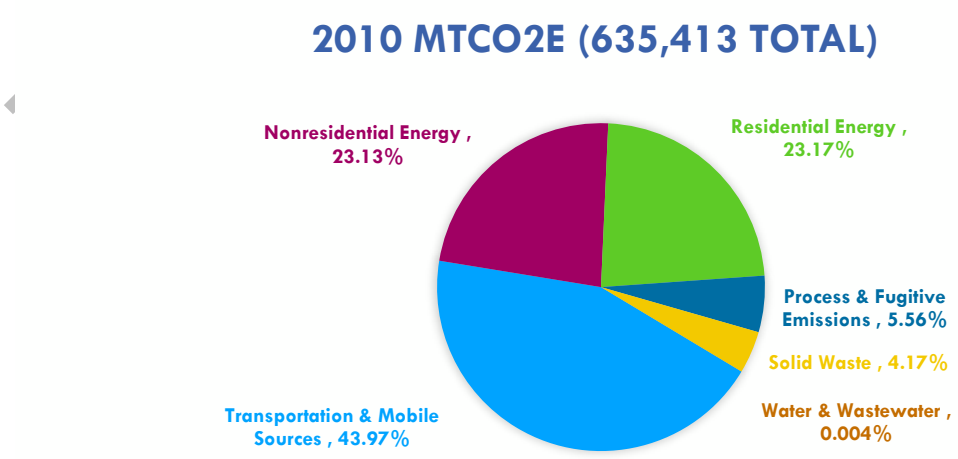


Table ES1. 2010 Community GHG Emissions Inventories

Sector	2010 $MTCO_2e$	% 2010 Total
Transportation & Mobile Sources	279,382	43.97%
Residential Energy	147,219	23.17%
Nonresidential Energy	146,949	23.13%
Process & Fugitive Emissions	35,349	5.56%
Solid Waste	26,488	4.17%
Wastewater Treatment	26	0.004%
Total	**635,413**	**100%**

The Municipal Operations GHG inventory is a subset of the Community inventory, making up a small percentage (~2%) of the community's emissions in 2010. The Municipal Operations inventory is divided into the following four categories: buildings and facilities; streetlights and traffic signals; vehicle fleet; and wastewater treatment and water pumping. As shown in Figure ES2 and Table ES2, the City of Ventura Local Government emitted 11,752 $MTCO_2e$ in the baseline year 2010. The largest contributing sector was water and wastewater at 5,231 $MTCO_2e$, representing almost half (44.51%) of emissions for the year.

Figure ES2. 2010 Municipal Operations GHG Emissions Inventory

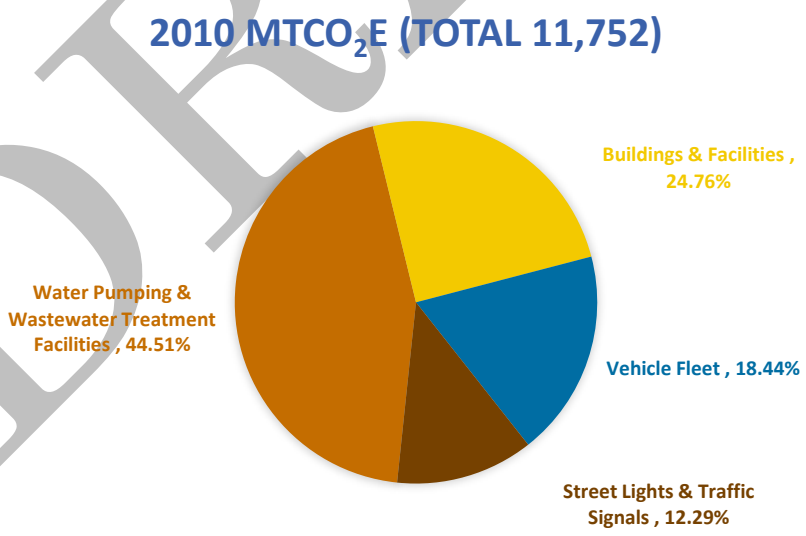


Table ES2. 2010 Municipal Operations GHG Emissions Inventory

Sector	2010 $MTCO_2e$	% 2010 Total
Water Pumping & Wastewater Treatment Facilities	5,231	44.51%
Buildings & Facilities	2,910	24.76%
Vehicle Fleet	2,167	18.44%
Streetlights & Traffic Signals	1,444	12.29%
Total	**11,752**	**100.00%**

Forecasts and Planning Scenarios

The EAP establishes a GHG reduction goal for 2030 by considering the following:

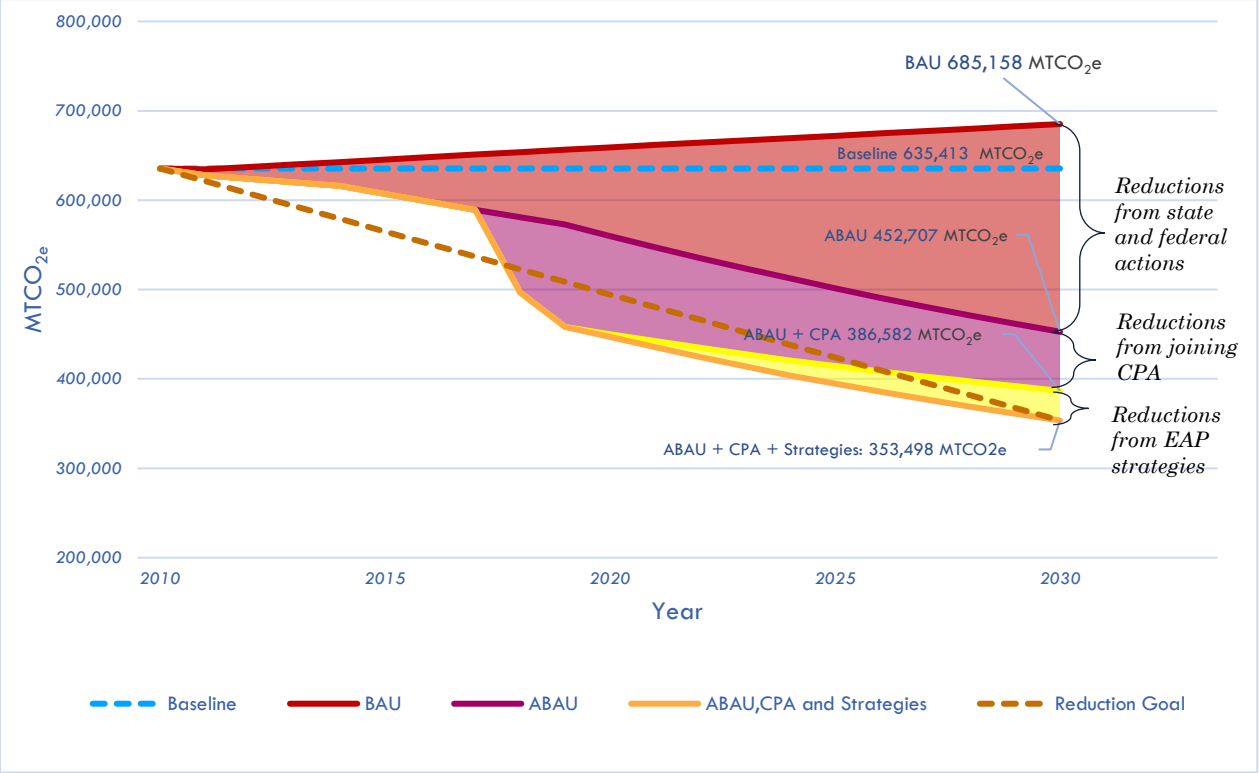
1. Future growth projections under a business-as-usual (BAU) scenario
2. ABAU scenario that represents projected emissions reductions due to federal and state legislative actions
3. Joining CPA
4. Implementing the goals, strategies, and actions identified by this plan

Starting with the 2010 baseline GHG inventory, emissions from the Ventura community were first forecasted through 2030 under a BAU scenario, which represents projected emissions from housing, employment, and population growth, assuming no legislative action is taken by federal, state, or local governments. Under this scenario, the City's 2030 emissions are projected to rise by 7.86 percent from the 2010 baseline.

The BAU scenario is used as the starting point for the ABAU scenario. The ABAU scenario represents projected emissions reductions due to federal and state legislative actions focused on curbing GHG emissions. Under the ABAU scenario, emissions are projected to fall by 28.75 percent from the baseline by 2030.

Finally, a community planning scenario was conducted to model the cumulative impacts of Ventura's membership in CPA and the emissions reductions associated with the strategies included in this EAP by 2030, using the ABAU scenario as a starting point. Under this community planning scenario, when all federal, state, and local action reductions are applied, emissions are forecasted to decrease 44.37 percent from 2010 (635,413 $MTCO_2e$) to 2030 (353,498 $MTCO_2e$). These reductions slightly surpass the City's goal of 44 percent GHG emissions reductions below 2010 levels by 2030, as modeled in Figure ES3.

Figure ES3. City of Ventura Planning Scenario 2010-2030



The largest decrease is projected to be in the commercial energy sector (-61.94%), followed by transportation and mobile sources (-46.38%), process and fugitive emissions (-41.54%), industrial energy (-39.29%), and residential energy (-35.30%). The projected change in each of the sectors is shown in Table ES3.

Table ES3. City of Ventura Community Planning Scenario 2010-2030 ($MTCO_2e$)

Sector	2010 $MTCO_2e$	2030 $MTCO_2e$	% Change
Transportation & Mobile Sources	279,382	149,791	-46.38%
Residential Energy	147,219	95,251	-35.30%
Commercial Energy	135,329	51,501	-61.94%
Process & Fugitive Emissions	35,349	20,664	-41.54%
Solid Waste	26,488	29,208	10.27%
Industrial Energy	11,620	7,054	-39.29%
Water & Wastewater	26	29	11.54%
Total	**635,413**	**353,498**	**-44.37%**

EAP Strategies

The strategies for GHG reductions in the energy sector presented in this EAP were developed through modifying strategies found in existing Climate Action Plans (CAPs) and EAPs as well as drafting new strategies and actions to meet the needs of the City, the changing policy landscape, and the specific resources within the region. Community priorities were assessed through surveys, tabling events, and community meetings that focused on capturing attitudes around innovative energy upgrades and technologies in addition to climate change impacts and gathering feedback on proposed emissions reduction strategies. Each strategy was analyzed to predict the following: GHG emissions reduction, kilowatt-hour (kWh) and therm savings over the next five and ten years, cost to the City,[1] and benefits to both the community and City separately. Costs were calculated in the form of direct costs to the City from staff time and other finite costs, e.g. printing and consultant costs. Benefits for the community and the City were estimated in financial savings from reduced electricity and natural gas demand and reduction in gasoline demand from EV-related strategies. Co-benefits were also considered in the strategy selection, as the strategies are expected to benefit public health, air quality, resiliency, public and City staff awareness, social equity, the local economy, and the transportation and building sectors.

EAP implementation will require the City to prioritize energy policies, programs, and projects, but much of the work outlined in this document is planned in collaboration with other local agencies, organizations, and existing programs. EAP strategies are classified into five general categories:

1. Leverage existing partnerships
2. Develop new programs
3. Promote existing programs
4. Update codes, ordinances or permitting practices
5. Capital improvements.

Therefore, the plan lays out a framework to both grow existing programs and partnerships and to develop new programs and internal processes to support energy upgrades.

The cumulative GHG emissions for each of the EAP strategies by 2030 are listed in Table ES4. Some strategies are considered "supporting" and do not have direct GHG impacts and energy use savings These strategies will not contribute to the overall GHG and energy use reductions, but are included in this plan as they are expected to drive the impact of other strategies, or to have future GHG emissions savings associated with the action.

[1] *Community costs were not calculated because there were too many variables involved to make any meaningful predictions.*

Table ES4: Community Planning Strategy Emissions Reductions

Strategy	2021 - 2030 Cumulative Savings ($MTCO_2e$)
Community Strategies	
C1: Increase Energy-focused Outreach to Ventura Residents	3,611
C2: Increase Energy-focused Outreach to Commercial Sector	3,517
C3: Financial Initiatives for Energy Improvements	16,617
C4: Promote Green Building	42
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	Support Strategy
C6: Investigate and Implement Localized Reach Codes	15,579
C7: Encourage Energy Education in Real Estate Transactions	Support Strategy
C8: Promote Energy Efficiency for Renters	Support Strategy
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	290
C10: Partner with Local Organizations to Support Energy Projects and Programs	Support Strategy
C11: EV Advocacy	166,158
C12: Support EV Infrastructure Development	Support Strategy
Municipal Strategies	
M1: City Support for Implementing EAP	Support Strategy
M2: Support Clean Power Alliance's Local Programs	Support Strategy
M3: Energy Upgrades at City Facilities	252
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	170
M5: Establish Funding for Energy Projects	Support Strategy
M6: Transition Municipal Fleet to Zero Emission Vehicles	977
M7: Upgrade Streetlights	58
TOTAL	**207,271**

The projected cost savings and total cost to the City per year for each of the strategies is captured in the following Table ES5. The table also shows the cumulative cost benefit analysis for 2030, but does not display the estimated cost to the community.

Table ES5: EAP Strategies Cost Benefit Analysis

Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	2030 Cumulative Community Cost Savings ($)	2030 Cumulative Cost to City ($)
Community Strategies				
C1: Increase Energy-focused Outreach to Ventura Residents	16,200,176	647,505	3,103,432	75,000
C2: Increase Energy-focused Outreach to Commercial Sector	14,636,577	187,045	2,390,013	75,000
C3: Financial Initiatives for Energy Improvements	71,861,079	2,840,332	13,733,107	190,900
C4: Promote Green Building	32,239	6,051	11,129	122,250
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	n/a	n/a	n/a	n/a
C6: Investigate and Implement Localized Reach Codes (TOTAL)	-6,399,472	2,923,952	2,080,989	42,704
C6a (All Electric Reach Code)	-28,547,773	2,923,952	-1,241,256	21,325
C6b (Solar Reach Code)	22,148,300	0	3,322,245	21,325
C7: Encourage Energy Education in Real Estate Transactions	n/a	n/a	n/a	n/a
C8: Promote Energy Efficiency for Renters	n/a	n/a	n/a	n/a
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	15,684,349	0	2,352,652	85,500
C10: Partner with Local Organizations to Support Energy Projects and Programs	n/a	n/a	n/a	n/a
C11: EV Advocacy	-15,684,349	n/a	73,781,319	108,000
C12: Support EV Infrastructure Development	n/a	n/a	n/a	n/a
Municipal Strategies				
M1: City Support for Implementing EAP	n/a	n/a	n/a	n/a
M2: Support Clean Power Alliance's Local Programs	n/a	n/a	n/a	n/a
M3: Energy Upgrades at City Facilities	3,096,424	8,602	473,410	700,300

Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	2030 Cumulative Community Cost Savings ($)	2030 Cumulative Cost to City ($)
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	7,108,734	0	1,066,310	2,473,900
M5: Establish Funding for Energy Projects	n/a	n/a	n/a	n/a
M6: Transition Municipal Fleet to Zero Emission Vehicles	-891,984	n/a	382,526	106,910
M7: Upgrade Streetlights	2,107,268	0	316,090	260,900

Conclusion

The City is well on its way to achieve their energy related GHG reduction goals. As the City expands existing programs and develops new programs to assist residents and businesses to conduct energy upgrades, community input and participation are necessary to ensure successful EAP Implementation. The City highly encourages active participation of local energy users to successfully cut GHG emissions by reducing their energy usage. Ultimately, a collaborative effort to implement this plan will save money, reduce GHG emissions, increase resiliency to climate change, and ultimately increase the quality of life for everyone in the City.

CHAPTER 1: BACKGROUND

1.1 City Profile

City of Ventura, officially named San Buenaventura, is a California coastal community founded in 1782 when Saint Junipero Serra established Mission San Buenaventura, the ninth of the California missions. Serra named the mission after the Italian Saint Bonaventure, hence the nickname that Ventura is the "city of good fortune." Located along the Pacific Ocean between Los Angeles and Santa Barbara, the City was incorporated in 1866.

Photo by Sue Hall Serra

The City of Ventura is a full-service municipality serving 109,000 residents within the 32 square mile city limits. Nearly 600 staff members focus on delivering key services to our businesses, residents, and visitors to ensure Ventura remains a fiscally stable, economically vibrant, safe, clean, and desirable community.

Ventura is home to a diverse mix of more than 12,000 businesses and a robust workforce of more than 53,000. The City of Ventura makes economic development a priority and is committed to providing local businesses with the resources they need to thrive and expand. Ventura is the region's leader in the healthcare and public administration sectors with three renowned medical institutions and the County's Government Center located within the City's boundary.

1.2 Environmental Action in Ventura

The City of Ventura is a special place to live due to the people and environment that make up the fabric of its culture. City officials seek to protect and enhance the unique "sense of place" that builds pride in Ventura's historic and natural settings. Residents, businesses, and community groups maintain a strong environmental ethic and work to conserve the ecological wealth of the community. Ventura's natural assets are invaluable and deserve to be protected however possible, whether by conserving foothills and open space, encouraging smart growth, planning for clean transportation options, decreasing GHG emissions, protecting picturesque rivers and beaches, or keeping the City safe and clean. This desire to protect Ventura's environment is reflected in the following policies and practices of the City Council and staff.

2007	City Council passed the "Green Initiative", a ten-point action plan designed to reduce environmental impacts from the City's municipal operations. The plan includes reducing energy and vehicle fuel use; developing a green purchasing policy; educating employees about green practices; and forming a Green Team to help implement these programs.
2012	The Environmental Sustainability Strategy (ESS) was developed to improve Ventura's municipal environmental performance and reduce operating costs by improving the City's operational efficiency and reducing resource consumption. The ESS identifies strategies and projects that reduce energy, fuel, chemical and water use; reduces solid waste and hazardous waste generation; and increases the purchase of environmentally preferable products. The ESS consolidates the efforts of individual City divisions into a single document, establishes goals and strategies, and provides a process for tracking progress over time. The City also launched their Green Business Program in 2012, to support local businesses in adopting environmentally responsible practices.[2]
2015	City of Ventura Environmental Sustainability Division and VCREA worked collaboratively to develop the Climate on the Move report, which included a community-level GHG emissions inventory and a CAP template for the City. Climate on the Move provides city-specific community GHG emission data from 2010 through 2012, 2020 emission forecasts, and GHG reduction target options.
2018	City Council voted to join CPA; the newly established community choice energy (CCE) program based in Los Angeles. This allowed the City Council to determine what type of electricity would be sold to customers within the City. The City Council voted to join CPA at a 100 percent renewable energy default, meaning that electricity customers within the City would automatically be enrolled in the new program to receive 100 percent renewable electricity.[3] The switch to CPA[4] and defaulting enrollment in 100 percent renewable energy resulted in a significant decrease in the GHG impacts of energy generation and consumption in the City. This effort demonstrated significant leadership in climate change action from Ventura. It is expected that CPA will also create programs designed to assist residents in adding local renewable energy, switching to EVs, and electrifying appliances.
2019	City of Ventura Environmental Sustainability Division worked with VCREA and Community Environmental Council to create an EV Accelerator Plan for the City. The City's Accelerator Plan was included in a larger EV Ready Blueprint for Ventura County,[5] which creates a step-by-step plan for electrifying the Region's transportation sector. The City's Accelerator Plan details the infrastructure needed for EVs to be one-eighth of all registered vehicles in the City by 2030.[6]

[2] *Between 2012 and 2020, the City's Green Business Program certified 83 businesses. Updated energy and other resource saving data can be found at https://greenbusinessca.org/CityofVentura*

[3] *These customers have the option to opt out of the program, or to opt into a lower renewable energy percentage tier offered by CPA.*

[4] *Electricity service to most customers began by May of 2019.*

[5] *https://www.vcenergy.org/electric-vehicle-blueprint/*

[6] *One-eighth of all vehicles register in the City is equivalent to the Cities' share of EVs in order to meet the state of California's goal is five million registered Zero Emission Vehicles by 2030.*

1.3 Support for EAP Development

On Earth Day 2017, local students from iMatter[7] marched to City Hall to attend a City Council Meeting and encouraged Councilmembers to move forward with developing a CARP. While the City of Ventura has historically had a strong environmental ethic, efforts to address GHG emissions have been decentralized. City of Ventura's Environmental Sustainability Division recognized the need to bring all stakeholders to the table to create a plan for a more resilient, equitable, and energy-efficient future. The Environmental Sustainability Division joined forces with VCREA and the Community Environmental Council (hereinafter referred to as Project Team) to apply for funding to develop an EAP - a major steppingstone in the development of the City's first CARP. The Project Team applied for and was awarded Investor Owned Utility (IOU) Strategic Plan funding[8] and CEC Local Government Challenge grant funding to develop an EAP. The goals of both grant programs were to capture the energy efficiency potential within public buildings and facilities, promote energy efficiency in the community, and support the development of community-level strategic plans. Therefore, the EAP lays out goals, strategies, and actions that reduce energy use, increase energy efficiency, and increase the adoption of renewable energy to achieve significant energy savings and GHG reductions.

Work began in 2018 on the EAP, with engagement from City staff, community members, and industry experts. The process of developing the EAP has helped the City of Ventura's municipal operations and the community better understand their collective emissions, plan for building resiliency, and respond to the next generation's request to create a plan for a more sustainable Ventura. If effectively implemented, the EAP will provide a pathway for the City of Ventura (municipal operations and the community at large) to lower utility bills, reduce pollution, improve the comfortability of our buildings, increase resiliency to climate change, and improve social equity while meeting the State's climate goals.

Photo by Danny Goen Leo Robbins

[7] *https://www.imatteryouth.org/*

[8] *Strategic Plan grant funding was administered through the IOU Local Government Partnership Program and implemented through collaborations between SCE, SoCalGas, and local governments.*

CHAPTER 2: PURPOSE

2.1 What is an EAP

This EAP identifies the City of Ventura's long-term vision and goals for energy supply and consumption by residents, businesses, visitors, and municipal operations. The plan will help reduce GHG emissions associated with electricity production and consumption, reduce natural gas production and combustion, and address some vehicle operations; thus, improving the air quality and the health of the community. This EAP is designed to be incorporated as the energy chapter of the City's CARP. This comprehensive document will guide the City's decisions and investments to reduce GHGs and adapt to the changing climate.

The EAP identifies goals, strategies, and associated actions to reduce energy consumption, increase energy efficiency, shift to renewable energy sources, and electrify both transportation and natural gas-powered processes (heating, etc.). Specifically, the EAP outlines the most cost-effective strategies and actions the City and community may take to reduce overall energy consumption and related GHG emissions. The plan also sets a 2010 baseline for Ventura's GHG emissions and includes the GHG accounting for emissions across the entire community as well as for municipal operations. The EAP is designed to plan for emissions reductions for the next ten years (until 2030) with midterm goals for 2025.

The EAP also serves to prepare the City and community for changing state policies that will influence how and when we use energy. The City's EAP may serve as a regional model for other agencies and will aid the County in meeting its energy and GHG reduction goals by identifying opportunities for energy conservation in a manner that is consistent with its cities.

Finally, the EAP provides an overview of the GHG emissions in the City, and how they are expected to change in the next decade. The City will not be solely responsible for all the emissions reductions within its boundaries. The impact of state and federal policies and demographic changes will also impact emissions in Ventura. This EAP captures the internal and external drivers of GHG emissions, including a full accounting of baseline emissions, which provides important context for the development of a CARP.

2.2 Focus on Climate Change

The City of Ventura recognizes that climate change is altering local climatic conditions and requires planning across sectors and industries to prepare for and mitigate impacts. Climate change is causing more severe temperatures and prolonged droughts. These circumstances trigger dangerous events that imperil life and property, such as the Thomas Fire that began in December 2017.

To protect City residents, and adhere with state guidelines, the City has made addressing local impacts of climate change a top priority. This EAP serves to address the GHG emissions that are causing climate change associated with energy production and consumption throughout the City of Ventura for the next decade.

Photo by Bill Nash

In addition to outlining GHG reductions, this EAP serves as a planning tool to mitigate the impacts of climate change on the energy systems in Ventura. For instance, it is anticipated that higher temperatures will strain our electricity grid as more air conditioners are deployed to counter increased temperatures. In turn, the City may experience additional power outages from higher demands on the grid. Increased natural disasters may also drive residents and businesses to turn to diesel or other fossil-fuel-fired generators to provide backup power, further worsening air quality conditions and impacting human health. This plan provides a framework for the City to plan for programs and strategies to address the environmental, health, and safety concerns of residents and workers as they relate to climate change impacts on the energy system.

2.3 Planning Beyond 100 Percent Renewable Electricity

Although the City implemented a 100 percent renewable energy default in 2018 through CPA, achieving significant GHG savings, Ventura recognizes that there is more that can be done to reduce the GHG impacts associated with energy consumption. As the State transitions to a higher percentage of renewable energy on the grid, managing the timing of electricity consumption to match the production from sources like solar will be critical in reducing the GHG impacts of the state's energy supply. Ultimately, electricity users will need to increasingly match the timing of energy usage to that of its generation. Electricity users, grid managers, and utilities will need to move towards storing the excess energy that is produced in the middle of the day, to be used when the sun is not shining. Shifts in the timing of energy usage and availability will occur through applications of energy storage, both at a distributed level and at the utility level, and from signals in electricity pricing. Additionally, the electrification of the both the transportation sector (through increased EV adoption) and the building sector (through replacing natural gas combusting appliances such as heaters, stoves, etc. with electric appliances) will cause the community's demand for electricity to grow. Thus, the City recognizes that electricity demand is dynamic and requires planning for an increase in demand as transportation and appliances are electrified. Much of the work of managing the grid and implementing electrification policies will happen beyond the city level, but this EAP is designed to drive the types of energy management that will bring local benefits to the community. By implementing strategies that promote building

and transportation electrification, energy efficiency, shifts in energy use timing, and the adoption of local renewable energy and storage resources, the City is taking the next step to support a local renewable, resilient electricity system.

2.4 Regulatory Background

The state of California has numerous policies and regulations to address GHG emission in the coming decades. Several of these policies are directly related to energy production and consumption. Others are related to the energy performance of buildings, or the adoption of EVs, which are in-turn directly connected to energy consumption. Some of the state policies are specifically designed to promote GHG reduction investments with an equity perspective, in order to ensure that the climate and energy improvements throughout the state include low-income or under-resourced communities.

The strategies within this EAP are designed to support the state's ambitious climate goals. The GHG reduction goals identified most directly support SB 32, which calls for a 40 percent reduction in emissions below 1990 levels by 2030. As shown in Figure 1, AB 32 has driven some reductions up to the point of the publication of this EAP, but the goal set by SB 32, and the additional 2050 goal set by EO S-3-05 as shown in Table 1, will require deep emissions cuts. These emissions reductions will be met by the implementation of the state policies described in the following tables, in concert with action from federal and local governments and agencies.

Figure 1: California's GHG Reduction Targets[9]

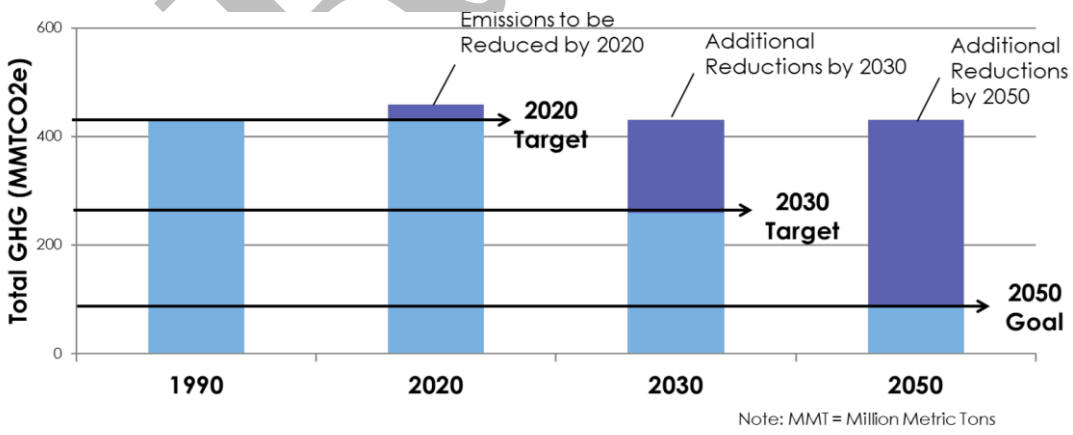


Table 1 provides a summary of key state policies that are supported by strategies within this EAP. Full descriptions of these policies and how they relate to the EAP strategies are available in Appendix A.

[9] *https://ww2.arb.ca.gov/sites/default/files/classic//cc/scopingplan/meetings/082018/august-20-2018-ghg-workshop-summary.pdf*

Table 1: Relevant State GHG, Energy, and Clean Mobility Goals and Milestones

Policy	Year	Objectives	Goals and Milestones
EO S-3-05	2005	GHG Reductions	Set goal to reduce GHG emissions to 1990 levels by 2020 and to 80% below 1990 levels by 2050
Assembly Bill (AB) 32	2006	GHG Reductions	Mandate to reduce statewide GHG emissions level to 1990 levels by 2020
AB 118	2007	GHG Reductions, Transportation	Established Clean Transportation Program to advance innovative fuel and vehicle technologies
California Green Building Standards Code (CCR, Title 24, Part 11 - CALGreen)	2007, updated every 3 years	GHG Reductions, Buildings	Green building standards code for residential and nonresidential new construction and additions and alterations to existing buildings which increase the building's conditioned area, interior volume, or size
EO S-14-08	2008	GHG Reductions, Electricity	Establishes renewable energy generation share for retail sellers of electricity in California
EO S-21-09	2010	GHG Reductions, Electricity	Directs California Air Resources Board (CARB) to set a 33% renewable energy target as established by EO S-14-08
SB X1-2	2011	GHG Reductions, Electricity	Requires California utilities to generate 33% of their electricity from renewables by 2020
SB 535	2012	GHG Reductions, Equity	Allocates 25% of climate investments to state-designated Disadvantaged Communities
EO B-16-2012	2012	GHG Reductions, Transportation	Set goal to accommodate 1 million EVs by 2020 and 1.5 million by 2025
EO B-30-15	2015	GHG Reductions	Set goal to reduce GHG emissions to 40% below 1990 levels by 2030. Increases California's renewable electricity procurement goal from 33% by 2020 to 50% by 2030
SB 350	2015	GHG Reductions, Equity	Mandated low-income barriers study for clean transportation; established 2030 GHG reduction target of 40% below 1990 levels
AB 802	2015	GHG Reductions, Buildings	Establishes energy benchmarking requirements for certain buildings
SB 32	2016	GHG Reductions	Mandates reduction in GHG emissions to 40% below 1990 levels by 2030
AB 1550	2016	GHG Reductions, Equity	Allocates 25 percent of climate investments to disadvantage communities and an additional 10 percent to low-income communities and households
EO B-55-18	2018	Carbon Neutrality	Sets goal of Carbon neutrality no later than 2045
SB 100	2018	GHG Reductions, Electricity	Accelerates the transition to renewable energy resources between 2020 and 2030 and sets a new GHG-free electricity goal by 2045
EO B-48-18	2018	GHG Reductions, Transportation	Sets target to deploy at least 5 million zero emission vehicles (ZEVs) in California by 2030 Install 250,000 EV chargers, 10,000 direct current (DC) fast chargers, and 200 hydrogen refueling stations by 2025
SB 700	2018	GHG Reductions, Electricity	Provides incentives to customers for distributed energy resources
EO N-79-20	2020	GHG Reductions, Transportation	Order requiring sales of all new passenger vehicles to be zero-emission by 2035

Policy	Year	Objectives	Goals and Milestones
California Building Standards Code California Code of Regulations, Title 24 Part 6 (Energy Code)	Updated Every 3 Years	GHG Reductions, Buildings	Established building energy efficiency standards for newly constructed and existing residential and nonresidential buildings that are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods

There are additional state policies that will (or currently do) significantly impact the GHG emissions in the City of Ventura that are beyond the scope of this EAP. Although these policies are not directly tied to the energy and transportation electrification strategies within the EAP, they are listed below in Table 2 to provide context for the wider discussion around GHG reduction goals, and the City's forecasting of GHG emissions in the future. These policies are also described in Appendix A.

Table 2: Key State Goals and Milestones that Impact City GHG Emissions Beyond Scope of EAP

Policy	Year	Objectives	Goals and Milestones
AB 1493	2002	GHG Reductions, Transportation	Requires CARB to develop and adopt regulations to reduce GHG emissions from new passenger cars and light duty trucks beginning in 2011
State Alternative Fuels Plan	2007	GHG Reductions, Transportation	Reduce Petroleum fuel use by 15% below 2003 levels by 2020
CARB's Tractor-Trailer GHG Regulation	2008	GHG Reductions, Transportation	Regulation to significantly reduce GHG emissions produced by certain heavy-duty tractor-trailer
EO S-01-07	2009	GHG Reductions, Transportation	Establishes a low carbon fuel standard to reduce carbon intensity of California's transportation fuels by at least 10% from 2010 levels by 2020, and 20 percent from 2010 levels by 2030
CARB's Advanced Clean Cars Program	2012	GHG Reductions, Transportation	Establishes standards that combines the control of GHG emissions and criteria pollutants, and requires greater numbers of ZEVs for vehicle model years from 2017 through 2025
CARB NOx Standards	2013	Air Quality	70% reduction in NOx by 2023, 80% reduction in NOx by 2031, CARB optional low-NOx standard is a 90% reduction from the current standard

In addition to state goals and mandates, the federal government has its own goals and mandates for addressing GHG emissions, energy production and consumption, and clean mobility. Table 3 includes a sample of key federal policies that impact GHG emissions and energy planning in Ventura, also described in Appendix A.

Table 3: Relevant Federal Climate Goals and Milestones

Policy	Year	Objectives	Goals and Milestones
Corporate Average Fuel Economy (CAFE) Standards	1978[10]	GHG Reductions, Transportation	Regulates how far our vehicles must travel on a gallon of fuel for passenger cars and light trucks and sets fuel consumption standards for medium- and heavy-duty trucks and engines
Energy Policy Act 0f 2005	2005	GHG Reductions, Electricity	Established Federal tax credits for renewable energy projects
Federal Clean Air Act (CAA)	2007	Air Quality	U.S. Supreme Court ruled that CO_2 is an air pollutant under CAA, and the U.S. Environmental Protection Agency has the authority to regulate emissions of GHG

Further discussion about GHG forecasting and accounting follows in Chapter 3.4: 2030 Community GHG Emissions Forecast.

[10] *CAFE standards are updated regularly.*

CHAPTER 3: INVENTORIES, FORECASTS, AND PLANNING SCENARIOS

The first step in planning for GHG reductions is to inventory historical and current GHG emissions. The Community and Municipal Operations GHG Emissions Inventories in this EAP will form the basis for the City's future CARP, which will address emission reduction targets, mitigation, and adaptation efforts across all sectors discussed below. As such, these inventories focus on all community and municipal operations emission sources and activities over which the City has significant influence, either directly through sources, practices, services, and regulations including building codes, or indirectly through policies, land use decisions, incentives, assistance, outreach, and education. The inventories are not, therefore, limited in scope to energy related emissions.

The City chose the 2010 calendar year as a baseline for GHG emissions from Community and Municipal Operations. The baseline inventory was developed as a benchmark against which to measure GHG emissions in the future, as the City implements this EAP and the future CARP. The City also conducted a second inventory for 2015 calendar year to provide an additional snapshot of GHG emissions, which is discussed in Appendix B.[11]

The Community inventory was developed following a well-recognized protocol published by International Council for Local Environmental Initiatives (ICLEI) using the national standards for local-scale accounting of emissions that contribute to climate change.[12] The Community Protocol establishes requirements and recommended best practices for developing community GHG emission inventories. Ventura's Community inventory follows these guidelines and accounting principles with accepted variations to adapt to the needs of the community and the data available. These protocols allow inventories from different years to be directly compared and ensures that no significant emissions sources are forgotten, or double counted. Inventory computations were carried out by VCREA using the ICLEI's ClearPath online tool for reference and in-house Excel-based data management tools.

The Community inventory accounts for activities within the city boundaries and is divided into seven categories as shown in Table 4. The GHG emissions for each category are calculated based on the following activities:

[11] *The City chose to use the 2010 GHG emissions as the baseline rather than using more recent data from 2015 due to concerns about the natural gas data emissions accuracy in 2015; as further discussed in Appendix B*

[12] *This methodology is laid out in the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol), Version 1.1, released in July 2013. The Community Protocol was developed concurrently with the Global Protocol for Community-Scale Greenhouse Gas Emissions Pilot Version 1.0, released in May 2012.*

Table 4: GHG Emissions Categories for Community Inventory

Transportation & Mobile Sources	Total annual Vehicle Miles Traveled (VMT) for the City of Ventura are calculated using an origin-destination model, following the Regional Transportation Advisory Committee's (RTAC) recommended approach, based on CARB's guidance for Metropolitan Planning Organizations (MPO). An origin-destination model attributes 100% of VMT from internal trips, 50% of VMT from trips that originate or terminate within a jurisdiction and excludes VMT from "pass-through" trips that do not originate or terminate in the jurisdiction
Residential Energy	Total electricity and natural gas usage of single-family and multifamily residential homes within the city
Commercial Energy	Total electricity and natural gas usage of commercial businesses within the city
Industrial Energy	Total electricity and natural gas usage of industrial and agricultural operations within the city
Process & Fugitive Emissions	Direct release of GHG compounds to the atmosphere from various types of equipment and processes[13]
Solid Waste	Methane (CH_4) emissions[14] from waste sent to landfills from the community
Wastewater Treatment	Stationary methane emissions from devices designed to combust gas produced by anaerobic digesters

Emissions from air travel and imported water are excluded from the inventory because the City does not have an airport and sources 100 percent of its water locally.[15]

The Municipal Operations inventory was created following the methodology laid out in the Local Government Operations Protocol.[16] The Local Government Operations Protocol enables local governments to measure and report GHG emissions associated with government operations in a standardized fashion. The Municipal Operations inventory is a subset of the Community inventory, meaning all emissions from the Municipal Operations inventory in a given year are included in the Community inventory of that year. The Municipal Operations inventory is divided

[13] *Limited to high global warming potential (GWP) GHGs used as substitutes for ozone-depleting substances (i.e. refrigerants, aerosols) or for emitted from electricity transmission. Excludes gases emitted due to semiconductor malfunctioning.*

[14] *The City of Ventura distinct waste emission factors are calculated from jurisdiction specific solid waste characterization data.*

[15] *https://www.cityofventura.ca.gov/1075/Water-Sources*

[16] *The Local Government Operations Protocol was developed by the CARB, California Climate Action Registry, ICLEI, and The Climate Registry.*

into four categories as shown in Table 5. The GHG emissions for each category are calculated based on the following activities:[17]

Table 5: GHG Emissions Categories for Municipal Inventory

Buildings & Facilities	Total electricity and natural gas usage of city owned buildings and facilities
Streetlights & Traffic Signals	Total electricity use of city owned streetlights, traffic control signals and parking and area lighting
Vehicle Fleet	Gasoline and diesel fuel usage of city owned vehicles
Wastewater Treatment & Water Pumping	Total electricity usage of city owned water pumping stations and wastewater treatment facilities. Methane emissions from combustion of gas from anaerobic digesters. Process nitrous oxide (NOx) emissions from nitrification and denitrification

The outputs for these inventories are given in the unit CO_2e. CO_2e is a measure used to compare the emissions from various GHGs based upon their global warming potential (GWP). GWP is a measure of how much heat a GHG traps in the atmosphere relative to carbon dioxide. For example, the GWP for methane over 100 years is 21, which means that emissions of one million metric tons (MMT) of methane is equivalent to emissions of 21 MMT of CO_2e.

For the Community and Municipal Operations inventories, emission sources can be categorized by "scope" according to the City's degree of control over the emissions source and the location of the source. Emission sources are categorized as direct (Scope 1) or indirect (Scope 2 or Scope 3), in accordance with the World Resources Institute and the World Business Council for Sustainable Development's Greenhouse Gas Protocol Corporate Standard.[18] Scope 1 emissions occur physically within the city, Scope 3 emissions occur outside the city and Scope 2 emissions are from the use of electricity, steam, and/or heating and cooling supplied by grids, which may or may not cross city boundaries as shown in Figure 2.[19]

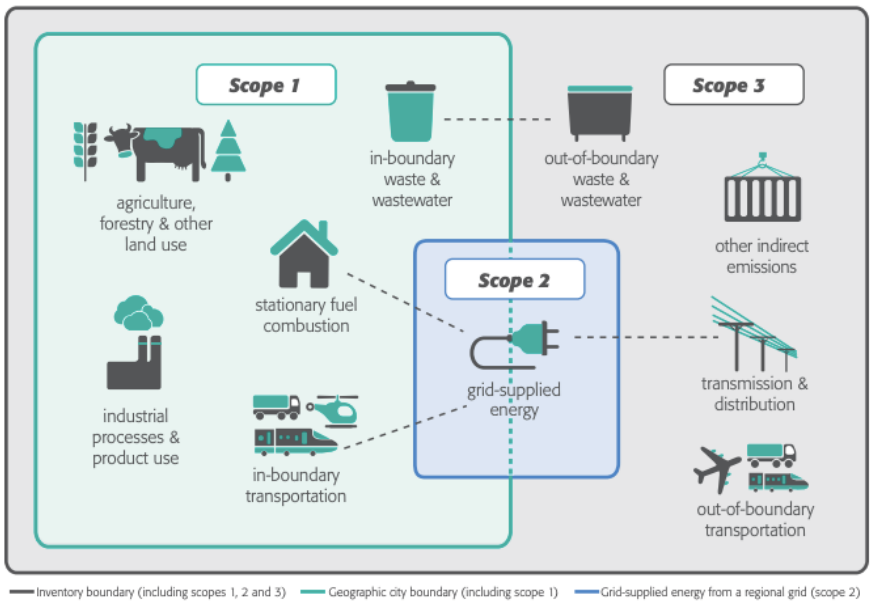
Figure 2: Emissions Scopes by Boundary[20]

[17] *Emissions from employees commuting, municipal transit fleet, solid waste, utility energy used at the wastewater plant and process and fugitive emissions are all excluded from the municipal inventory because they are already accounted for in the community inventory.*

[18] *https://ghgprotocol.org/about-wri-wbcsd*

[19] *https://ghgprotocol.org/sites/default/files/standards_supporting/GPC_Executive_Summary_1.pdf*

[20] *https://ghgprotocol.org/sites/default/files/standards_supporting/GPC_Executive_Summary_1.pdf*



Discussing emissions in terms of scope in addition to sector provides added insight into the development of the GHG reduction strategies, as it further defines the emission sources as direct or indirect and identifies the level of operational control the City has over the source. For the City of Ventura, solid waste emissions occurring at landfills outside the City are their only Scope 3 emissions. Since there are no power plants within the city's boundary, all emissions from electricity purchased by the City and community are Scope 2. Natural gas usage, however, counts as Scope 1 because emissions are generated from burning the fuel within the city, unlike electricity which produces emissions when generated outside the city. All other emissions included in the Community and Municipal Operations inventories (transportation, process and fugitive, wastewater, and all municipal emissions besides electricity usage) are Scope 1 emissions.

The methodology and data sources for the Community and Municipal Operations inventories are discussed in detail in Appendix B. The following sections provide a general overview of the inventories.

3.1 2010 Community GHG Emissions Inventory

The city of Ventura community emitted approximately 635,413 $MTCO_2e$ in the baseline year 2010. As shown in Figure 3 and Table 6, transportation and mobile sources was the largest contributor to emissions (43.97%), producing approximately 279,382 $MTCO_2e$. The residential energy sector was the second largest contributor to emissions (23.17%), producing approximately 147,219 $MTCO_2e$. Nonresidential energy contributed 146,949 $MTCO_2e$ (23.13%). The remaining sectors made up the remaining 9.73 percent of the emissions.

Figure 3. 2010 Baseline Community GHG Emissions Inventory

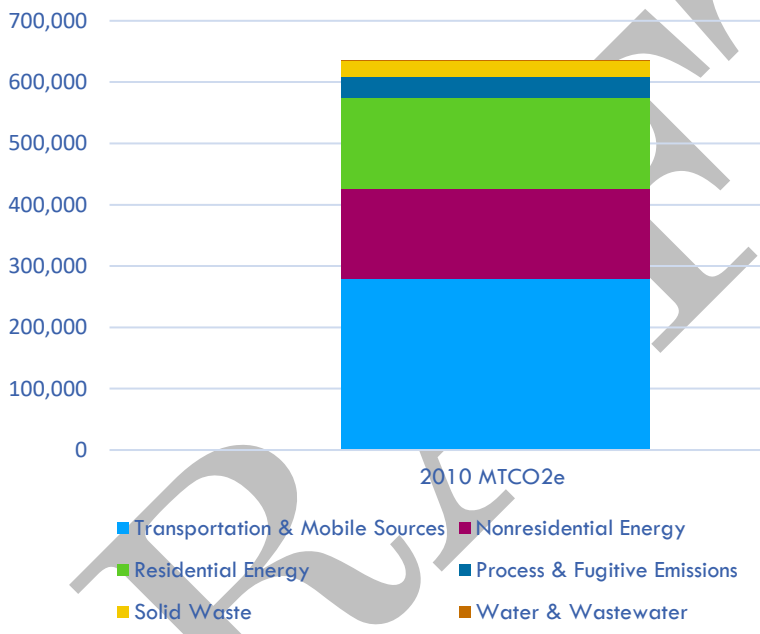


Table 6. 2010 Community GHG Emissions Inventory

Sector	2010 $MTCO_2e$	% 2010 Total
Transportation & Mobile Sources	279,382	43.97%
Nonresidential Energy	146,949	23.13%
Residential Energy	147,219	23.17%
Process & Fugitive Emissions	35,349	5.56%
Solid Waste	26,488	4.17%
Wastewater Treatment	26	0.004%
Total	**635,413**	**100%**

3.2 2010 Municipal Operations GHG Emissions Inventory

The Municipal Operations GHG inventories are a subset of the Community inventories. Municipal operations make up a small percentage (~2%) of the community's emissions in 2010 but are examined in further detail because the City has the most control over their own operations.

The City of Ventura Local Government emitted 11,752 $MTCO_2e$ in the baseline year 2010. As shown in Figure 4 and Table 7 the largest contributing sector was water and wastewater at 5,231 $MTCO_2e$, representing almost half (44.51%) of emissions for the year. The second largest sector was buildings and facilities which emitted 2,910 $MTCO_2e$, about a quarter of the total (24.76%). Vehicle Fleet was the third largest contributor at 2,167 $MTCO_2e$ (18.44%), followed by streetlights and traffic signals, which was the smallest emission source (12.29%) with 1,444 $MTCO_2e$.

Figure 4. 2010 City of Ventura Municipal Operations GHG Inventory

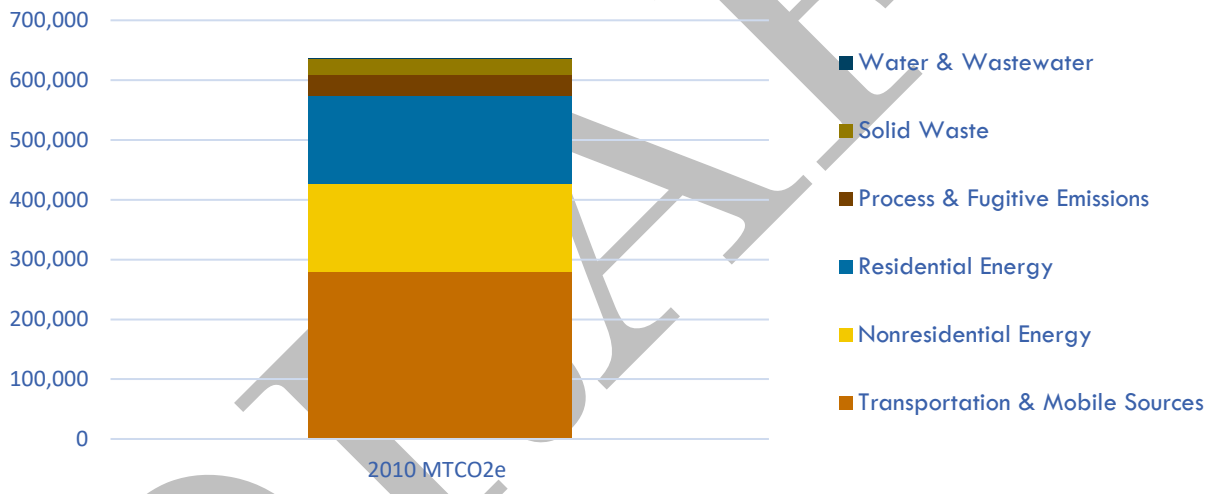


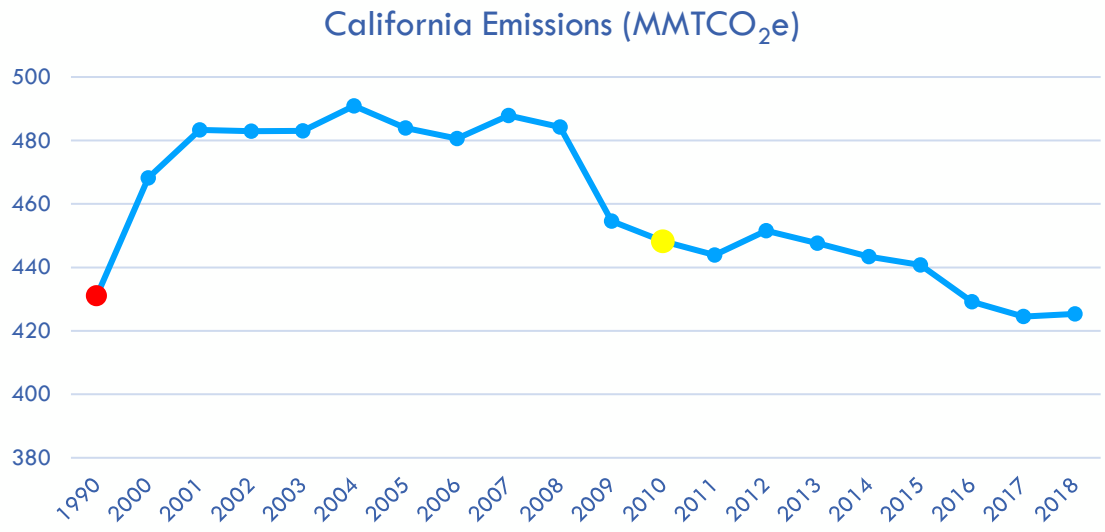
Table 7. 2010 Municipal Operations GHG Emissions Inventories

Sector	2010 $MTCO_2e$	% 2010 Total
Water Pumping & Wastewater Treatment Facilities	5,231	44.51%
Buildings & Facilities	2,910	24.76%
Vehicle Fleet	2,167	18.44%
Streetlights & Traffic Signals	1,444	12.29%
Total	**11,752**	**100.00%**

3.3 Setting an Emissions Reduction Goal

The City of Ventura may establish a GHG emissions reduction goal to match the State's goal of 40 percent below 1990 levels by 2030, in line with SB 32. As the City does not have a GHG inventory developed for 1990, state trends were used to estimate the difference between City emissions for 1990 and 2010. According to data from CARB,[21] state emissions peaked in 2004 (Figure 5). CARB estimates that 1990 emissions levels were 431 $MMTCO_2e$, shown on the graph with a red dot. In 2010, Ventura's baseline year, state emissions were 448.5 $MMTCO_2e$ (shown with a yellow dot) which is 4 percent higher than in 1990. If the City's emissions followed state trends, then it is reasonable to conclude that Ventura's 2010 emission levels were also 4 percent higher than 1990 levels. Based on this assumption, a reduction goal of 44 percent below the baseline of 2010 (equivalent to the 40 percent reduction from 1990 levels) by 2030 was used in the forecasts for this report.

Figure 5: California Emissions 2000 - 2018, with 1990 Estimate Included



Reaching the 44 percent city emissions reduction goal (355,831 $MTCO_2e$) by 2030 is expected to be achievable through implementing state and federal policies that will reduce emissions across all sectors, combined with local action to reduce emissions within the City. Local emissions reductions across non-energy sectors will be planned for in the City's future CARP. The following Sections (3.4 through 3.6) model the expected impact of state and federal climate policies and local actions that are specific to the energy sector on the City's emissions over the next ten years.

[21] *https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2016/ghg_inventory_trends_00-16.pdf*

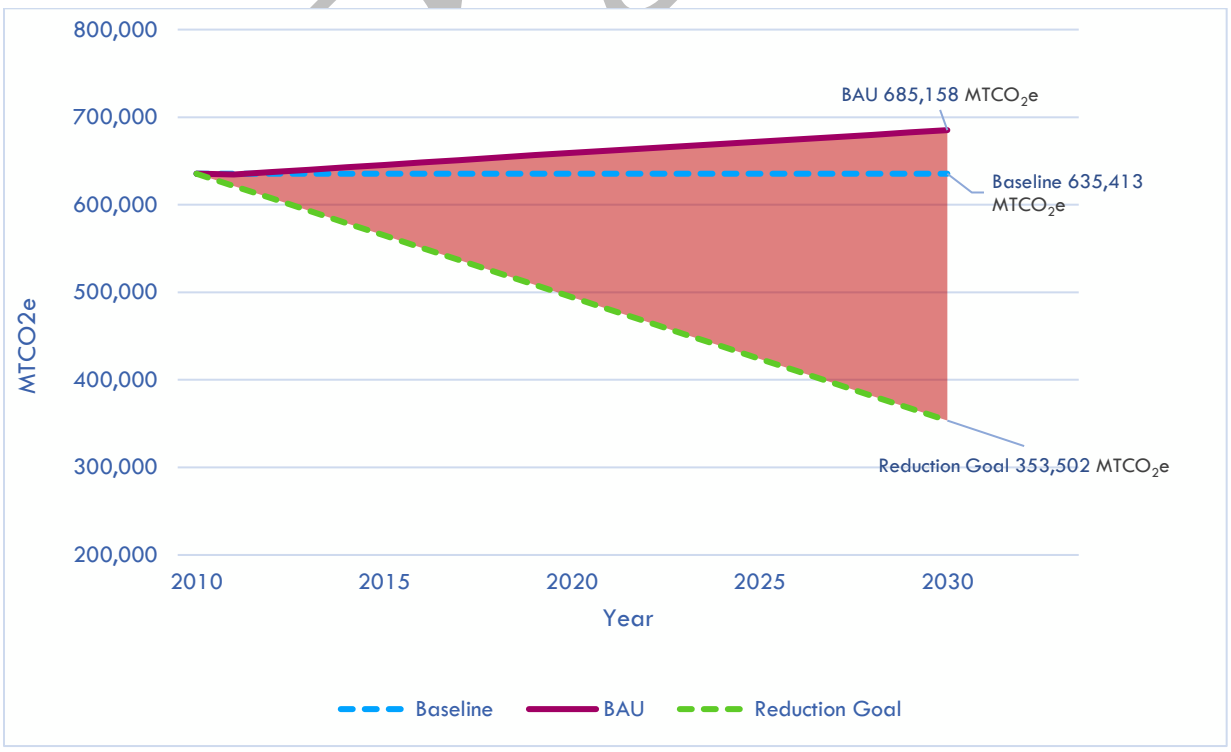
3.4 2030 Community GHG Emissions Forecast

GHG emissions forecasts are a tool to predict the growth or decline of emissions due to changes in population, influence of state and federal policies, and impacts of local decisions. For the purpose of an EAP, GHG emissions forecasts are an important tool because a City needs to plan for GHG reductions and energy usage to meet the needs of the future. City leaders must acknowledge that the current trajectory of GHG emissions will change and plan accordingly. For instance, the implementation of state GHG reduction policies are expected to cause a significant decrease in local emissions. The practice of forecasting emissions paints a clearer picture of what local emissions are likely to be in the future, and what additional local action is required to meet emissions reductions goals.

This section contains a forecast for all community and government operations GHG emissions within the City of Ventura. A specific Municipal Operations forecast was also completed following the same protocols, and is available in Appendix C.

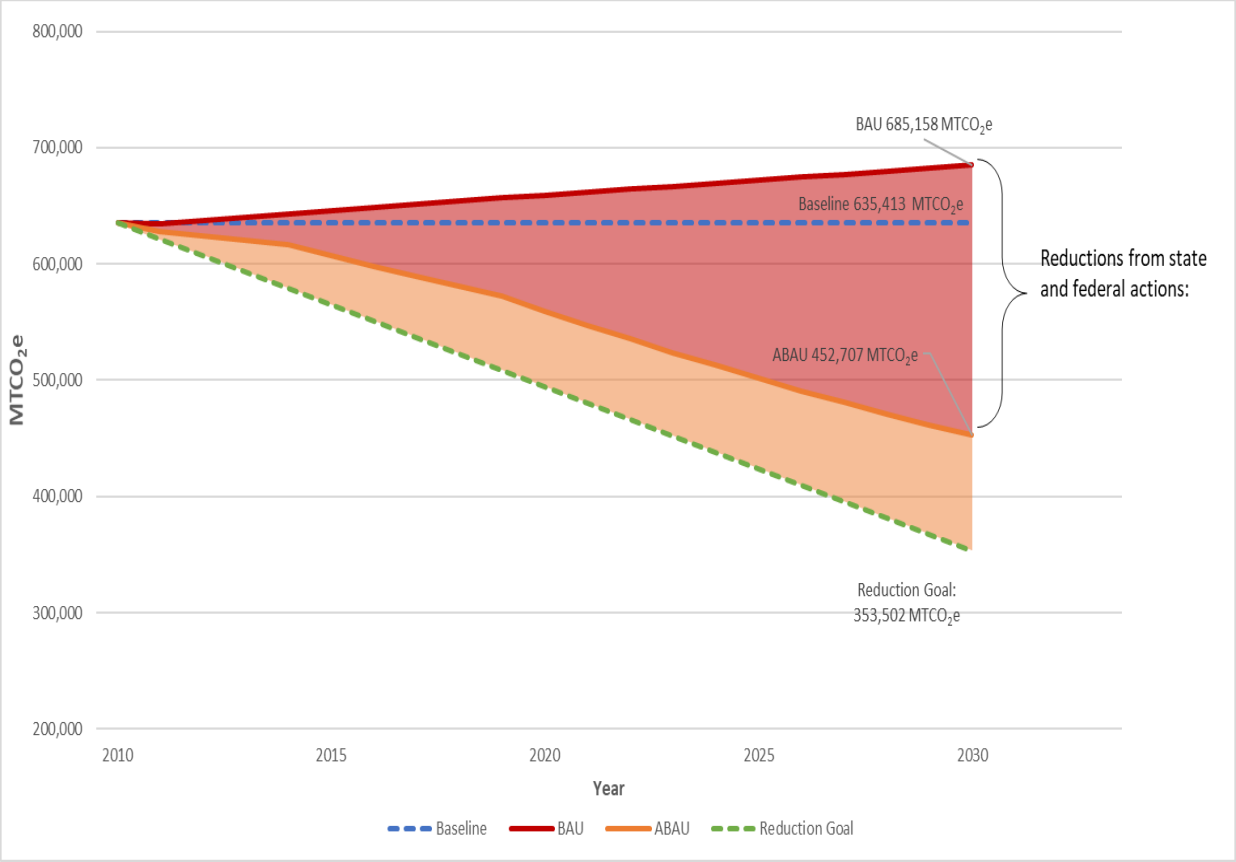
Starting with the 2010 baseline GHG inventory, emissions from the City of Ventura were forecasted through 2030 under two scenarios. The first is the BAU scenario, which represents projected emissions from housing, employment, and population growth, assuming no legislative action is taken by federal, state, or local governments. Under this scenario, the City's emissions are projected to rise in 2030 by 7.85 percent from the 2010 baseline to 685,158 $MTCO_2e$ as shown in Figure 6.

Figure 6. Community BAU Forecast



The BAU scenario is used as the starting point for the ABAU scenario. The ABAU scenario represents projected emissions reductions due to federal and state legislative action and excludes City reduction strategies and actions discussed in the EAP. The ABAU assumes that the state and federal policies (listed on pages 22 and 23) will be successfully implemented, reaching their planned emissions reductions on-time. Under the ABAU scenario, emissions are projected to fall by 28.75 percent by 2030 as shown in Figure 7.

Figure 7. Community ABAU Forecast



The ABAU scenario accounts for the following state and federal legislation:[22]

- **California SB 350** – Requires that utilities achieve a 33 percent renewable energy procurement by 2020 and 50 percent by 2030. In the ABAU forecast renewable energy procurement was projected to reach 60 percent by 2030 based on SCE's Renewable Portfolio Standard (RPS) goals.[23]
- **California Advanced Clean Cars Program** – Aligns tailpipe GHG and smog-causing pollutant standards with long-term state goals and requires manufactures to offer low and zero emission vehicles for sale.
- **California Tractor-Trailer GHG Regulation** - Requires the use of aerodynamic technologies on tractors and trailers.
- **Federal CAFE Regulations** – Sets fuel economy standards for the production of new passenger vehicles.
- **CEC Title 24 Part 6** – Requires the installation of solar photovoltaic systems in newly constructed homes.
- **California SB 1383** – Sets goal of 40 percent reduction of the emission of Short-lived Climate Pollutants (SLCP) from 2013 levels by 2030.

[22] *There are two legislative measures that were identified, but intentionally excluded from this forecast scenario:*

***California AB 341**, signed in 2011, sets a statewide goal of diverting 75 percent of solid waste by 2020. This bill was excluded from the ABAU forecast because city specific solid waste characterization data is available through California Department of Resources Recycling and Recovery (CalRecycle). This data, which will be used for future inventories, shows that solid waste tonnage per capita has remained relatively constant from 2015 through 2020. Solid waste emissions were, therefore, projected using population growth as a proxy.*

***California SB X7-7**, signed in 2009, sets a statewide goal of 20 percent reduction in water use per capita by 2020. Reports from the City Water District indicate that this reduction has not occurred. Water use was also forecasted using population growth as a proxy.*

[23] *Southern California Edison Company's (U 338-e) 2019 Draft Renewables Portfolio Standard Procurement Plan: http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/0949B2C15307BF1D88258427008310C2/$FILE/R1807003-SCE%202019%20Draft%20RPS%20Written%20Plan-Public-Vol.%201.pdf*

Table 8 shows the expected changes in emissions under the ABAU forecast between 2010 and 2025, and 2010 and 2030.

Table 8: Community ABAU Forecast Output

Emissions Sector	2010 $MTCO_2e$	2025 $MTCO_2e$	2030 $MTCO_2e$
Transportation & Mobile Sources	279,382	198,272	175,521
Residential Energy	147,219	135,221	128,333
Commercial Energy	135,329	106,371	91,898
Process and Fugitive	35,349	24,439	20,664
Solid Waste	26,488	28,631	29,208
Industrial Energy	11,620	8,559	7,054
Wastewater Treatment	26	29	29
Total	**635,413**	**501,522**	**452,707**
City of Ventura Emissions Goal			**355,831**

Table 8 shows that the biggest drop in forecasted emissions under the ABAU occurs in transportation and mobile sources. These emissions are expected to drop so much because of the modeled impacts of the California Advanced Clean Cars Act. The Advanced Clean Cars Act reduces emissions by improving the fuel efficiency and types of vehicles on the road, reducing the carbon intensity per mile driven. As transportation accounts for 44 percent of the community emissions, and VMT is expected to grow in the coming years, this expected decrease in the emissions associated with driving is especially critical.

There is also a large drop in energy related emissions, as seen from summing the changes in residential, commercial, and industrial energy sectors in Table 8. Although the energy sectors include emissions from both electricity and natural gas, the modeled decrease in emissions is from the expected impact of SB 350, which reduces the carbon intensity of the electricity we use by requiring utilities to procure a higher percentage of their generation from renewable sources. As energy accounts for 44 percent of emissions in 2010, this policy is very impactful in the total emissions reductions projections.

The policies that are modeled in the EAP are forecast to have a significant cumulative impact on Ventura's GHG emissions. From the 2010 baseline measurement of 635,413 $MTCO_2e$ to the ABAU measurement of 452,707 $MTCO_2e$, the City will benefit from an expected 28.75 percent reduction in emissions if the policies are successfully implemented. The remaining 15 percent in emissions reductions to meet the 44 percent goal by 2030 can be met by the energy related actions that the City has already begun or are outlined for future action as strategies in this EAP.

3.5 2025 and 2030 Community Planning Scenarios

The Planning Scenarios that follow forecast the impact of joining CPA and of energy strategies in this EAP to reduce GHG emissions for the years 2025 and 2030.

Clean Power Alliance

The City joined CPA in 2019 with 73.83 percent of residential accounts and 80.90 percent of nonresidential accounts choosing not to opt out of the 100 percent renewable energy default tier. Figures 8 and 9 display the percentage of residential and commercial customers for each tier (Lean, Clean, and 100% Renewable). Joining CPA did not decrease electricity usage, but it had a tremendous effect on emissions by bringing the emissions intensity of a majority of the city's electricity usage to zero.

Figure 8. Residential CPA Enrollment 2019

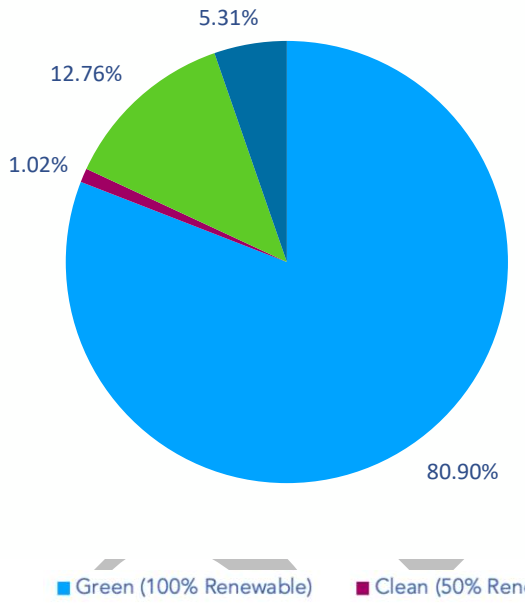
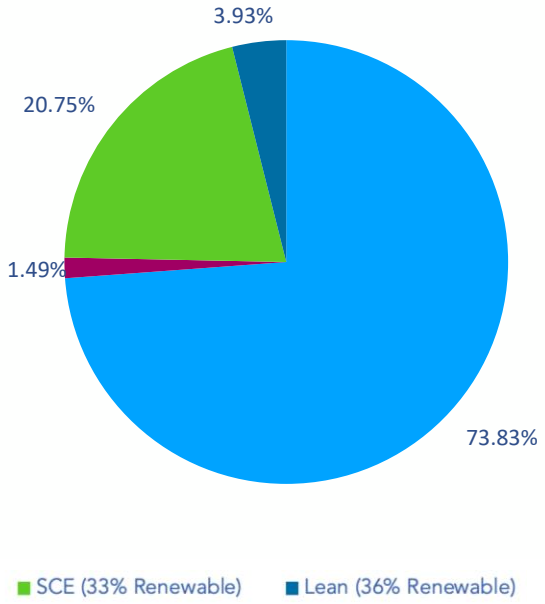


Figure 9. Commercial CPA Enrollment 2019



Emissions reductions were forecast into the future based on the 2019 enrollment percentages in each renewable energy mix, as shown in Figures 8 and 9. The emission reductions associated with CPA enrollment were calculated using a methodology detailed in Appendix D. Joining CPA is not listed as a strategy in this EAP because the action was taken before the development of the plan. Joining CPA is forecast to result in 1,159,723 $MTCO_2e$ cumulative emissions avoided by 2030, more than any EAP strategy is projected to reduce.

EAP Strategies

There are nineteen EAP strategies, described in Chapter 4, that are designed to reduce energy related GHG emissions. Twelve of these strategies focus on community-level emissions, and seven are focused specifically on the City's municipal emissions. Each of these strategies has an associated methodology to calculate the GHG impacts of strategy implementation, which will be discussed throughout Chapter 4 and detailed in Appendix D. This section will discuss the GHG reductions for each of the EAP strategies in relation to the ABAU baseline for community emissions. Projected reductions from other (non-energy related) sectors are not included here; strategies to reduce emissions in those sectors will be developed in the future CARP.

The EAP strategies are expected to decrease emissions in the City by addressing energy usage in various ways. Total cumulative GHG savings for these strategies relative to the ABAU forecast have been projected for 2025 and 2030 using starting values from the 2010 baseline inventory, shown in Table 9. Some strategies are listed as "supporting" because they do not have direct GHG impacts. These strategies will not contribute to the overall GHG and energy use reductions but are included in this plan as they are expected to drive the impact of other strategies, or the strategies are likely to have future GHG emissions savings associated with the action. For instance, Community Strategy 5 (a supporting strategy), calls for evaluating energy related codes, ordinances, and permitting processes. While an evaluation will not have direct GHG savings, it is expected that this strategy will lead to GHG emissions reductions as the City directs resources to regularly examining these practices and looking for opportunities for improvement. Assumptions related to GHG emission reductions and the calculated electricity and natural gas savings reductions for each strategy are thoroughly explained in Appendix D.

Table 9: Community Planning Strategy Emissions Reductions

Strategy	2025 $MTCO_2e$ (Cumulative)	2030 $MTCO_2e$ (Cumulative)
Community Strategies		
C1: Increase Energy-focused Outreach to Ventura Residents	1,000	3,611
C2: Increase Energy-focused Outreach to Commercial Sector	1,111	3,517
C3: Financial Initiatives for Energy Improvements	4,627	16,617
C4: Promote Green Building	12	42
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	Support Strategy	Support Strategy
C6: Investigate and Implement Localized Reach Codes	4,256	15,595
C7: Encourage Energy Education in Real Estate Transactions	Support Strategy	Support Strategy
C8: Promote Energy Efficiency for Renters	Support Strategy	Support Strategy
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	94	290
C10: Partner with Local Organizations to Support Energy Projects and Programs	Support Strategy	Support Strategy
C11: EV Advocacy	57,963	166,158
C12: Support EV Infrastructure Development	Support Strategy	Support Strategy
Municipal Strategies		
M1: City Support for Implementing EAP	Support Strategy	Support Strategy
M2: Support Clean Power Alliance's Local Programs	Support Strategy	Support Strategy
M3: Energy Upgrades at City Facilities	82	252
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	60	170
M5: Establish Funding for Energy Projects	Support Strategy	Support Strategy
M6: Transition Municipal Fleet to Zero Emission Vehicles	294	977
M7: Upgrade Streetlights	33	58
TOTAL	**69,528**	**207,271**

All of the strategies listed above achieve GHG reductions by planning for reduction of kWh or therm consumption except for the following:

> Strategy C11: EV Advocacy - This strategy reduces emissions by increasing the percentage of EVs on the road through education and infrastructure development. The strategy potentially increases emissions from electricity slightly because of charging but is outweighed by the emissions reductions from 21,752,563 gallons of gasoline projected to be avoided by 2030.

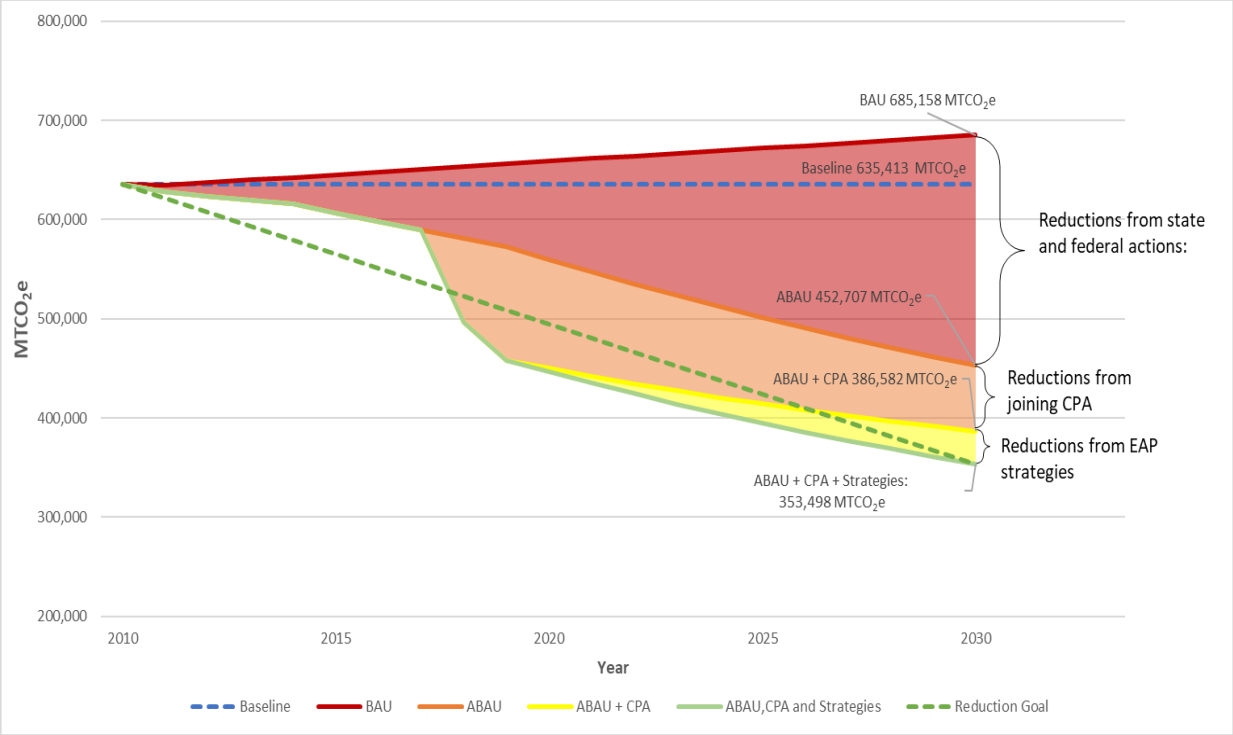
Strategy C6: Investigate and Implement Localized Reach Codes - This strategy includes assessing and implementing an electrification reach code, which would ultimately increase electricity usage in new buildings that were built without natural gas lines. This strategy would, however, decease GHG emissions from the energy sector as there would be a significant decrease in emissions associated with reduced natural gas combustion and only a small increase in GHG emissions associated with the increased electricity use.

Strategy M6: Transition Municipal Fleet to Zero Emission Vehicles – This strategy aims to replace 25 percent of the city vehicle fleet with EVs by 2030. Calculations for this strategy were, therefore, based on an expected increase in electricity use associated with charging, but also includes a projected avoidance of 891,984 gallons of gasoline by 2030 and an associated 977 $MTCO_2e$.

Forecast for Strategy and Recent Actions

When reductions from all the federal and state policies in the ABAU, joining CPA, and the EAP strategies are applied, emissions are forecasted to decrease 44.37 percent from 2010 (635,413 $MTCO_2e$) to 2030 (353,498 $MTCO_2e$) as shown in Figure 10.

Figure 10. City of Ventura Planning Scenario 2010-2030



The largest emissions decrease in the community planning scenario is projected to be in the commercial energy sector (-61.94%), followed by transportation and mobile sources (-46.38%),

process and fugitive (-41.54%), industrial energy (-39.29%) and residential energy (-35.30%), as shown in Table 10.

Table 10. City of Ventura Community Planning Scenario 2010-2030

Sector	2010 $MTCO_2e$	2030 $MTCO_2e$	% Change
Transportation & Mobile Sources	279,382	149,791	-46.38%
Residential Energy	147,219	95,251	-35.30%
Commercial Energy	135,329	51,501	-61.94%
Process & Fugitive Emissions	35,349	20,664	-41.54%
Solid Waste	26,488	29,208	10.27%
Industrial Energy	11,620	7,054	-39.29%
Water & Wastewater	26	29	11.54%
Total	**635,413**	**353,498**	**-44.37%**

A specific planning scenario for municipal energy usage, and the forecasted impacts of the same state and federal legislation, joining CPA, and implementing municipal-focused EAP strategies was also conducted for this EAP. The results of this analysis are available in Appendix D.

Although the City appears to be slightly ahead of current state emissions targets based on the actions discussed previously, the process of developing a CARP will identify strategies to further reduce emissions and proactively plan to approach carbon neutrality. Planning for carbon neutrality by 2045 is in line with state EO B-55-18, and the general trend towards tightening climate goals in the state. Specifically, it is expected that the CARP will address GHG emissions associated with the transportation sector, which is 44 percent of City 2010 baseline inventory, and therefore has significant opportunity for emissions reductions beyond those planned for by federal and state climate policy.

3.6 EAP Strategies - Cost Benefit Analysis

A cost benefit analysis was performed for each individual EAP strategy to determine how total projected cost to the City compares to total projected savings (to the City and the community) by 2030 (Table 11). This analysis of net financial savings in 2030 may be useful for City decision makers in prioritizing plan implementation and investment because the investment in a strategy may be compared to the expected utility bill savings for the community and the City.

Calculations for financial savings were based on the expected energy savings associated with a given strategy. The assumptions for the energy savings associated with each strategy are listed in Appendix D. The financial savings for the community strategies are expected to be experienced by community members that participate in strategy implementation. For instance, a homeowner

that makes an energy efficiency upgrade will experience the financial savings directly. Generally, as energy demand is reduced through implementing a strategy there will be a lower utility bill, which is reflected in the calculations. For these financial savings calculations, it is assumed that electricity will cost $0.15 cents per kWh and natural gas will cost $1.04 per therm, based on current (2021) average utility rates. These rates may change significantly in the next decade, and the City may choose to update financial projects based on energy prices in the future.

The cost for each community strategy is calculated based on a calculation of City staff time, potential consultant costs, and other costs (printing, etc.) to implement a given strategy. Direct costs for community members of strategy implementation, such as the cost of purchasing more efficient appliances or EVs are not included in this analysis. For the municipal strategies, however, the costs of these upgrades are included.

As shown in Table 11, 2030 net financial savings are projected to be highest for Strategy C3: Financial Initiatives for Energy Improvements" ($13,542,207) and Strategy C11: "EV Advocacy" ($73,673,319). These savings represent expected high electricity or gasoline savings by community members and relatively low investment from the City. The projected savings for the municipal strategies are relatively low, or negative in some cases because these calculations more fully capture the entire cost of the project than the community strategies. In contrast to community strategies where the costs will be borne by community members that make energy upgrades, all of the municipal strategies' estimated costs are captured in the analysis below, such as direct purchase of solar panels or EVs for municipal use. The negative (or low) values for 2030 net financial savings associated with some municipal strategies reflect a longer payback period but will eventually result in municipal utility savings.

For Strategies C11 and M6, which focus on electric vehicle adoption, additional information follows in Table 12 for the calculations of increased electricity costs and decreased fuel costs. Assumptions for the costs related to each strategy as well as the benefits are detailed in Appendix D.

Table 11: EAP Strategies Cost Benefit Analysis

Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	2030 Cumulative Cost Savings ($)	2030 Cumulative Cost to City ($)	2030 Net Financial Savings ($)
Community Strategies					
C1: Increase Energy-focused Outreach to Ventura Residents	16,200,176	647,505	$3,103,432	$75,000	$3,028,432
C2: Increase Energy-focused Outreach to Commercial Sector	14,636,577	187,045	$2,390,013	$75,000	$2,315,013
C3: Financial Initiatives for Energy Improvements	71,861,079	2,840,332	$13,733,107	$190,900	$13,542,207
C4: Promote Green Building	32,239	6,051	$11,129	$122,250	$-111,121
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	n/a	n/a	n/a	n/a	n/a
C6: Investigate and Implement Localized Reach Codes (TOTAL)	-6,399,472	2,923,952	$2,080,989	$42,704	$2,038,285
C6a (All Electric Reach Code)	*-28,547,773*	*2,923,952*	*$-1,241,256*	*$21,325*	*$-1,262,608*
C6b (Solar Reach Code)	*22,148,300*	*0*	*$3,322,245*	*$21,325*	*$3,300,893*
C7: Encourage Energy Education in Real Estate Transactions	n/a	n/a	n/a	n/a	n/a
C8: Promote Energy Efficiency for Renters	n/a	n/a	n/a	n/a	n/a
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	15,684,349	0	$2,352,652	$85,500	$2,267,152
C10: Partner with Local Organizations to Support Energy Projects and Programs	n/a	n/a	n/a	n/a	n/a
C11: EV Advocacy	-15,684,349	n/a	$73,781,319	$108,000	$73,673,319
C12: Support EV Infrastructure Development	n/a	n/a	n/a	n/a	n/a

Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	2030 Cumulative Cost Savings ($)	2030 Cumulative Cost to City ($)	2030 Net Financial Savings ($)
Municipal Strategies					
M1: City Support for Implementing EAP	n/a	n/a	n/a	n/a	n/a
M2: Support Clean Power Alliance's Local Programs	n/a	n/a	n/a	n/a	n/a
M3: Energy Upgrades at City Facilities	3,096,424	8,602	$473,410	$700,300	$-226,890
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	7,108,734	0	$1,066,310	$2,473,900	$-1,407,590
M5: Establish Funding for Energy Projects	n/a	n/a	n/a	n/a	n/a
M6: Transition Municipal Fleet to ZEVs	-891,984	n/a	$382,526	$106,910	$275,616
M7: Upgrade Streetlights	2,107,268	0	$316,090	$260,900	$55,190

Cost benefit analysis for "EV advocacy" (Strategy C11) and "Transitioning Municipal Fleet to Zero Emission Vehicles" (Strategy M6) were calculated based on savings are from reduced gasoline use and increased electricity costs (shown in Table 11 as negative savings) associated with charging vehicles. Table 12 shows the projected fuel savings and increased electricity charges. Fuel savings assume a cost of $3.50 per gallon of gas. The calculations in Table 12 are incorporated into the 2030 net financial cost and savings numbers shown in Table 11 but presented below for additional context.

Table 12. Electric Vehicle Cost Benefit Analysis

Strategy	2025 Increased Electricity for Charging (kWh)	2025 Gasoline Savings (Gallons)	2030 Increased Electricity for Charging (kWh)	2030 Gasoline Savings (Gallons)	2030 Cost Savings ($)	2030 Cost to City ($)	2030 Net Financial Savings ($)
C11: EV Advocacy	-4,277,550	6,921,270	-15,684,349	21,752,563	$73,781,319	$108,000	$73,673,319
M6: Transition Municipal Fleet to ZEVs	-243,268	40,233	-891,984	147,521	$382,526	$106,910	$275,616

In addition to the energy and cost savings shown in Table 12, it may also be helpful to consider the City's investment in each strategy in terms of municipal dollars invested per expected emissions savings. As shown in Table 13, there is a significant range in the expected cost of reducing emissions associated with the various strategies. Specifically, the "All Electric Reach Code" (Strategy C6a: $1.42/MTCO$_2$e) and "EV Advocacy" (Strategy C11: $0.65/ MTCO$_2$e) are projected to have the most cost-effective emissions reductions from the perspective of City investment. Because the City has high levels of renewable energy on the grid through CPA, strategies that are focused on electrification (such as EV adoption and All Electric Reach Codes) have the highest expected emissions savings, even though they are not associated with the highest energy savings.

Among the municipal strategies, the most cost-effective strategy for reducing emissions is forecast to be "Transitioning Municipal Fleet to Zero Emission Vehicles" (Strategy M6). The other municipal strategies have a relatively high cost per emissions reductions, for reasons discussed previously. However, the City should consider the co-benefits of all the strategies in consideration (as discussed in Chapter 4) in addition to the net financial benefits and municipal dollars invested per expected emissions savings. Specifically, for some of the higher prices strategies that focus on solar and storage installation, the energy and community resilience benefits of these projects should be weighed carefully.

Table 13 Strategy Cost Analysis by Emissions Savings

Strategy	2030 Cumulative Cost to City ($)	Total Emissions Avoided 2030 ($MTCO_2e$)	City Investment/$MTCO_2e$ saved by 2030 ($)
Community Strategies			
C1: Increase Energy-focused Outreach to Ventura Residents	$75,000	3,611	$20.77
C2: Increase Energy-focused Outreach to Commercial Sector	$75,000	3,517	$21.32
C3: Financial Initiatives for Energy Improvements	$190,900	16,617	$11.49
C4: Promote Green Building	$122,250	42	$2,910.71
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	n/a	0	n/a
C6: Investigate and Implement Localized Reach Codes (TOTAL)	$42,704	15,579	$2.74
C6a (All Electric Reach Code)	*$21,352*	*14,991*	*$1.42*
C6b (Solar Reach Code)	*$21,352*	*588*	*$36.31*
C7: Encourage Energy Education in Real Estate Transactions	n/a	0	n/a
C8: Promote Energy Efficiency for Renters	n/a	0	n/a
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	$85,500	290	$294.83
C10: Partner with Local Organizations to Support Energy Projects and Programs	n/a	0	n/a
C11: EV Advocacy	$108,000	166,158	$0.65
C12: Support EV Infrastructure Development	n/a	0	n/a

Strategy	2030 Cumulative Cost to City ($)	Total Emissions Avoided 2030 ($MTCO_2e$)	City Investment/$MTCO_2e$ Saved by 2030 ($)
Municipal Strategies			
M1: City Support for Implementing EAP	n/a	0	n/a
M2: Support Clean Power Alliance's Local Programs	n/a	0	n/a
M3: Energy Upgrades at City Facilities	$700,300	252	$2,778.97
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	$2,473,900	170	$14,552.35
M5: Establish Funding for Energy Projects	n/a	0	n/a
M6: Transition Municipal Fleet to ZEVs	$106,910	977	$109.43
M7: Upgrade Streetlights	$260,900	58	$4,498.28

CHAPTER 4: ENERGY ACTION PLAN STRATEGIES

4.1 Strategy Development

The following section describes the methods and details for developing the proposed energy strategies, which were informed by community opinion and priorities, extensive research of best practices, and a review of spatial community energy consumption data specific to the City. The City prioritized consistent community engagement throughout EAP development to ensure community support for and successful implementation of the EAP. Thus, resulting in EAP strategies that include actions to help the community access information, programs, and assistance necessary to reduce both their GHG emissions and energy consumption.

To ensure that the EAP aligned with best practices of other cities across the state, the Project Team reviewed EAPs and CAPs from a number of cities to develop a template of strategies for the City to consider. The City of Oxnard's Government and Community EAP, adopted by Oxnard City Council in 2013, serves as a primary influence on the structure and strategies included in this Plan. Beyond the direct review of plans, the Project Team also conducted research on energy related pilot programs throughout the state so that the most current energy strategies would be presented to the City.

To refine the energy strategies, the City also considered energy consumption data beyond what was available from SCE and SoCalGas. By analyzing the energy consumption patterns at a focused scale, the Project Team was able to modify the strategies to address the specific needs of neighborhoods within the City.

4.1.1 Community Engagement

The City conducted public outreach and engagement to provide residents, business owners, stakeholders, City staff, partner organizations, and individuals with the opportunity to participate in the planning process for drafting the EAP. The goals of outreach and engagement were to:

1. Raise awareness of EAP development
2. Educate the public and other organizations about this plan
3. Provide opportunities for input at the various steps of plan development
4. Provide opportunities to influence decision-making.

Photo Taken by City of Ventura Staff

Specifically, the community outreach and engagement process helped identify and refine goals, strategies, and actions for reducing energy consumption, increasing energy efficiency, and using more renewable energy. Community outreach and engagement comprised a variety of methods, including community surveys, a community workshop, tabling events, and stakeholder meetings.

4.1.1.1 OUTREACH SURVEYS

The City developed two community surveys to gather input from residents to help the City further understand community needs and preferences for the EAP.

Community Engagement Round 1 Survey

The first survey was designed to identify community priorities for energy improvements across residential and commercial sectors. The survey also asked participants about the importance of planning for climate change and resiliency through energy improvements. The survey was in both English and Spanish and was available electronically and in hard copy format. The online survey was hosted on VCREA's and the City's webpages between March and July 2018. Hard copy surveys were also distributed to residents at community meetings including the Neighborhood Community Council and Housing Authority of the City of Buenaventura meetings, tabling events including Ventura EcoFest and Fourth of July Street Fair, social media posts, and through the City's monthly e-newsletter. Of the 316 responses received from residents and businesses, several community attitudes about energy became clear:

1. The City should prioritize climate and energy programs for both municipal operations and the community.
2. Energy planning should include strategies that are achievable, reduce emissions, improve environmental health, support the local economy, and keep the city resilient toward natural disasters and the future impacts of climate change.
3. The City should take steps to reduce resource and knowledge barriers for residents and businesses to implementing energy efficiency and renewable energy projects
4. The commercial sector represents an opportunity for education on energy policy and financing for greening projects.
5. Commercial and residential tenants need assistance to implement energy measures in their offices and homes.

Community Engagement Round 2 Survey

The second survey was designed to gather community feedback on some specific strategy ideas for improving energy performance in residential and commercial buildings. The survey also asked respondents to identify priorities for increasing EV infrastructure and electrified public transportation. The survey was in both English and Spanish and was hosted on VCREA's and the City's webpage for ten weeks in the early summer of 2019. Similar outreach methods were used

to advertise the survey, including emails to previous email respondents. Ninety residents responded to the second survey.

The responses to both surveys were incorporated into the final strategy design. Round 1 and Round 2 Survey Reports are included in Appendix E.

4.1.1.2 COMMUNITY ENERGY WORKSHOP

On June 8, 2019, the City hosted a Community Energy Workshop at City Hall. With approximately 40 members of the public in attendance, the workshop opened with a presentation that introduced the concept of energy action planning and educated attendees about potential strategies. After the presentation, attendees split off into several breakout groups to discuss draft strategies that were featured in the Round 2 outreach survey. VCREA and Community Environmental Council staff recorded community input on strategies including solar and energy storage, citywide actions, and energy efficiency initiatives. A summary of feedback from this event is available in Appendix E.

4.1.1.3 TABLING EVENTS

City and VCREA staff hosted EAP focused booths at the annual Ventura EcoFest and Fourth of July Street Fair in 2018 and 2019. The booths attracted hundreds of community members with EAP-related games and prizes and provided a venue to discuss EAP strategies with residents.

Photo by VCREA Staff

4.1.1.4 CONTRACTOR LUNCH

In order to vet some strategies with the local energy contractor community, the City hosted a lunch for local contractors that work in solar, energy storage, HVAC, EV infrastructure, and other relevant tradespeople. The event featured conversations with City staff from the Building and Safety and Environmental Sustainability Divisions, and a review of draft EAP strategies. About a dozen energy professionals attended the lunch. A summary of feedback from this event is available in Appendix E.

4.1.1.5 ENVIRONMENTAL SUSTAINABILITY DIVISION SOCIAL MEDIA OUTREACH

The City utilized its Facebook and e-newsletter to publicize events relating to EAP planning efforts. Staff published articles online and posted about the Community Energy Workshop, Community Engagement Surveys, tabling events, and a free energy audit and benchmarking program for commercial businesses known as kWh Countdown.

4.1.1.6 KWH COUNTDOWN BUSINESS ENGAGEMENT

The kWh Countdown program, funded through the Local Government Challenge grant, served to support EAP development by informing the development of the business-focused energy strategies. The program, which began in July 2018, provided businesses with free energy benchmarking and ASHRAE Level II audits to help business owners analyze their energy usage, save money on utility bills, identify funding sources for energy upgrades, and prioritize energy efficiency projects. In addition, effective June 2018, state law (AB 802) requires buildings larger than 50,000 square feet to conduct benchmarking and disclose their energy usage. kWh Countdown helped businesses fulfill these requirements at no cost.

ASHRAE Level II Audit

These audits analyze how a whole building is functioning and identify projects that will provide the greatest energy reduction at the best return on investment. The audit involves interviews with facility staff, review of utility bills, and walkthrough of the facility. Data is compiled and used to complete a report describing energy efficiency measures and potential capital improvements with detailed energy calculations and financial analysis of proposed measures.

The Project Team, in partnership with the City's Green Business Program, recruited businesses, and reviewed energy audits. Working closely with businesses to analyze their energy usage provided the Project Team insight into the needs and challenges of business owners trying to effectively reduce utility bills and increase overall performance, health, and safety of their business facility.

4.1.2 Energy Atlas Data

SCE and SoCalGas provided the City with energy data that was used to develop the GHG inventories and forecasts. However, the City was able to get more granular electricity usage data from a research program on energy consumption at University of California, Los Angeles (UCLA)

called Energy Atlas.[24] Energy Atlas offers a database of building energy consumption that links utility account information to building characteristics, sociodemographic data, and other significant attributes that can be expressed spatially. Energy Atlas provided the City with monthly energy data for calendar years 2011 through 2016, with consumption statistics spatially aggregated at a census tract level, a much smaller geographic unit than that provided by SCE and SoCalGas.[25] This data provided insight into how energy usage varies with building size and age, energy consumption patterns in tenant verses owner-occupied buildings, the effect of rooftop solar on usage, usage in multifamily verses single-family settings, and geographic variability of usage. These patterns help to identify where energy efficiency is necessary, where to focus outreach efforts and possible incentives, and where energy reduction programs should be developed. Thus, the Energy Atlas data was used by the Project Team to adjust the draft energy strategies to meet community needs at the neighborhood level. Moreover, Energy Atlas data can be continuously used by City staff and partner agencies to implement this plan.

Appendix F contains further explanation about the Energy Atlas data and the methodologies employed to calculate, analyze, and visualize the community's energy consumption.

4.2 Overview of Strategies

A suite of strategies has been identified across multiple sectors that when implemented, will collectively lead to a reduction in GHG emissions that meet local priorities and support state goals. The energy savings, GHG emissions savings, and cost benefit analyses for the EAP strategies were discussed and quantified in Chapter 3. This section will introduce broad metrics for comparing the strategies to each other and analyze their costs and impacts in the community. Ultimately, each strategy will be detailed in Section 4.3 with associated co-benefits; energy savings and GHG emission reductions; City costs and City and community cost savings; potential funding sources; implementation timelines; and a responsible party.

4.2.1 Co-Benefits

In addition to the direct GHG reduction benefits associated with the EAP strategies, there are numerous co-benefits associated with energy upgrades. These co-benefits highlight the positive impacts that the EAP strategies can have on local or regional economic, social, and environmental conditions such as monetary savings, economic vitality, or air quality improvements. The City identified the following co-benefits:

[24] *Because Energy Atlas data was not available for the 2010 baseline inventory year, SCE data was used instead of Energy Atlas data in the inventory.*

[25] *The Energy Atlas data is packaged in a manner that does not conflict with various privacy protection regulations in place.*

Informs Public/Staff

Actions that educate the public/staff about programs, rebates, incentives, or other mechanisms that support energy savings, renewable energy, EV adoption, etc.

As the City develops new ways to connect with residents/staff, the community will see the City as a resource for energy support; thus, strengthening the connection between the City and the community. As the community becomes more informed about the energy landscape, it is expected that they will in-turn become more engaged in planning processes at the community level.

Increases Community Resiliency

Actions that pair local renewable energy with energy storage, increasing the community's resiliency during grid interruptions and natural disasters.

Installing a secure power generation system (e.g. renewable microgrid) will support a building's most critical operations during planned power outages or emergency power shut offs without the fossil-fuel combustion that other energy backup systems (e.g. generators) require. If the community can increasingly rely on local power from microgrids, rather than rely on the delivery of energy over wires or natural gas lines, gasoline, and diesel deliveries, Ventura will experience improved protection from grid interruptions. The resiliency benefits of local power generation and storage will be especially valuable as the City prepares for increased impacts from climate change. From a health and safety perspective, residents that rely on power for medical devices or are vulnerable to health impacts due to power loss will especially benefit from secure power supplies. By supporting the implementation of renewable microgrids for homes or other critical facilities, the City can protect vulnerable residents against power outages. Planning for these renewable microgrids to run without fossil-fuel powered generators will additionally support the City's climate and air quality goals.

Improves Building Stock

Strategies that support energy upgrades in public and private properties are investments in the community's building stock and associated quality of life for residents and employees.

Houses, apartment buildings, and government facilities that are upgraded to have adequate insulation will have lower Heating, Ventilation, and Air Conditioning (HVAC) demands and are generally more comfortable living spaces. The resources and programs identified in this plan will also support local business and municipal facility mangers in identifying cost-effective energy improvements that will result in more modern and enjoyable workspaces.

Supports Local Economy

Strategies that help building owners and renters see significant economic benefits from energy upgrades outlined in this plan.

Business and municipal facilities that undergo energy upgrades will have reduced energy bills where savings can be invested back into business and municipal operations; thus, supporting the local economy. The operational savings for municipal facilities can be reinvested into the community, through increased public services. Residents may also see lower energy bills, as power demand is offset by solar or other energy efficiency improvements. For lower income residents, these improvements will be especially important. Utility bill savings across the community will have a myriad of positive impacts on the local economy.

Developing local renewable energy resources and implementing this EAP may also provide economic insulation for residents, businesses, and the city from rising energy prices. This connection may be clearest for solar customers that have a reduced demand for grid electricity but is also true for buildings that are upgraded to require less energy through energy efficiency improvements. Residents and fleet operators that switch to EVs from internal combustion vehicles will also be protected from rising gasoline prices, especially if these vehicles are powered from solar energy.

Improves Air Quality

Strategies that result in indoor and/or outdoor air quality improvements resulting from decreased combustion of fossil-fuels.

Indoor air quality improvements will result from electrification of natural gas-powered appliances, such as stoves and furnaces. Outdoor air quality is expected to improve as more residents and commuters switch from internal combustion vehicles to EVs. Transitioning away from fossil fuel-powered generators and expanding the application of renewable energy throughout the community may also result in improved air quality.

Improves Public Health

Strategies that enhance the health and well-being of the community.

The city will see public health benefits related to the growth of a vibrant economy with cleaner air, improved housing stock, and improved transportation systems.

Improves Transportation System

Strategies that support the increased adoption of EVs for personal, commercial, and municipal applications.

The EAP calls for the increased adoption of EVs and implementation of electric buses and shuttles to be used in public transportation. Parallel to these efforts, there are strategies designed to improve the infrastructure to support this transition, such as the deployment of charging stations. Implementing this EAP will result in an upgraded, cleaner transportation system across the community.

Social Equity

Strategies that ensure an equitable distribution of benefits of GHG emission and energy use reductions, helping alleviate unequal impacts created by climate change.

The EAP incorporates equity considerations into strategy development and implementation. Strategies that promote renewable energy programs and projects help to create and promote jobs for the local workforce. Strategies that help small business or vulnerable populations finance energy efficiency improvements help save money and improve overall building health and comfort.

4.2.2 Strategy Type and Responsible Department or Division

Implementation of EAP strategies may require the City to develop and implement or modify existing codes, ordinances, permitting practices, programs, and projects. Accordingly, strategies are characterized by five types:

1. **Leverage Existing Partnerships** with SCE, SoCalGas, CPA, VCREA, Tri-county Regional Energy Network (3C-REN), Central Cost Green Building Council, and Community Environmental Council, which all have existing programs that focus on reducing energy usage and GHG emissions. The city will benefit from the momentum, resources, and funding associated with existing municipal and community programs.
2. **Develop New Programs** to fit the unique needs of the community and municipal operations that are not currently addressed by existing programs.
3. **Promote Existing Programs** to build upon and improve existing community and municipal program offerings and engage more residents and businesses to increase program participation.
4. **Update Codes, Ordinances, or Permitting Practices** to facilitate sustainable development within the city and conserve energy, improve air quality, and reduce GHG emissions.
5. **Capital Improvements** at municipal facilities to implement energy upgrades to save money, reduce GHG emissions, and increase resiliency.

EAP strategies span a variety of activities; therefore, various City departments and divisions will take primary responsibility for implementation of specific strategies. Collaboration between City departments as well as local and regional organizations will also be key to successful implementation of the EAP.

4.2.3 Timeline for Strategy Implementation

Implementation of EAP strategies require careful consideration for operational and capital resources needed, as well as timing for implementation and monitoring. The following implementation metrics serve as guidance to City decision makers and staff by providing relative timelines for each EAP strategy:

- **Ongoing**: Already occurring or to occur in perpetuity
- **Short-term**: Within the next five years
- **Mid-term**: Within the next ten years
- **Long-term**: To occur beyond ten years

4.2.4 Relative Costs for Strategy Implementation

In Section 3.6, information is presented on the full cost-benefit analysis for each strategy. The anticipated costs for strategy implementation include staffing needs, start-up costs, ongoing administration, and monitoring. As the strategies are detailed in Section 4.3, their costs can be compared by using the relative categories described in Table 14. Although the costs are presented in the form of full-time employee equivalence, the City may pool resources from several existing positions and departments or bring in consultant help to implement a given strategy rather than making additional hires.

Table 14: Anticipated Cost to the City of Ventura

RELATIVE COSTS	DESCRIPTION
LOW	Assumes less than one full-time equivalent employee and/or consultant costs, marketing costs, program costs, operational and maintenance costs, capital improvement costs, and/or financing costs less than $20,000 to oversee implementation.
MEDIUM	Assumes less than one full-time equivalent employee and/or consultant costs, marketing costs, program costs, operational and maintenance costs, capital improvement costs, and/or financing costs between $20,001 and $50,000 to oversee implementation.
HIGH	Assumes one full-time equivalent employee and/or consultant costs, marketing costs, program costs, operational and maintenance costs, capital improvement costs, and/or financing costs between $50,001 and $150,000 to oversee implementation.

VERY HIGH	Assumes one full-time equivalent employee and/or consultant costs, marketing costs, program costs, operational and maintenance costs, capital improvement costs, and/or financing costs exceeding $150,001 to oversee implementation.

While high level costs and anticipated benefits are discussed in this plan, it is important to understand that although the EAP does include a comprehensive cost benefit analysis, the EAP does not serve as a mechanism for funding allocation. Funding for EAP implementation will be allocated through the City's budgeting process and capital improvement process.

In lieu of allocating monies from the City's General Fund or departmental budgets, potential funding sources such as regional, state, and federal programs and grants are identified to help implement certain EAP strategies. Additionally, the City may establish funding mechanisms and resources such as creating financing programs and incentives to help with strategy implementation.

4.3 Community Strategies

The following twelve strategies will help the community realize energy savings, reduce the use of fossil-fuels, increase the usage of renewable energy, increase equity, and enhance local resiliency in preparation for rising utility costs, natural disasters, and global climate change. Each strategy includes:

- Actions to support implementation
- Community and City benefits
- GHG emissions reductions as well as kWh and therm savings over the next five and ten years;[26]
- Costs to the City
- Community and City cost savings
- Potential funding sources
- Implementation timelines
- Responsible party.[27]

These implementation metrics are intended to be updated regularly per the implementation, program evaluation, and monitoring strategies.

Community strategies are organized by the following goals:

[26] *Strategies are identified as supporting when there is not a contribution to the overall GHG and energy use reductions.*

[27] *The level of detail for each strategy may vary based on the available data.*

Goal 1: Increase Resident and Business Energy Knowledge and Encourage Action

Strategy C1: Increase Energy-focused Outreach to Ventura Residents

Strategy C2: Increase Energy-focused Outreach to Commercial Sector

Goal 2: Reduce Building Energy Consumption

Strategy C3: Financial Initiatives for Energy Improvements

Strategy C4: Promote Green Building

Strategy C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices

Strategy C6: Investigate and Implement Localized Reach Codes

Strategy C7: Encourage Energy Education in Real Estate Transactions

Strategy C8: Promote Energy Efficiency for Renters

Goal 3: Work to Ensure a Resilient and Low Carbon Community

Strategy C9: Promote Solar and Energy Storage for Residential and Commercial Properties

Strategy C10: Partner with Local Organizations to Support Energy Projects and Programs

Goal 4: Support the Transition to Transportation Electrification

Strategy C11: Electric Vehicle Advocacy

Strategy C12: Support Electric Vehicle Infrastructure Development

Goal 1: Increase Resident and Business Energy Knowledge and Encourage Action

Strategy C1: Increase Energy-focused Outreach to Ventura Residents

The City will increase their energy-focused outreach efforts to residents through existing outreach channels and community events and by offering a workshop series. These outreach efforts will educate residents about available rebates and incentives, programs and projects, and associated savings with the goal of increasing energy upgrades throughout the community.

ACTIONS

- C1.1: Regularly update the City's Environmental Sustainability website, social media, and other outreach methods with energy-focused resources including programs, rebates, and incentives offered by IOUs, CPA, VCREA, 3C-REN and other energy-focused organizations. Case studies and best practices highlighting successful energy improvements should also be included in the outreach materials.
- C1.2: Regularly update the City's Environmental Sustainability website, Sustainable Ventura Newsletter, social media, and other outreach methods showing the community's progress towards achieving local energy reduction and climate goals.
- C1.3: Include updates on municipal energy projects with associated energy and dollar savings and GHG emission reductions in the Sustainable Ventura Newsletter and on the Environmental Sustainability website.
- C1.4: Develop energy and climate education and incentive outreach materials in partnership with local contractors, energy leaders, IOUs, CPA, VCREA, and 3C-REN. Offer these outreach materials at City planning and building counters, during meetings, and public events within the City of Ventura.
- C1.5: Collaborate with local experts, including contractors and staff from partner agencies like 3C-REN, to perform residential energy efficiency and gather information to develop case studies about successful energy efficiency and renewable energy projects.
- C1.6: Partner with key community stakeholders, IOUs, CPA, VCREA, and energy focused organizations to develop a quarterly workshop series to engage and

3C REN
TRI-COUNTY REGIONAL ENERGY NETWORK
SAN LUIS OBISPO • SANTA BARBARA • VENTURA

3C-REN

This partnership between the counties of Ventura, Santa Barbara and San Luis Obispo offers 1) direct energy saving opportunities to households, with an emphasis on hard-to-reach and underserved communities; and 2) capacity-building services to public and private sector building industry professionals, including workforce training and technical code support.

3C-REN programs take a holistic approach to delivering energy-efficient, resilient, and healthy buildings within the tri-county region. These efforts reduce energy use, strengthen local job markets and support climate goals.

educate the public on rebates and incentives, programs, partnerships, and other opportunities to enrich energy and climate education.

- C1.7: Continue partnership with Ventura Unified School District (VUSD) to empower students to be leaders in lowering energy consumption and utilizing EVs in their community through in-class education, internships, and other programs.
- C1.8: Partner with 3C-REN and Community Action of Ventura County to conduct focused homeowner and renter outreach to the city's disadvantaged and low-income communities, using Energy Atlas data and maps to guide outreach.

Benefits						
Strategy Type	Promote Existing Programs		**Responsible Party**		Environmental Sustainability Division	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	4,418,230 kWh	176,592 therms	1,000 $MTCO_2e$	16,200,176 kWh	647,505 therms	3,611 $MTCO_2e$
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**		2030
City Costs	Low	**Funding Source**	Grants and/or cost sharing with CPA, IOUs, 3C-REN, VCREA, and Community-based Organizations (CBOs) for costs associated with outreach materials and workshop series. General Fund for staff time			

Strategy C2: Increase Energy-focused Outreach to Commercial Sector

The City will increase their energy-focused outreach efforts to businesses through the Green Business Program, Ventura Chamber of Commerce, existing outreach channels, and community events. These outreach efforts will educate businesses about available rebates and incentives, programs and projects, technologies, and financing opportunities with the goal of increasing energy upgrades throughout the commercial sector.

ACTIONS

- C2.1: Increase awareness of existing commercial energy resources including Green Business Program, CPA-sponsored Peak Management Pricing and Green Leader programs, and IOU-sponsored business energy assessments, incentives and rebates, direct install programs, Savings By Design program, and demand response program through utilizing the City's Environmental Sustainability website, social media, and other outreach methods. Apply targeted outreach to commercial facilities in high energy using zones, following Energy Atlas data and maps.
- C2.2: Dedicate a portion of the Sustainable Ventura Newsletter to green business operations, including programs, case studies, and opportunities to reduce energy consumption and capitalize on financing programs like Property Assessed Clean Energy (PACE) and IOU-sponsored on-bill financing.
- C2.3: Partner with IOUs, CPA, VCREA, Chamber of Commerce, property management firms, and real estate professional groups to offer workshops and seminars that promote opportunities for commercial energy improvements and energy programs, including financing, rebate, and incentive opportunities.
- C2.4: Promote the benefits of joining CPA for businesses and encourage continued enrollment the 100 percent renewable energy option.
- C2.5: Support commercial pilot projects utilizing thermal energy storage, energy storage, dispatchable storage, back-up power at critical facilities, and microgrid development. Support includes outreach for completed projects through the City's Environmental Sustainability website, Sustainable Ventura Newsletter, social media, press releases, City Council and staff attendance at ribbon cutting events, etc. The City may also set a goal for the number of commercial energy storage projects within the city and provide regular updates on meeting the goal and which facilities have adopted energy storage through a campaign including press releases and social media coverage.
- C2.6: Conduct direct outreach to commercial building managers about energy benchmarking in order to improve compliance with AB 802. Offer free energy benchmarking as an incentive for participating in the City's Green Business Program.
- C2.7: Partner with 3C-REN, American Institutes of Architects (AIA) Ventura Chapter, and other energy-focused organizations to develop and share outreach materials on how new commercial construction and significant remodels can meet 2030 Nonresidential Zero Net Energy requirements.

CITY OF VENTURA ENVIRONMEN

The City of Ventura has a robust environmental outreach program in the City of Ventura. Utilizing resources such as newsletters, sc pages, billboards and more, the City successfully reaches tens of its environmental messa

The Green Schools program offers education and resources to sch efforts. VUSD has partnered with the City for over a decade to Environmental Sustainability and Ventura Water offered present schools.

The City's environmentally focused video content receives hundred various social media platforms. Topics ranging from composting an conservation gather viewers from all demographics throu

The City also has a robust Green Business Program that supports and operating costs while facilitating certification through the Cal reaches dozens of businesses annually and has resulted in over Ventura.

The City partners with local organizations, such as the Community Coast Green Building Council to offer educational workshops and from the Solarize program, the EAP, Green Buildi

LOAN PROGRAM EXAMPLE

Ventura Water could partner with a third-party funding entity and a foundation, where the foundation would provide the capital used for loans to finance energy upgrades. The third-party funding entity would be responsible for loan processing and tracking, and receive a service fee from Ventura Water, separate of the initial capital. Ventura Water would facilitate repayment of these loans to the revolving fund via the water bill and ensure a low interest rate that makes the loans viable for funding distributed energy resources (DER) projects in the community. In this case, the City would ensure a low interest rate by establishing a fixed rate in the program contract (e.g. 1.5%), enough to grow the revolving fund but keep loans affordable for residents. For accepted loans, the third-party would transfer funds directly to an approved contractor and report the awarded loan amount, as well as customer information, to Ventura Water and the loan amount would then be added to the water bill.

Benefits						
Strategy Type	Promote Existing Programs		**Responsible Party**		Environmental Sustainability Division	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	3,991,794 kWh	51,012 therms	1,111 $MTCO_2e$	14,636,577 kWh	187,045 therms	3,517 $MTCO_2e$
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**		2030
City Costs	Low	**Funding Source**	Grants and/or cost sharing with CPA, IOUs, VCREA, and CBOs for costs associated with outreach materials and workshop series. General Fund for staff time.			

Goal 2: Reduce Building Energy Consumption

Strategy C3: Financial Initiatives for Energy Improvements

The City will partner with other entities and non-profit organizations to promote existing, or explore the development of, new financial initiatives that support residential and nonresidential

energy improvements. These new financial initiatives could include piloting a revolving loan fund program or an on-bill financing program providing no-fee, zero interest loans to customers for energy efficiency retrofits, and installation of renewable energy projects.

ACTIONS

- C3.1: Promote existing IOU and state agency financing programs like the Residential Energy Efficiency Loan program that is designed to help homeowners and renters access competitive financing solutions for their energy efficiency projects.
- C3.2: Investigate the feasibility of developing a Qualified Low-income Home Rehabilitation Loan program to finance home repairs eliminating health and safety hazards, increasing energy efficiency, and maintaining local housing stock.
- C3.3: Investigate developing a revolving loan fund or on-bill financing to help bring down the cost of residential and nonresidential energy efficiency retrofits and renewable energy projects not covered by IOUs or CPA.

Benefits							
Strategy Type	Develop New Program		**Responsible Party**		City Manager's Office Ventura Water		
Target Year	**2025**			**2030**			
Potential Savings and Reductions (cumulative)	19,598,476 kWh	774,636 therms	4,627 $MTCO_2e$	71,861,079 kWh	2,840,332 therms	16,617 $MTCO_2e$	
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**		2028	
City Costs	Medium	**Funding Source**	General Fund for staff time or consultant				

Strategy C4: Promote Green Building

The City will collaborate with 3C-REN, AIA Ventura Chapter, Central Coast Green Building Council, and other green building organizations to develop and share resources that include recommendations and processes for green building practices for new residential and nonresidential construction and significant remodels.

ACTIONS

- C4.1: Develop outreach materials to help encourage voluntary efforts to exceed CALGreen Code requirements as a guiding tool for new residential and nonresidential construction and significant remodels. Display outreach materials at planning and building counters and on Community Development Department's webpage.

- C4.2: Support 3C-REN, AIA Ventura Chapter, Central Coast Green Building Council, and other green building organizations in developing green building trainings, sharing case studies, and offering other educational opportunities.
- C4.3: Develop design guidelines for new residential and nonresidential construction that include passive design strategies (i.e. minimizing solar reflectivity, implementing cool roofs, placing trees or vegetation to maximize shading, orienting building for ideal climate conditions including daylighting) and for maximizing solar resources (e.g. photovoltaic capacity of roof space, south facing windows). Include these green building resources in permit application packets or permit incomplete letters.
- C4.4: Spotlight development projects that meet Leadership in Energy and Environmental Design (LEED) Gold Standards, CALGreen Tier 1, or other green building certifications during City Council Meetings.
- C4.5: Partner with AIA Ventura Chapter, Central Coast Green Building Council, and other green building organizations to develop a Green Building Awards Competition. The competition should include award categories such as, Business Energy Champion of the Year, Green Building of the Year, and Energy Efficiency and Renewable Energy Leader awards.

Benefits						
Strategy Type	Leverage Partnership		**Responsible Party**		Community Development Department	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	8,792 kWh	1650 therms	12 $MTCO_2e$	32,239 kWh	6,051 therms	42 $MTCO_2e$
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**		2030
City Costs	Medium	**Funding Source**	Grants and/or cost sharing with CBOs for costs associated with outreach materials. General Fund for staff time.			

Strategy C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices

The City will review building codes, zoning ordinances, General Plan policies, and permitting practices to remove barriers for installing energy projects. The City will also review permitting procedures and associated documentation to improve the process of obtaining energy-related project data, i.e. how many projects are exceeding Title 24, Part 6, installing solar and EV charging, etc.

ACTIONS

- C5.1: Hold meetings with renewable energy and energy storage companies to identify factors limiting the development of behind the meter solar and energy storage projects every three years.
- C5.2: During the General Plan Update process, review energy-related building codes, zoning ordinances, General Plan policies, and permitting practices to identify and remove barriers to installing renewable energy projects, energy storage, EV charging including public, private, and on-street, and electrification of cooking and heating and cooling systems in residential and nonresidential new construction and significant remodels.
- C5.3: Work with Ventura City Fire Department and other relevant agencies to review their policies to determine if they negatively affect local renewable integration and installation of energy storage projects. If problematic policies are identified, explore opportunities for revisions that would allow for more of these types of energy projects.
- C5.4: Update the City's Development Review and Building Permit forms to request voluntary energy-related data, e.g. Home Energy Rating System (HERS) ratings for homes, Title 24, Part 6 compliance percentage, LEED certification level, etc. The City should update permitting software so Development Review and Building Permit staff can input energy-related data for EAP implementation tracking.

Benefits	 			
Strategy Type	Update to Codes, Ordinances, and Permitting Practices	**Responsible Party**	Community Development Department	
Target Year	**2025**		**2030**	
Potential Savings and Reductions (cumulative)	Support Strategy		Support Strategy	
Implementation Timeframe	Short-term	**Start Year** 2021	**Completion Year**	2026
City Costs	Low	**Funding Source**	General Fund for staff time.	

Strategy C6: Investigate and Implement Localized Reach Codes

The City should investigate and implement energy-related reach codes to modify Title 24, Part 6 requirements for residential and nonresidential new construction and significant remodels.

ACTIONS

- C6.1: Investigate and implement a localized reach code for new residential construction to prohibit or disincentivize connection to natural gas lines.

- C6.2: Investigate and implement a reach code to establish minimum kilowatt (kW) of solar installation requirements for nonresidential new construction.
- C6.3: Investigate and implement a reach code to require all new nonresidential and multi-family housing construction to install EV charging stations.

REACH CODES

Every three years, cities and counties across California adopt new and revised Building Standards Codes (Standards) under Title 24 of the California Code of Regulations. These updates are designed to increase the energy performance of California's new buildings in each code cycle. Cities can choose to adopt local reach codes, on top of these Standards, at any time. Reach codes are building codes that are more stringent than those required by the state. Prescriptive codes require specific energy measures to be implemented in buildings, while Performance codes require overall energy efficiency standards to be met in buildings. Other types of reach codes that are not energy- related can aim to GHG emissions overall, such as making buildings EV ready. Reach codes can result in energy and cost savings during building construction and every-day operation and can help local agencies reach GHG reduction and climate planning goals.

REACH CODES CASE STUDY

The City of San Luis Obispo has an ambitious goal of carbon neutrality by 2035. One of the policies set to help them achieve this is a reach code that mandates building electrification, called the Clean Energy Choice Program for New Buildings. Per this new code, developers who construct all-electric buildings have access to various technical and financial incentives to support them, facilitated through a partnership with Central Coast Community Energy (3CE). The building electrification reach code is intended to make new construction more cost-efficient, safe, and sustainable. Of the city's total GHG emissions, 29 percent come from buildings, and 53 percent of those emissions are from natural gas alone. While the code does not completely ban natural gas development in new structures, it strongly incentivizes all-electric building. The shift to all electric buildings will mean significant GHG emission reductions for these buildings; as 3CE begins to deliver carbon-free electricity, new all electric buildings will eventually have no energy related GHG emissions. [28]

Benefits	 					
Strategy Type	Update to Codes, Ordinances, and Permitting Practices		**Responsible Party**	Community Development Department		
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	-1,745,311 (increase) kWh	797,441 therms	4,252 $MTCO_2e$	-6,399,472 (increase) kWh	2,923,952 therms	15,579 $MTCO_2e$

[28] *https://www.slocity.org/government/department-directory/city-administration/office-of-sustainability/climate-action/carbon-neutral-buildings/-fsiteid-1*

Potential Savings and Reductions (All Electric Reach Code)	-7,785,756 (increase) kWh	797,441 therms	4,058 $MTCO_2e$	-28,547,773 (increase) kWh	2,923,952 therms	14,991 $MTCO_2e$
Potential Savings and Reductions (Commercial Solar Reach Code)	6,040,445 kWh	0 therms	194 $MTCO_2e$	22,148,300 kWh	0 therms	588 $MTCO_2e$
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**		2025
City Costs	Medium	**Funding Source**	General Fund for staff time or consultant.			

Strategy C7: Encourage Energy Education in Real Estate Transactions

The City will work with realtors to educate residential and nonresidential property buyers and sellers about energy efficiency, green building labeling, and energy benchmarking and auditing. If property owners incorporate green building techniques and implement energy improvements, their property values will increase, their homes and businesses will be more comfortable, and they will save money on utility bills.

ACTIONS

- C7.1: Collaborate with 3C-REN, Associations of Realtors and other similar organizations to develop, and promote the benefits of, a real estate Green Building Labeling Program that recognizes residential and nonresidential properties that are energy efficient, have good HERS score, and incorporate green building techniques.
- C7.2: Partner with Associations of Realtors to provide information on IOU and CPA energy efficiency incentives and rebates to residential and nonresidential property sellers and buyers. Support should be provided to sellers and buyers when they are submitting rebate and incentive applications during point-of-sale transactions.

HERS

The California HERS Index is a program developed by the Residential Energy Services Network to gauge how energy-efficient a home is. The index compares a home's energy performance to the current industry standard for newly built homes. HERS Index ratings range from of 0 through 100+, with a score of 100 indicating that the home meets the current industry standards, and a score of 0 indicating the highest energy efficiency. The index takes into account variables such as insulation in windows and doors, heating and air conditioning ducts, roofs, attics, and major appliances, among others. A HERS assessment will provide a comprehensive report identifying the most relevant and cost-effective improvements that can be made for a home. For homebuyers, the HERS Index will provide insight into a property's energy profile and projected utility costs. For sellers, HERS Index scores can increase the resale value when buyers consider the added value of a home with high energy performance.

Benefits					
Strategy Type	Develop New Program		**Responsible Party**	Environmental Sustainability Division	
Target Year	**2025**			**2030**	
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy	
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**	2025
City Costs	Low	**Funding Source**	Grants for outreach materials; General Fund for staff time.		

Strategy C8: Promote Energy Efficiency for Renters

The City will identify and pursue strategies to support energy upgrades in rented residential and nonresidential buildings. Energy improvements will increase the landlord's property values, increase the rental unit's comfort, and save money on utility bills.

ACTIONS

- C8.1: Collaborate with 3C-REN, local property management firms, and renter protection agencies to investigate the feasibility of energy efficiency opportunities for residential and nonresidential renters, including evaluation for Green Building Labeling Program label upon unit vacancy, developing and marketing a green landlord database, and promoting renter energy efficiency resources.
- C8.2: Develop and distribute outreach materials regarding energy efficiency upgrades, including financing options, IOU and 3C-REN energy upgrade opportunities for multifamily housing building owners. Distribute outreach material to property owners via property management firms.
- C8.3: Collaborate with property management firms to develop a Green Commercial Lease Agreement Checklist to support shared landlord-tenant agreements that facilitate financing for energy efficient retrofits to renter-occupied buildings.

Benefits	  				
Strategy Type	Develop New Program		**Responsible Party**		Environmental Sustainability Division
Target Year	**2025**			**2030**	
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy	
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**	2025
City Costs	Low/Medium	**Funding Source**	Grants and/or cost sharing with local agencies or CBOs for program development and outreach materials; General Fund for staff time.		

Goal 3: Work to Ensure a Resilient and Low Carbon Community

Strategy C9: Promote Solar and Energy Storage for Residential and Commercial Properties

The City will support development of solar, battery, and energy programs and projects to help increase the community's resiliency to climate change impacts.

ACTIONS

- C9.1: Collaborate with CBOs to expand on existing solar programs, such as Community Environmental Council's Solarize and Grid Alternative's low-cost renewable energy installations, by providing resources to assist in the installation of single family and multi-family solar and energy storage projects. Resources provided may include program advertisements and outreach, sharing best practices for solar installation on City websites, and co-hosting educational solar workshops.
- C9.2: Support SCE and CPA's development of residential and commercial Community Solar programs and projects. Support may be in the form of outreach to residents about subscription to community solar projects, City Council support for the siting of the solar projects, and sharing data as needed to develop successful projects and programs.
- C9.3: Collaborate with Community Environmental Council and VCREA to develop and implement an energy storage outreach and education program. Program offerings could include hosting community energy storage workshops and developing informational materials on the benefits of and available incentives for energy storage.

COMMUNITY SOLAR

Community Solar projects are solar installations that members of the community can subscribe to. For homeowners, renters, or commercial energy users that cannot install solar where they live or work, these projects can provide energy and financial benefits through a single, large installation. There are usually no up-front costs to the community, making this renewable energy more accessible to low- and middle-income households. Usually, a project developer and investors will come together to plan, fund, and build the solar project. Customers can then subscribe to the solar project. Once constructed, the solar panels generate power, and subscribers receive credits that typically reduce their utility bills. Some community solar developers also integrate work force training and education into their projects, adding to overall benefits.

COMMUNITY SOLAR CASE STUDY

In early 2019, the Los Angeles Department of Water and Power (LADWP) launched a Community Solar Program in an effort to expand access to the benefits of clean energy for renters living in multifamily buildings and for homeowners in areas of economic and environmental disadvantage. The Shared Solar Program (SSP) allows residents of multifamily dwellings who are on certain rate schedules, including low-income and medical lifeline customers, to subscribe to 50 kWh or 100 kWh of solar electricity, depending on their energy use. The SSP rate is $0.1845 per kWh, which is slightly higher than the current standard electricity rate but allows subscribers to lock into the fixed rate for up to 10 years, insulating themselves from rising electricity costs. A Discounted Offer rate reliant on outside funding to maintain is being considered for qualifying households. The program sources solar energy from within the LA basin. [29]

Benefits						
Strategy Type	Leverage Partnerships		**Responsible Party**		Environmental Sustainability Division	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	4,277,550 kWh	N/A therms	94 $MTCO_2e$	15,684,349 kWh	N/A therms	290 $MTCO_2e$
Implementation Timeframe	Short-term	**Start Year**	2021	**Completion Year**		2030
City Costs	Low	**Funding Source**	Grants and/or cost sharing with, CPA, CBOs, and local agencies for program development and outreach materials; General Fund for staff time.			

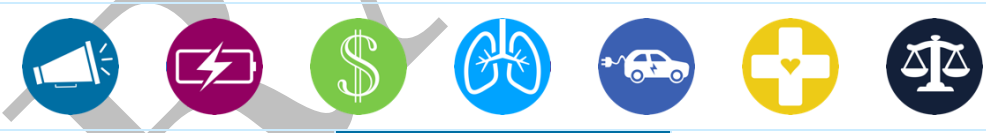
[29] *https://www.ladwp.com/ladwp/faces/ladwp/residential/r-gogreen/r-gg-ressolar/r-gg-rs-sharedsolar?_adf.ctrl-state=5gcmbk877_17&_afrLoop=4943151844175*

Strategy C10: Partner with Local Organizations to Support Energy Projects and Programs

The City will take an active role in identifying and pursuing opportunities to engage local organizations in energy retrofit and upgrade work as well as installations of renewable energy, energy storage, and EV charging infrastructure projects. The City can provide assistance in securing funding, education, and additional support as needed.

ACTIONS

- C10.1: Collaborate with CBOs and Housing Authority of the city of San Buenaventura to attain and use grant funding, such as the Community Development Block Grants, to cover both labor and equipment for energy efficiency retrofits and install renewable energy, energy storage, and EV charging infrastructure at affordable housing projects.
- C10.2: Partner with Ventura County Community College District, VUSD, Workforce Development Board, 3C-REN, and non-profit organizations to promote local green job opportunities and trainings.
- C10.3: Partner with 3C-REN, VCREA, and the Ventura County Library System to promote Home Energy Savings Do-It-Yourself Toolkits. Each kit includes tools to help measure a home's current energy use, along with helpful tips on ways to make a home more energy smart. The kits also include free items to keep like light-emitting diode (LED) lightbulbs, low-flow showerheads, and other things to help homes use less energy and water.

Benefits							
Strategy Type	Leverage Partnerships		**Responsible Party**		Environmental Sustainability Division		
Target Year	**2025**			**2030**			
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy			
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**	2026		
City Costs	Low	**Funding Source**	General Fund for staff time.				

Goal 4: Support the Transition to Transportation Electrification

Strategy C11: Electric Vehicle Advocacy

The City will establish or deepen partnerships with local organizations and private companies to conduct education and outreach on the benefits of EV ownership and usage through programs and events.

ACTIONS

- C11.1: Partner with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to develop and implement an EV outreach and education program. Program offerings could include hosting events like EV "lunch and learns" and developing informational materials on the benefits of EV ownership.
- C11.2: Expand public-private partnerships to support outreach efforts that will increase awareness of EV models and their benefits, through activities such as green car shows and test-drive events.
- C11.3: Advocate for Gold Coast Transit District (GCTD) and Ventura County Transportation Commission (VCTC), and VUSD to set a 2030 target to electrify 100 percent of their bus fleet through collaboration and membership on their Board of Directors.

Benefits						
Strategy Type	Leverage Existing Partnerships		**Responsible Party**		Environmental Sustainability Division	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	-46,034,366 (increase) kWh	N/A therms	57,963 $MTCO_2e$	-144,679,435 (increase) kWh	N/A therms	166,158 $MTCO_2e$
Gasoline Savings (Gallons)	6,921,270 Gallons			21,752,563 Gallons		
Implementation Timeframe	Short-term	**Start Year**	2021	**Completion Year**		2030
City Costs	Low	**Funding Source**	Grants and/or cost sharing with VCREA and Electric Drive 805, for outreach materials; General Fund for staff time.			

Strategy C12: Support Electric Vehicle Infrastructure Development

The City will work to improve the network of public and private charging stations by planning for station locations, promoting incentives for installations, and removing barriers to charging station installations.

ACTIONS

- C12.1: Collaborate with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to build upon the EV Infrastructure Interactive Map by identifying new preferred locations for Level 2 and DC Fast Chargers.
- C12.2: Collaborate with VCREA, Community Environmental Council, EV Advocates of Ventura County, Electric Drive 805, and other EV advocacy groups to identify EV infrastructure funding sources, identify and remove local barriers to EV charging station installations, and recommend consistent affordable rate structures for public charging stations.
- C12.3: Increase installation of private EV charging stations by promoting federal, state, SCE, CPA, and local rebates and incentives through existing communication channels such as the City, VCREA, and Electric Drive 805 websites, social media, and additional methods as identified by the City.
- C12.4: Partner with the local Housing Authority and CBOs to increase EV charging stations at public housing as well as investigate the feasibility of the Housing Authority to host an EV carshare pilot project for a multifamily housing project.

Benefits							
Strategy Type	Leverage Existing Partnerships		**Responsible Party**		Environmental Sustainability Division Community Development Department		
Target Year	**2025**			**2030**			
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy			
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**	2030		
City Costs	Low	**Funding Source**	Grants and/or cost sharing with VCREA and Electric Drive 805, for outreach materials; General Fund for staff time.				

4.4 Municipal Energy Strategies

The following seven strategies focus on municipal energy savings to reduce the use of fossil-fuels, increase the usage of renewable energy, and enhance local resiliency in preparation for rising utility costs, natural disasters, and global climate change. Each strategy includes supporting implementation actions; benefits to the City; cumulative GHG emissions reductions and kWh and therm savings over the next five and ten years;[30] costs to the City; cost savings for the City; potential funding sources; implementation timelines; and responsible party.[31] These implementation metrics are intended to be updated regularly per the implementation, program evaluation, and monitoring strategies.

Municipal strategies are organized by the following goals:

Goal 1: Establish Systems to Reduce Municipal Energy Usage

Strategy M1: City Support for Implementing Energy Action Plan

Strategy M2: Support Clean Power Alliance's Local Programs

Goal 2: Implement Energy Improvements to Save Money, Reduce GHG Emissions, and Increase Resiliency

Strategy M3: Energy Upgrades at City Facilities

Strategy M4: Install Renewable Energy and Energy Storage Projects at City Facilities

Strategy M5: Establish Funding for Energy Projects

Strategy M6: Transition Municipal Fleet to Zero Emission Vehicles

Strategy M7: Upgrade Streetlights

[30] *Strategies are identified as supporting when there is not a contribution to the overall GHG and energy use reductions.*

[31] *The level of detail for each strategy may vary based on the available data.*

Goal 1: Establish Systems to Reduce Municipal Energy Usage

Strategy M1: City Support for Implementing Energy Action Plan

The City should dedicate staff time within appropriate City departments to promote and implement municipal strategies contained in the EAP.

ACTIONS

- M1.1: Direct sustainability staff to work with facilities staff to investigate and pursue solar, energy storage, EV, and energy efficiency projects at municipal facilities.
- M1.2: Develop City administrative policies and guidelines to support staff in energy conservation and implementation of energy projects, e.g. shutting down computers and turning off lights when leaving work.
- M1.3: Update procurement policies and guidelines to ensure the purchase of energy efficient equipment in cases where the projected energy savings of the equipment outweigh the additional up-front costs. The procurement policies and guidelines should also encourage purchases to be made from a diverse mix of businesses, including businesses owned by minorities, women, or disabled veterans, and in communities identified by the state government as disadvantaged.
- M1.4: Expand the City's Green Team outreach efforts to include trainings, emails, signs, and other outreach methods that focus on encouraging energy conservation within City facilities. The Green Team could initiate a competition, such as the Energy Star's Kilowatt Crackdown, to encourage City Departments to reduce their energy consumption.
- M1.5: Utilize 3C-REN's Code Coach and Workforce Education trainings geared towards expanding staff's knowledge of energy efficiency technologies and integrating California Building Standard updates into the permit review process.

Benefits							
Strategy Type	Promote Existing Programs		**Responsible Party**		City Manager's Office Public Works Department		
Target Year	**2025**			**2030**			
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy			
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**		2030	
City Costs	Low	**Funding Source**	General Fund for staff time.				

Strategy M2: Support Clean Power Alliance's Local Programs

The City will utilize their seat on the CPA Board of Directors to advance programs and policies that are in line with best practices towards decarbonization, electrification, and equity for ratepayers.

ACTIONS

- M2.1: Advocate for programs and rebates to encourage adoption of EVs, energy efficiency measures, energy storage, and renewable energy systems based on other successful CCE and IOU programs.
- M2.2: Encourage programs and rebates to have special consideration for low-medium income residents.
- M2.3: Advocate for net energy metering policies that are favorable for solar customers (higher kWh purchase rates than SCE for net surplus generating customers) and the establishment of community solar programs that benefit renters or other customers that cannot install solar where they live or conduct business. Community solar program should offer cost savings for participating customers in the form of reduced electricity bills.
- M2.4: Advocate for development of distributed energy resources including solar, energy storage, and microgrid within Ventura County that are designed to improve regional grid resilience and reliability.
- M2.5: Encourage development of programs that provide education, rebates, or other incentives for EV charging and to electrify cooking, space heating, and domestic hot water appliances.

SOLAR PROGRAM CASE STUDY

The Los Angeles Department of Water and Power (LADWP) has a solar program to benefit single family households, called the Solar Rooftops Program (SRP). SRP launched in 2017 and offers homeowners who meet certain criteria the opportunity to install solar panels on their roof at no cost. LADWP pays for, installs, and maintains the system, giving the resident a monthly or annual payment for use of their rooftop to generate the renewable solar energy that is sent back onto the grid. SRP participants can earn from $240- $600 each year, which can be more financially beneficial for lower electricity users that would otherwise need to finance a solar system and received net energy metering credits.[32]

[32] *https://www.ladwp.com/ladwp/faces/ladwp/residential/r-gogreen/r-gg-ressolar/r-gg-rs-solarrooftops?_adf.ctrl-state=ymzwnwlz8_4&_afrLoop=280773907186992*

Benefits						
Strategy Type	Leverage Existing Partnerships		**Responsible Party**		City Council Environmental Sustainability Division	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy		
Implementation Timeframe	Ongoing	**Start Year**	2021	**Completion Year**	2030	
City Costs	Low	**Funding Source**	General Fund for staff time to support the City's CPA representative on the Board of Director.			

Goal 2: Implement Energy Improvements to Save Money, Reduce GHG Emissions, and Increase Resiliency

Strategy M3: Energy Upgrades at City Facilities

The City should plan for energy upgrades throughout the building portfolio to address energy conservation, electrification, renewable energy, and resiliency needs. Projects will be developed based on audits, monitoring, benchmarking, and city needs. Additionally, this assessment should identify the most critical facilities to serve as resiliency centers, which will be equipped with solar, energy storage, and microgrid capabilities.

ACTIONS

- M3.1: Upgrade the energy management system in order to better track the energy consumption of municipal facilities.
- M3.2: Continue City facility benchmarking efforts with the goal of benchmarking all applicable municipal facilities by 2022. This will increase building energy performance awareness, effectiveness of energy efficiency measure implementation, and transparency while prioritizing facilities for energy improvements.
- M3.3: Coordinate with SCE, SoCalGas, and Southern California Regional Energy Network (SoCalREN) to conduct comprehensive energy audits throughout the City's facility portfolio and develop a long-range (5-10 year) plan to address energy efficiency, electrification, and renewable energy opportunities based on audit findings.
- M3.4: Implement energy efficiency, electrification, and renewable energy opportunities identified during energy audits as needed or when funding is available.
- M3.5: Identify critical facilities to be utilized during power outages and disaster events. If feasible, develop a plan to add solar, energy storage, and microgrid capacity to these municipal facilities by 2025 with the intention of increasing resiliency, reducing demand charges, and shifting demand in response to peak electricity prices.
- M3.6: Work with SCE, SoCalGas, and CPA to enroll municipal facilities in available utility support programs, including Demand Response, Retro-commissioning, HVAC optimization, and other programs as identified in energy audits or otherwise.

Benefits						
Strategy Type	Capital Improvements		Responsible Party	Public Works		
Target Year	2025			2030		
Potential Savings and Reductions (cumulative)	1,192,849 kWh	4,301 therms	82 $MTCO_2e$	21,752,563 kWh	3,096,424 therms	252 $MTCO_2e$
Implementation Timeframe	Short-term	Start Year	2022	Completion Year		2030
City Costs	Very High	Funding Source	General Fund or IOU incentive to update energy management system. General Fund for staff time. Utilize SoCalREN to conduct a comprehensive energy audit of municipal facilities. General Fund or financing for energy upgrades.			

Strategy M4: Install Renewable Energy and Energy Storage Projects at City Facilities

The City's 2012 ESS recommended exploring renewable energy projects at the following City-owned facilities:

- Solar hot water system at Community Pool
- Solar panels at the Wastewater Treatment Plant
- Solar panels and/or wind turbines at the Avenue Water Treatment Plant Engineering
- Solar panels for water distribution at 330 Booster Station and Bailey Treatment Plant
- Additional solar panels at the Maintenance Yard
- Solar panels at the Westpark Gymnasium
- Solar panels at the Barranca Vista Community Center
- Solar panels at the existing Avenue Senior Center
- 250 kw solar panels at Police and Fire Headquarters
- Solar panels at Fire Stations Facilities
- Solar panels for Corbett Tank and Kimball Booster Pump Station

Renewable energy projects at City facilities may be installed at no upfront cost through power purchase agreements or the City may choose to purchase the equipment in some cases.

ACTIONS

- M4.1: Conduct feasibility analysis for installing renewable energy projects at all City-owned and operated facilities that were identified as viable solar sites in the ESS and identified as critical facilities in M3.5. Analysis should also include energy storage and microgrid capacity requests for all facilities identified as critical.
- M4.2: Develop policy to require re-roofing projects on government facilities to evaluate the feasibility of incorporating solar or "solar ready" features, including mounting posts for panels and roof penetrations for conduit and/or pipes for facilities.

- M4.3: Set a goal of meeting 25 percent of the City's municipal electricity needs through on-site renewable generation by 2030.

Benefits						
Strategy Type	Capital Improvements		**Responsible Party**	Public Works		
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	1,938,746 kWh	N/A therms	60 $MTCO_2e$	7,108,734 kWh	N/A therms	170 $MTCO_2e$
Implementation Timeframe	Mid-term	**Start Year**	2022	**Completion Year**		2030
City Costs	Very High	**Funding Source**	General Fund to develop the Solar Request for Proposal and analyze findings and for the upfront costs of capital improvements. City can apply for incentives and rebates from programs like the Energy Commission's Self-Generation Incentive Program (SGIP) or potential CPA program offerings.			

Strategy M5: Establish Funding for Energy Projects

The City should partner with other entities interested in pursuing funding mechanisms to finance energy projects to learn best practices.

ACTIONS

- M5.1: Develop and implement a green revolving loan fund (RLF) to finance energy projects at municipal facilities and reinvest the money saved from lowered utility bills into future energy projects.
- M5.2: Pursue funding opportunities to finance energy upgrade projects identified in energy audits and renewable energy feasibility assessments

REVOLVING LOAN FUND

A RLF is a pool of money that can be used to finance projects for multiple residents, businesses, or agencies. RLFs can be made available for specific purposes, such as clean energy projects or energy efficiency upgrades. The pool of money is continually replenished as loans are repaid and can be made available to finance other projects on an ongoing basis. Agencies and governments can establish RLFs to fund their own projects, as well as residential or private sector projects, to equitably achieve local energy and climate goals.

Benefits					
Strategy Type	Develop New Programs		**Responsible Party**	Public Works	
Target Year	**2025**			**2030**	
Potential Savings and Reductions (cumulative)	Support Strategy			Support Strategy	
Implementation Timeframe	Short-term	**Start Year**	2022	**Completion Year**	2025
City Costs	Very High	**Funding Source**	General Fund for staff time or consultant. General Fund or grants to develop, set-up, and seed revolving loan fund.		

REVOLVING LOAN FUND CASE STUDY

The City of Santa Barbara has a RLF model that is used to pay for energy projects on City owned buildings and properties. By opting to oversee all municipal utility bills and pay them from a centralized fund, the City is able to efficiently manage the overall energy budget. Savings from rate changes, efficiency measures, and energy projects are put into a reserve to be invested in other energy improvements. Within the first year after consolidating municipal utility bills, the City saved over $60,000. This reserve was seeded with a $25,000 allocation as well as a 0 percent interest "loan" from the general fund of $100,000 that was paid back in over four years. Currently, the City's revolving fund rolls over approximately $100,000 annually - an amount large enough to be invested in more costly projects, such as rooftop solar, that will continue to save the city money and reduce GHG emissions.

Strategy M6: Transition Municipal Fleet to Zero Emission Vehicles

City should support the State's goal of 5 million ZEVs on California's roads by 2030 through installing EV charging infrastructure and mimicking the State of California Department of General Services vehicle procurement approach that favors EVs for new fleet purchases.

ACTIONS

- M6.1: Set a goal to transition one eighth of the City fleet to EVs by 2030.
- M6.2: Establish a ZEV policy requiring City Departments to purchase light-duty vehicles, if available and cost effective, according to the following priority structure: (1) pure ZEVs, (2) plug-in hybrid EVs, and (3) hybrids.
- M6.3: Centralize fleet procurement authority so one staff will review all vehicle procurements and require revisions of selected vehicles if the justification for non-ZEV or hybrid options is lacking.
- M6.4: Track the California Division of Measurement Standards updates to proposed regulations for EV charging rates to ensure the charging rates are not burdensome to EV drivers. Consider a per-kWh pricing for charging rates that best aligns the incentives of drivers and charging providers that provides a clear connection between the cost paid by charging providers and the price paid by EV drivers.
- M6.5: Install Level 2 charging infrastructure at City public parking lots and investigate the feasibility of installing DC Fast Chargers in these lots.
- M6.6: Explore the feasibility of utilizing City owned smart charging stations to earn credit revenue by participating in the California Low Carbon Fuel Standards (LCFS) program.

Benefits						
Strategy Type	Develop New Program		**Responsible Party**		Public Works	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	- 243,268 (increase) kWh	N/A therms	294 $MTCO_2e$	- 891,984 (increase) kWh	N/A therms	977 $MTCO_2e$
Gasoline Savings	40,233 Gallons			147,521 Gallons		
Implementation Timeframe	Mid-term	**Start Year**	2022	**Completion Year**		2030
City Costs	Medium	**Funding Source**	General fund for staff time and to purchase EVs and install EV charging infrastructure. Potential rebates and manufacturers' incentives can help offset EV purchase costs. SCE Charge Ready 2.0 and CALeVIP funding can potentially cover cost of installing EV charging infrastructure. Ventura County Air Pollution Control District, CARB, and CEC may have additional funding to purchase EVs and install charging infrastructure.				

Strategy M7: Upgrade Streetlights

The City should plan for and investigate funding to upgrade all streetlights to LEDs.

ACTIONS

- M7.1: Establish a funding source and timeline to meet the goal for streetlight upgrades as described in the 2018 Public Works Strategic Plan of converting the 1,000 city-owned and maintained streetlights to LEDs by 2025 to reduce costs and improve quality. As of March, 2021, about 40 percent of this work remains to be done.
- M7.2: Investigate establishing a funding source and timeline to attain ownership of SCE owned streetlights and update those lights to LEDs.

Benefits						
Strategy Type	Capital Improvements		**Responsible Party**		Public Works	
Target Year	**2025**			**2030**		
Potential Savings and Reductions (cumulative)	1,053,634 kWh	N/A therms	33 $MTCO_2e$	2,107,268 kWh	N/A therms	58 $MTCO_2e$
Implementation Timeframe	Long-term	**Start Year**	2022	**Completion Year**		2030
City Costs	Very High	**Funding Source**	General Fund and IOU incentives for streetlight upgrades. Grants for adding EV charging to streetlights.			

4.5 Implementation, Program Evaluation, and Monitoring

The EAP identifies strategies to meet the GHG and energy reduction targets for 2025 and 2030. Reaching these reduction targets will require a continued commitment from the City to monitor progress and make plan updates when needed. Reaching the targets will also require engagement beyond the City's control, including continued implementation of federal and state mandates, and dedicated residents choosing to take individual actions to be a part of the solution.

City staff should track EAP implementation to confirm whether proposed reduction strategies are successfully reducing emissions as estimated and planned to allow potential reevaluation of the reduction strategies as may be needed. The following discussion outlines the steps that the City will take to successfully monitor and implement the EAP.

Strategy IMP1: Utilize Energy Action Plan Implementation Tools

The City should develop an EAP consistency checklist to ensure compliance with EAP strategies when reviewing City plans, programs, and activities including Capital Improvement Projects as well as community development projects. The checklist will help government staff and community development project applicants plan for and approve work that support the City's sustainability goals. Additionally, an Excel-based monitoring tool has been developed to support effective monitoring and implementation of the EAP. This tool allows the City to track its progress in reducing GHG emissions and activity data using readily available data reports. This tool can be used to collect data, track GHG emissions, and assess the effectiveness of the EAP strategies. The EAP consistency checklist, described above, will allow the City to track EAP strategy compliance and can be entered into the monitoring tool. The monitoring tool should also track data associated with EAP strategies that are considered education, outreach, and behavioral changes.

- IMP1.1: Develop an EAP consistency checklist for municipal plans, programs, and projects.
- IMP1.2: Develop an EAP consistency checklist for community development.
- IMP1.3: Expand Excel-based inventory monitoring tool to include strategy implementation monitoring.
- IMP1.4: Update the monitoring tool annually with EAP inventory data including GHG emissions reductions from state and federal mandates and implementation data associated City plans, programs, and activities as well as community development projects.

Strategy IMP2: Conduct Annual Monitoring

The City should begin implementation within the first fiscal year of adoption and conduct annual monitoring and reporting to track progress toward achieving the GHG reduction and energy usage reduction targets.

- IMP2.1: Prepare an annual progress report.
- IMP2.2: Incorporate EAP goals and strategies into City plans, programs, and activities.
- IMP2.3: Integrate implementation of EAP strategies into City department budgets and work plans, Capital Improvement Program, and programs and projects.

Strategy IMP3: Update Greenhouse Gas Emissions Inventory and Energy Action Plan

The City should update the GHG inventory EAP to reflect the adoption and implementation of any new technologies, programs, and projects to reduce GHG emissions and energy usage. Certain EAP strategies should be amended if the City finds that these strategies are not achieving the intended GHG emission and energy usage reductions.

- M3.1: In the calendar year 2024 and 2029, prepare an inventory for the most recent year with complete available data.
- M3.2: In the calendar year 2025 and 2030, update the EAP to incorporate the latest inventory and strategy amendments.

Strategy IMP4: Continued Education and Outreach

The City should continue to develop and expand collaborative partnerships with local and regional organizations that support EAP implementation.

- IMP4.1: Continue to participate and be a formal member of local and regional organizations that provide tools and support for reducing energy consumption, increasing energy efficiency, using more renewable energy, electrifying the transportation sector, and GHG emission reductions.
- IMP4.2: Work closely with local CBOs that may contribute to the successful implementation of the EAP.
- IMP4.3: Collaborate with other local jurisdictions to support the implementation of regional GHG and energy usage reduction efforts.

Strategy IMP5: Preparation of a Climate Action Plan

The EAP serves as the equivalent of an energy chapter of a CARP and is designed to integrate into a comprehensive CARP when the City 's resources support the preparation of a plan. The City should prepare a comprehensive CARP during the General Plan Update process.

- IMP5.1: Include a policy in the General Plan update that commits the City to monitoring EAP progress and updating the community and municipal GHG inventories at least every five years, along with updates to the EAP as needed.
- IMP5.2: Develop a comprehensive CARP if funding is secured.
- IMP5.3: Developed a framework for reducing GHG emissions and energy usage by 2035 and 2040 that is similar to the 2025 and 2030 EAP analysis.

4.6 Next Steps

By developing this EAP, the City has taken a significant step towards planning for GHG emissions reductions related with energy usage. As noted throughout this plan, successful implementation will require engagement across City departments, monitoring, and potential investment from City leadership. Active participation from City residents will also be required to meet the goals described in this EAP.

As the City develops a CARP, Ventura has the opportunity to show strong climate leadership in exceeding the state's current goals (SB 32), which can be met by actions described in this EAP. By planning for significant emissions cuts in areas of transportation, and associated land use planning practices, the City is primed to be a leader in comprehensive GHG emissions reductions.

APPENDIX A: KEY STATE AND FEDERAL POLICIES

A.1: Relevant State GHG, Energy, and Clean Mobility Goal and Milestones

Assembly Bill 32/Senate Bill 32, California Global Warming Solutions Act of 2006

In September 2016, SB 32 was signed into law, requiring California to reduce GHG emissions to 40 percent below 1990 levels by 2030. SB 32 expands on California's previous GHG emissions reductions mandate under AB 32 (2006), which called for the state to reduce GHG emissions to 1990 levels by 2020. The implementation of this policy is overseen by the CARB.

The City's GHG reduction goal (of 45 percent below the 2020 baseline by 2030) currently matches that of this state policy, based on the assumptions that City emissions followed the general trajectory of State emissions between 1990 and 2010.

A major element of AB 32 and SB 32 has been the development of the State's Cap and Trade program, which regulates emissions on large electric power plants, large industrial plants, and fuel distributors. Although these industries do not have a large presence in Ventura, the City may still benefit from Cap and Trade enforcement by the revenue generated from the program, which is invested through the Greenhouse Gas Reduction Fund (GGRF). These investments support programs and projects throughout the state that reduce GHG emissions and deliver economic, environmental, and public health benefits for residents.

Executive Orders: EO S-3-05, EO B-30-15, and EO B-55-18

In June, 2005, Governor Arnold Schwarzenegger issued EO S-3-05, setting a goal to reduce greenhouse gases by 80 percent below 1990 levels by 2050. In April 2015, Governor Brown issued EO B-30-15 establishing a new interim greenhouse gas reduction target of 40 percent below 1990 levels by 2030 and directing state agencies to take additional actions to prepare for the impacts of climate change (precursor of SB 32). In September 2018, Governor Brown issued EO B-55-18, setting a statewide goal to achieve carbon neutrality as soon as possible and no later than 2045. Although executive orders are not enforceable policies, GHG focused executive orders have been the basis of policy proposals, such as SB 32. By planning for high GHG reductions and a consideration of carbon neutrality, the City will be prepared to follow state leadership.

Assembly Bill 118, Alternative Fuels and Vehicle Technologies

In 2007, AB 118 established the Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP), or the Clean Transportation Program, to advance innovative fuel and vehicle technologies that would help meet the State's climate goals. The bill also created an Alternative

Fund to be managed and administered by the Energy Commission that would invest in projects that support the development and deployment of those transportation technologies.

In 2018, VCREA was awarded a grant to complete an EV Readiness Blueprint for Ventura County through the Clean Transportation Program's EV Ready Communities Challenge Phase 1 solicitation. The grant funded development of the Ventura County EV Ready Communities Blueprint, including an EV Accelerator Plan for the City of Ventura that is intended to spur rapid adoption of EVs in the region and to make EVs and other clean mobility options fully accessible to everyone in our communities. The EV focused strategies in this EAP are informed by the EV Readiness Blueprint and associated Accelerator Plan.

Title 24, Part 11

Title 24, Part 11 is the California Green Building Standards Code (CALGreen). CALGreen is a mandatory statewide code for all new residential and nonresidential construction projects that consists of five categories:

1) Planning and design
2) Energy efficiency
3) Water efficiency and conservation
4) Material conservation and resource efficiency
5) 5) Environmental quality

The code applies to the planning, design, operation, construction, use, and occupancy of every newly constructed buildings and additions and alterations to existing buildings in California. The code contains both mandatory and voluntary measures in the categories above. The voluntary measures are arranged into tiers 1 and 2, meaning that buildings that meet CALGreen tier 1 go beyond mandatory measures, and CALGreen tier 2 projects go even further in implementing sustainability practices. CALGreen standards were established in 2007, but similar to Part 6 of Title 24, Part 11 is also updated every three years, to meet best practices and to improve the green building practices across the state.

Strategies within the EAP are designed to support CALGreen implementation in the following ways:

1) Strategies focused on code education and outreach will prepare the contractor community and City inspectors for new and existing requirements, ensuring that new development, additions, and alterations are built to state standards within Ventura
2) Strategies promoting EV infrastructure at multifamily housing will likely be aligned with future iterations of CALGreen and in line with those of tier 1, or tier 2 projects. Promoting those practices before they are required will prepare the contractor community and improve the building stock.

Executive Orders: EO S-14-08 and EO S-21-09

Governor Schwarzenegger signed two EOs that called for an increase in procurement of renewable energy from the electric utilities of California. EO S-14-08 called for all retail electricity sellers to serve 33 percent of their load with renewable energy by 2020. The following year, EO S-21-09 was signed, which directed CARB to set a 33 percent renewable energy target as established by EO S-14-08. These EOs were later codified in SB X1-2.

Senate Bill X1-2, California Renewable Energy Resources Act

In March, 2011 SB X 1-2 was signed into law, which required California utilities to generate 33 percent of their electricity from renewables by 2020. The policy additionally mandated that renewables supplied to the California grid be from sources within, or directly proximate to, California make up at least 50 percent of the total renewable energy for the 2011 through 2013 compliance period, at least 65 percent for the 2014 through 2016 compliance period, and at least 75 percent for 2016 and beyond. Although the policies in this EAP are not directly related to the supply of renewable energy being delivered to Ventura rate payers via the grid, policies to support the adoption of local energy storage ultimately support the state's increased dependence on intermittent renewable energy sources.

Senate Bill 535, California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund

In September 2012, SB 535 was signed into law, mandating that 25 percent of the GGRF would go to projects that provide benefits to Disadvantaged Communities (DACs), and specifying a minimum of 10 percent of GGRF be invested on projects located within DACs. The City of Ventura has two census tracts that qualify as "DACs" under the CalEnviroScreen[33] analytical tool created by the California Environmental Protection Agency. These census tracts are eligible for the increased investment under SB 535. By planning for energy upgrades, projects, and programs that will benefit DACs, the City will be prepared to apply for these funds as they become available.

Executive Orders: EO B-16-2012 and EO B-48-18

Governor Brown signed two EOs that signaled strong support for ZEVs. In March 2012, Governor Brown issued EO B-16-2012 establishing that California Accommodate 1 million EVs by 2020 and 1.5 million by 2025. In 2018, Governor Brown signed EO B-48-18, establishing a new target of 5 million ZEVs in California by 2030. This EAP includes policies to accelerate the adoption of EVs in accordance with these executive orders.

[33] *https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30*

Senate Bill 350, Clean Energy and Pollution Reduction Act

In October 2015 California passed SB 350, which established renewable energy, energy efficiency, and GHG reduction goals. SB 350 calls for an increase in energy efficiency in buildings of 50 percent by 2030 for both electricity and natural gas usage. To reach these savings targets, energy utilities will be required to submit plans that outline strategies and programs. These plans will be reviewed and revised by the state's energy agencies. SB 350 also directs state agencies to undertake various studies to identify and assess barriers and opportunities for access to renewable energy, energy efficiency, and zero emission transportation options for low income communities (and some other target groups).

The energy programs developed by the utilities, as required by this policy, will affect energy consumption of buildings in Ventura. This EAP includes strategies to increase and improve outreach to residents and businesses regarding utility programs. The City's municipal facilities may also reduce energy demand through these programs.

Assembly Bill 802, Energy Efficiency Benchmarking and Public Disclosure

In October of 2015, the State of California passed AB 802, directing the CEC to establish the Building Energy Benchmarking Program. The Program requires owners of buildings larger than 50,000 square feet with either no residential utility accounts or 17 or more residential utility accounts to benchmark and disclose their buildings' energy performance. The purpose of the program is to help building owners better understand their energy consumption through standardized energy use metrics that enable smarter and more cost-effective improvements in building energy use.

This policy applies to some of the City's municipal facilities, and also applies to privately owned buildings in the jurisdiction. Although the policy does not call for any direct energy and GHG reductions, the policy remains an important tool in establishing transparency in building performance, and ultimately in energy improvement. This plan includes strategies designed to increase compliance with AB 802.

Assembly Bill 1550, Greenhouse Gas Investment Plan

In September 2016, California passed AB 1550, modifying the investment minimums to DACs that were established under SB 35. AB 1550 requires at least 25 percent of funds go to projects within and benefitting DACs and at least an additional 10 percent is for low-income households or communities. The City of Ventura has several census tracts that are identified under AB 1550 as "low income" and therefore are eligible for the increased investment under AB 1550. By planning for energy upgrades, projects, and programs that will benefit low-income areas, the City will be prepared to apply for these funds as they become available.

Senate Bill 100, The 100 Percent Clean Energy Act of 2018

In September 2018, California legislature passed SB 100, which set a state policy that retail sales of electricity would be 60 percent renewable by 2030 and 100 percent carbon free by 2045. Although this policy applies directly to public utilities and not to the City and local energy customers, the statewide shift to increasingly renewable and carbon-free electricity is relevant to the City's GHG reduction goals and membership in the CPA CCE provider.

Under the City's current plan with CPA, residential and commercial electricity accounts receive 100 percent renewable energy by default. This commitment to renewable energy surpasses the state's goals and establishes Ventura as a leader in California.

Senate Bill 700, Self-Generation Incentive Program

In September 2018, the state passed SB 700, which extended the SGIP that is implemented by the IOUs to provide incentives to customers for distributed energy resources like small-scale wind energy and energy storage systems. Eighty percent of program funding is directed towards energy storage and 20 percent to onsite generation. This EAP includes strategies to support the adoption of energy storage technologies and associated incentives, such as those provided through the SGIP program.

Executive Order N-79-20, Zero Emission Vehicles

In September 2020 Governor Newsom signed EO N-79-20, which calls for all new car sales to be zero emission by 2035. This EAP includes policies to accelerate the adoption of EVs in accordance with this executive order.

Title 24 Updates, Part 6

California Building Standards Code California Code of Regulations, Title 24, Part 6 Energy Code is the Building Energy Efficiency Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The CEC updates the Building Energy Efficiency Standards every three years. These updates are designed to increase the energy performance of California's new buildings in each code cycle through mandatory, prescriptive, and performance-based building codes. In the most recent update of the code cycle, which became effective on January 1, 2020, an example of a new requirement was a minimum solar installation on all new single-family residential construction. The next code cycle will have an effective date of January 1, 2023 and will be developed with stakeholder engagement.

The strategies in this EAP align with Title 24 Part 6 in three keyways:

1) Strategies focused on code education and outreach will prepare the contractor community and City inspectors for new and existing code requirements, ensuring that new development is built to state standards within Ventura.
2) Strategies that establish best practices guidelines for energy efficiency in new development that go beyond those of current Energy Code requirements promote building

practices that are likely to be part of future code cycles. These strategies will prepare the contractor community for future changes and improve the City's building stock.

3) Strategies focused on "reach code" development, or local building codes that have more stringent energy efficiency requirements than state code, are establishing test cases for new code elements in future updates. Cities that establish reach codes are leaders in developing energy efficient buildings and informing future state code decisions.

A.2: Key State Policies that impact City GHG emissions beyond scope of EAP

Assembly Bill 1493 California Clean Cars Campaign

In 2002, AB 1493 was passed, requiring CARB to develop and adopt regulations to reduce GHG emissions from new passenger cars and light duty trucks beginning in 2011. Although this EAP does not directly address the GHG emissions of new passenger cars (but does include policies to encourage a transition to EVs), the expected reductions in GHG emissions from this policy are used in the GHG forecasts.

Assembly Bill 1007 State Alternative Fuels Plan

As required by AB 1007 (2005), the State Alternative Fuels Plan presents strategies that the state must take to increase the use of alternative non-petroleum fuels for motor vehicle use. The Plan assesses alternative fuels and to meet California's goals of reduced petroleum consumption, increased alternative fuels usage, reduced GHG emissions, and increased in-state production of biofuels. Ventura's EAP encourages the adoption of ZEVs with numerous EV-related strategies and associated actions.

California Air Resources Board's Tractor-Trailer GHG Regulation

In 2008, CARB approved the Tractor-Trailer Greenhouse Gas Regulation, designed to reduce GHG emissions of trucking operations by improving the aerodynamic performance of tractor-trailers. The regulation was enacted in 2010 requiring the use of aerodynamic technologies on tractors and trailers, along with requiring the use of low rolling resistance tires. Although this EAP does not address trucking practices technologies, the (forecasted) emissions reductions of this policy are included in the GHG emissions planning for the City.

Executive Order S-01-07 Low Carbon Fuel Standard

In 2009, the LCFS was developed by EO S-01-07, supporting AB 32, with the goal to reduce the carbon intensity of the state's transportation fuels by 10 percent from 2010 levels by 2020, and by 20 percent by 2030. The standard was modified between 2013 and 2015, and the latest set of standards became effective in 2016.

The LCFS serves to incentivize the production of fuels that have lower carbon emissions by creating a credit market for these fuels. This EAP does not include policies that directly impact LCFS, but some of the EV adoption and infrastructure goals discussed may be advanced because of the LCFS. For instance, electric utilities receive credits when their customers purchase EVs, so this market-based policy drives the deployment of incentives from utilities to EV drivers in California.

State Clean Vehicle Rebate Project

The State Clean Vehicle Rebate Project (CVRP) provides rebates of up to $7,000 for the purchase or lease of new ZEVs, including electric, plug-in hybrid electric, and fuel cell vehicles. As long as funds are available, eligible Ventura residents can follow a simple process to apply for a CVRP rebate after purchasing or leasing an EV. Thus, CVRP helps increase EV adoption in Ventura by providing financial incentives to increase EVs on the City's roadways. This EAP includes strategies to educate Ventura residents on vehicles incentives, including the CVRP. A shift away from gasoline and diesel brings many environmental and economic benefits, including less air pollution and reduced GHG emissions.

California Air Resources Board's Advanced Clean Cars Program

In 2012, the CARB adopted a set of regulations to control emissions from passenger vehicles, collectively called Advanced Clean Cars Program. These policies established standards that combine the control of GHG emissions and criteria pollutants and require greater numbers of ZEVs for vehicle model years from 2017 through 2025. Ventura's EAP encourages the adoption of ZEVs through education measures and strategies that promote an improved network of charging stations for EVs.

California Air Resources Board Nitrous Oxide Standards

In 2013, CARB established low NOx engine emission standards for heavy duty engines (i.e. trucks) that are 90 percent below national standards. Although these standards are voluntary, they are designed to prepare the industry for future emissions regulations, and CARB continues to assess the feasibility of lower NOx emissions. This work is focused on improving air quality in California, but the transitions to lower NOx emission vehicles that meet CARB standards (met by natural gas or liquefied petroleum gas engines as compared to diesel engines) also have GHG reduction impacts. Ventura's EAP does not address trucking or engine requirements, but the (forecasted) emissions reductions of this policy are included in the GHG emissions planning for the City.

A.3: Key National Climate Policies

Corporate Average Fuel Economy Standards

In 1975, United States Congressed enacted the CAFE standards to improve the fuel efficiency of cars and light trucks sold in the United States. CAFE provide a national standard for how far vehicles must travel on a gallon of fuel based on the weight and class of the vehicle. These standards have been updated regularly since CAFE implementation and are credited with creating more fuel-efficient vehicles in the United States. This EAP does not address CAFE standards directly, but vehicle fuel efficiency improvements have been incorporated into the emissions projections used in the plan.

Energy Policy Act 0f 2005

In 2005, the Energy Policy Act of 2005 established a federal tax credit for solar-electric systems which allowed residential customers and commercial customers to recoup 30 percent of the cost of a solar system. The tax credits have been extended and modified by congress several times, most recently at the end of 2020. In 2021, the residential tax credit for solar systems is 26 percent and will remain at 26 percent for commercial and residential properties until 2023 when it will drop to 22 percent. In 2024 and beyond, a 10 percent tax credit for commercial systems will remain in place, but there will be no federal tax credits for residential solar installations. This EAP includes strategies to help local residential and commercial energy customers install solar energy and access the tax credits before they expire.

Federal Clean Air Act

In 2007, The U.S. Supreme Court ruled that CO_2 is an air pollutant under CAA, and the U.S. Environmental Protection Agency has the authority to regulate emissions of GHGs. As GHG emissions are increasingly regulated at the federal scale, it is expected that there will be some impact on California's emissions, although the scale of that impact is to be determined.

APPENDIX B: GREENHOUSE GAS INVENTORY METHODOLOGY

Community Inventory Guidelines

The City of Ventura Community GHG Inventory follows the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (Community Protocol), Version 1.1, released in July 2013. The Community Protocol was developed as a guide for local governments to accurately account for GHG emissions associated with the communities they represent. The Community Protocol was developed concurrently with the Global Protocol for Community-Scale Greenhouse Gas Emissions Pilot Version 1.0, released in May 2012.

The Community Protocol establishes requirements and recommended best practices for developing community GHG emission inventories. The Community Inventory follows these guidelines and accounting principles with accepted variations to adapt to the needs of the community and the data available. These changes will be highlighted in the Methods and Data Sources section of this chapter.

Community GHG Inventory Summary

The Community GHG Inventory uses 2010 for the baseline year and is summarized in Table 1. An additional inventory was conducted for 2015, in order to provide a second snapshot of GHG emissions.

Table 1: Complete Ventura City 2010 GHG Inventory

Sector	Inventory Record	MT CO_2e	Sector Percentage
Transportation and Mobile Sources	GCTD 2010	1,618	0.58%
	VCTC GAS 2010	214	0.08%
	VCTC DSL 2010	323	0.12%
	HDT DSL 2010	18,237	6.53%
	HDT GAS 2010	8,496	3.04%
	LM GAS 2010	248,359	88.90%
	LM DSL 2010	680	0.24%
	Amtrak Passenger Rail 2010	1,396	0.50%
	Metrolink Passenger Rail 2010	58	0.02%
	Total	**279,382**	
Residential Energy	Residential Electricity 2010	60,907	41.37%
	Residential Non-Utility Fuels - Wood	62	0.04%
	Multi-Family Natural Gas 2010	26,684	18.13%
	Residential Non-Utility Fuels - Bottled, Tank, or LP gas	1,308	0.89%
	Single Family Natural Gas 2010	58,258	39.57%
	Total	**147,219**	
Commercial Energy	Commercial Electricity 2010	93,607	69.17%
	Commercial Natural Gas 2010	41,721	30.83%
	Total	135,328	
Process & Fugitive Emissions	High GWP 2010	35,349	100.00%
	Total	**35,349**	
Solid Waste	Solid Waste with Methane Collection	26,342	99.45%
	Solid Waste No Methane Collection	147	0.55%
	Total	**26,488**	
Industrial Energy	Industrial Electricity 2010	9,513	81.87%
	Industrial Natural Gas 2010	2,107	18.13%
	Total	**11,620**	
Wastewater Treatment	Emissions from the Combustion of Digester Gas	7	26.74%
	Nitrification/Denitrification Process N_2O Emissions from Wastewater Treatment	19	73.26%
	Total	**26**	
	Grand Total	***635,413***	

Community Emissions Inventory Methodology

The following sections summarize the methodology and data sources used to calculate emissions for the Community Inventories. They discuss data disparities between the two inventories, and emissions increases or decreases within sectors between the 2010 baseline and the 2015 inventories.

In 2015, the City of Ventura emitted 579,115 $MTCO_2e$, approximately a 9 percent decrease from the 2010 inventory. Table 2 show the changes in community emissions from the 2010 and 2015 inventories across the seven sectors for the City of Ventura. From 2010 to 2015, total emissions decreased by 8.86 percent. The residential (-26.67%) and nonresidential (-18.87%) energy sectors both decreased significantly, with both a decrease in community kWh consumption and a decrease in the carbon intensity of the energy that was being used. There were also natural gas usage reductions associated with the residential and nonresidential sectors, which is discussed below. Transportation and mobile sources remained almost constant, increasing by only 0.31 percent. Process and fugitive emissions (38.92%) increased the most, followed by wastewater treatment (15.38%). Solid waste emissions decreased 14.84 percent.

It is of note that the residential and nonresidential energy decreases in 2015 should be considered critically due to data privacy rules that may have impacted the accuracy of this reporting. On May 5, 2014, the California Public Utilities Commission issued D.14-05-016 that adopted new rules regarding access to energy usage and usage-related data by local government entities. [34] In response, SoCalGas created a new Energy Data Request Program (EDRP) to facilitate the data request and release process. In the same year that EDRP was implemented, the aggregated totals for the City's gas usage reported by SoCalGas dropped by approximately 30 percent across all four sectors (single-family, multifamily, commercial, and industrial). Although neither SoCalGas nor the City of Ventura can confirm that this caused discrepancies in data, it is suspected that the unusual drop in natural gas usage between 2012 and 2013 is due to differential aggregation rather than actual savings.

[34] *https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M090/K845/90845985.PDF*

Table 2. 2015 Community GHG Emissions Inventory Update

Sector	2010 $MTCO_2e$	% 2010 Total	2015 $MTCO_{2e}$	% 2015 Total	% change
Transportation & Mobile Sources	279,382	43.97%	280,242	48.39%	0.31%
Nonresidential Energy	146,949	23.13%	119,217	20.59%	-18.87%
Residential Energy	147,219	23.17%	107,961	18.64%	-26.67%
Process & Fugitive Emissions	35,349	5.56%	49,108	8.48%	38.92%
Solid Waste	26,488	4.17%	22,557	3.90%	-14.84%
Wastewater Treatment	26	0.004%	30	0.01%	15.38%
Total	**635,413**	**100.00%**	**579,115**	**100.00%**	**-8.86%**

Demographic Data

Housing, population, workforce, and business demographics were pulled from U.S. Census, California Department of Finance, and Southern California Association of Governments (SCAG) data. This data was used in the calculations to determine emissions for several of the sectors, as discussed in the following sections.

Table 3. Housing, Population, Workforce, and Business Demographics

Year	Total Housing Units	Occupied Housing Units	Number of Houses Using Natural Gas	Number of Single- Family Houses Using Natural Gas	Number of Multi-Family Units Using Natural Gas
2010	42,448.00	40,265.00	33,452.00	22,941.55	10,510.45
2011	42,445.00	40,238.00	33,337.00	22,838.67	10,498.33
2012	42,333.00	40,232.00	32,514.00	22,191.65	10,322.35
2013	43,512.00	41,119.00	33,027.00	22,575.41	10,451.59
2014	43,795.00	41,306.00	32,814.00	21,866.61	10,947.39
2015	43,238.00	41,029.00	32,172.00	21,484.89	10,687.11

Community Energy Emissions

In total, this sector made up about 46 percent of the community emissions in 2010, and approximately 39 percent of community emissions in 2015.

Community energy emissions include residential and nonresidential (commercial and industrial) electricity, natural gas, and alternative (non-utility) fuel emissions. The emissions are discussed below by category: electricity, natural gas, and alternative fuels.

TOTAL ELECTRICITY EMISSIONS

The community electricity emissions for the City of Ventura are broken out into residential, commercial, and industrial. Industrial emissions are an aggregated total of industrial and agricultural related electricity emissions. Municipal emissions are included in the Community inventory, but they are also calculated individually in the municipal inventory. Data for electricity usage is provided by SCE, shown in Table 4. Emission factors are specific to SCE and provided annually by ICLEI's ClearPath.

Table 4. Total City Electricity Usage 2010-2015 (kWh)

Year	Residential	Non-Residential	Total
2010	218,973,868	370,741,543	589,715,411
2011	219,481,411	374,962,768	594,444,179
2012	213,812,996	380,465,813	594,278,809
2013	193,578,828	368,386,494	561,965,322
2014	189,439,793	375,92,4048	565,363,841
2015	189,242,126	371,117,315	560,359,441

Methods for calculating electricity emissions are consistent from 2010 through 2015 with two exceptions. Industrial energy usage data from SCE is consistent from 2010 through 2012 but industrial energy usage data for 2013 through 2015 was not available due to data privacy rules.[35] The first exception therefore is that values for 2013 through 2015 were aggregated into just two categories, residential and non-residential, to maintain confidentiality of individual entities. The second exception is that a 2010 SCE electricity emission factor was not provided in ICLEI's ClearPath. 2010 localized electricity grid emission factors were therefore used to calculate 2010 emissions, following ICLEI's recommendation.[36]

TOTAL NATURAL GAS EMISSIONS

The natural gas or stationary fuel combustion emissions for the City of Ventura are broken out into single-family, multifamily, commercial, and industrial. Industrial emissions are an aggregated total of industrial and agricultural related natural gas emissions. Municipal Operations emissions are included in the Community Inventory, but they are also calculated individually in the Municipal Operations inventory. Data for natural gas usage is provided by SoCalGas shown in Table 5. Emission factors are specific to SoCalGas and provided annually by ICLEI's ClearPath.

[35] *Residential, Commercial, Agricultural Energy Consumption Data (15/20 Aggregation Rule) - https://test3.dms.sce.com/sites/default/files/inline-files/EDRP%2BFact%2BSheet%2Bfor%2BLocal%2BGovernments.pdf*

[36] *https://www.epa.gov/sites/production/files/2015-01/documents/egrid_9th_edition_v1-0_year_2010_summary_tables.pdf*

Table 5. Total City Natural Gas Usage 2010-2015 (therms)

Year	Single-Family	Multifamily	Commercial	Industrial	Total
2010	10,953,497	5,018,236	7,846,055	397,021	24,214,809
2011	11,002,772	5,057,685	7,816,470	384,789	24,261,716
2012	10,230,098	4,758,489	7,781,266	345,006	23,114,859
2013	10,526,318	4,873,302	7,631,352	315,257	23,346,229
2014	8,014,846	4,012,587	5,840,070	191,016	18,058,519
2015	7,848,501	3,904,034	5,789,313	199,976	17,741,824

Alternative Fuels

Alternative fuels for the residential sector are non-utility fuels used in homes primarily for heating. Emissions are calculated in three subgroups: fuel oil and kerosene, Liquified Petroleum Gas, and wood.

Each subgroup is calculated by multiplying the average fuel use per household by the estimated number of households utilizing each alternative fuel. The estimated number of households utilizing each alternative fuel is from City of Ventura, U.S. Census data.[37] To calculate average household fuel use (MMBtu/customer); annual residential natural gas usage (therms) is multiplied by the number of households using natural gas and multiplied by a factor of 0.1. The annual number of households using natural gas is from U.S. Census data. Final emissions in CO_2e are calculated using ClearPath.

Transportation and Mobile Sources

This sector made up 43.9 percent of emissions in 2010 and 48.4 percent of emissions in 2015.

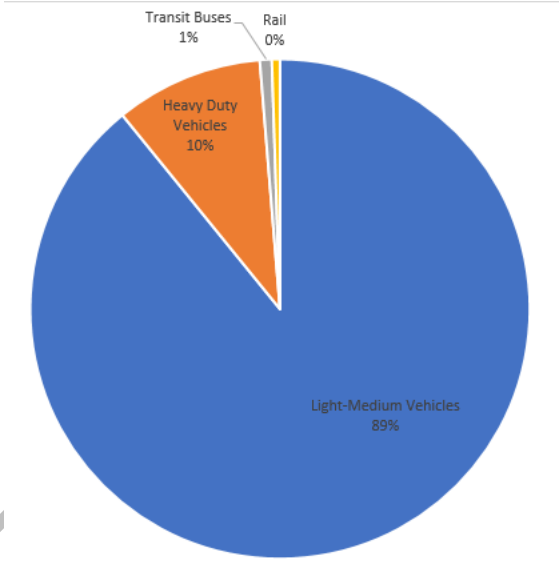
Emissions counted as transportation and mobile sources include the "on road" emissions of cars, trucks, etc. and "transit" associated emissions from buses and rail operation.

[37] *https://data.census.gov/cedsci/*

Table 6. Transportation and Mobile Sources Emission Breakdown

Transportation Sector	$MTCO_2e$
Light-Medium Vehicles	249,039
Heavy Duty Vehicles	26,734
Transit Buses	2,155
Rail	1,453

Figure 1: Transportation and Mobile Sources Emission Breakdown



The City's emissions for transportation and mobile sources remained fairly stable between the two inventory years, with less than 1 percent (.31%) increase. However, given the decreases in emissions from the energy sectors (or the data omissions in the natural gas calculations), the emissions from transportation and mobile sources was a larger section of the total emissions in 2015; in 2010 the sector accounted for 43.9 percent of the emissions, and in 2015, the sector accounted for 48.4 percent of the emissions.

The following sections describe the data sources, and methodology of calculating emissions from on road and transit operations.

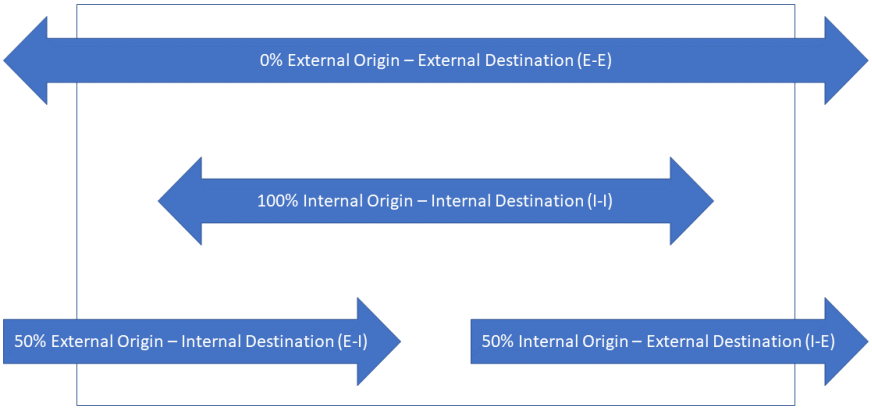
ON-ROAD

The emissions associated with on-road transportation are calculated by estimating the annual VMT, applying the VMT Percent Split Ratio and the Fuel Breakdown Ratio, and then multiplying by the respective emission factor.

Calculating Vehicle Miles Traveled

The first step in determining the annual VMT is to choose a method to calculate the miles that should be attributed to the City. There are two ways of reporting VMT associated with vehicles: 1) Travel associated with origin and destination land uses in the community through a demand-based allocation of trips, or 2) Travel occurring within the jurisdictional boundary of the community. The first of these methods is recommended under ICLEI's Community Protocol, with the rationale that local governments can influence transportation emissions through land use and urban design regulations and through transportation infrastructure investments. This methodology is applied in the Ventura inventories using a regional travel demand model implemented by the City's MPO - SCAG. The allocation of VMT to each city is based on the RTAC recommendations to CARB on allocation of VMT to MPOs whereby VMT from internal trips (I-I) is attributed at 100 percent, VMT from trips that originate or terminate within the MPO (I-E or E-I) is discounted by 50 percent, and VMT from "pass-through" trips that do not originate or terminate in the MPO (E-E) are excluded (Figure 2. RTAC VMT Allocation). This method, referred to as the RTAC method, attempts to recognize that an MPO has more ability to influence distance and mode for a local trip than for an interregional trip and has very limited ability to influence a pass-through trip. The RTAC method is applied to light-medium (LM) and heavy-duty (HDT) vehicle trips but does not include on-road bus transit, as bus VMT are included in the transit calculations.

Figure 2. RTAC VMT Allocation



The VMT data for the inventories comes from a countywide traffic modeling project in 2018; the Ventura County Traffic Model (VCTM). The model was developed in a collaborative effort between SCAG, local agencies through VCTC and the Transportation Technical Advisory Committee, and replaced a previous version developed in 2015.

The 2018 VCTM incorporates SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS) Regional Travel Demand Model and uses 663 Ventura County zones for trip distribution and mode choice. Model outputs include: VMT broken down by city of origin and city of destination for all cities within the County and the unincorporated area,

VMT for trips originating outside the County and terminating within, and VMT for trips from within the County to destinations outside. This traffic model computes a VMT for a baseline year of 2012 and a forecast year for 2040 total for each city in Ventura County, applying the RTAC method discussed above.

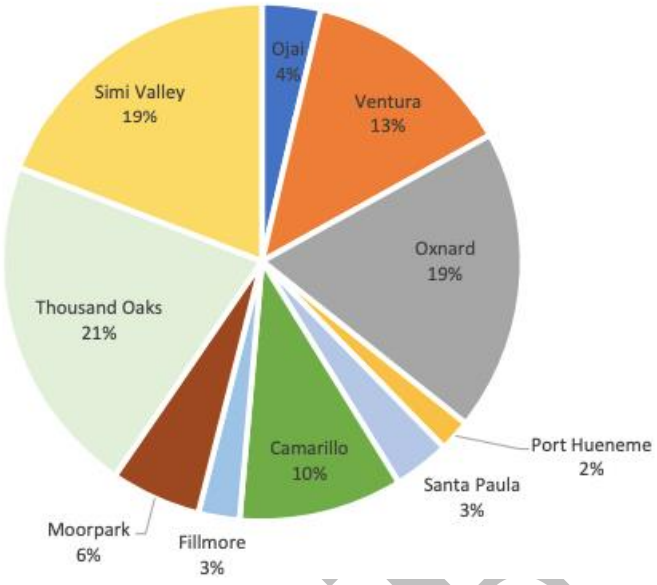
The VCTM model outputs are represented in Table 7. The model outputs show that in 2012 approximately 1.6 million miles of daily travel originated within the City and terminated elsewhere, and 1.6 million miles of daily travel originated elsewhere and terminated in the City.

Table 7. City of Ventura VMT Model Outputs for 2012 and 2040

	Source	2012 Average Daily VMT	2012 Annual VMT	2040 Average Daily VMT	2040 Annual VMT	2010 Annual VMT (Interpolated)	2011 Annual VMT (Interpolated)	2013 Annual VMT (Interpolated)	2014 Annual VMT (Interpolated)	2015 Annual VMT (Interpolated)
Internal-Internal	VCTC Model	766,485	279,767,202	864,135	315,409,211	277,221,345	278,494,273	281,040,131	282,313,060	282,313,060
Internal-External	VCTC Model *	3,253,753	1,187,619,684	3,360,841	1,226,707,096	1,184,827,726	1,186,223,705	1,189,015,663	1,190,411,642	1,190,411,642
Internal-External	Calculated		4,983,960			4,831,118	4,907,698	5,059,905	5,135,538	5,204,758
50% Internal-External	Calculation (RTAC Method)		596,301,822			594,829,422	595,565,702	597,037,784	597,773,590	597,808,200
100% Internal, 50% I-E	Calculation (RTAC Method)		876,069,024			872,050,767	874,059,975	878,077,915	880,086,650	880,121,260

As part of the Ventura County General Plan Update, Ascent Environmental was contracted by the County of Ventura in 2018 to determine annual VMT for each city in the County of Ventura, as well as unincorporated areas, for each year from 2010 to 2015. Ascent applied the 2012 and 2040 outputs of the VCTC to interpolate VMT (using the RTAC method) between 2010 and 2015. From this calculation Ascent also determined a proportional breakdown (Figure 3), which is used to divide 73.6 percent of total annual countywide VMT between the cities. The remaining 26.4 percent of countywide VMT is the "responsibility" of the unincorporated County and is therefore excluded from City inventories. The City of Ventura is responsible for approximately 13.42 percent of the VMT that was attributed to the 10 incorporated cities in the County. (Figure 3)

Figure 3. 2010 County of Ventura VMT Breakdown



Based on Ascent's interpolation of the VCTC and applying the RTAC method, the City was "responsible" for a total of 662 million miles in 2010 (half of the internal-external plus all of the internal-internal miles) as shown in Table 8 below.

Table 8: On Road Total VMT in Ventura Between 2010 and 2015

	2010	2011	2012	2013	2014	2015
Ventura County Total VMT	6,724,350,264	6,747,109,730	6,769,869,196	6,792,628,661	6,815,388,127	6,838,147,592
Incorporated Area VMT Percentage	73.6%	73.6%	73.6%	73.6%	73.6%	73.6%
Incorporated Area VMT	4,946,892,151	4,963,635,572	4,980,378,992	4,997,122,412	5,013,865,832	5,030,609,252
City of Ventura VMT Percentage	13.39%	13.38%	13.37%	13.35%	13.34%	13.34%
City of Ventura VMT	662,475,249	664,056,441	665,637,478	667,218,360	668,799,088	671,027,843

Vehicle Miles Traveled Percent Split Ratio

After determining the VMT in the City of Ventura following the RTAC method, the next step in calculating GHG emissions from the VMT is to consider what types of vehicles drove those miles. Annual On-Road GHG emissions can be more accurately calculated by allocating VMT by vehicle type, applying a VMT Percent Split Ratio to the Total Annual VMT. The A VMT Percent Split Ratio estimates the percentage of vehicles within a certain class as the GHG emissions associated with different vehicle classes vary. The applied VMT Percent Split Ratio is adjusted from the SCAG VMT Percent Split Ratio for the City of Ventura. The model includes LM, HDT, and Bus VMT in the ratio (Bus VMT was extracted from the VMT Split Ratio because Bus VMT is accounted for separately). As shown in Table 9, the VMT Percent Split Ratio assumes that about 96 percent of VMT are LM and the remaining 4 percent are HDT. This LM and HDT ratio is applied to the Total Annual VMT to calculate the Total Annual LM and HDT VMT.

Table 9. Vehicle Class Split Ratio 2010-2015

	2010	2011	2012	2013	2014	2015
LM % Split Ratio	95.64%	95.64%	95.64%	95.64%	95.64%	95.64%
Total:	633,586,348.77	635,098,589.35	636,610,680.77	638,122,624.30	639,634,421.20	641,765,985.04
HDT % Split Ratio	4.36%	4.36%	4.36%	4.36%	4.36%	4.36%
Total:	28,888,900.24	28,957,852.11	29,026,797.19	29,095,735.52	29,164,667.17	29,261,857.60

Fuel Breakdown Ratio

The next step in calculating GHGs is to consider what type of fuel the LM and HDT vehicles use. GHG emissions can be calculated by applying Fuel Breakdown Ratios, based on the average percentage of vehicles in each class that run on gasoline, diesel, or electricity. The applied Fuel Breakdown Ratio was calculated from Emission FACtors (EMFAC) data using the U.S. Community Protocol as outlined by California's Statewide Energy Efficiency Collaborative. The percentages of VMT from gasoline, diesel, and electric are applied to both LM and HDT resulting in four VMT categories (LM diesel (DSL), LM GAS, HDT DSL, and HDT GAS), as shown in Table 10. The table also shows that about 99.6 percent of LM vehicles are modeled to run on gasoline and only 0.3 percent on diesel. These numbers do for LM VMT ratio's do not add up to 100 as electric car VMT is calculated into the ratio. Emissions from EVs are not shown below because the emissions associated with driving an EV are accounted for in electricity emissions.

Table 10. Ventura VMT as Sorted by Vehicle Class and Fuel Type

	2010	2011	2012	2013	2014	2015
On Road LM						
Total:	633,586,348.77	635,098,589.35	636,610,680.77	638,122,624.30	639,634,421.20	641,765,985.04
LM DSL	1,891,138.87	2,550,512.60	3,233,077.20	3,624,432.68	4,004,673.41	4,397,172.69
LM DSL Ratio	0.30%	0.40%	0.51%	0.57%	0.63%	0.69%
LM Gas	631,172,671.03	632,015,697.65	632,841,425.09	633,967,272.28	635,110,795.26	636,859,848.90
LM Gas Ratio	99.62%	99.51%	99.41%	99.35%	99.29%	99.24%
On Road HDT						
Total:	28,888,900.24	28,957,852.11	29,026,797.19	29,095,735.52	29,164,667.17	29,261,857.60
HDT DSL	17,658,186.15	18,230,259.51	18,594,250.30	19,205,734.47	19,728,686.31	20,368,763.21
HDT DSL Ratio	61.12%	62.95%	64.06%	66.01%	67.65%	69.61%
HDT Gas	11,230,714.09	10,727,592.61	10,432,546.89	9,890,001.05	9,435,980.85	8,893,094.39
HDT Gas Ratio	38.88%	37.05%	35.94%	33.99%	32.35%	30.39%

Emission Factors

The final step in calculating GHG emissions from on road transportation is to apply emissions factors to the VMT data. To begin, CO_2 emission factors were calculated for each respective vehicle class and fuel type. These emissions factors were conditioned from annual Ventura Region EMFAC data. For each fuel type, a factor is calculated by taking the sum of VMT for all vehicle types by each individual fuel type (e.g. gasoline). The Weighted Percent Daily Average VMT is calculated by dividing vehicle type VMT by the total daily VMT for each vehicle type. The CO_2 weighted average gallon per mile (g/mile) is calculated by multiplying each vehicle type CO_2 RUNEX g/mile by the vehicle type percent daily VMT. The sum of each vehicle type CO_2 weighted average g/mile is the new CO_2 g/mile emission factor.

Table 11. CO_2 Emissions Factors Per Year Sorted by Vehicle and Fuel Type (g/mile)

Year	LM - DSL	HDT – DSL	LM – GAS	HDT - GAS
2010	375.48	1078.52	406.37	786.51
2011	377.77	1082.29	407.11	785.21
2012	375.22	1093.74	402.04	787.71
2013	368.41	1097.60	395.08	789.56
2014	361.27	1101.78	387.24	791.55
2015	354.94	1111.05	380.61	797.31

The default nitrous oxide (N_2O) and methane (CH_4) emissions factors are provided by the U.S. Community Protocol and the EPA. Table TR.1.4 of the US Community Protocol (Page 74 - Appendix D - Transportation) has default LM emission factors per VMT for N_20 and CH_4. Table TR.2.2 (Page 76 – Appendix D – Transportation) has default HDT emission factors per VMT for N_20 and CH_4.

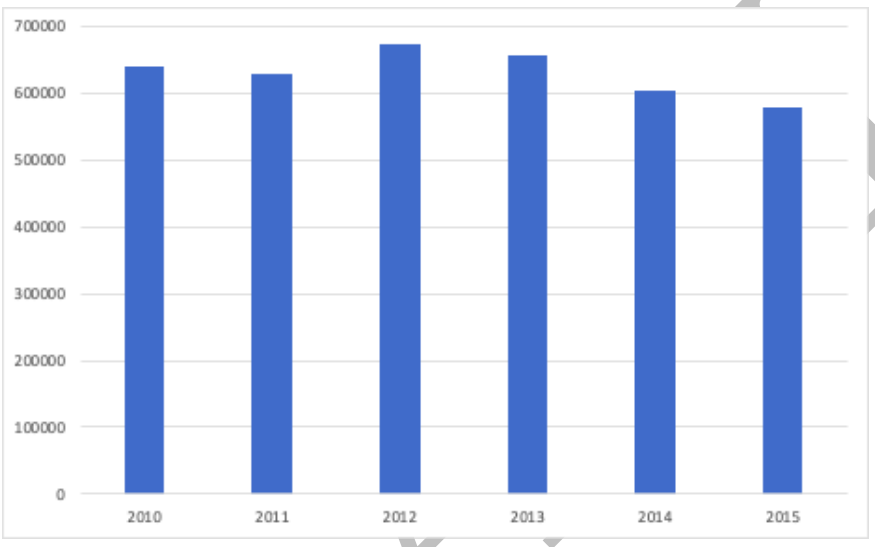
Table 12. On Road CH_4/N_2O Emissions Factors

	On Road LM Emission Factor	On Road HDT Emission Factor
GAS		
CH_4 g/mile	0.020	0.0333
N_2O g/mile	0.017	0.0134
DSL		
CH_4 g/mile	0.0005	0.0051
N_2O g/mile	0.001	0.0048

Final On-Road Greenhouse Gas Emissions

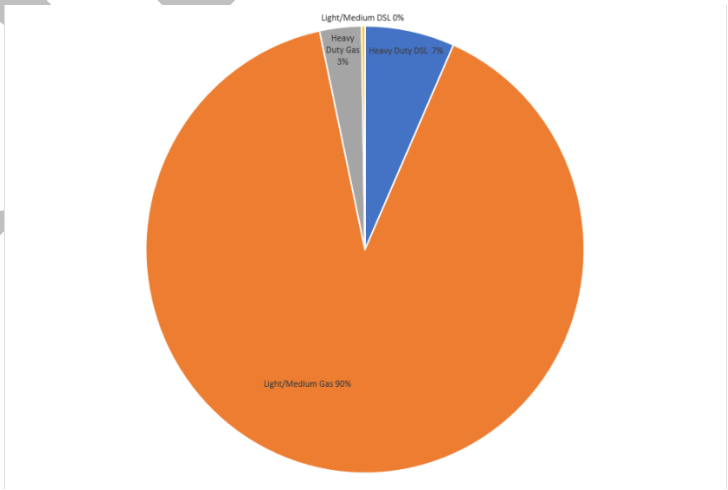
Final on-road emissions were converted into CO_2e using the 5th IPCC Climate Assessment 100 Year Values, with the calculations and Global Warming Potentials applied through ICLEI's ClearPath online software. Although, the City's VMT was to rise between 2010 and 2015, this projected rise in VMT had little effect on total projected emissions as shown in Figure 4; because emissions factors from CARB (Table 11) lowered slightly in the same time period.

Figure 4. City of Ventura On-Road GHG Emissions 2010-2015 ($MTCO_2e$)



As shown in Figure 5, LM, gasoline powered vehicles account for 90 percent of the on-road emissions (and approximately 39 percent of the City's total emissions) in 2010.

Figure 5. On-Road Transportation Emissions 2010



Transit

Transit emissions encompass Bus VMT associated with the VCTC and the GCTD. Both VCTC and GCTD provided City of Ventura specific VMT from transit buses operated within the Jurisdiction (Shown in Tables 13 and 14 below). VCTC annual VMT is the sum of the total number of weekday and weekend bus trips and correlated trip mileage. GCTD annual VMT is calculated using the same method with six less weekdays a year, resulting in 255 operating weekdays and 104 weekend days - accounting for the six holidays GCTD buses do not operate.

Table 13: Ventura County Transportation Commission VMT

Route	Annual VMT
Weekdays	
Coastal Express	606
HWY-101	224.6
East West Connector	105.8
HWY-126	200.1
Weekends	
Coastal Express	158
HWY-101	176.8
HWY-126	346
TOTAL:	367,429.70

Table 14: Gold Coast Transit District VMT

Number of Trips			Miles by Day Type		
Monday - Friday	*Saturday*	*Sunday*	*Monday - Friday*	*Saturday*	*Sunday*
41	29	29	464.94	328.86	328.86
44	29	29	498.08	328.28	328.28
15	15	15	115.65	115.65	115.65
16	15	15	93.92	88.05	88.05
28	22	21	229.32	180.18	171.99
27	21	21	218.7	170.1	170.1
2	0	0	19.6	0	0
15	14	14	80.25	74.9	74.9
16	15	14	85.44	80.1	74.76
1	0	0	2.05	0	0
23	14	14	106.03	64.54	64.54
23	14	14	107.64	65.52	65.52
21	13	12	15.54	9.62	8.88
21	13	12	15.12	9.36	8.64
1	0	0	5.68	0	0
2	0	0	11.14	0	0

VCTC total CO_2e were calculated using annual Ventura Region EMFAC emission factors and Fuel Breakdown Ratios. The Fuel Breakdown Ratio specific to Ventura Region Buses is applied

to the total annual VCTC VMT resulting in a VCTC Diesel Bus VMT and a Gasoline Bus VMT. The Ventura Region EMFAC Gasoline and Diesel Bus CO_2 g/mile emission factors were applied to the annual Gasoline and Diesel VMT. N_2O and CH_4 HDT emission factors for both Gasoline and Diesel Buses are default emission factors provided by the US Community Protocol, Table TR.2.2 (Page 76 – Appendix D – Transportation).

Table 15: Ventura County Transportation Commission Emissions

		2010	2011	2012	2013	2014	2015
GAS	Ratio	48.74%	47.34%	46.01%	45.65%	46.60%	47.24%
	VMT	179,102.33	173,944.50	169,039.22	167,734.31	171,220.20	173,563.85
	MT CO_2	213.33	208.47	203.15	205.58	210.43	215.39
	MT N_2O*	0.00240	0.00233	0.00227	0.00225	0.00229	0.00233
	MT CH_4*	0.00596	0.00579	0.00563	0.00559	0.00570	0.00578
DSL	Ratio	51.26%	52.66%	53.99%	54.35%	53.40%	52.76%
	VMT	188,327.37	193,485.20	198,390.48	199,695.39	196,209.50	193,865.85
	MT CO_2	323.18	332.56	339.37	340.17	332.86	326.01
	MT N_2O*	0.00090	0.00093	0.00095	0.00096	0.00094	0.00093
	MT CH_4*	0.00096	0.00099	0.00101	0.00102	0.00100	0.00099

GCTD total CO_2e is calculated using Compressed Natural Gas (CNG) emission factors for CO_2, N_2O, and CH_4. The CNG CO_2 emission factor was calculated as defaults were not available. Standard Cubic Feet (scf) of CNG per diesel gallon equivalent (DGE) is from the National Renewable Energy Laboratory.[38] Fuel economy for CNG Buses is from a study by the Department of Energy.[39]

[38] *https://www.nrel.gov/docs/fy10osti/48814.pdf*

[39] *https://www.energy.gov/eere/fuelcells/articles/doe-fuel-cell-bus-analysis-finds-fuel-economy-be-14-times-higher-diesel*

Table 16: CNG Emissions Factors

CNG CO_2 Emission Factor Calculations	
Conversion: Standard Cubic Feet (scf) of CNG per diesel gallon equivalent (DGE)*	137
Fuel economy: miles per gallon diesel equivalent (mpg DE)**	3.3
CO_2 kg/scf	0.0545
CO_2 kg/mile	2.2626

N_2O and CH_4 emissions were calculated using default emission factors from the EPA.[40]

Table 17: Gold Coast Transit District Emissions 2010-2015

		2010	2011	2012	2013	2014	2015
CNG	MT CO_2	1548.55	1548.55	1548.55	1548.55	1548.55	1548.55
	MT N_2O	0.12	0.12	0.12	0.12	0.12	0.12
	MT CH_4	1.35	1.35	1.35	1.35	1.35	1.35
Emission Factors for CNG*	CO_2 kg/mile	2.2626	2.2626	2.2626	2.2626	2.2626	2.2626
	N_2O g/mile	0.1750	0.1750	0.1750	0.1750	0.1750	0.1750
	CH_4 g/mile	1.9660	1.9660	1.9660	1.9660	1.9660	1.9660

Final transit emissions were converted into CO_2e using the 5th IPCC Climate Assessment 100 Year Values, with the calculations and GWPs applied through ICLEI's ClearPath online software.

Rail

Amtrak and Metrolink Passenger Rail operate within the City of Ventura. Amtrak has approximately 13.25 miles of rail and Metrolink approximately 1.25 miles of rail within the City boundary. Both trains operate on diesel fuel. Emissions for both rail operators were estimated by calculating the energy consumed (gallons of diesel) by passenger rail. The method for calculating energy consumed by passenger rail is from the US. Community Protocol, TR.5.1. (Page 52 – Appendix D – Transportation).

[40] *https://www.epa.gov/sites/production/files/2015-07/documents/emission-factors_2014.pdf*

Table 18: Amtrak and Metrolink Annual Fuel Consumption

	Amtrak - Passenger Rail Emissions	Metrolink - Passenger Rail Emissions
Annual Energy Consumed (gal diesel)	135,432.41	5,639.30
Annual kg CO_2	1,382,764.92	57,577.21
Annual g N_20	35,212.43	1,466.22
Annual g CH_4	108,345.93	4,511.44

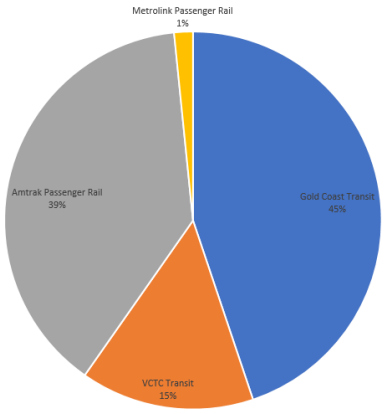
Default emission factors for Diesel Passenger Rail are from the US Community Protocol, TR.5.2. (Page 52 – Appendix D – Transportation).

Table 19: Diesel Emissions Factors for Rail

Diesel Passenger Rail Default Emission Factors	
CO_2 kg/gal	10.21
N_20 g/gal	0.26
CH_4 g/gal	0.80

Final rail emissions were converted into CO_2e using the 5th IPCC Climate Assessment 100 Year Values, with the calculations and GWPs applied through ICLEI's ClearPath online software. As shown in Figure 6, rail emissions make up about 40 percent of the transit emissions in Ventura, and bus emissions make up the remaining 60 percent.

Figure 6. Transit and Rail Emissions 2010



Process and Fugitive Emissions (High Global Warming Potential)

This sector made up 5.5 percent of emissions in 2010, and 8.5 percent of emissions in 2015.

Process and Fugitive emissions are emissions of gases or vapors from pressurized equipment leaks and other unintentional release. A common example of gases released this way are Hydrofluorocarbons (HFCs), which are commonly used as refrigerants, aerosols, fire retardants, foams, and solvents. They are substitutes for chlorofluorocarbons (CFCs), which were phased out by the Montreal Protocol in 1987 because of their ozone depleting potential. HFCs, like the CFCs they replaced, are potent GHGs. Therefore, these gases are said to have High Global Warming Potential (HGWP). HFCs represent only a small fraction of global GHGs but because of their potency, their climate change impacts are significant and rising, and included in California's GHG Emission Inventory.[41] They are emitted directly into the atmosphere as a result of their application or from leakage. For the purposes of estimating the City's contribution to these HGWP emissions, CARB's GHG inventory tool was used to query California's total emissions for ozone depleting substitutes, and the totals for each year apportioned based on the proportion of the State's population living in Ventura.[42] Population was used to calculate total process and fugitive emissions are from the U.S. Census.

As shown in Table 20, emissions from HFCs saw the largest proportional rise in emissions among these HGWP gases, jumping 38.92 percent from the 2010 to 2015 community inventory. This increase reflects the fact that use of HFCs across the State has grown over the past decade, primarily for refrigeration and air conditioning. Principal among these gases are HFC-134a, HFC-125, HFC-143a, HFC-32, and HFC-245fa, which together account for 98 percent of the total HFC GHG emissions (Figure 7). It should be noted that the source data used for this sector of the inventory was taken from CARB, which measures total statewide emissions. This means that the city has significantly less control over the emissions calculated in this section than the others.

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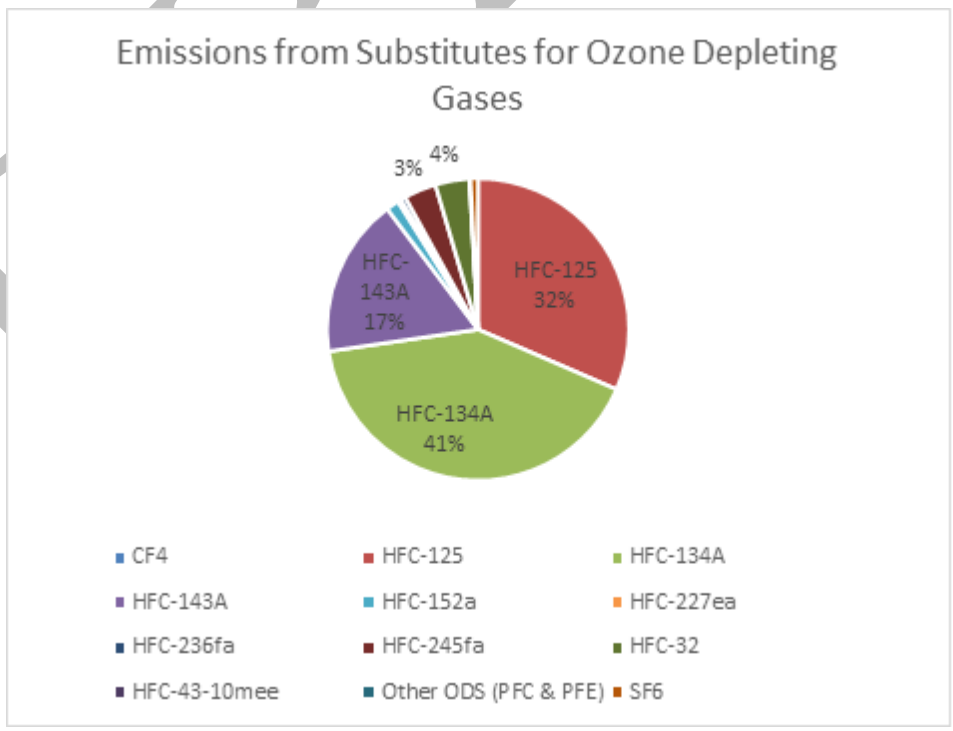
[41] *California tracks the emissions of HFCs, perfluorocarbons (PFCs) and sulfur hexafluoride (SF6) as part of the State's GHG Emission Inventory. http://icleiusa.org/publications/us-community-protocol/*

[42] *GHGs used to calculate total process and fugitive emissions are as follows: CF4, HFC-125, HFC-134A, HFC-143A, HFC-152a, HFC-227ea, HFC-236fa, HFC-245fa, HFC-32, HFC-43-10mee, other ODS (PFC & PFE), and SF6. Gases released from semiconductor manufacturing are excluded on the assumption that industrial processes cannot be apportioned on a per capita basis. Emissions factors for these GHGs were taken from the EPA's Fifth Climate Assessment Report (AR5).*

Table 20. California High GWP Gas Emissions (Metric Tons)

	2010	2011	2012	2013	2014	2015
CF4	0.311	0.335	0.321	0.31	0.3	0.308
HFC-125	840.48	1,015.97	1,196.52	1,379.47	1,551.51	1,714.71
HFC-134a	5,129.37	5,152.49	5,166.36	5,244.44	5,336.00	5,324.90
HFC-143a	448.45	505.54	568.69	629.58	681.54	721.40
HFC-152a	1,776.79	1,846.67	1,931.10	1,968.13	1,982.75	1,981.78
HFC-227ea	18.65	23.15	23.90	28.07	19.69	19.54
HFC-236fa	10.20	9.86	9.74	9.35	8.95	8.80
HFC-245fa	216.35	226.15	235.83	247.33	268.61	356.18
HFC-32	427.48	547.78	667.92	792.13	913.75	1,037.81
HFC-365mfc	0.40	0.42	0.407	0.429	0.42	0.426
HFC-43-10mee	10.65	10.76	10.86	10.94	11.03	6.19
Other PFC and PFE	0.30	0.19	0.28	0.245	0.24	0.26

Figure 7. Emissions Breakdown from High GWP Gases



Solid Waste

Emissions in this sector made up 4.1 percent of emissions in 2010, and 3.9 percent of emissions in 2015

Emissions from solid waste decreased by 14.84 percent from 2010 (26,488 $MTCO_2e$) to 2015 (22,557 $MTCO_2e$). GHG emissions from the disposal of solid waste by the City's population were calculated using the methodology defined in the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions[43] and included as part of the Community GHG inventory (These emissions were not included in the Government Operations GHG inventory because the City does not own the landfills nor do they control their operation). Ninety five percent of solid waste emissions come from the decomposition of biologic waste in landfills, which generates methane, carbon dioxide and nitrous oxide in differing proportions based on the management process. Landfill emissions are unique among sources of emissions in that the emissions are generated over long periods of time following the dumping of the waste. Emissions from solid waste for the City of Ventura are calculated by multiplying the total tonnage of waste disposed by the jurisdiction specific waste emission factors. The total tonnage of waste data is from the CalRecycle. Data is provided for each jurisdiction by tonnage disposed per facility or landfill. The City of Ventura specific waste emission factors are calculated from jurisdiction specific, CalRecycle, solid waste characterization data. Final emissions in CO_2e are calculated using ClearPath.

A majority of the City's solid waste is disposed of at the Toland Landfill near Santa Paula through a scheduled third-party hauler trash service, although materials are sometimes taken to other area landfills when self-hauling, construction and demolition services, or bin rental are used. The origin of all waste is tracked by the landfill and reported to CalRecycle. Since 2010, the community's total disposal has averaged around 120,000 tons per year.

[43] *Appendix E: Solid Waste Emission: Activities and Sources, Version 1.1, July 2013*

Table 21. City of Ventura Solid Waste Disposal 2010-2017

Facility Information					2010	2011	2012	2013	2014	2015	2016	2017
Facility Name/ Waste Group	Distance to Facility (Miles)	Data Source	CH_4 Collection or No CH_4 Collection	Notes	Tons of Waste Landfilled							
Lancaster Landfill & Recycling Center	104.0	CalRecycle	Unknown			5.0	5.0	0.0		0.0	0.0	1.0
McKittrick Waste Treatment Site	106.0	CalRecycle	Unknown				249.0	225.0	5.0	21.0	23.0	
Mid-Valley Sanitary Landfill	125.0	CalRecycle	Unknown				0.0					
American Avenue Disposal	215.0	CalRecycle	Unknown						1.0			
Bakersfield Metropolitan (BENA) SLF	132.0	CalRecycle	Unknown	Voice mail	1.0							
Asuza Land Reclamation Co. Landfill	85.0	CalRecycle	No Methane	Flaring Methane	138.0	49.0	138.0	239.0	85.0	107.0	530.0	144.0
Kettleman Hills or CWMI, KHF (MSW Landfill B-19) or Chemical Waste Mgmt., Inc.	185.0	CalRecycle	No Methane	Hazardous Waste (no Methane Produced, Organic Waste, Methane Flaring	18.0	24.0					5.0	
Antelope Valley Public	89.7	CalRecycle	No Methane	LGF Flare		2.0	3.0	4.0	13.0	12.0	25.0	7.0
Simi Valley Landfill and Recycling Center	40.8	CalRecycle	Methane Collection	LFGEP (2004-2016), Currently Flaring	5,982	5,620	7,260	5,071	6,426	6,217	10,863	18,207
Sunshine Canyon Landfill	55.9	CalRecycle	Methane Collection	LFGEP (Current) and Methane	2.0							
Toland Rd. Landfill	22.0	CalRecycle	Methane Collection	LFG Collection (2004-present)	106,769	100,724	104,180	105,644	107,494	110,485	106,772	104,191
Olinda Alpha Sanitary Landfill	108.0	CalRecycle	Methane Collection	LFG Collection, Early LFG and Upgrade				11.0			11.0	0.0
Chiquita Canyon Sanitary Landfill	41.7	CalRecycle	Methane Collection	LFG Collection, (2004 – present)		2.0		2,204	2,926	1,457	1,052	2,135
Frank R. Bowerman Sanitary LF	120.0	CalRecycle	Methane Collection	LFG Collection					22.0		0.0	

Prima Deshecha Sanitary Landfill	130.0	CalRecycle	Methane Collection	Landfill-gas-to-energy plant, no dates identified		6.0

Wastewater Treatment

Emissions in this category were less than 0.1 percent of emissions in both 2010 and 2015.

The City owns and operates its own wastewater treatment plant (WWTP), the Ventura Water Reclamation Facility, which provides treatment services to approximately 98 percent of City residences. Because the Plant is located within the City, its energy use is included in the community data provided to the City by the utility companies, and the associated emissions are captured in the energy section of the Community GHG inventory. However, those energy emissions are examined in more detail in the Government Operations inventories. The GHG emissions presented here are process emissions resulting from the following sources:

- Nitrification or denitrification
- Effluent discharge
- Combustion (excluding CO_2, which is classified as non-reportable resulting from a biogenic source)
- Incomplete combustion

In the wastewater treatment process, nitrogen is removed through nitrification and denitrification steps, which result in N_2O emissions. These emissions are calculated based on the size of the population served by the WWTP, an emission factor for high nitrogen loading of industrial or commercial discharge that depends on the industrial/commercial customers that use the plant, and an emission factor based on the Nitrogen load of the wastewater.

Conventional WWTPs are not able to remove all of the nitrogen content in wastewater, leaving about 10 percent in the effluent. Trace amounts of N_2O are present in effluent, with most of the nitrogen in other forms. When the nitrogen containing effluent reaches a natural watershed, indirect N_2O emissions occur through side reactions. These emissions are calculated based on the nitrogen load of the wastewater and associated emission factors. Stationary methane emissions come from devices designed to combust gas produced by anaerobic digesters. Data used to calculate total stationary methane emissions is as follows: measured standard cubic feet of digester gas produced per day (std ft3/day), fraction of methane in biogas, and the population served. Data was provided by the City of Ventura WWTP staff. Final emissions in CO_2e are calculated using ClearPath. Emissions are calculated using the methodology defined in the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendix F - Wastewater and Water Emission Activities and Sources - Version 1.1, July 2013.

Process emissions from wastewater treatment account for only a small portion (<1%) of the community's overall GHG emissions; however, the emissions from the energy (listed in Industrial Energy and the Municipal Operations inventory) used to treat wastewater are significant. Contributions from process nitrous oxide and combustion of digester gas are shown in Table 22. These process emissions are estimated by using population as a proxy therefore they gradually increased between 2010 and 2015.

Table 22. Process Emissions from Wastewater Treatment 2010-2015

Year	Population	Emission factor for insignificant industrial/ commercial discharge	Emission factor for WWTP with N/D (g N_2O/person/ year)	Conversion from g to MT	GWP N_2O*	N_2O Emissions ($MTCO_2e$)	MTN_2O
2010	106,433	1	7	0.0000001	265	19.74	0.07
2011	107,345	1	7	0.0000001	265	19.91	0.08
2012	108,256	1	7	0.0000001	265	20.08	0.08
2013	109,954	1	7	0.0000001	265	20.40	0.08
2014	110,473	1	7	0.0000001	265	20.49	0.08
2015	110,752	1	7	0.0000001	265	20.54	0.08

Municipal Operations Inventory Guidelines

The Municipal Operations GHG Inventories follow the Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories Version 1.1 released in May 2010. The Government Operations Protocol was developed as a guide for local governments to account for GHG emissions associated with their own operation. The Municipal Operations inventories are a subset of the Community inventory, meaning that all municipal emissions in a given year are also included in the Community inventory of the same year.

The Municipal Operations inventories were completed for the baseline year of 2010 and 2015. The 2015 Municipal Operations inventory update showed that the city emitted a total of 10,065 $MTCO_2e$, 14.36 percent less than in 2010. As shown in Table 23, the largest GHG emissions decline was in the buildings and facilities sector, which decreased 21.65 percent. The water pumping and wastewater treatment sector saw the second largest reduction (16.94%), followed by streetlights and traffic signals (14.06%). The emissions in these sectors are related to the energy use by the City and the associated GHG emissions of that energy. The City's total energy use did not decline from 2010; however, grid electricity became significantly cleaner over this time period resulting in reduced emissions. The only sector that increased in emissions is vehicle fleet, which rose slightly by 1.48 percent. A summary of the inventories and the change in emissions over time is shown in Table 23.

Table 23. 2015 Municipal Operations GHG Emissions Inventory Update

Sector	2010 $MTCO_2e$	% 2010 Total	2015 $MTCO_2e$	% 2015 Total	% Change
Water Pumping & Wastewater Treatment Facilities	5,231	44.51%	4,345	43.17%	-16.94%
Buildings & Facilities	2,910	24.76%	2,280	22.65%	-21.65%
Vehicle Fleet	2,167	18.44%	2,199	21.85%	1.48%
Streetlights & Traffic Signals	1,444	12.29%	1,241	12.33%	-14.06%
Total	11,752	100.00%	10,065	100.00%	-14.36%

The following sections summarize the methodology used to calculate emissions for the Municipal Operations Inventories. They discuss data sources and disparities between the two inventories, and emissions increases or decreases within sectors between the 2010 baseline and the 2015 inventories.

Water Pumping and Wastewater Treatment Facilities

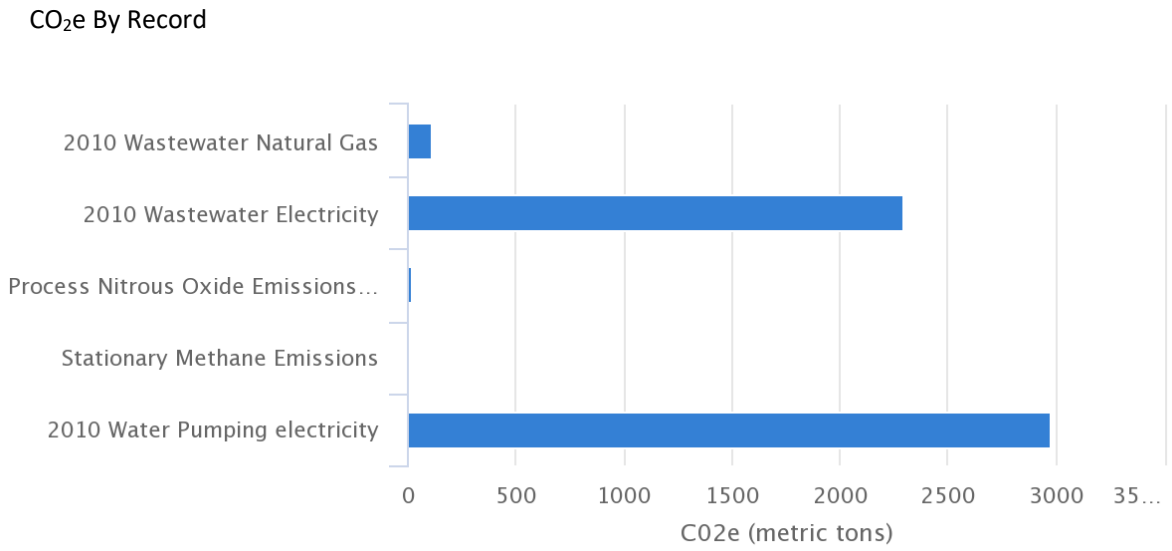
Emissions from this sector made up 44.5 percent of municipal emissions in 2010 and 43.2 percent of municipal emissions in 2015.

This sector includes emissions from four different sources (Figure 8):

1. Electricity used for water pumping throughout the city.
2. Electricity and natural gas used by the WWTP
3. Process nitrous oxide emissions from nitrification/denitrification at the WWTP.
4. Stationary methane emissions from devices designed to combust gas produced by anaerobic digesters at the WWTP

As shown in Figure 8, the electricity associated with water pumping was the biggest source of GHG emissions in this sector in 2010, followed by the electricity used for wastewater treatment processes. Together, these electricity related emissions make up over 99 percent of the emissions associated with water pumping and wastewater treatment facilities. Electricity used for water pumping and wastewater treatment combined is over half of all of the electricity purchased by the City.

Figure 8. Water and Wastewater Emissions 2010



Between the two GHG inventories, in 2010 and 2015, this sector saw a 16.94 percent reduction in GHG emissions. In 2015, City water pumps used 530,089 kWh less electricity than in 2010. The WWTP also had a drop-in electricity usage; it used 1,225,428 kWh less electricity in 2015 than in 2010. However, the WWTP also used 58,837 more therms in 2015 than in 2010, which is a 282 percent increase. This increase in therm usage can be explained because the WWTP uses natural gas for cogeneration, which is subject to considerable variation in demand for utility-provided gas depending on the amount of methane and carbon dioxide waste that is yielded from wastewater digestion. The cogeneration impacts also explain the reduction in electricity demand since cogeneration supplies the plant with power by combusting these gases. For this reason, the City of Ventura WWTP has fluctuated greatly in both natural gas and electricity demand from year to year, with each changing in inverse of the other.

The methodology for calculating emissions for each sub-sector of Municipal Water Pumping and Wastewater Treatment follow:

ELECTRICITY AND NATURAL GAS

Emissions from energy used, including electricity and natural gas usage, at the City of Ventura WWTP are calculated by multiplying kWh and therm usage by their respective emissions factors in ClearPath.

STATIONARY METHANE EMISSIONS

Stationary methane emissions are from devices designed to combust gas produced by anaerobic digesters, based on site specific data of a centralized WWTP that uses anaerobic digesters. Data used to calculate total stationary methane emissions is as follows: measured standard cubic feet of digester gas produced per day (std ft^3/day), fraction of method in biogas, and the population served. Data was provided by the City of Ventura WWTP staff. Final emissions in CO_2e are calculated using ClearPath.

Data needs and methods for calculating stationary methane emissions combustion of digester gas can be found in the US Community Protocol, WW.1 (Page 19 & 20 – Appendix F – Wastewater and Water).

PROCESS NITROUS OXIDE EMISSIONS

Emissions from wastewater treatment include N_2O when centralized WWTPs utilize nitrification or denitrification. These emissions are calculated based on the population served. The following equation is used to calculate annual N_2O emissions:

Annual N_2O emissions = $((P \times F_{ind\text{-}com}) \times EF \times 10^{-6}) \times GWP$

P = population

$F_{ind\text{-}com}$ = Factor for insignificant industrial or commercial discharge

EFnit/denit = Emission factor for WWTP with nitrification or denitrification (g N_2O/person/year)

10^{-6} = Conversion from g to mt (mt/g)

GWP = Global Warming Potential; conversion from mt of N_2O to mt of CO_2 equivalents

The equation for calculating process nitrous oxide emissions from WWTPs that use nitrification or denitrification can be found in the US Community Protocol, Equation WW.7 (Page 44 – Appendix F – Wastewater and Water).

WATER PUMPING

Emissions from the movement of water were calculated by adding together the usage of all city-owned water pumps. Data was collected from City SCE account bills and emissions were calculated by applying emissions factors in ClearPath.

Buildings and Facilities

In 2010, the City's Building and Facilities were associated with 24.7 percent of the Municipal Operations GHG emissions. In 2015, this percentage was 22.7 percent

In 2010, City owned buildings and facilities used 5,536,655 kWh of electricity and 257,754 therms of natural gas. Some of the largest electricity consumers were the Ventura Police and Fire Headquarters (932,675 kWh), City Hall (839,527 kWh), Aquatic Center (676,777 kWh) and Court House (472,560 kWh). The Aquatic Center was also responsible for over half of the city's natural gas consumption, using 143,829 therms in 2010, mostly to heat the pools in the winter. Other significant natural gas consumers in 2010 include City Hall (51,155 therms) and Police and Fire Headquarters (29,313 therms).

Figure 9. City of Ventura Municipal Natural Gas Usage (therms)

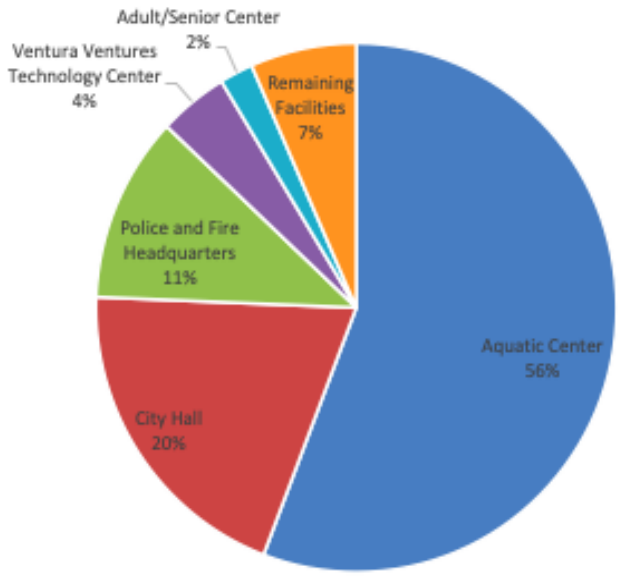
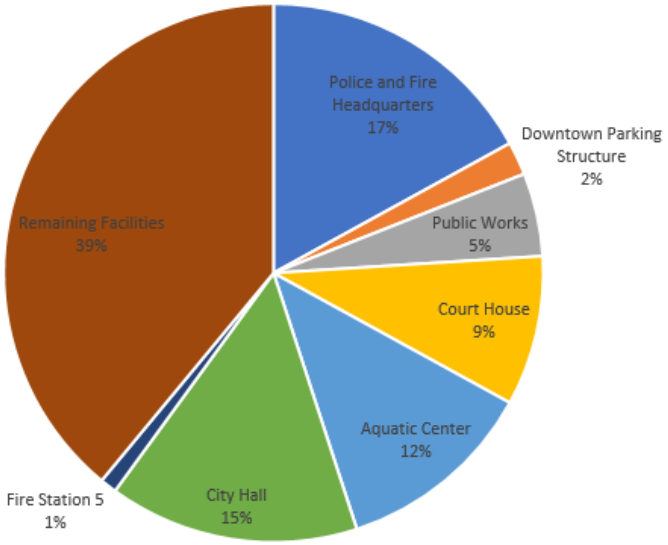


Figure 10. City of Ventura Municipal Electricity Usage (kWh)



City owned buildings and facilities used 6.45 percent less electricity (-357,216 kWh) and 22.56 percent less natural gas (-58,163 therms) in 2015 than the 2010 baseline. The most significant reduction in energy use occurred at the Aquatic Center, which used 143,829 therms in 2010, but only 116,512 therms in 2015. Police and Fire Headquarters also reduced their natural gas usage from 29,313 to 17,769 therms. None of the highest electricity consuming facilities achieved as significant of a reduction; however, overall efficiency did increase due to LED retrofits and Chiller upgrades. This increase in efficiency, along with grid electricity becoming less carbon intensive resulted in emissions from buildings and facilities decreasing by 22 percent between 2010 and 2015. (Table 23)

Vehicle Fleet

In 2010, City's vehicle fleet was responsible for 18 percent of the Municipal Operations GHG emissions. In 2015, this percentage increased to 22.6 percent.

Emissions from fleet vehicles are calculated by multiplying the total quantity of gasoline and diesel fuel used by their respective emissions factors per gallon. VMT was not calculated for fleet vehicles, however the VMT from these vehicles is encompassed by the traffic model used in the Community Inventory.

In 2010, City owned vehicles consumed 197,170 gallons of gasoline and 42,772 gallons of diesel fuel. Emissions were calculated by multiplying fuel use by emission factors for gasoline and diesel in ClearPath.

City owned vehicles used 191,456 gallons of gasoline and 50,766 gallons of diesel in 2015. This represents a 2.89 percent decrease in gasoline and an 18.68 percent increase in diesel used from the baseline. This increase in diesel fuel used resulted in the sector emitting 47 MT CO_2e more than in 2010.

Streetlights and Traffic Signals

In 2010 and 2015 inventories, emissions associated with the energy used to power streetlights and traffic signals made up about 12 percent of the Municipal Operations GHG emissions.

Streetlights and traffic signals in the City of Ventura used a combined 5,191,161 kWh in 2010. This equipment used a combined 5,273,543 kWh in 2015 (1.6 percent increase from 2010). Despite this increase in kWh consumption, the emissions from this sector decreased from the 2010 baseline to the 2015 inventory by 203 $MTCO_2e$. Because the emissions for kWh are calculated based on emission factors that change annually based on the sources of grid electricity, the fact that the grid electricity became less carbon intensive between 2000 and 2015 offset the small increase in kWh consumption.

APPENDIX C: GHG FORECASTING METHODOLOGY

To calculate the BAU GHG trajectory for City of Ventura, emissions were forecasted through 2030 by applying growth rate scenarios to the output values of the 2010 baseline inventory. Growth rate scenarios represent the projected change in activity data or carbon intensity factors compounded at five-year intervals. Growth rate scenarios for both activity data and carbon intensity factors were calculated using the compound annual growth rate calculator tool in ClearPath. This tool uses the following equation:

CAGR (Compound Annual Growth Rate) = [(ending value/starting value)^(1/x years)]-1

Starting and ending values for each growth rate scenario were taken from authoritative[44] sources that provide projections for various data through 2030. Two different sets of growth rate scenarios were applied to the 2010 inventory outputs to create the BAU and ABAU forecasts. The BAU growth rate scenarios are intended to represent projected growth with no action taken to reduce emissions. The ABAU growth rate scenarios are intended to represent emissions reductions from state and federal policies. The corresponding growth rate scenarios for each forecast are listed in Tables 1 and 2.

[44] *Sources including ICLEI, SEEC, US Community Protocol, Environmental Protection Agency, CARB, CEC, U.S. Census, etc.*

Table 1. Community BAU and ABAU Forecast Starting Values

Sector	Output	2010 Starting Value	2010 CO_2e	Growth Rate	Carbon Intensity Factor
Residential Energy	Natural Gas - Energy Equivalent (MMBtu)	1,597,173.30	84,929.37	SCAG RHNA	n/a
	Electricity Energy Equivalent (MMBtu)	747,351.09	63,031.14	SCAG RHNA	0
	LPG - Energy Equivalent (MMBtu)	20,578.19	1,308.27	SCAG RHNA	n/a
	Wood - Energy Equivalent (MMBtu)	6,206.88	61.83	SCAG RHNA	n/a
Commercial Energy	Electricity Energy Equivalent (MMBtu)	1,148,602.22	96,872.43	City of Ventura employment (SCAG RTP/SCS)	0
	Natural Gas - Energy Equivalent (MMBtu)	784,605.50	41,721.24	City of Ventura employment (SCAG RTP/SCS)	n/a
Industrial Energy	Electricity Energy Equivalent (MMBtu)	116,727.28	9,844.71	City of Ventura employment (SCAG RTP/SCS)	0
	Natural Gas - Energy Equivalent (MMBtu)	39,702.10	2,107.18	City of Ventura employment (SCAG RTP/SCS)	n/a
Transportation & Mobile Sources	Gasoline - On Road VMT	614,389,769.00	256,855.32	Ascent 2012-2040 VMT Model	0
	Diesel - On Road VMT	18,696,827.51	18,917.66	Ascent 2012-2040 VMT Model	0
	CNG – Transit VMT	684,417.66	1,618.15		
	Energy Equivalent (MMBtu)	19,481.33	1,454.09	none	n/a
	Diesel - Transit VMT	188,327.37	323.47	none	n/a
	Gasoline - Transit VMT	179,102.33	214.19	none	n/a
Solid Waste	Waste Generated (wet tons)	112,910.00	26,488.42	SCAG Service Population (Population + Employment)	n/a

Wastewater	Process N_2O Population Served	106,433.00	19.74	SCAG Service Population (Population + Employment)	n/a
	Annual Gas Production (SCF/yr)	65,745,000.00	6.94	SCAG Service Population (Population + Employment)	n/a
Process & Fugitive Emissions	Other Process and Fugitive Gas (MT)	25.36	35,348.12	City of Ventura Population (SCAG RTP/SCS)	n/a

Table 2. Government Operations BAU and ABAU Forecast Starting Values

Sector	Output	2010 Starting Value	2010 CO_2e	Growth Rate	Carbon Intensity Factor
Buildings & Facilities	Natural Gas - Energy Equivalent (MMBtu)	27,858.10	1,480.83	None	0
	Electricity Energy Equivalent (MMBtu)	18,896.43	1,593.72	None	n/a
Streetlights & Traffic Signals	Electricity Energy Equivalent (MMBtu)	17,717.27	1,444.09	None	0
Vehicle Fleet	Gasoline - On Road VMT	1 (placeholder)	1,731.15	None	0
	Diesel - On Road VMT	1 (placeholder)	436.70	None	0
Water & Wastewater	Electricity Energy Equivalent (MMBtu)	62,450.43	5,267.07	SCAG Service Population (Population + Employment)	n/a
	Process N2O Population Served	106,433.00	23.10	SCAG Service Population (Population + Employment)	n/a
	Digester Annual Gas Production (SCF/yr)	65,745,000.00	7.10	SCAG Service Population (Population + Employment)	n/a

The data sources and adjustments for each growth rate scenario are listed below. Compound growth rate scenarios are broken into 5-year increments.

- City of Ventura Population - Population projections were taken directly from the SCAG RTP/SCS Plan.[45]

	2012	2020	2035	
Population	106,700	112,500	122,000	
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.007	0.007	0.005	0.005

- City of Ventura Employment - Employment projections were taken directly from the SCAG RTP/SCS plan.[46]

	2012	2020	2035	
Employment	60,700	62,700	65,200	
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.004	0.004	0.003	0.003

- SCAG Regional Housing Needs Assessment (RHNA) – Projects that 5300 new households will be needed by 2030 to match growth in population.[47]

	2010	2030		
Households	40,265	45,565		
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.006	0.006	0.006	0.006

[45] *SCAG RTP/SCS Plan: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf*

[46] *SCAG RTP/SCS Plan: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf*

[47] *SCAG RHNA Allocations: https://scag.ca.gov/sites/main/files/file-attachments/rhna-draft-allocations-090320-updated.pdf?1602188695*

- RHNA adjusted for residential electricity efficiency – Reduces projected increase in residential households by 53 percent to account for increased efficiency in new residential construction.
    - Assumption: New buildings will be 53 percent more efficient using electricity than current buildings.[48]

	2010	2030		
Households (Growth 53% reduced)	40,265	42,756		
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.003	0.003	0.003	0.003

- RHNA adjusted for residential natural gas efficiency – Reduces projected increase in residential households by 7 percent to account for increased efficiency in new residential construction.
    - Assumption: New buildings will be 7 percent more efficient using natural gas than current buildings.[49]

	2010	2030		
Households (Growth 7% reduced)	40,265	45,194		
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.006	0.006	0.006	0.006

[48] *CEC Building Energy Efficiency Standards for Residential and Nonresidential Buildings: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf*

[49] *CEC Building Energy Efficiency Standards for Residential and Nonresidential Buildings: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf*

- Employment adjusted for commercial electricity efficiency- Reduces projected increase in employment by 30 percent to account for increased efficiency in new construction.
    - Assumption: New commercial buildings will be 30 percent more efficient using electricity than current buildings.[50]

	2012	2020	2035	
Employment (Growth 30% reduced)	60,700	62,100	63,850	
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.003	0.003	0.002	0.002

- SCAG Service Population – Population and employment from SCAG RTP/SCS added together.[51]

	2012	2020	2035	
Population	167,400	175,200	187,200	
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.006	0.006	0.004	0.004

- SCE Renewable Energy Portfolio 2030 – RPS goals taken directly from SCE RPS procurement plan.[52]

	2011	2015	2020	2025	2030
Non-Renewable Energy %	79.4	75.8	67	53.3	40
Time Range	2010-2014	2015-2019	2020-2024	2025-2029	
Compound Growth Rate	-0.009	-0.024	-0.045	-0.056	

- Ascent 2012-2040 VMT Projections – VMT projections taken from Ascent 2012-2040 on-road VMT model used in 2010 baseline inventory. The Ascent VMT model is based on 2018 VCTC traffic model (Table 7 in Appendix B: Inventory Methodology).

[50] *CEC Building Energy Efficiency Standards for Residential and Nonresidential Buildings: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf*

[51] *SCAG RTP/SCS Plan: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf*

[52] *http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/0949B2C15307BF1D88258427008310C2/$FILE/R1807003-SCE%202019%20Draft%20RPS%20Written%20Plan-Public-Vol.%201.pdf*

	2010	2040		
VMT	662,475,249	727,749,561		
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0.003	0.003	0.003	0.003

- On Road CO_2 intensity CARB EMFAC – Emissions factors taken from CARB 2017 EMFAC web database. Factors for vehicle types included in inventory were multiplied by their respective VMT projection, added together and then divided by total VMT to determine average carbon intensity per mile driven.[53]

	2010	2015	2020	2025	2030
Average Gallons/Mile	19.08	17.51	15.48	13.23	11.55
Time Range	2010-2014	2015-2019	2020-2024	2025-2029	
Compound Growth Rate	-0.017	-0.024	-0.031	-0.027	

- SB 1383 short-lived climate pollutants goal – 2030 goal calculated by taking 60 percent of 2013 inventory output for process and fugitive emissions sector. Compound growth rates determined between 2015 inventory output and 2030 goal.[54]

	2015	2030		
MT CO_2e	49,108.78	29,513.75		
Time Range	2010-2014	2015-2019	2020-2024	2025-2029
Compound Growth Rate	0	-0.033	-0.033	-0.033

[53] *CARB 2017 Emissions Factors Database: https://arb.ca.gov/emfac/2017/*

[54] *SB 1383 Chapter 395 Bill Text: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1383*

2030 Municipal Operations Greenhouse Gas Emissions Forecast

Municipal Operations GHG emissions, a subset of community emissions, are examined in further detail in this section. Emissions from the 2010 Municipal Operations GHG Inventory were also forecasted to 2030 under a BAU and ABAU scenario. These scenarios are based on the same growth factors and legislative requirements that were applied in the Community forecast. In the BAU scenario, emissions are projected to increase 4.57 percent. In the ABAU scenario, emissions are projected to decrease 33.45 percent (Figures 1 and 2).

Figure 1. Municipal Operations BAU Forecast

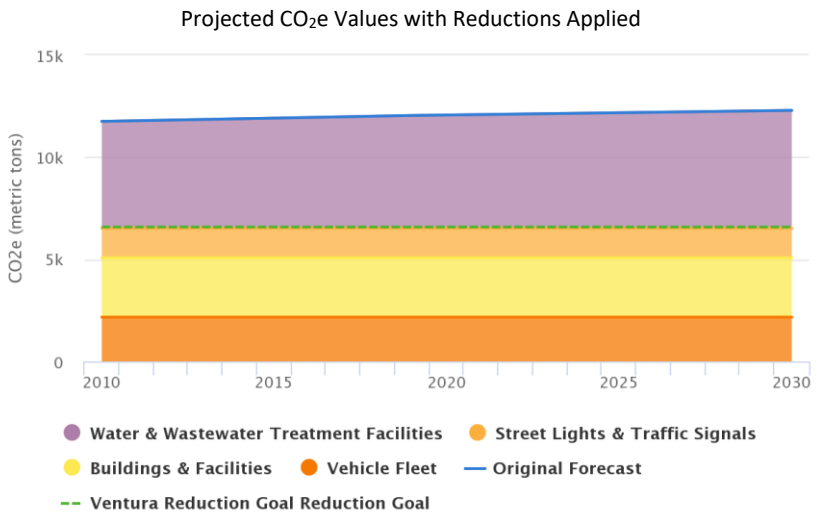
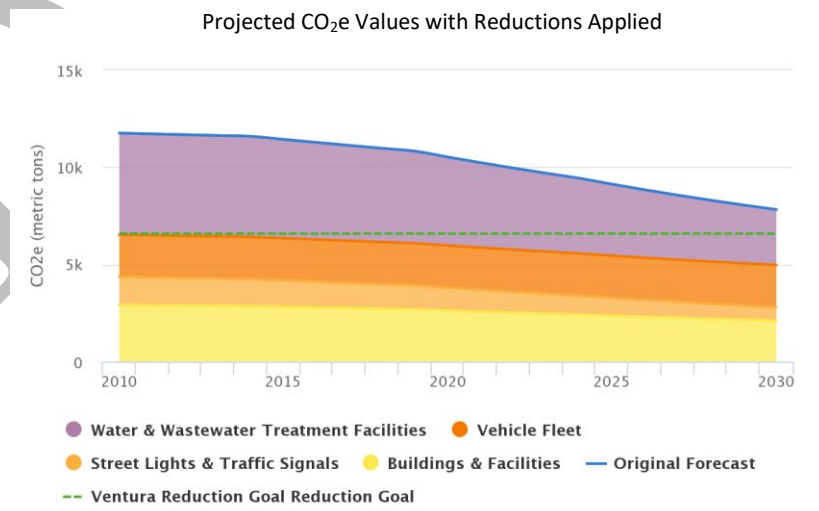


Figure 2. Municipal Operations ABAU Forecast



The most critical factor affecting the Municipal Operations ABAU forecast is the SB 350 RPS requirement. This policy has such a significant impact because emissions from electricity use make up most of the Municipal Operations emissions for each sector except vehicle fleet, and SB 350 reduces the carbon intensity of the energy that is purchased from SCE. Additionally, grid electricity purchased from SCE is forecasted to become 60 percent carbon free by 2030, which exceeds the 50 percent requirement set by SB 350.[55] This projection of SCE's outpacing SB 350 is included in the ABAU forecast. According to Table 3, vehicle fleet is the only sector projected to increase in emissions.

Table 3: Municipal Operations ABAU Forecast Output

Emissions Sector	2010 $MTCO_2e$	Change 2010-2025	2025 $MTCO_2e$	Change 2025-2030	2030 $MTCO_2e$
Water & Wastewater Treatment Facilities	5231	-1555	3676	-826	2850
Buildings & Facilities	2910	-553	2357	-247	2110
Vehicle Fleet	2168	0	2168	0	2168
Streetlights & Traffic Signals	1444	-519	925	-232	693
Total	11753	-2627	9126	-1305	7821

[55] *Southern California Edison Company's (U 338-e) 2019 Draft Renewables Portfolio Standard Procurement Plan: http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/0949B2C15307BF1D88258427008310C2/$FILE/R1807003-SCE%202019%20Draft%20RPS%20Written%20Plan-Public-Vol.%201.pdf*

Renewable Electricity grid Mix 2010-2030

A majority of emissions reductions in both ABAU forecasts result from purchasing electricity with lower carbon intensity than previous years. The lower carbon intensity is due to SCE increasing its renewable procurement standard and customers opting in to CPA. It is critical to consider the reduced carbon intensity of electricity as time passes when calculating emissions reductions, since reducing electricity usage will reduce GHG emissions less in the future. As shown in Tables 4 and 5, prior to 2018 the City and community purchased electricity exclusively from SCE. For these years, the total renewable electricity percentage is the same as SCE's RPS for each year. In 2018, all electricity customers were automatically opted in to purchasing CPA 100% Green Power, with opt out options of 50 percent renewable (CPA Clean Power), 36 percent renewable (CPA Lean Power) or simply switching back to SCE. Most customers remained opted in to the 100 percent renewable option resulting in a drastic decrease in electricity emissions instantly. CPA enrollment data was collected for 2018 through 2020 and projected for 2021 through 2030. No changes in enrollment were projected besides 2 percent of non-enrolled commercial customers enrolling in 100 percent CPA each year as a part of Strategy C2: Increased Energy-focused Outreach to Commercial Sector.

Table 4. City of Ventura Residential Renewable Electricity Grid Mix 2010-2030

Year	CPA (100%)	CPA Clean (50%)	CPA Lean (36%)	SCE	SCE RPS	Total Residential Renewable Electricity Mix
2010	0.0%	0.0%	0.0%	100.0%	20.0%	20.00%
2011	0.0%	0.0%	0.0%	100.0%	20.6%	20.60%
2012	0.0%	0.0%	0.0%	100.0%	19.8%	19.80%
2013	0.0%	0.0%	0.0%	100.0%	21.5%	21.50%
2014	0.0%	0.0%	0.0%	100.0%	23.4%	23.40%
2015	0.0%	0.0%	0.0%	100.0%	24.2%	24.20%
2016	0.0%	0.0%	0.0%	100.0%	28.0%	28.00%
2017	0.0%	0.0%	0.0%	100.0%	31.6%	31.60%
2018	80.9%	1.0%	5.3%	12.8%	36.5%	87.98%
2019	85.3%	1.1%	3.8%	9.8%	37.8%	90.92%
2020	83.2%	1.1%	4.5%	11.2%	39.1%	89.74%
2021	83.2%	1.1%	4.5%	11.2%	40.3%	89.88%
2022	83.2%	1.1%	4.5%	11.2%	41.6%	90.02%
2023	83.2%	1.1%	4.5%	11.2%	42.8%	90.15%
2024	83.2%	1.1%	4.5%	11.2%	48.3%	90.77%
2025	83.2%	1.1%	4.5%	11.2%	48.3%	90.77%
2026	83.2%	1.1%	4.5%	11.2%	49.3%	90.88%
2027	83.2%	1.1%	4.5%	11.2%	52.0%	91.18%
2028	83.2%	1.1%	4.5%	11.2%	54.7%	91.48%
2029	83.2%	1.1%	4.5%	11.2%	57.3%	91.77%

2030	83.2%	1.1%	4.5%	11.2%	60.0%	92.07%

Table 5. City of Ventura Non-Residential Renewable Electricity Grid Mix 2010-2030

Year	CPA (100%)	CPA Clean (50%)	CPA Lean (36%)	SCE	SCE RPS	Total Residential Renewable Electricity Mix
2010	0.0%	0.0%	0.0%	100.0%	20.0%	20.00%
2011	0.0%	0.0%	0.0%	100.0%	20.6%	20.60%
2012	0.0%	0.0%	0.0%	100.0%	19.8%	19.80%
2013	0.0%	0.0%	0.0%	100.0%	21.5%	21.50%
2014	0.0%	0.0%	0.0%	100.0%	23.4%	23.40%
2015	0.0%	0.0%	0.0%	100.0%	24.2%	24.20%
2016	0.0%	0.0%	0.0%	100.0%	28.0%	28.00%
2017	0.0%	0.0%	0.0%	100.0%	31.6%	31.60%
2018	73.8%	1.5%	3.9%	20.7%	36.5%	83.57%
2019	86.4%	1.5%	4.1%	8.1%	37.8%	91.64%
2020	80.7%	1.9%	5.8%	11.6%	39.1%	88.26%
2021	80.9%	1.9%	5.8%	11.4%	40.3%	88.54%
2022	81.1%	1.9%	5.8%	11.1%	41.6%	88.82%
2023	81.4%	1.9%	5.8%	10.9%	42.8%	89.08%
2024	81.6%	1.9%	5.8%	10.7%	48.3%	89.79%
2025	81.8%	1.9%	5.8%	10.5%	48.3%	89.91%
2026	82.0%	1.9%	5.8%	10.3%	49.3%	90.12%
2027	82.2%	1.9%	5.8%	10.1%	52.0%	90.49%
2028	82.4%	1.9%	5.8%	9.9%	54.7%	90.86%
2029	82.6%	1.9%	5.8%	9.7%	57.3%	91.20%
2030	82.8%	1.9%	5.8%	9.5%	60.0%	91.54%

APPENDIX D: PLANNING SCENARIO METHODOLOGY

Emissions reductions for Community and Municipal Operations planning strategies were calculated individually using a combination of the ClearPath planning module and in-house excel tools. Data sources, assumptions and calculations for each strategy are detailed in this section.

Data Sources

The background data for all planning strategies can be found below (Table 1). In the EAP Strategies Calculations section of this appendix these values will be shown in the source data box at the top for each strategy.

Table 1. Planning Strategies Data Sources

Data	Value (2019)	Source
Population	110,752	Census
Occupied Households	41,029	Census
Households using natural gas	32,172	Census
Low-income Households	6,633	CPA
Total Residential electricity usage	179,524,893 kWh	SCE
Total Residential natural gas usage	13,805,477 therms	SoCalGas
Total Commercial electricity usage	265,210,501 kWh	SCE
Total Commercial natural gas usage	6,785,064 therms	SoCalGas
# of business locations	20,909	Census
# of new businesses each year	12	City Manager's Office
Households enrolled in 3C-REN weatherization/efficiency upgrade program	270	3C-REN
kWh savings per 3C-REN weatherization/efficiency upgrade program	427 kWh	3C-REN
Therm savings per 3C-REN weatherization/efficiency upgrade program	11 therms	3C-REN
Ratio of businesses not enrolled in CPA	0.2075	CPA
New residential homes per year	148	City Manager's Office
Installed commercial PV capacity from reach code	20 kW/facility	Assumption from Solarize Programs
Increased solar capacity (kW) per home	4 kW	Assumption from Solarize Programs

Homes enrolled in Solarize Ventura program	30	Assumption from Solarize Programs
Increased solar capacity (kW per year) as a result of Solarize Ventura program	50 kW	Assumption from Solarize Programs
Total fleetwide gasoline VMT (miles)	642,403,385	Ascent Modeling
Avg fleetwide gasoline fuel economy (MPG)	22.30	Ascent Modeling
Fuel economy of vehicles replaced by EVs	25.22 MPG	EMFAC
Fuel economy of EVs (MPGGe)	115	ClearPath default value
% of gas vehicles replaced by electric in 2030	14.23	Ventura County EV Blueprint

EAP Strategies Impact Summary

The table below summarizes the energy and GHG impacts of each of the EAP strategies. Calculations for these values follow in subsequent sections.

Table 2: Strategy Impacts

Community Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	Total Emissions Avoided 2025 ($MTCO_2e$)	Total Emissions Avoided 2030 ($MTCO_2e$)
C1: Increase Energy-focused Outreach to Ventura Residents	16,200,176	647,505	1,000	3,611
C2: Increase Energy-focused Outreach to Commercial Sector	14,636,577	187,045	1,111	3,517
C3: Financial Initiatives for Energy Improvements	71,861,079	2,840,332	4,627	16,617
C4: Promote Green Building	32,239	6,051	12	42
C5: Evaluate Energy-related City Building Codes, Ordinances, and Permitting Practices	n/a	n/a	0	0
C6: Investigate and Implement Localized Reach Codes (TOTAL)	-6,399,472	2,923,952	4,252	15,579
C6a (All Electric Reach Code)	*-28,547,773*	*2,923,952*	*4058*	*14,991*
C6b (Solar Reach Code)	*22,148,300*	*0*	*194*	*588*
C7: Encourage Energy Education in Real Estate Transactions	n/a	n/a	0	0
C8: Promote Energy Efficiency for Renters	n/a	n/a	0	0
C9: Promote Solar and Energy Storage for Residential and Commercial Properties	15,684,349	0	94	290
C10: Partner with Local Organizations to Support Energy Projects and Programs	n/a	n/a	0	0
C11: EV Advocacy	-15,684,349	n/a	57,963	166,158
C12: Support EV Infrastructure Development	n/a	n/a	0	0

Municipal Strategy	2030 Cumulative Electricity Savings (kWh)	2030 Cumulative Natural Gas Savings (Therms)	Total Emissions Avoided 2025	Total Emissions Avoided 2030

M1: City Support for Implementing EAP	n/a	n/a	0	0
M2: Support Clean Power Alliance's Local Programs	n/a	n/a	0	0
M3: Energy Upgrades at City Facilities	3,096,424	8,602	82	252
M4: Install Renewable Energy and Energy Storage Projects at City Facilities	7,108,734	0	60	170
M5: Establish Funding for Energy Projects	n/a	n/a	0	0
M6: Transition Municipal Fleet to Zero Emission Vehicles	-891,984	n/a	294	977
M7: Upgrade Streetlights	2,107,268	0	33	58

Municipal Operations Planning Scenario

A Municipal Operations planning scenario was conducted in the same way that the Community planning scenario was conducted (as presented in Section 3.5 of the EAP). The results of the Municipal Operations planning scenario are shown in this section.

Municipal Operations emissions are projected to decrease by 38.35 percent from 2010 (11,753 $MTCO_2e$) to 2030 (7,246 $MTCO_2e$) if all of seven EAP Municipal Operations strategies are implemented (and all of the modeled state and federal policies in the ABAU model are successful in reducing emissions). The largest percentage decrease is projected in the streetlights and traffic signals sector (53.95%), followed by water and wastewater treatment (45.52%), buildings and facilities (35.77%) and vehicle fleet (14.11%). (Figure 1 and Table 3).

Figure 1. City of Ventura Government Operations Planning Scenario 2010-2030

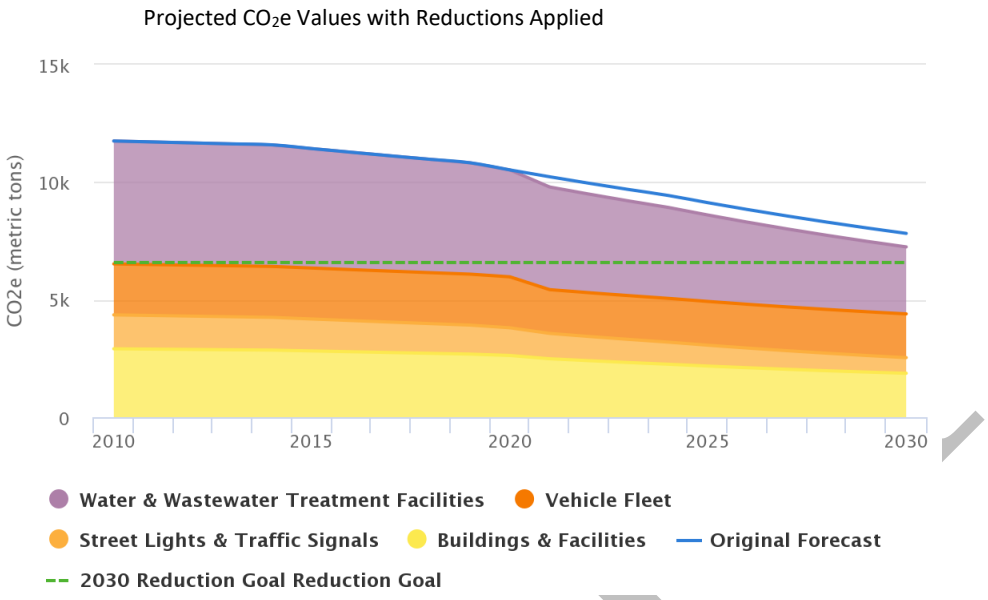


Table 3. City of Ventura Government Operations Planning Scenario 2010-2030

Emissions Sector	2010 $MTCO_2e$	2030 $MTCO_2e$	% Change
Water & Wastewater Treatment	5,231	2,850	-45.52%
Buildings & Facilities	2,910	1,869	-35.77%
Vehicle Fleet	2,168	1,862	-14.11%
Streetlights & Traffic Signals	1,444	665	-53.95%
Total	11,753	7,246	-38.35

EAP Strategies Calculations

This section is broken down by the calculators that were used for each EAP strategy. Usually there are multiple calculators added together to project emissions reductions for each strategy. The source data box for each calculator at the top references the base data taken from Table 1. In the table associated with each strategy, yearly GHG and energy savings are added cumulatively over the ten-year implementation plan for the EAP. The entries in Table 1 that are described as "additional annual savings" refer to the amount of annual energy savings that are added to the running cumulative total each year, which feed into the GHG calculations. The ClearPath entries section of each strategy table shows which calculated data was entered into ClearPath for each calculator.

Strategy C1: Increase Energy-focused Outreach to Ventura Residents

Key assumptions and calculation methodology	Reductions for strategy C1 were calculated in two parts: a. Energy reductions from homes that take action based on City outreach efforts were calculated by assuming 1% of homes take action each year resulting in 10% electricity and natural gas savings per home. b. 3C-REN tracks reductions from its efficiency upgrade projects annually and uses the data to forecast the upcoming year. Data recorded in 2020 was used to project that 270 homes will enroll in 3C-REN weatherization and efficiency upgrade programs in 2021 averaging 427 kWh and 11 therms savings per home. Emissions were calculated directly from these estimates for 2021 and the same annual kWh and therm savings were used for 2022 through 2030.
Additional annual electricity savings (kWh)	294,816
Additional annual natural gas savings (therms)	11,775
Upfront cost to the city ($)	1,000 for printing (Annual) 1,000 to host workshop series (Annual) 5,500 for administration. (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 3,028,432 saved
2025 and 2030 Cumulative GHG Savings ($MTCO_2e$)	2025: 1,000 2030: 3,611
Data Sources	U.S. Census SCE SoCalGas 3C-REN

C1a. Residential Energy Efficiency Education

Source Data	Value	Unit
# of occupied homes	41,029	Homes
# of homes using natural gas	32,172	Homes
Total Residential kWh usage	179,524,893	kWh/year
Total Residential therm usage	13,805,477	Therms/year
Assumptions:		
1% homes take action each year		
10% kWh savings in homes taking action		
5% therm savings in homes taking action		
Calculations:	***Value***	***Unit***
Residential kWh usage / # of occupied homes	4,375.56	Avg kWh consumption per home
Avg kWh consumption per home *.10	437.56	kWh savings per home per year
Res therm usage / # of homes using natural gas	429.11	Therm consumption per home
Avg therm consumption per home *.05	21.46	Therm savings per home per year
# of occupied homes *.01	410.29	# of participating households
ClearPath Entry	***Value***	***Unit***
Number of additional participating households each year	410.29	Homes
kWh savings per home per year	437.56	kWh/home/year
Therm savings per home per year	21.46	Therms/home/year

C1b. 3C-REN Weatherization Programs

Source Data	Value	Unit
# homes enrolled in program each year	270	Homes
kWh savings per year	427	kWh/year
Therm savings per year	11	Therms/year
Assumptions:		
None		
Calculations:	***Value***	***Unit***
None		
ClearPath Entry	***Value***	***Unit***
# homes enrolled in program each year	270	Homes
kWh savings per year	427	kWh/year
Therm savings per year	11	Therms/year

Strategy C2: Increase Energy-Focused Outreach to the Commercial Sector

Key assumptions and calculation methodology	Reductions for strategy C2 were calculated in two parts: a. Energy reductions from commercial locations that take action based on City outreach efforts were calculated by assuming 1% of businesses take action resulting in 10% electricity and 5% for natural gas savings per home. b. Emissions reductions from promoting CPA were calculated by assuming 2% of non-enrolled businesses will opt in to the 100% Clean Power option each year.
Additional Annual electricity savings (kWh)	265,210
Additional Annual natural gas savings (therms)	3,404
Upfront cost to the city ($)	1,000 for printing (Annual) 1,000 to host workshop series (Annual) 5,500 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 2,315,013 saved
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 1,111 2030: 3,517
Data sources	CPA U.S. Census SCE SoCalGas

C2a. Commercial Energy Efficiency Education

Source Data	Value	Unit
# of commercial locations	20,909	Comm locations
Commercial electricity usage	265,210,501	kWh/year
Commercial natural gas usage	6,785,064	Therms/year
Assumptions:		
1% businesses take action each year		
10% kWh savings in businesses taking action		
5% therm savings in businesses taking action		
Calculations:	***Value***	***Unit***
Commercial kWh usage / # of businesses	12,684.03	Avg elec consumption per business
Avg kWh consumption per business *.10	1,268.40	kWh savings per business per year
Commercial therm usage / # of businesses	324.50	Avg therm consumption per business

Avg therm consumption per business *.05	16.22	Therm savings per business per year
# of commercial locations *.01	209.09	# participating businesses
ClearPath Entry	***Value***	***Unit***
Number of additional participating businesses each year	209.09	Businesses
kWh savings per business per year	1,268.40	kWh/business/year
Therm savings per business per year	16.22	Therms/business/year

C2b. CPA Promotion

Source Data	Value	Unit
Businesses not enrolled in CPA	0.2075	Ratio of businesses
Commercial electricity usage	265,210,501	kWh/year
# of businesses	20,909	Businesses
Assumptions:		
2% of non-enrolled businesses will enroll each year		
100% renewable energy		
No kWh/therm savings		
Calculations:	***Value***	***Unit***
Commercial kWh usage / # of businesses	12,684.03	Avg kWh consumption per business
Ratio of Businesses not enrolled in CPA * # of businesses	4,338.61	# businesses not enrolled in CPA
# businesses not enrolled in CPA *.02	86.77	# businesses enrolling/year
ClearPath Entry	***Value***	***Unit***
Starting total electricity use	265,210,501	kWh/year
Starting emissions from commercial electricity use	62,438	CO_2e/year
# businesses enrolling annually	86.77	Businesses/year
Avg business electricity consumption	12,684.03	kWh/year

Strategy C3: Financial Initiatives for Energy Improvements

Key assumptions and calculation methodology	Reductions for strategy C3 were calculated in three parts: a. It was assumed that 1% of low-income homes will participate in the Qualified Low-income Home Rehabilitation Loan program, achieving 20% electricity and 10% natural gas savings per home each year. b. It was assumed that 2% of homes will carry out energy upgrades using the revolving loan fund or on-bill financing, achieving 20% electricity and 10% natural gas savings per home each year. c. It was assumed that 2% of businesses will carry out energy upgrades using the revolving loan fund or on-bill financing, achieving 10% electricity and natural gas savings per location each year.
Additional Annual electricity savings (kWh)	1,306,563
Additional Annual natural gas savings (therms)	51,627
Upfront cost to the city ($)	30,000 for consultant (One-Time) 16,090 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 13,542,207 saved
2025 and 2030 cumulative GHG Savings (MTCO2e)	2025: 4,627 2030: 16,617
Data sources	U.S. Census SCE SoCalGas

C3a. Qualified Low-income Home Rehabilitation Loan program

Source Data	Value	Unit
# of occupied homes	41,029	Homes
# of homes using gas	32,172	Homes
Total Residential electricity usage	179,524,893	kWh/year
Total Residential natural gas usage	13,805,477	Therms/year
# of low-income households	6,633	Homes
Assumptions:		
1% homes take action each year		
20% kWh savings in homes taking action		
10% therm savings in homes taking action		

Calculations:	*Value*	*Unit*
Residential kWh usage / # of occupied homes	4,375.56	Avg elec consumption per home
Avg kWh consumption per home *.20	875.11	kWh savings per home per year
Residential therm usage / # of homes using gas	429.11	Avg therm consumption per home
Avg therm consumption per home *.10	42.91	Therm savings per home per year
# of low-income homes *.01	66.33	# of participating households
ClearPath Entry	*Value*	*Unit*
Number of additional participating households each year	66.33	Homes
kWh savings per home per year	875.11	kWh/home/year
Therm savings per home per year	42.91	Therms/home/year

C3b. Revolving Loan Fund or On-Bill Financing (Residential)

Source Data	Value	Unit
# of occupied homes	41,029	Homes
# of homes using natural gas	32,172	Homes
Total residential electricity usage	179,524,893	kWh/year
Total residential natural gas usage	13,805,477	Therms/year
Assumptions:		
2% homes take action each year		
20% savings in homes taking action		
10% therm savings in homes taking action		
Calculations:	*Value*	*Unit*
Residential kWh usage / # of occupied homes	4,375.56	Avg kWh consumption per home
Avg kWh consumption per home *.20	875.11	kWh savings per home per year
Residential therm usage / # of homes using natural gas	429.11	Avg therm consumption per home
Avg therm consumption per home *.10	42.91	Therm savings per home per year
# of occupied homes *.02	820.58	# of participating households
ClearPath Entry	*Value*	*Unit*
Number of additional participating households each year	820.58	Homes
kWh savings per home per year	875.11	kWh/home/year
Therm savings per home per year	42.91	Therms/home/year

C3c. Revolving Loan Fund or On-Bill Financing (Commercial)

Source Data	Value	Unit
# of commercial locations	20,909	Comm locations
Total Commercial electricity usage	265,210,501	kWh/year
Total Commercial natural gas usage	6,785,064	Therms/year
Assumptions:		
2% businesses take action each year		
10% kWh savings in businesses taking action		
10% therm savings in businesses taking action		
Calculations:	***Value***	***Unit***
Commercial kWh usage / # of businesses	12,684.03	Avg kWh consumption per business
Avg kWh consumption per business *.10	1,268.40	kWh savings per business per year
Comm therm usage / # of businesses	324.50	Avg therm consumption per business
Avg therm consumption per business *.10	32.45	Therm savings per business per year
# of commercial locations * .02	418.18	# of participating businesses
ClearPath Entry	***Value***	***Unit***
Number of additional participating businesses each year	418.18	Businesses
kWh savings per business per year	1,268.40	kWh/business/year
Therm savings per business per year	32.45	Therms/business/year

Strategy C4: Promote Green Building

Key assumptions and calculation methodology	Reductions for strategy C4 were calculated in two parts: a. It was assumed that 2% of newly constructed homes and significant residential additional and alternations will take action based on Green Building Promotion, achieving 10% reduction in expected electricity and natural gas demand. New buildings are assumed to be 53% more efficient than current building stock using electricity and 7% more efficient using natural gas. b. It was assumed that 1% of newly constructed commercial locations will take action based on Green Building Promotion, achieving 5% reduction in expected electricity and natural gas demand. New buildings are assumed to be 30% more efficient than current building stock using electricity.
Additional Annual electricity savings (kWh)	662
Additional Annual natural gas savings (therms)	120
Upfront cost to the city ($)	1,000 for printing (Annual) 2,200 for initial guideline development (One-Time) 11,005 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: -111,121
2025 and 2030 cumulative GHG Savings (MTCO2e)	2025: 12 2030: 42
Data sources	U.S. Census SCE SoCalGas City Manager's Office CEC

C4a. Green Building Promotion (Residential)

Source Data	Value	Unit
# of occupied homes	41,029	Homes
# of homes using natural gas	32,172	Homes
Total Residential electricity usage	179,524,893	kWh/year
Total Residential natural gas usage	13,805,477	Therms/year
# of new homes per year	148	Homes/year
Assumptions:		
2% newly constructed homes take action		
10% kWh savings in homes taking action		
10% therm savings in homes taking action		
New buildings will be 53% more efficient using electricity than current building stock		
New buildings will be 7% more efficient using natural gas than current building stock		
Calculations:	***Value***	***Unit***
Res kWh usage / # of occupied homes	4,375.56	Avg kWh consumption per home
Avg kWh consumption per home *.47	2,056.51	Avg kWh consumption of NEW home
Avg kWh consumption of NEW home *.10	205.65	kWh savings per NEW home per year
Residential therm usage / # of homes using natural gas	429.11	Avg therm consumption per home
Avg therm consumption per home *.93	399.08	Avg therm consumption of NEW home
Avg therm per NEW home *.10	39.91	Therm savings per NEW home per year
# of NEW homes per year * .02	2.96	# of participating households
ClearPath Entry	***Value***	***Unit***
Number of additional participating households each year	2.96	Homes
kWh savings per home per year	205.65	kWh/home/year
Therm savings per home per year	39.91	Therms/home/year

C4b. Green Building Promotion (Commercial)

Source Data	Value	Unit
# of business locations	20,909	Business locations
Total commercial electricity usage	265,210,501	kWh/year
Total commercial natural gas usage	6,785,064	Therms/year
# of new business locations per year	12	Business locations/year
Assumptions:		
1% newly constructed business locations take action		
5% kWh savings in business locations taking action		
5% therm savings in business locations taking action		
New commercial buildings will be 30% more efficient using electricity than current building stock		
Calculations:	***Value***	***Unit***
Commercial kWh usage / # of business locations	12,684.04	Avg kWh consumption per business
Avg kWh consumption per business *.70	8,878.82	Avg kWh consumption of NEW business
Avg kWh consumption of NEW business *.05	443.94	kWh savings per NEW business per year
Comm therm usage / # of business locations	324.50	Avg therm consumption per business
Avg therm consumption per business *.05	16.23	Therm savings per NEW business per year
# of NEW business locations per year * .01	0.12	# of participating households
ClearPath Entry	***Value***	***Unit***
Number of additional participating businesses each year	0.12	Business locations
kWh savings per business per year	443.94	kWh/business/year
Therm savings per business per year	16.23	Therms/business/year

Strategy C6: Investigate and Implement Localized Reach Codes

Key assumptions and calculation methodology	Reductions for strategy C6 were calculated in two parts: a. Natural gas demand for new homes was calculated assuming new buildings will be 7% more efficient than current building stock. 90% of new buildings are assumed to follow the reach code. Increase in electricity demand in lieu of natural gas appliances is estimated by calculating 1/3 the equivalent in MMBtu. b. PV capacity installation calculated by multiplying expected new business locations per year by assumed capacity of 20kW per building.
Additional Annual electricity savings (kWh)	a. -519,612 b. n/a Total: -519,612
Additional Annual natural gas savings (therms)	a. 53,157 b. n/a Total: 53,157
Upfront cost to the city ($)	$30,000 for consultant (One-Time) 12,704 for administration (One-Time)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 2,038,285
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 4,252 2030: 15,579
Data sources	U.S. Census SCE SoCalGas CEC

C6a. All-Electric Homes Reach Code

Data needs	Data	Unit
New residential homes per year	148	Homes/year
Total residential natural gas Usage	13805477	Therms
Households using natural gas	32,172	Homes
Assumptions:		
New buildings will be 7% more efficient than current building stock using natural gas		
90% of new homes will NOT be connected to natural gas lines		
New all electric homes will require additional electricity equivalent to natural 1/3 gas reduced in MMBtu		
Calculations:	***Value***	***Unit***
Residential therm total / Households using natural gas	429.11	Avg therm usage per current home
Avg therm usage per current home * 0.93	399.08	Expected therm usage of new title 24 home
New residential homes per year *.90	133.2	# of new homes NOT connected to natural gas lines per year
Expected gas usage of new title 24 home *5/.17065/3	3,897.61	Electric equivalent to gas savings (kWh)
ClearPath entries	***Unit***	***Data***
Primary driver	133.2	New homes NOT connected to natural gas lines/year
Unit energy savings (for increased electricity)	-3,897.61	Electric equivalent to gas savings (kWh)
Unit energy savings (for reduced natural gas connections)	399.08	Therms saved/home NOT connected to gas lines

C6b. Commercial Solar Reach Code

Data needs	Data	Unit
Commercial new construction per year	12	Buildings
Assumptions:		
Installed solar capacity per building	20	kW per building
Calculations:	***Value***	***Unit***
Commercial new construction * installed solar capacity per building	240	kW installed capacity per year
ClearPath entries	***Unit***	***Data***
Commercial new construction per year	12	Buildings
Increased solar capacity	240	kW installed capacity per year

Strategy C9: Promote Solar and Energy Storage for Residential and Commercial Properties

Key assumptions and calculation methodology	Emissions reductions for strategy C9 were calculated based on the set goal of installing 4 kW of PV capacity at 30 homes and 50 total kW on commercial properties / year.
Additional Annual electricity savings (kWh)	285,260
Additional Annual natural gas savings (therms)	n/a
Upfront cost to the city ($)	1,500 for printing (Annual) 1,000 to host workshop series (Annual) 5,500 for initial material/program development (One-Time) 5,500 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 2,267,152 saved
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 94 2030: 290
Data sources	n/a

C9a. Promote Solar PV (Residential)

Data needs	Data	Unit
N/A		
Assumptions:		
Homes participating in program	30	Homes/year
PV kW Capacity Installed per home	4	kW/home
Calculations:	***Value***	***Unit***
Homes participating in program * PV kW capacity installed per home	120	kW installed capacity per year
ClearPath entries	***Unit***	***Data***
Increased solar capacity	120	kW installed capacity per year

C9b. Promote Solar PV (Commercial)

Data needs	Data	Unit
N/A		
Assumptions:		
PV kW Capacity Installed	50	kW
Calculations:	***Value***	***Unit***
50		
ClearPath entries	Unit	Data
Increased solar capacity	50	kW Installed capacity per year

Strategy C11: Electric Vehicle Advocacy

Key assumptions and calculation methodology	All data for strategy C11 was collected and directly from the city inventories and EV Blueprint. Calculations were carried out in ClearPath based off inputs listed below.
Additional Annual electricity savings (kWh)	-2,192,174 (consumption increase for charging)
Additional Annual natural gas savings (therms)	n/a
Additional Annual Gasoline savings (gallons)	362,543
Average Annual Community and City costs ($)	328,826 for charging (Annual) - Community 9,000 for administration (Annual) - City
2030 net financial savings: gasoline savings minus city costs for admin and charging ($)	2030: 70,438,059 saved
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 57,963 2030: 166,158
Data sources	U.S. Census SCE EMFAC Ascent

C11. Electric Vehicle Advocacy

ClearPath entry	Value	Unit
Total fleetwide gasoline VMT	642,403,385	VMT
Avg fleetwide gasoline fuel economy	22.3	MPG
Fuel economy of vehicles displaced by electric	25.22	MPG
Fuel economy of EVs	115	MPGGe
% of gasoline vehicles displaced by electric at end of program	14.23	%
Number of years to reach EV %	10	Years
% of EVs that are plug-in hybrid	0	%
% of plug-in hybrid miles that are on electricity	0	%

Strategy M3: Energy Upgrades at City Facilities

Key assumptions and calculation methodology	Reductions for Strategy M3 are based on 3 audits conducted on city facilities in 2020 by SoCalREN. These facilities are the city hall, maintenance yard and aquatic center, which have suggested Energy Efficiency Measures that total $191,400. It is assumed that the reduction measures identified in these audits will be carried out in 2021, resulting in the savings projected by SoCal REN. Additionally, it is assumed that 17 other municipal facilities will conduct audits and implement efficiency measures resulting in 10% electricity reduction and 5% natural gas reduction by 2030, based on the savings projected for the four initial facilities in the SoCal REN audits. It is assumed that the energy upgrades at each of the 17 remaining facilities will cost $19,000.
Additional Annual electricity savings (kWh)	16,724 projected for 17 other facilities
Additional Annual natural gas savings (therms)	476 projected for 17 other facilities
Upfront cost to the city ($)	25,000 for consultant to update management system (One-Time) 191,400 Project Cost for SoCal REN Audits (One-Time) 323,000 for 17 other facilities identified (One-Time) 16,090 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: -226,890
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 60 2030: 170
Data sources	SCE SoCalGas

M3. Energy Upgrades at City Facilities

Facilities Audited	Electricity Reductions Projected	Natural Gas Reductions Projected
City Hall	104,290 kWh	n/a
Maintenance Yard	28,000 kWh	n/a
Aquatic Center	21,400 kWh	864 therms

Source Data	Value	Unit
Avg kWh consumption per building	167,243	kWh
Avg therm consumption per building	9516	Therms
Assumptions:		
10% kWh savings in buildings taking action		
5% term savings in buildings taking action		
17 Municipal facilities participate		
Calculations:	***Value***	***Unit***
Avg kWh consumption per building *.10	16,724.32	kWh savings per building
Avg therm consumption per building *.05	475.81	Therm savings per building
ClearPath Entry	***Value***	***Unit***
Number of additional participating buildings each year	17	Buildings
kWh savings per participating building per year	1,672.43	kWh/building/year
Therm savings per participating building per year	47.58	Therms/building/year

Strategy M4: Install Renewable Energy and Energy Storage Projects at City Facilities	
Key assumptions and calculation methodology	Installed Solar Capacity (kW) for strategy M4 was calculated by taking 25% of total electricity use of municipal buildings and dividing by a local generation potential estimate. We assume that the solar projects will be installed gradually (77.1 kW/year used in the calculations). Although true costs for PV installation will be determined by assessments and may be available with no upfront cost "power purchase agreements", installed price/watt assumed to be $3.00 for the cost benefit analysis.
Additional Annual electricity savings (kWh)	1,294,860
kW of installed solar to meet kWh goal	771 kW
Cost/watt to install solar	$3.00/watt
Annual Cost to install solar (over 10 years)	$231,300
Additional Annual natural gas savings (therms)	n/a
Average Annual electricity bill savings ($)	77,691 saved
Upfront cost to the city ($)	16,090 for administration (Annual)
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: -1,407,590
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 60 2030: 170
Data Sources	SCE

M4. Municipal PV Installation

Source Data	Value	Unit
Generation Potential	1678	kWh/year/kW
Municipal Facilities electricity usage per year	5,179,439	kWh/year
Assumptions:		
25% of municipal (facility) energy usage will be supplied by PV by 2030		
Calculations:	***Value***	***Unit***
Municipal electricity usage per year/4	1,294,860	kWh/year
25% kWh/year/generation potential	771	kW required
ClearPath Entry	***Value***	***Unit***
Installed solar capacity	77.1	kW/year installed
Generation potential	1678	kWh/kW installed capacity (ClearPath default value referenced to area)

Strategy M6: Transition Municipal Fleet to Zero Emission Vehicles

Key assumptions and calculation methodology	Total VMT for city vehicles was estimated by multiplying average gasoline and diesel fuel efficiency data from city inventories and multiplying by the gallons of each fuel used. Based on city goals, 1/8 of this VMT is estimated to be traveled by EVs by 2030. Gas costs were assumed to be $3.50/gallon
Additional Annual electricity savings (kWh)	81,809 kWh
Additional Annual natural gas savings (therms)	n/a
Additional Annual gasoline savings (gallons)	2685
Annual gasoline cost savings ($)	9,396 saved
Upfront cost to the city ($)	2,646 for charging (Annual) 8,045 for administration (Annual)
2030 net financial savings: gasoline savings minus city costs for admin and charging ($)	2030: 275,616
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 294 2030: 977
Data sources	EMFAC Ascent

M6. Fuel Switching

Source Data	Value	Unit
Avg fuel economy of gasoline vehicle	25.22	MPG
Avg fuel economy of DSL vehicle	11.58	MPG
Total gasoline consumption	191,456.80	Gallons
Total DSL consumption	50,766.00	Gallons
Assumptions:		
None		
Calculations:	***Value***	***Unit***
Avg fuel economy gasoline * Total Gasoline consumption	4,828,540.50	Gasoline VMT of City fleet
Avg fuel economy DSL * Total DSL consumption	587,870.28	DSL VMT of City fleet
Gasoline VMT + DSL VMT	5,416,410.77	Total VMT of City fleet
Total VMT *.125	677,051.35	VMT of vehicles to be switched
ClearPath Entry	***Value***	***Unit***
Total Fleetwide VMT of fuel type to be switched (initial)	4,828,540.50	VMT
Avg Fuel Economy (initial)	25.22	MPG
VMT of vehicles to be switched	677051.35	VMT
Avg Fuel Economy of vehicles to be switched	25.22	MPG
New vehicle fuel economy	115.00	MPGGe (ClearPath default)

Strategy M7: Upgrade Streetlights

Key assumptions and calculation methodology	Electricity reductions are calculated based on the city goal of installing 1000 LED light fixtures. Calculations were carried out in ClearPath based off inputs listed below.
Additional Annual electricity savings (kWh)	303,985
Additional Annual natural gas savings (therms)	n/a
Annual GHG savings ($MTCO_2e$)	1
Upfront cost to the city ($)	16,090 annually for administration (Annual) 100,000 for LED bulbs
2030 net financial savings (dollars saved on energy minus city costs ($))	2030: 55,190 saved
2025 and 2030 cumulative GHG Savings ($MTCO_2e$)	2025: 33 2030: 58
Data Sources	n/a

M7. LED Streetlight Installation

Data needs	Data	Unit
Number of streetlights retrofitted	1,000	Light fixtures
Number of streetlights retrofitted per year	100	Light fixtures/year
Daily hours of operation	11	Hours (ClearPath default)
Assumptions:		
None		
Calculations:	***Value***	***Unit***
None		
ClearPath Entry	***Value***	***Unit***
Number of streetlights retrofitted	1000	Light fixtures
Number of streetlights retrofitted per year	100	Light fixtures/year
Daily hours of operation	11	Hours (ClearPath default)

APPENDIX E: COMMUNITY OUTREACH

Community Outreach Reports

Round 1 Community Engagement Report

THE CITY OF VENTURA

ROUND 1 COMMUNITY ENGAGEMENT

SURVEY RESULTS AND ANALYSIS

The City of Ventura is developing an Energy Action Plan (EAP). This plan is designed to help the Ventura Community lower harmful greenhouse gas emissions. Through strategic policies and programs, the EAP aims to increase energy efficiency and local renewable energy generation. This plan benefits multiple sectors, promotes reliable energy to your home or business, and builds resilience so the community can bounce back in the event of a natural disaster.

To ensure that this plan empowers and supports every Ventura community member, the EAP team has been working with residents to fully gauge how to best support and empower a resilient and sustainable Ventura for years to come. You've voiced your needs and shared your valuable experience, here are the results.

KEY TAKEAWAYS

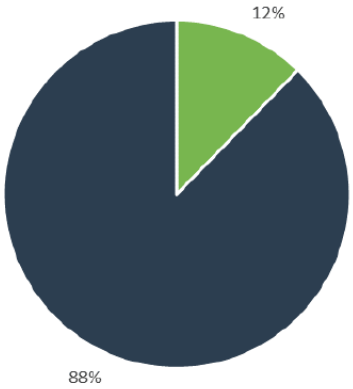
316 residents shared their insight and values by responding to the survey.

88% of the respondents feel it's important for the City to support a clean energy economy, public health, and resilience.

96% of the 45 student respondents feel that it is important for their school to run on renewable energy.

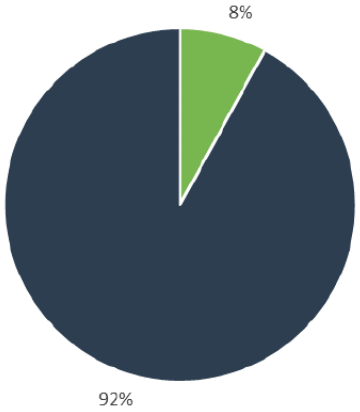
RESIDENTIAL SURVEY HIGHLIGHTS

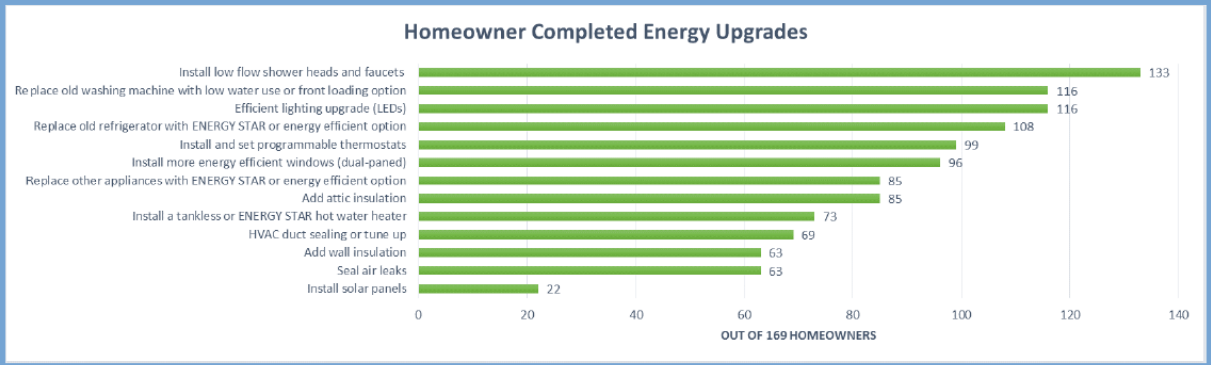
HOMEOWNERS AND RENTERS PROVIDED VALUABLE INSIGHT TO HELP INFORM STRATEGIES THAT WILL INCREASE ENERGY EFFICIENCY AND LOCAL RENEWABLE ENERGY GENERATION.



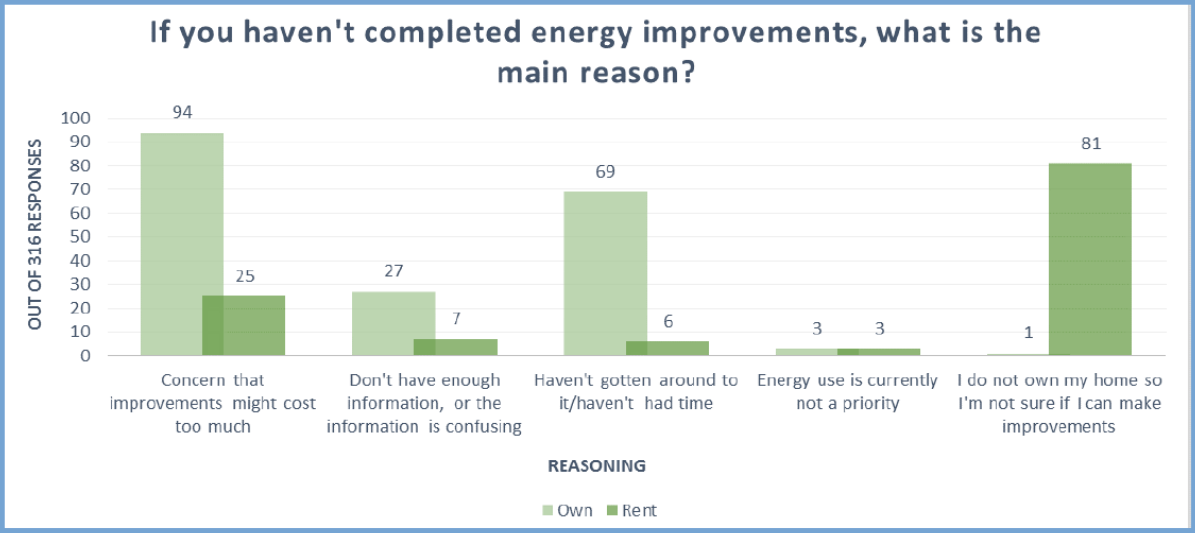
88% OF RESPONDENTS FEEL THE CITY SHOULD BE PROACTIVE IN THINKING AND PLANNING FOR CLIMATE CHANGE IMPACTS.

92% OF RESPONDENTS WOULD LIKE TO SEE THE CITY TAKE STEPS TO STRENGTHEN ENERGY RELIABILITY AND SAFETY IN THE EVENT OF AN OUTAGE OR NATURAL DISASTER.





We asked homeowners what energy upgrades they've already completed. This helps the EAP team identify hard-to-complete upgrades and strategize how to help homeowners make these improvements in a cost-effective way.

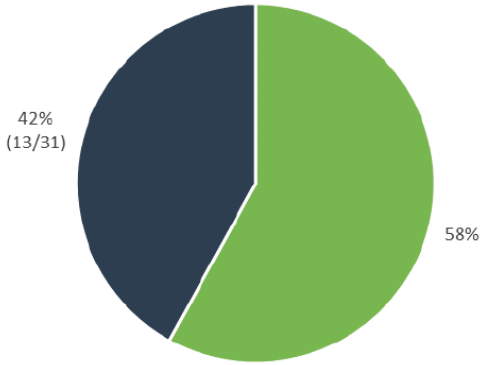


We asked homeowners and renters the reasons they have not been able to make some energy efficiency upgrades. This helps identify gaps in energy efficiency support. The EAP will address these gaps with strategies that help homeowners and renters.

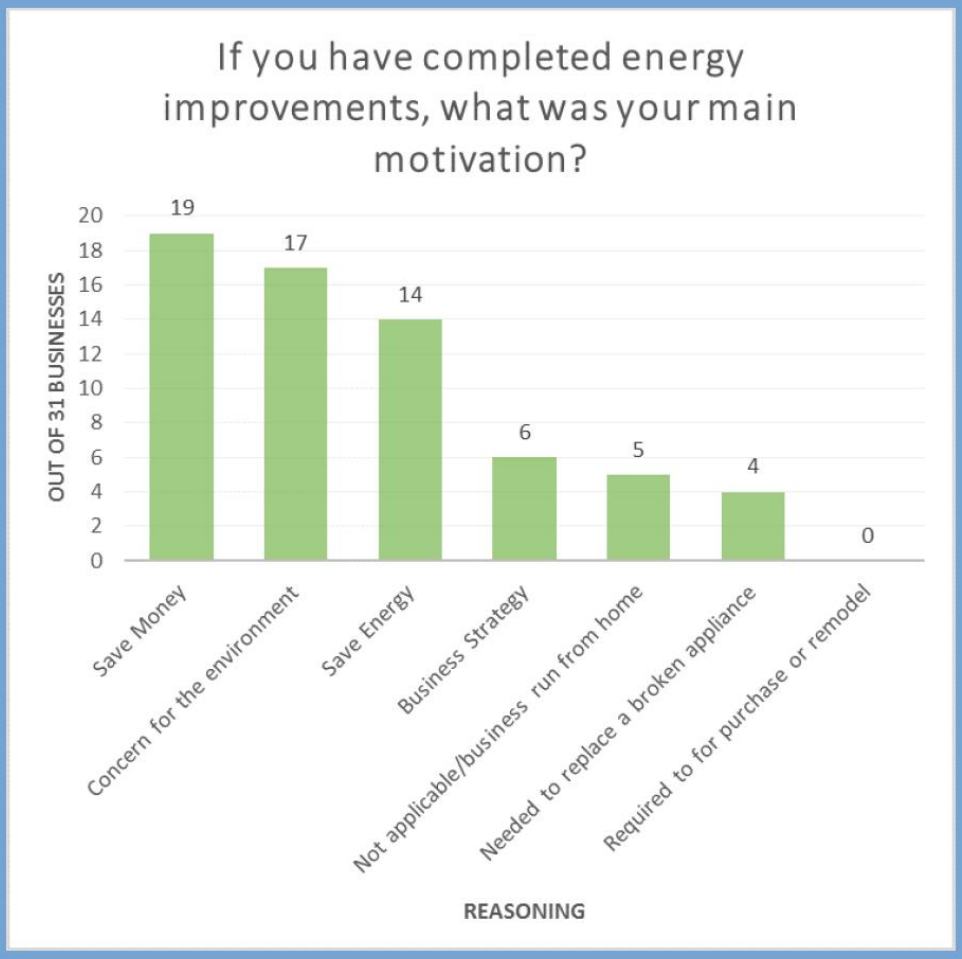
COMMERCIAL SURVEY HIGHLIGHTS

BUSINESS OWNERS AND MANAGERS SHARED THEIR EXPERIENCES TO INFORM STRATEGIES THAT WILL HELP THEM UTILIZE ENERGY EFFICIENCY UPGRADES TO SAVE MONEY AND REDUCE THEIR IMPACT.

42% OF BUSINESS OWNERS STATED THAT THEY HAVE NOT MADE ENERGY UPGRADES BECAUSE THEY RENT THEIR FACILITY AND ARE NOT SURE IF THEY CAN MAKE IMPROVEMENTS.



This highlights the necessity for commercial owner-tenant strategies that support energy efficiency improvements.



We asked business owners and managers the reasons they have completed energy efficiency upgrades. Identifying the main motivation helps the EAP team cater strategies to the needs of business owners and managers.

PHOTOGRAPHER: CHRISTOPHER MUEGNIOT

"THIS IS A FANTASTIC PROACTIVE WAY TO START ADDRESSING WHAT WE CAN DO AS A COMMUNITY, ESPECIALLY AFTER THE THOMAS FIRE. HEARING THESE WILD FIRES GROWING IN INTENSITY DUE TO CLIMATE CHANGE IS A SCARY THING! WAY TO GO VENTURA IN STARTING THIS IMPORTANT CONVERSATION."
-VENTURA RESIDENT

CITY OF VENTURA ENVIRONMENTAL SUSTAINABILITY

Community Environmental Council

Ventura County REGIONAL ENERGY ALLIANCE

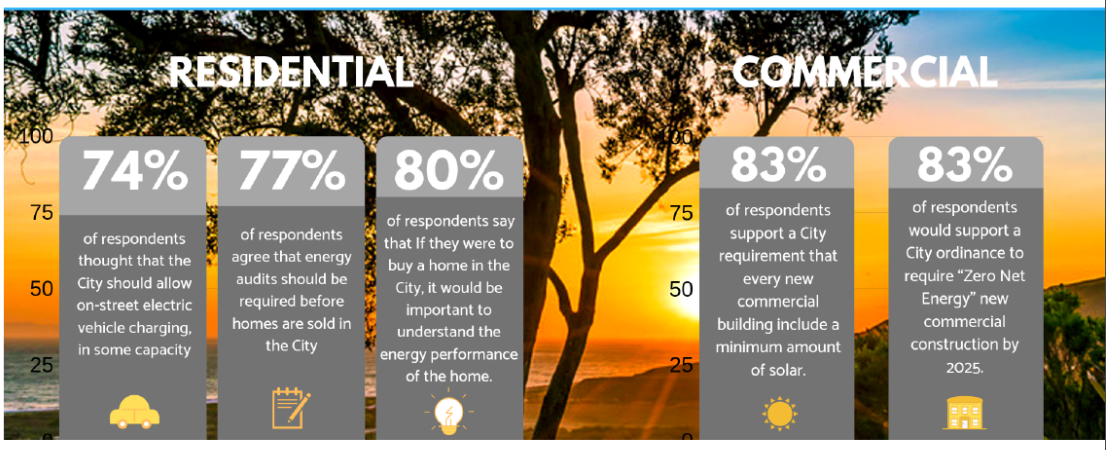
CITY OF VENTURA

ROUND 2 COMMUNITY ENGAGEMENT

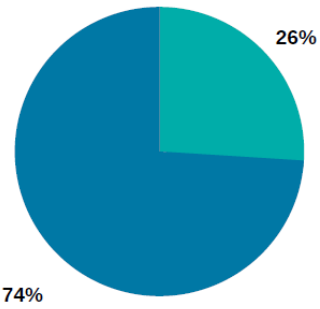
SURVEY RESULTS AND ANALYSIS

In Round 2 of our community engagement, we asked residents about which energy policies and incentives the City should consider for residential and commercial buildings. We also asked them to identify priorities for increasing electric vehicle infrastructure and electric public transportation. In total, 89 people participated in the outreach survey. The valuable feedback we received from the community will help us understand how to best support sustainable energy use and zero-emissions transportation choices in the City of Ventura.

HIGHLIGHTS FROM RESPONDENTS

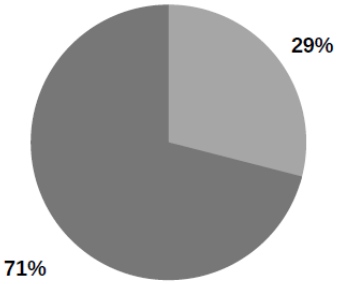


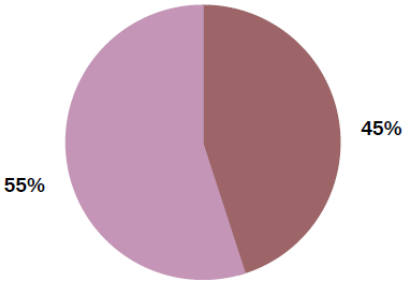
Ventura residents showed strong support for increasing the number of electric vehicle charging stations and access to electric public transportation in the city.



74% (66 people) think the City should allow on-street EV charging, in some capacity.

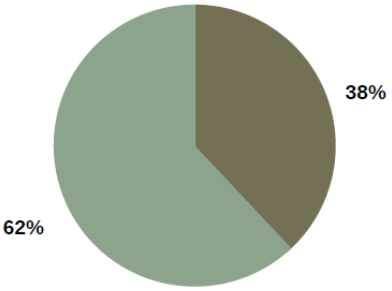
71% (63 people) feel it is important for the bus systems (Gold Coast Transit and VCTC) to transition to all-electric buses.





55% (49 people) feel there are currently not enough public electric vehicle charging stations in the City for them to consider driving an electric vehicle.

62% (55 people) feel the City should require the installation of electric vehicle charging stations at all new commercial developments.



We asked residents which energy efficiency policies the City should consider for residential properties.

77% (68 people) agree that energy audits should be required before homes are sold in the City; however, 56% (38 people) of those respondents *only* support the policy if the energy audits are free.

55% (49 people) think the City should require "cool roof" materials in residential re-roof projects.

72% (64 people) support the City requiring that all rental units upgrade interior lighting to LED when there are vacancies.

80% (71 people) say that, if they were to buy a home in the City, it would be important to understand the energy performance of the home. Residents were unsure; however, about what type of policy would effectively support an energy efficiency standard at the time of a home's sale. Only 42% (37 people) think homes that receive poor energy scores on audits should be required to complete energy upgrades before they are sold. Concerns around who bears the cost of upgrades and whether such policies would affect the affordability of housing in the City were cited as main concerns.

When asked about which energy policies the City should enact for commercial buildings, respondents told us this:

66%
59 people

felt the City should offer a loan program to help commercial properties upgrade their equipment to improve the efficiency of their operations.

83%
74 people

support a City requirement that every new commercial building include a minimum amount of solar.

83%
74 people

would support a City ordinance to require "Zero Net Energy" new commercial construction by 2025.

"We should go all out as much as possible to be an environmentally friendly city, and to model these sustainable practices for other cities."
- Ventura Resident

CITY OF VENTURA
ENVIRONMENTAL SUSTAINABILITY
www.cityofventura.ca.gov/es

Community Environmental Council

Ventura County REGIONAL ENERGY ALLIANCE

Contractor Lunch, December 17, 2019

Concepts for review from draft EAP, City of Ventura

Contractor feedback to draft EAP strategies is captured below as quotes or ratings for various ideas (Ratings for ideas are captured as "X" votes following numbers)

Residential Solar/Storage

The City will review and revise City building codes, design guidelines, and zoning ordinances to remove barriers to renewable energy and battery storage projects.

"Check out Antelope Valley's municipal bus electrification and battery storage project. Also, Lancaster is home to a large electric bus factory. School buses can be used to power schools during outages."
"Battery storage – Suggest standardizing permits and implementing online permits. Online permitting of battery storage could result in quantification of for GHG emission reductions.
"Zip Bar foam built into panels - plaster product that becomes structural component - does not pass City plan check (e.g. not allowed) for residential construction because it does not have an ICC number."

The City will develop or expand on existing solar programs, such as Solarize, to provide resources to assist in the installation of residential (multi-family and single-family) solar and storage projects. Resources provided can be in the form of education, planning, contacting installers, and/or financial incentives.

POOR
1
2
3
4-X
5- XXX
GREAT

"Solarize programs are great. Bringing more customers/case studies to the workshops would help facilitate adoption. Incentives from the City would be great and alleviate the pressure of installers to lower their costs."
"The City of Ventura should take the initiative to Solarize public housing buildings and to establish vehicle charging stations so residents can be encouraged to purchase EVs. Perhaps these charging stations could be covered with solar roofs"

Commercial Solar/Storage

The City will Identify and work to remove barriers to commercial on-site renewable energy generation and energy storage by reviewing and exploring revision opportunities in development codes, design guidelines, zoning ordinances, and general plan policy.

"More education and focus are needed on micro-grids. Resiliency!"
"The City should work with Amber Kinetics to establish codes for establishing flywheel storage installations"

The City will actively support local commercial pilot projects encompassing thermal energy storage, battery storage, customer side/dispatchable storage, backup power at critical facilities, and microgrid development.

POOR
1
2 X ("This grade is based on the fact that there doesn't appear to be any movement on micro-grid pilots")
3
4
5- XX
GREAT

"I can help you include flywheel energy storage in this plan."

The City will research the development of a Solar Cooperative Purchasing Program (e.g. Solarize for businesses) to reduce renewable energy development costs.

POOR
1
2
3
4
5- XXX
GREAT

"City should look for incentives or dollars to provide the Solarize program."
"The City of Ventura should Solarize all public housing and make a large purchase of solar equipment and vehicle charging stations to economize"

Electric Vehicles

The City will review internal permitting policies and permit prices for public and private EV charger installations and modify policies and prices to reflect best practices
"Great" "The City should establish partially solar-powered charging station using battery storage as a demonstration project"
The City will streamline permitting for residential and non-residential EV charging stations as required under California law.
"Yes, Amen." "Great" "EV permit fees – multiple permit fees add up and are expensive. Suggest Bear Valley Electrical Service has a Destination Make-Ready Rebate Pilot that provides installation rebates for up to 50 Level 2 chargers to commercial customers in addition to providing EV-TOU rate. Program combines EV permits fee with other electrical permit fees." https://www.bves.com/media/managed/approvedadviceletters3/355_E_BVES_Transportation_Electrification_Pilot_Programs_Memorandum_Acco_.pdf.
What else should the City do to encourage EV adoption?
"Promote electric bikes! Electric bikes help educate market about charging." "Establish battery or flywheel substations and establish mini/neighborhood utilities." "Some form of monetary incentive"

Other Green Building

The City will amend City Building Code to recommend cool roof materials compliant with CALGreen Code for new construction and significant re-roofing projects.

POOR
1
2
3
4
5- XXXX
GREAT

"Public housing could use cool roof technology as air conditioners are prohibited in public housing units"

The City will subsidize permit fees and provide front-of-line permitting for building projects pursuing LEED or other green building certifications.

POOR
1
2
3
4-XX
5-XX
GREAT

The City will research barriers to electrification of cooking, heating and cooling in new and existing homes, and update City permitting practices to streamline electrification.

"City-run senior housing residents require a way to cool their units in the summer months as they are prohibited from using standard window mounted AC units"
"Heat pumps – there is not an appetite for heat pumps; usually only homes without gas lines request heat pumps. Pumps can be expensive and loud if installed on the side of the house. Suggest installing heat pumps during whole house system upgrades and also incentivizing heat pumps. Suggest miniplates as an option."
"Lack of incentives – CPA is looking at DER pilot program with incentives as well as Local Strategic Plan incentives for electrification and reach codes."

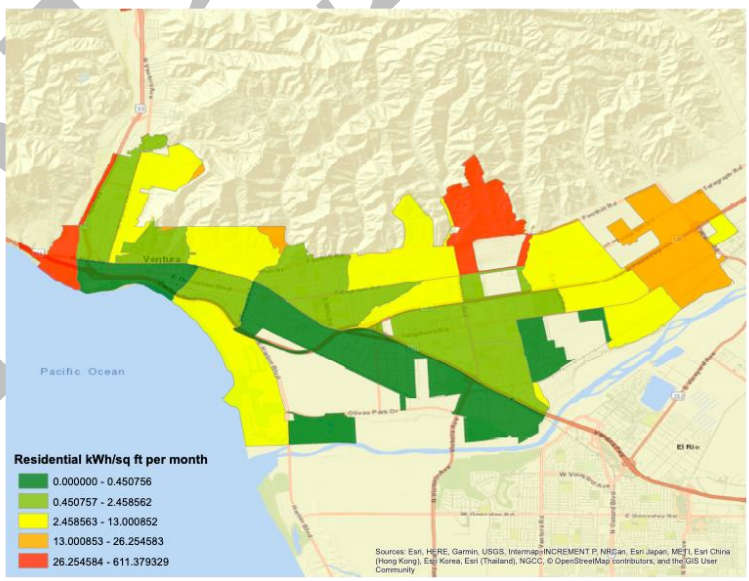
What else should the City do to increase Green Building OR energy efficiency OR electrification in existing buildings?
"Monetary incentive or reduction in permitting timelines"
"Oversized AC units – many homes do not need big systems. Suggest contractors help address problems with oversized systems by advising to install appropriately sized systems."
"Incentivize Architects and Realtors to educate."

APPENDIX F: ENERGY ATLAS DATA ANALYSIS AND MAPPING METHODOLOGY

UCLA first provided data to the City in March of 2018, but a number of updates and improvements in the data formatting methodology were implemented and are reflected in the dataset UCLA provided in July 2019, which included calendar years 2011 through 2016. Data was provided in spreadsheets and broken out into main categories of building use types: Residential, Industrial, Institutional, Commercial, Agriculture, Other,[56] and Uncategorized. The data was also broken down by the following use types: Single-family, Multifamily (Duplexes to large apartment complexes), Condominiums, Residential Other (Mobile home parks, manufactured homes, nursing homes, rural residential), Residential Uncategorized, Commercial (Office buildings, hotels, retail, restaurants, mixed-use commercial, etc.), Industrial (Manufacturing, warehouses, processing facilities, extraction sites, etc.), Institutional (Schools, public hospitals, government owned property, churches, tax-exempt properties, etc.), Agriculture (Farms, agricultural lands, orchards, etc.), Other, and Uncategorized.

Figures 1,2,3, and 4 show the Geographical Information System (GIS) analysis of Energy Atlas electricity data from 2016.

Figure 1. City of Ventura Residential Electricity Usage 2016 (kWh/sq. ft/month)

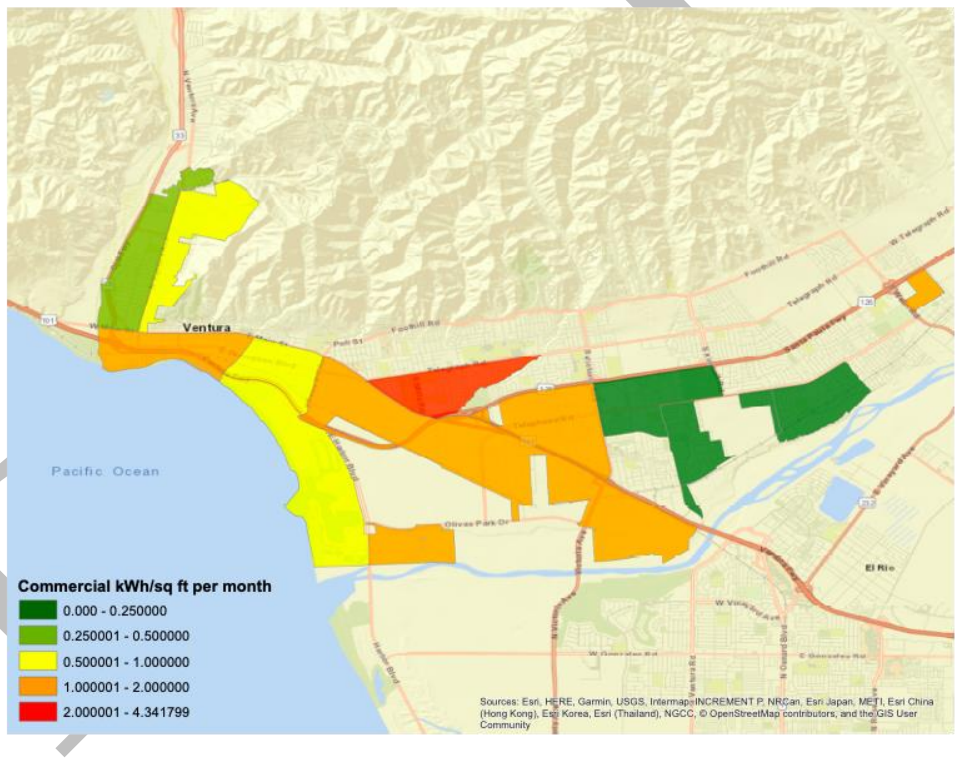


[56] *Spans diverse range of use types unable to fit within the pre-set categories, including miscellaneous bus terminals, airports, vacant land, reservoirs, truck terminals, rights-of-way, etc.*

As shown in Figure 1, residential energy use was highest in the west edge of the city along Highways 101 and 33 as they enter the city's boundaries and in the north-east most census blocks. The most efficient areas were generally along Highway 101 on the southern side of the city. Areas with higher density of housing development tended to be more efficient than areas of lower housing density.

Energy consumption data for commercial properties is also shown geographically in Figure 2. However, fewer census blocks were displayed in the Commercial sector, making analysis less complete than the Residential sectors. Some census blocks were not displayed because there must be a certain amount of accounts in a given block for UCLA to publish the data according to privacy restrictions.[57] Since there are fewer total Commercial accounts, there were more census blocks for which no data was able to be provided.

Figure 2. City of Ventura Commercial Electricity Usage 2016 (kWh/sq. ft/month)



From the blocks for which data was provided, efficiency was generally greatest in the west and east areas and lowest in the middle blocks. This trend is somewhat the opposite of what was observed for the residential sector. Future analysis could also look into the relationship between the age of the buildings within a census track and the associated energy efficiency of the buildings.

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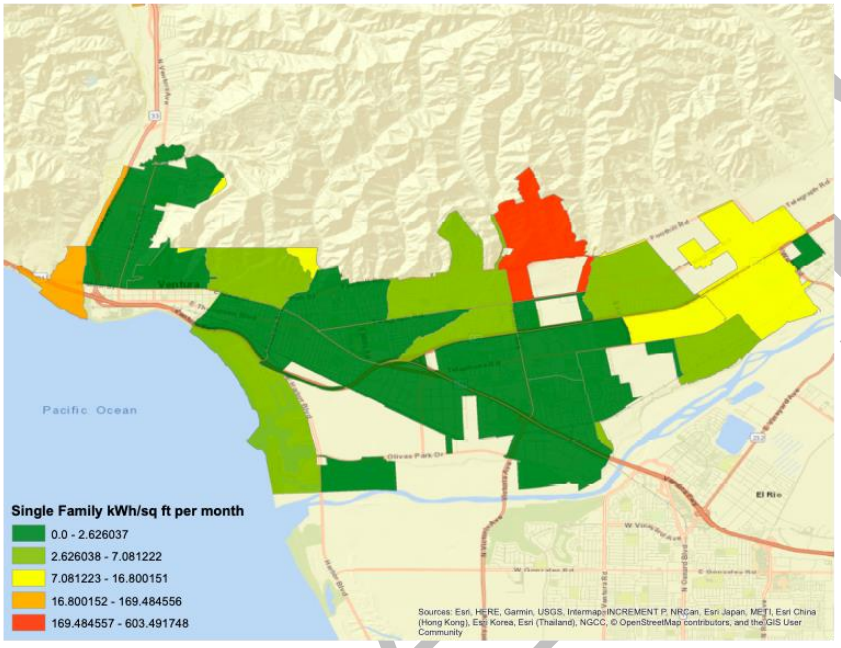
[50] *https://energyatlas.ucla.edu/*

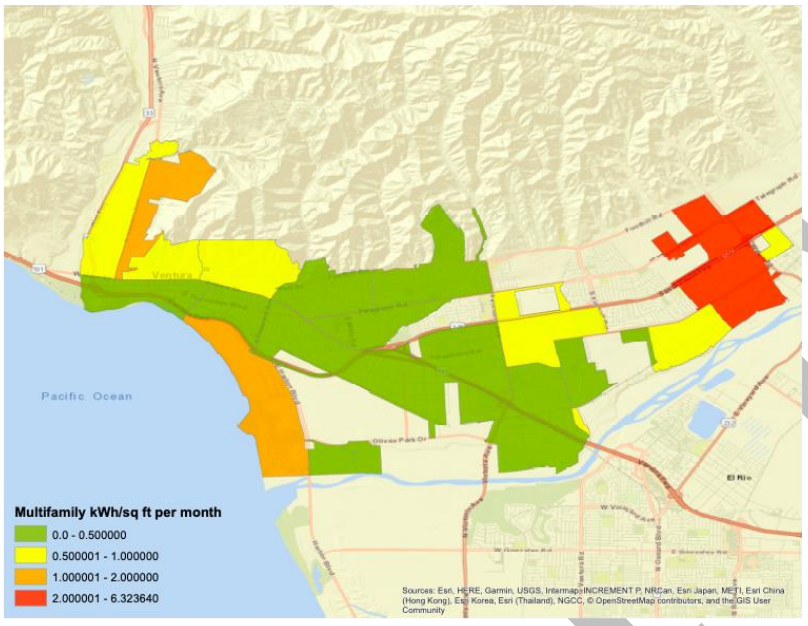
The residential data is further parsed in the following maps (Figures 3 and 4) to address the variation between various housing types and the associated energy usage.

Figure 3. City of Ventura Single-family Electricity Usage 2016 (kWh/sq. ft/month)



The Single-family sector had the highest general efficiency across all census blocks. This trend is most likely because single-family homes have less occupants per square foot than multifamily homes on average. If efficiency were measured by electricity usage per person instead then it would be expected that multifamily homes would be more efficient. Spatially, the distribution of highest and lowest efficiency blocks matches the total residential sector.

Figure 4. City of Ventura Multifamily Electricity Usage 2016 (kWh/sq. ft/month)



The Multifamily sector, much like the Commercial sector, has some missing census blocks due to data privacy restrictions in blocks where there are not enough accounts. Spatially the distribution of efficiency generally matches the other residential sectors, with the exception that the eastern most block was the least efficient.