Appendix E

Greenhouse Gas Emissions Forecast, Targets, and Reduction Measures Memo

Memo

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Date: December 11, 2025

To: Adam Gufarotti, Carlos Serna, Damaris Abraham, Bailey MacLean (City of Lake Elsinore)

From: Natalie Kataoka, Adam Qian, Andrew Beecher, Poonam Boparai

Subject: **Greenhouse Gas Emissions Forecast, Targets, and Reduction Measures Memorandum for the City of Lake Elsinore Climate Action and Adaptation Plan**

INTRODUCTION

The City of Lake Elsinore (City) is updating its Climate Action Plan, which was first adopted in 2011. The Climate Action and Adaptation Plan (CAAP) will provide a programmatic framework for the City to reduce its greenhouse gas (GHG) emissions in alignment with State legislation and include climate resilience and adaptation strategies. The CAAP includes a baseline GHG emissions inventory, a forecast of future GHG emissions to align with growth projections of the ongoing General Plan Update, an assessment of the GHG emissions reductions that will be needed to meet State-aligned GHG reduction targets, and a set of adaptation strategies designed to make the community more resilient to current and future climate hazards. This memorandum summarizes the results of a GHG emissions forecast that aligns with the growth projections of the concurrent General Plan Update, and GHG reduction targets consistent with Senate Bill 32 (SB 32) and Assembly Bill 1279 (AB 1279). AB 1279 was signed into law in 2022, which formally adopted a long-term statewide target for reducing GHG emissions to net-zero by 2045, including an 85% reduction in anthropogenic GHG emissions below 1990 levels before 2045 (State of California 2023a). This memorandum also summarizes the quantification results for the GHG reduction strategies included in the CAAP and demonstrates a pathway for the City to reach GHG reduction targets consistent with State legislation.

The scope of the analysis presented in this memorandum is intended to maintain consistency with the growth projections associated with the City's General Plan Update (GPU). As such, the analysis includes both the Lake Elsinore City Limits and Sphere of Influence (SOI), which are collectively referred to as "Lake Elsinore" throughout this memorandum unless otherwise specified.

1.1 ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of 7 parts:

- **Section 1: Introduction** presents the context for the analysis of GHG emissions forecasts, reduction targets, and reduction strategies.
- **Section 2: Background** provides an overview of the CAAP, the regulatory context for GHG reduction targets, and a summary of the 2022 GHG inventory.
- **Section 3: Greenhouse Gas Emissions Forecasts** summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios for years 2030 and 2045.

- Section 4: Greenhouse Gas Reduction Targets describes locally-specific GHG reduction targets that align with State legislation and the approach for the identification of targets.
- Section 5: GHG Strategies Summary introduces the GHG reduction strategies included in the CAAP and summarizes the GHG reduction potential for quantified strategies.
- Section 6: Analysis of Targets Attainment presents a comparison of the GHG reduction targets and the projected GHG emissions for the City with implementation of the GHG strategies.
- Section 7: References includes references and citations used in this memorandum.
- Attachment A details the methods and results for the GHG emissions forecasts.
- Attachment B summarizes data, methods, and assumptions used to estimate GHG emissions reductions for each quantified strategy.
- Attachment C details estimates of the reduction in vehicle miles traveled (VMT) that would be achieved with implementation of various strategies.

2 BACKGROUND

Climate action planning includes steps the City can take to reduce emissions to achieve specific GHG reduction targets. The City has laid out a roadmap for achieving these targets by identifying GHG reduction measures, including new policies, programs, education and outreach efforts, and other actions that, if implemented, will reduce emissions in the region. The CAAP includes GHG reduction targets that are aligned with key state legislation and are specific to local conditions and emissions.

Local governments can establish targets that are most appropriate and applicable for local conditions. The State's legislative framework around GHG goals provides guiding principles that can inform local targets. The California Air Resources Board's (CARB's) *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) recommends that local targets support the State's implementation of strategies to reach the legislative targets established by SB 32 and AB 1279, which aim to reduce statewide anthropogenic emissions to:

- 40 percent below 1990 levels by 2030 (SB 32), and
- 85 percent below 1990 levels by 2045 (AB 1279).

Achievement of these targets requires identification of a set of strategies to reduce emissions across all emissions sectors. Each strategy is supported by specific actions that can be implemented at the jurisdictional level through municipal actions, such as adoption of building codes that improve energy efficiency and regulations that reduce the amount of organic waste sent to landfill.

This memorandum analyzes local GHG reduction targets for the CAAP that are consistent with the State's goals for reducing anthropogenic emissions by 2045 and provides the future GHG emissions reduction potential of specific GHG reduction strategies included in the CAAP. To inform this analysis, the calculation of future GHG emissions is also included in this memorandum, as both a BAU and legislative-adjusted BAU forecast. Collectively, the analysis p projection of future GHG emissions for the years 2030 and 2045, including the local impacts of State and federal actions, and how GHG emissions in Lake Elsinore can be reduced to meet State-aligned targets through local action.

2.1 STATE POLICIES AND PLANS

In September 2016, Governor Jerry Brown signed SB 32, which mandates that California reduce statewide GHG emissions to 40 percent below 1990 levels by 2030. It builds upon previous legislation (AB 32), codifying ambitious targets and driving the state's transition towards a low-carbon economy. In November 2017, the California Air Resources Board (CARB) released *California's 2017 Climate Change Scoping Plan* (2017 Scoping Plan), which outlined the State's strategy for achieving the 2030 reduction target of SB 32 (CARB 2017).

In September 2022, Governor Gavin Newsom signed AB 1279, which requires the State of California to achieve net zero GHG emissions by 2045 and reduce direct anthropogenic GHG emissions 85 percent below 1990 levels by 2045.

In December 2022, CARB released the 2022 Scoping Plan. This plan outlines the State's comprehensive strategy to achieve its climate goals under AB 1279. Building upon the 2017 Scoping Plan, the 2022 Scoping Plan demonstrates how net-zero emissions can be achieved in 2045 or sooner, consistent with AB 1279. It includes a variety of measures across different sectors to accelerate GHG emission reductions, enhance carbon sequestration, and implement new carbon capture, utilization, and storage measures consistent with SB 905 (also signed into law in 2022) to achieve net-zero emissions (sometimes also referred to by CARB as "carbon neutrality") by 2045.

2.2 GREENHOUSE GAS EMISSIONS INVENTORY

The GHG emissions inventory establishes the existing conditions for the CAAP, serving to identify the contribution of different communitywide GHG emissions sources in Lake Elsinore, and set a baseline for forecasting future emissions, setting GHG reduction targets, and monitoring progress towards reaching the target over time. The GHG emissions inventory presented here is for calendar year 2022, which provides a baseline for forecasting future emissions using most recently available data. To align with the City's General Plan Update, the baseline for 2022 includes estimates of GHG emissions for the City Limits and SOI.

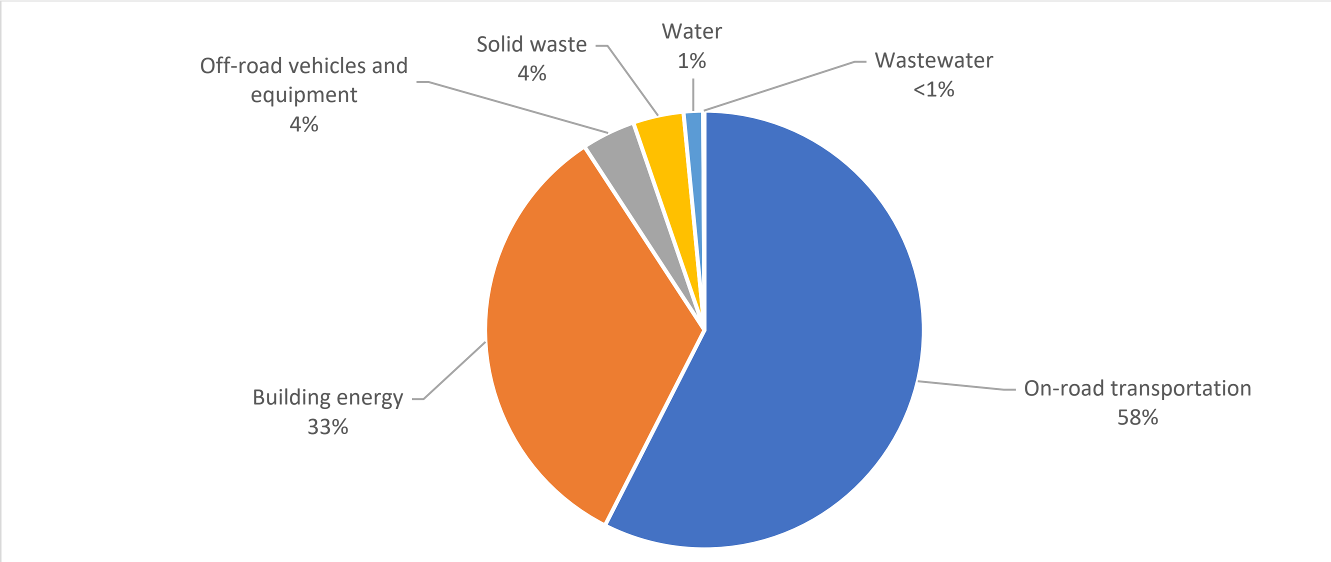
The results of the 2022 communitywide GHG emissions inventory demonstrate the contribution of different GHG emissions sources in Lake Elsinore by emissions sector. The largest contributor to total emissions was fuel combustion in on-road transportation, representing 58 percent of total emissions. The next largest emissions source was building energy, contributing 33 percent to total emissions. The remaining emissions sectors represent approximately 10 percent of total emissions, including off-road vehicles and equipment, solid waste, water, and wastewater. In total, communitywide emissions sources considered in the 2022 emissions inventory generated approximately 488,339 metric tons of carbon dioxide equivalent ($MTCO_2e$). These results are presented in Figure 1 and Table 1, showing the total emissions by sector with the representative contribution to total communitywide emissions.

Table 1 2022 GHG Emissions Inventory

Sector	GHG Emissions ($MTCO_2e$)	Percent of Total
On-road transportation	280,784	58%
Building energy	162,526	33%
Off-road vehicles and equipment	19,336	4%
Solid waste	18,224	4%
Water	6,982	1%
Wastewater	487	<1%
Total	**488,339**	**100**

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

Data Source: Modeled by Ascent in 2025.



Note: Totals are rounded to the nearest percent.

Data Source: Modeled by Ascent in 2025.

Figure 1 2022 GHG Emissions Inventory

3 GREENHOUSE GAS EMISSIONS FORECASTS

The GHG emissions forecast estimates how communitywide GHG emissions for Lake Elsinore may grow given population and economic growth, and how State and federal actions may help to reduce local emissions. Developing a GHG emissions forecast is an essential step for the CAAP, as it provides insight into anticipated future emissions levels and the necessary actions in each GHG emissions sector to reduce emissions within local control, in alignment with State targets. As such, a GHG emissions forecast is presented as a sector-level assessment of near-term (2030) and long-term (2045) GHG emissions projections based on current conditions under two scenarios.

Under the first scenario, GHG emissions would grow from 2022 levels at the same rates as population, employment, and vehicle travel, which is known as a *business-as-usual scenario*, or BAU, forecast. The BAU forecast serves as the basis for understanding how emissions levels may change with growth, and how far GHG emissions will need to be reduced in future years to meet GHG reduction targets without considering any future action to reduce GHG emissions. The second scenario considers the GHG reduction impact of local, state, and federal regulations, which is known as a *legislative-adjusted business-as-usual scenario*, or legislative-adjusted BAU, forecast. The legislative-adjusted BAU forecast provides a more detailed assessment of future GHG emissions by showing how currently adopted State and federal legislation and regulations will help Lake Elsinore reduce its GHG emissions. The future years selected for the GHG emissions forecasts are aligned with the GHG reduction target years for State legislation, 2030 for SB 32 and 2045 for AB 1279, and the GPU horizon year of 2045.

The BAU and ABAU forecasts presented in this memorandum incorporate the best available data and are consistent with the ongoing GPU, which analyzes growth within the Lake Elsinore City Limits and SOI. The BAU forecast utilizes growth projections consistent with the land use plan included in the GPU. Additionally, the legislative-adjusted BAU forecast incorporates State regulations such as 2022 California Building Energy Efficiency Standards and Advanced Clean Cars II regulations. Additional details on the methods for calculating the BAU and legislative-adjusted BAU forecasts are provided in Attachment A.

3.1 BUSINESS-AS-USUAL SCENARIO GREENHOUSE GAS EMISSIONS FORECAST

The BAU forecast was developed by scaling communitywide GHG emissions from the 2022 emissions inventory by the appropriate growth scaling factors. The growth scaling factors used include population, employment, and service population[1], and were applied to various emissions sources based on their relationship to the GHG emissions source. For example, growth in residential building electricity consumption would be expected to scale with an increase in population size, and commercial energy consumption would be expected to scale with the number of employees at businesses in Lake Elsinore. More details on the approach for applying growth scaling factors to specific GHG emissions sectors are provided in Attachment A. VMT for on-road transportation is also essential for understanding how future GHG emissions may change in Lake Elsinore. VMT data was estimated using the Riverside County Transportation Model (RIVCOM). The growth scaling factors and VMT used for the BAU forecast were obtained from the land use plan included in the GPU and are provided in Table 2.

Table 2 Historical and Projected Development from 2018 to 2045

Data	2018	2022	2030	2045
Population[1]	79,669	81,746	106,131	151,892
Total Employment[1]	16,066	16,694	24,309	40,795
Service Population[2]	95,735	98,440	130,440	192,687
Vehicle Miles Traveled (Annual)[3]	612,836,946	688,689,384	840,393,807	1,124,840,501

Notes:

[1] Population and total employment data source: Hermann, pers. comm., 2025.

[2] Service population is the sum of population and total employment.

[3] Vehicle miles traveled data for years 2022 and 2030 are interpolated between base year of the Riverside County Transportation Model (2018) and General Plan Update horizon year (2045) model data. See Attachment C for vehicle miles traveled estimates, which were converted from daily to annual vehicle miles traveled using an annualization factor of 353 travel days per year.

The results of the BAU forecast show that communitywide GHG emissions would be expected to grow, given no further GHG reduction efforts beyond 2022, as shown in Table 3. While a more realistic scenario for future GHG emissions can be provided with a legislative-adjusted BAU forecast, the BAU scenario provides the basis for understanding the GHG impacts of growth in Lake Elsinore.

Table 3 Business-as-Usual Scenario Forecast Results ($MTCO_2e$)

Sector	2022	2030	2045
On-road transportation	280,784	350,215	470,410
Building energy	162,526	211,710	307,658
Off-road vehicles and equipment	19,336	25,244	41,180
Solid waste	18,224	24,090	33,439
Water	6,982	8,749	12,252
Wastewater	487	615	864
Total	**488,339**	**620,623**	**865,804**
Percent Change from 2022 Levels	*NA*	*27%*	*77%*

Notes: Totals may not sum exactly due to rounding.

Modeled by Ascent in 2025.

[1] Service population refers to the sum of population and employment in Lake Elsinore.

3.2 LEGISLATIVE-ADJUSTED BUSINESS-AS-USUAL SCENARIO GREENHOUSE GAS EMISSIONS FORECAST

The legislative-adjusted BAU forecast was developed by accounting for the reductions in communitywide GHG emissions in Lake Elsinore that are expected to occur as a result of adopted State and federal legislation and regulations. The GHG reductions considered in the legislative-adjusted BAU forecast fall into six categories: building efficiency standards, off-road equipment regulations, solar policies and mandates, fuel efficiency standards and electric vehicle sale requirements, renewable natural gas requirements, and renewable electricity requirements. The full list of regulations considered in the legislative-adjusted BAU forecast is provided in Attachment A.

The legislative-adjusted BAU forecasts show that emissions are expected to decline from 2022 levels through 2045, as shown in Table 4.

Table 4 Legislative-Adjusted Business-as-Usual Scenario Forecast Results ($MTCO_2e$)

Sector	2022	2030	2045
On-road transportation	280,784	258,720	86,072
Building energy	162,526	130,739	51,908
Off-road vehicles and equipment	19,336	23,380	35,938
Solid waste	18,224	24,090	33,439
Water	6,982	6,931	0
Wastewater	487	580	622
Total	488,339	444,439	207,979
Percent Change from 2022 Levels	*NA*	*-9%*	*-57%*

Notes: Totals may not sum exactly due to rounding.

Modeled by Ascent in 2025.

The primary drivers of the emissions reductions are increased renewable electricity from the requirements of SB 100 and SB 1020 and fuel-efficiency and electric vehicle sales requirements for on-road vehicles. Senate Bills 100 and 1020 establish renewable and carbon-free electricity retail sales requirements for electricity providers. Senate Bill 100 establishes a 2030 target of 60 percent renewable or carbon-free electricity retail sales by 2030, and a 100 percent target for 2045 (State of California 2023b). The GHG reductions from all legislative adjustments considered in the forecast are summarized in Table 5.

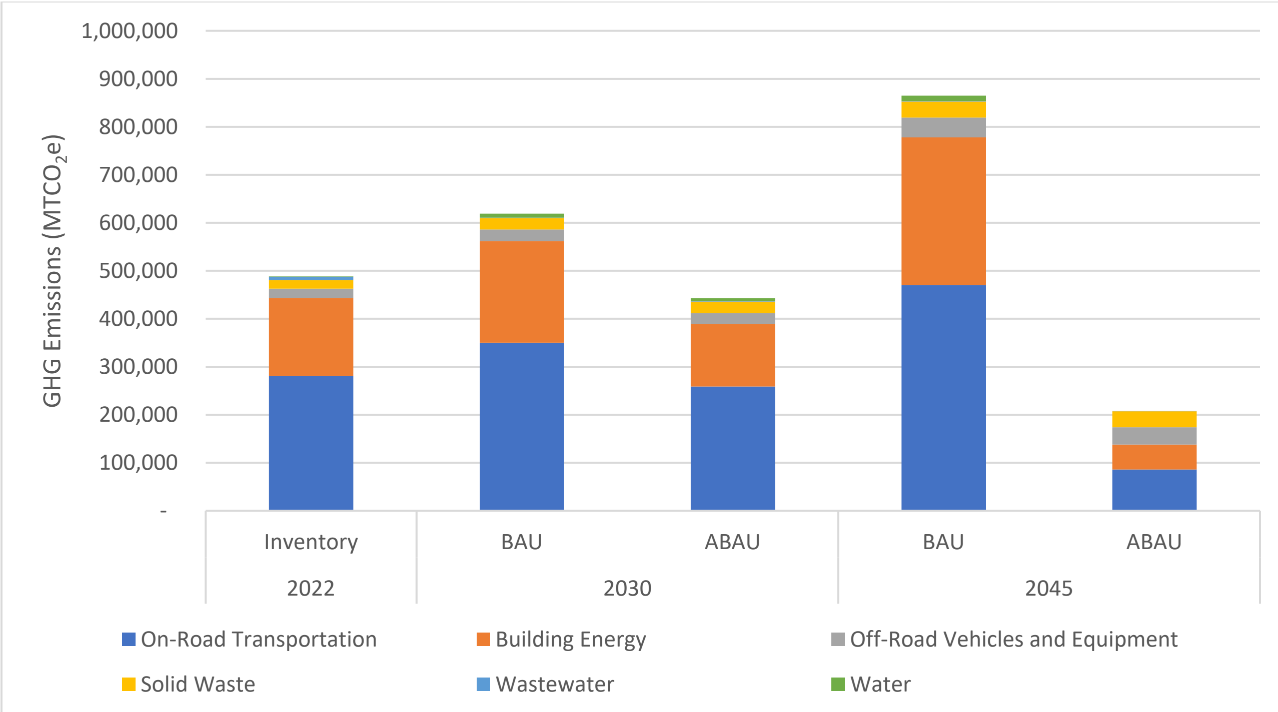
Table 5 GHG Reductions Considered in Legislative Adjusted Business-as-Usual Scenario Forecast ($MTCO_2e$)

Reductions from Legislative/Regulatory Actions	2030	2045
Building Efficiency Standards	19,227	30,986
Off-road Equipment Regulations	1,865	5,243
Solar Policies and Mandates	15,649	0
Fuel Efficiency Standards and Electric Vehicle Sales	91,495	384,338
Renewable Natural Gas Standards	6,547	11,155
Renewable Electricity Requirements	41,397	226,035
Total	**176,180**	**657,757**

Notes: Totals may not sum exactly due to rounding.

Modeled by Ascent in 2025.

The BAU and ABAU forecast results presented together demonstrate the impact of State and federal legislation and regulations on Lake Elsinore's GHG emissions profile over time, as shown in Figure 2.



Notes: ABAU = legislative-adjusted business-as-usual; BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Modeled by Ascent in 2025.

Figure 2 BAU and Legislative-Adjusted BAU GHG Emissions Forecasts

4 GREENHOUSE GAS REDUCTION TARGETS

A primary purpose of the CAAP is to align the City's GHG reduction targets with State goals. Since the 2011 CAP was adopted, SB 32 and AB 1279 were signed into law codifying near- and long-term GHG reduction targets. The CAAP establishes GHG reduction targets in alignment with SB 32 and AB 1279. All GHG reduction targets have been translated to be measured from the baseline of the 2022 GHG emissions inventory.

4.1 ALIGNMENT WITH STATEWIDE TARGETS

The primary statewide GHG reduction targets that are relevant to the CAAP are those established by SB 32 of 2016 and AB 1279 of 2022, which include:

- Reducing statewide GHG emissions 40 percent below 1990 levels by 2030 (SB 32), and
- Reducing statewide anthropogenic GHG emissions 85 percent below 1990 levels before 2045 (AB 1279).

With the State's adoption of these legislative targets, CARB was directed to develop and implement strategies to reduce statewide emissions consistent with the targets through a Climate Change Scoping Plan (Scoping Plan). The Scoping Plan outlines the State's strategy to reduce GHG emissions in each economic sector (referred to as "AB emissions sectors") and is regularly updated to reflect the most recent trends, technology, and legislative reduction targets. The 2017 Scoping Plan outlines the State's strategy for achieving the 2030 reduction target of SB 32 (CARB 2017), and the 2022 Scoping Plan builds upon this strategy to demonstrate how net-zero emissions will be achieved in 2045 or sooner, consistent with AB 1279 (CARB 2022). GHG reduction targets at the local level can be informed by statewide targets and the strategies outlined in the appropriate Scoping Plan.

In the Scoping Plan, statewide GHG emissions scenarios are modeled by AB 32 emissions sector for the State to achieve the corresponding target. Lake Elsinore can align GHG reduction targets in the CAAP with the Scoping Plan's GHG emission scenarios for only the AB 32 emissions sectors that are relevant to local conditions. For example, the State's forecasts for reducing emissions in the "Industrial" sector are not applicable to Lake Elsinore's GHG reduction target, as facilities that fall under this State categorization do not exist in Lake Elsinore. This target-setting approach is consistent with the legal precedence established by the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 62 Cal.4th 204* and the recommendations of the California Association of Environmental Professionals' *Final White Paper Beyond 2020 and Newhall* (AEP 2016).

4.1.1 Statewide Sectors Applicable to Lake Elsinore

A review of the AB 32 emissions sectors demonstrates that the City can have direct or indirect jurisdiction, control, or influence over activities that generate emissions and can reasonably contribute to reductions in four of the seven emissions sectors included in the statewide sectors emissions inventory: commercial and residential, electric power, recycling and waste, and transportation. This review is summarized in Table 6, showing the seven AB 32 emissions sectors and if they are applicable to Lake Elsinore, as well as the related sector in the Lake Elsinore GHG emissions inventory.

Table 6 Assembly Bill 32 Emissions Sectors Applicable to Lake Elsinore

Assembly Bill 32 Emissions Sectors	Applicable to Lake Elsinore?	Related Sector in Lake Elsinore GHG Inventory
Agriculture	No	NA
Commercial and Residential	Yes	Building Energy
Electric Power	Yes	Building Energy, Water
High Global Warming Potential (GWP) Gases	No	NA
Industrial	No	NA
Recycling and Waste	Yes	Solid Waste, Wastewater
Transportation	Yes	On-road Transportation, Off-road Equipment

Notes: NA = not applicable.

Four of the seven sectors listed in Table 6 apply to Lake Elsinore. Recycling and Waste, as well as Transportation, are all active economic sectors that directly produce emissions within Lake Elsinore. The Residential and Commercial sector, as characterized by CARB, includes only emissions from on-site fuel combustion (e.g., natural gas), which occurs at residential and commercial land uses. The Electric Power sector relates to emissions generated by electric power plants. Although major power plants are not active within Lake Elsinore, the grid-based electricity used by local buildings and facilities indirectly results in emissions at power plants that may be outside the region.

The agriculture, high global warming potential (GWP) gases, and industrial sectors are excluded for the following reasons. First, Lake Elsinore has no notable agricultural land uses or operations. Secondly, the City has limited to no ability to control or influence emissions of high GWP gases because it has limited or no jurisdiction or influence over the following activities in Lake Elsinore: substitution of ozone-depleting substances with high GWP gas substitutes; emissions of sulfur hexafluoride (SF_6) from electricity transmission lines; and semiconductor manufacturing processes. Thirdly, the City does not have jurisdiction to affect GHG emissions sources from industrial facilities that are covered entities under the State's Cap-and-Trade program.

The 2022 Scoping Plan also considers the need for the expansion of carbon dioxide removal (CDR) to meet the AB 1279 target of achieving statewide net-zero GHG emissions by 2045, through natural carbon sequestration and deployment of mechanical carbon capture. The State's CDR strategy identifies significant reductions from engineered strategies to remove significant levels of emissions from the atmosphere using technologies like direct air capture and carbon capture and sequestration (CCS). Constructing and operating direct air capture facilities to remove GHG emissions from the atmosphere is currently outside the scope of local governments in California, including Lake Elsinore. In addition, Lake Elsinore does not include large-scale petroleum refineries, GHG-emitting electric power plants, cement manufacturing facilities, or other industrial facilities that could have their GHG emissions reduced using CCS technologies. To achieve statewide net-zero emissions by 2045, the 2022 Scoping Plan relies on the deployment of CCS technologies and CDR strategies. However, the City government does not have the jurisdiction or other ability to construct and operate CCS and mechanical CDR strategies. Therefore, the CAAP focuses on targets to reduce anthropogenic emissions from sectors that are within the City's jurisdiction or influence.

By excluding these sectors under this approach, GHG reduction targets for Lake Elsinore can be established in proportion with statewide reductions for all sectors relevant to the city to the extent feasible using available data. This target-setting approach is consistent with CARB's 2022 Scoping Plan guidance for setting locally-based targets. It is also consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 62 Cal.4th 204*, which determined that the approach of assessing a project's consistency with statewide emissions reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emissions (in this case, the project is the CAAP, which covers emissions within the Lake Elsinore City Limits and SOI) to statewide emissions included in achieving statewide GHG reduction goals.

4.1.2 Basis for the 2030 GHG Reduction Target

For 2030, the CAAP's target is aligned with SB 32 and the statewide GHG emissions pathways towards reaching this target. The 2030 target for the CAAP is consistent with a 40 percent reduction in statewide GHG emissions below 1990 levels, by applying the sector-specific targets of relevant AB 32 emissions sectors to the Lake Elsinore's emissions profile as outlined in the 2017 Scoping Plan. This reduction equivalent is translated to be measured from a 2022 baseline, assuming that GHG emissions in Lake Elsinore have generally followed statewide emissions trends in relevant GHG emissions sectors since 1990.

4.1.3 Basis for the 2045 GHG Reduction Target

For 2045, the CAAP's target is aligned with AB 1279 and the statewide GHG emissions pathway towards reaching this target, as outlined in the 2022 Scoping Plan. AB 1279 requires that the State's net-zero emissions target by 2045 be achieved by reducing statewide anthropogenic emissions by at least 85 percent below 1990 levels before 2045, which includes the AB 32 emissions sectors. Anthropogenic emissions include the primary sources and activities within the Lake Elsinore GHG emissions sectors, including on-road transportation, building energy, solid waste, off-road transportation, water, and wastewater. The 2045 target for the CAAP is consistent with an 85 percent reduction in statewide anthropogenic GHG emissions below 1990 levels, by applying the sector-specific targets of relevant AB 32 emissions sectors to the Lake Elsinore's emissions profile as outlined in the 2022 Scoping Plan. This reduction equivalent is translated to be measured from a 2022 baseline, assuming that GHG emissions in Lake Elsinore have generally followed statewide emissions trends in relevant GHG emissions sectors since 1990.

4.1.4 Statewide GHG Emissions for Applicable Sectors

To develop a local GHG reduction target for Lake Elsinore that represents a percent reduction below 2022 GHG inventory levels, statewide GHG emissions for the year 2022 were compared to statewide target GHG emissions levels for applicable sectors within the 2017 Scoping Plan (SB 32) and 2022 Scoping Plan (AB 1279). CARB publishes annual statewide GHG emissions inventories for AB 32 emissions sectors, which allows for comparison of recent statewide GHG emissions levels with target levels needed to achieve regulatory targets under SB 32 and AB 1279. Comparing current and future GHG emissions for each AB 32 emissions sector applicable to Lake Elsinore, a total percent reduction in GHG emissions for the 2030 and 2045 target years can be derived. Table 7 provides the 2022 statewide emissions levels for sectors applicable to Lake Elsinore, and target levels outlined in the 2017 Scoping Plan for the

State's 2030 target under SB 32 and the 2022 Scoping Plan for the State's 2045 target levels under AB 1279. CDR targets are excluded from this analysis as Lake Elsinore does not have substantial opportunity for enhancing CDR through mechanical capture or enhanced sequestration in natural and working lands.

Table 7 Assembly Bill 32 Emissions Sector Targets Under 2017 and 2022 Scoping Plans

Assembly Bill 32 Emissions Sectors	2022 Statewide GHG Emissions Levels ($MMTCO_2e$)	2030 Statewide GHG Emissions Target Levels Under 2017 Scoping Plan ($MMTCO_2e$)[1]	2045 Statewide GHG Emissions Target Levels Under 2022 Scoping Plan ($MMTCO_2e$)
Commercial and Residential	40	39	4
Electric Power	60	42	9
Recycling and Waste	8	9	8
Transportation	140	107	8
Total	**247**	**197**	**29**
Percent Reduction Below 2022 Levels	—	*21%*	*88%*

Notes: Totals may not sum due to rounding. $MMTCO_2e$ = million metric tons of carbon dioxide equivalent.

[1] The 2017 Scoping Plan includes ranges of GHG emissions levels that must be met for each AB 32 emissions sector for the State to reach SB 32 GHG reduction target levels. Values presented in this table are the mid-point of the target level ranges presented in the 2017 Scoping Plan.

Sources: CARB 2017, CARB 2022, CARB 2025.

4.2 CAAP GREENHOUSE GAS REDUCTION TARGETS

The GHG reduction targets for the CAAP demonstrate consistency with State legislation through locally-specific GHG target levels based on the 2022 GHG emissions inventory. The Lake Elsinore GHG reduction targets for the years 2030 and 2045 are provided in Table 8.

Table 8 Lake Elsinore Greenhouse Gas Reduction Targets

Year	CAAP GHG Reduction Target (relative to 2022 levels)	Target Emissions Levels ($MTCO_2e$)
2022	—	488,339
2030	21%	388,224
2045	88%	57,278

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

5 GHG REDUCTION STRATEGIES

The CAAP proposes 14 GHG emissions reduction strategies to reduce emissions from the sectors evaluated in the 2022 inventory and forecasts, including on-road transportation, building energy use, off-road equipment, solid waste, and water supply. The strategies will be implemented through 27 GHG reduction measures that include corresponding implementation actions. In addition to reducing sources of emissions in Lake Elsinore, certain strategies would also increase local carbon sequestration potential through expansion of the urban tree canopy.

The strategies are organized by emissions sector and are identified by numbers corresponding to each emissions sector (e.g., BE-1 for the first strategy under the building energy emissions sector). Of the 14 strategies, 10 are analyzed for a numeric GHG reduction potential. Other strategies were not quantified due to available data and methods limitations, or limited local impact to GHG emissions. The GHG strategies and associated measures are provided in Table 9 along with their estimated annual GHG reductions in 2030 and 2045, corresponding to the forecast milestone years and targets. The annual estimated GHG reductions are shown relative to future forecasted emissions in each respective year (e.g., a 1,000 $MTCO_2e$ reduction in 2030 would be subtracted from the forecasted emissions in 2030). Table 9 also shows the percentage of total annual reductions across all sectors associated with each measure (e.g., BE-2 accounts for 57 percent of the total reductions in 2030 from all strategies). The estimated GHG emissions reductions shown are in positive units that are understood to be subtracted from future legislative-adjusted BAU emissions. Information on the quantification assumptions and methods used to estimate these quantified emissions is provided in Attachment B. The estimated reduction in VMT associated with strategies TR-1, TR-2, TR-4 is available in Attachment C.

Table 9 CAAP GHG Reductions by Strategy ($MTCO_2e$/year)

Strategy	Measure Number	Measure Name	2030	2045
Building Energy				
BE-1: Energy Efficiency and Decarbonization	BE-1.1	Encourage building operations that minimize electricity use.	5,207 (9%)	38,726 (26%)
	BE-1.2	Support efforts to reduce energy burden and track energy consumption.		
	BE-1.3	Develop building performance standards that adhere to or go beyond CALGreen Tier 1 values.		
	BE-1.4	Retrofit existing residential and non-residential buildings to use electric heating and cooling technology.		
	BE-1.5	Replace fixtures with energy efficient options.		
BE-2: Renewable Energy	BE-2.1	Facilitate the transition of residential electricity use to 100% renewable energy sources.	31,430 (52%)	0 (0%)
BE-3: Energy Education	BE-3.1	Develop educational campaigns and programs that inform community members about renewable energy and electrification benefits and opportunities.	Not quantified	Not quantified
		Sector Sub-Total	**36,547**	**38,726**
Transportation				
TR-1: Active Transportation	TR-1.1	Expand active transportation infrastructure by implementing the infrastructure, programmatic, and policy recommendations included in the Active LE Plan.	110 (<1%)	451 (<1%)
TR-2: Transit	TR-2.1	Increase opportunities for residents to access alternative transportation and reduce financial barriers to transit ridership.	1,588 (3%)	2,399 (2%)
	TR-2.2	Upgrade transit facilities and operations to better accommodate residents.		
TR-3: Zero-Emission Vehicles and Equipment	TR-3.1	Increase the adoption of EV's through financial incentives and vehicle replacement policies.	0 (0%)	78,322 (52%)
	TR-3.2	Expand EV charging infrastructure.		
	TR-3.3	Transition away from fossil-fuel powered equipment.		
TR-4: Smart Growth	TR-4.1	Encourage smart-growth strategies that increase connectivity and density.	853 (1%)	1,254 (1%)
	TR-4.2	Reduce the space dedicated to vehicles.		
		Sector Sub-Total	**2,551**	**82,426**

Strategy	Measure Number	Measure Name	2030	2045
Water				
W-1: Water Conservation	W-1.1	Reduce water consumption through regulation and assisting residents to upgrade to efficient fixtures.	7 (<1%)	0 (0%)
	W-1.2	Increase awareness of water loss through education and audits.		
	W-1.3	Replace lawn irrigation equipment to prevent water loss.		
W-2: Recycled Water	W-2.1	Encourage the use of recycled water by increasing access to recycled water systems and informational materials.	849 (1%)	0 (0%)
Sector Sub-Total			**856**	**0**
Solid Waste				
SW-1: Recycling and Composting	SW-1.1	Increase the diversion of organic waste for commercial, residential, and municipal facilities.	20,475 (34%)	29,856 (20%)
	SW-1.2	Support the use of sustainable materials.		
	SW-1.3	Expand access to recycling and compost materials and programs.		
	SW-1.4	Enable the proper disposal of non-organic waste.		
SW-2: Local Produce	SW-2.1	Improve access to local healthy produce.	Not quantified	Not quantified
Sector Sub-Total			**20,475**	**29,856**
Green Community				
GC-1: Green Jobs	GC-1.1	Enhance economic resilience by investing in green job development.	Not quantified	Not quantified
GC-2: Urban Tree Canopy	GC-2.1	Expand urban canopy to reduce the urban heat island effect.	133 (<1%)	323 (<1%)
GC-3: Green Construction Materials	GC-3.1	Reduce emissions associated with construction by requiring materials be low-carbon or recycled.	Not quantified	Not quantified
Sector Sub-Total			**133**	**323**
Total GHG Reductions			**60,653**	**151,331**

Notes: EV = electric vehicle, GHG = greenhouse gas, LE = Lake Elsinore, $MTCO_2e$ = metric tons of carbon dioxide equivalent.

[a] The percentage of total annual reductions across all sectors associated with each strategy are shown in the parentheses in each cell of estimated reductions (e.g., BE-1 accounts for 26 percent of the total reductions in 2045 from all strategies).

Source: Modeled by Ascent in 2025.

Between 2030 and 2045, four of the 14 strategies (BE-1, BE-2, TR-3, and SW-1) would account for between 94 and 98 percent of annual emissions reductions across the quantified measures. The relative proportion of the contribution of the four measures to total annual reductions is shown above in Table 9. Building energy related strategies account for 26 to 61 percent of total reductions, highlighting the potential from improving efficiency in existing buildings and limiting the expansion of natural gas infrastructure. The expansion of zero-emissions vehicle (ZEV) charging and fueling infrastructure to support a local ZEV fleet is also a key opportunity area, with the limited ability for VMT reduction strategies to substantially influence GHG emissions from on-road transportation.

6 ANALYSIS OF TARGETS ATTAINMENT

The purpose of the CAAP is to develop strategies that the City can implement to reduce communitywide GHG emissions in proportion with State GHG reduction targets. With the GHG emissions forecast, reduction targets, and analysis of GHG strategies presented in this memorandum, the City can assess if it can meet its GHG reduction targets or bridge the "emissions gap." The emissions gap analysis demonstrates the future expected GHG emissions levels from the legislative-adjusted BAU forecast for each GHG emissions sector, and additional GHG reductions that will need to be achieved by the reduction strategies of the CAAP to align with State GHG reduction targets.

Based on the modeling conducted and the assumptions made, the 10 quantified strategies have the potential to help the City meet the 2030 and 2045 targets that align with SB 32 and AB 1279 statewide GHG emissions targets. As shown in Table 9, implementation of the strategies would help reduce emissions in Lake Elsinore by 21 percent below 2022 levels by 2030 and 88 percent below 2022 levels by 2045. This would meet the GHG reduction targets for AB 32 emissions sectors that are applicable to Lake Elsinore under the 2017 Scoping Plan and 2022 Scoping Plan, i.e., 21 percent below 2022 levels by 2030 and 88 percent below 2022 levels by 2045.

6.1 EMISSIONS GAP ANALYSIS

Table 10 contains the gap analysis, which shows the future GHG emissions levels that would be achieved in Lake Elsinore with implementation of all quantified GHG strategies for the years 2030 and 2045. These emissions levels are compared to the 2030 and 2045 GHG reduction targets, showing that the targets can be feasibly achieved with continued implementation of State and federal regulations considered in the legislative-adjusted BAU forecast, and implementation of the GHG strategies by the City. Figure 3 shows the anticipated future emissions levels for each GHG emissions sector with implementation of GHG strategies, in comparison to target levels for 2030 and 2045.

Table 10 Comparison of GHG Projections with Strategy Implementation and Reduction Targets ($MTCO_2e$)

Data	2022	2030	2045
Legislative-Adjusted Business-as-Usual Forecast			
On-road transportation	280,784	258,720	86,072
Building energy	162,526	130,739	51,908
Off-road vehicles and equipment	19,336	23,380	35,938
Solid waste	18,224	24,090	33,439
Water	6,982	6,931	0
Wastewater	487	580	622
Total Emissions	**488,339**	**444,439**	**207,979**
GHG Emissions Reductions from Implementation of Strategies[1]			
On-road transportation	0	2,551	54,156
Building energy	0	36,638	38,726
Off-road vehicles and equipment	0	0	28,270
Solid waste	0	20,475	29,856
Water	0	856	0
Emissions removals through increased carbon sequestration	0	133	323
Total Emissions Reductions	**0**	**60,653**	**151,331**
GHG Emissions with Implementation of GHG Strategies[2]			
On-road transportation	280,785	256,169	31,916
Building energy	162,526	94,102	13,182
Off-road vehicles and equipment	19,336	23,380	7,668
Solid waste	18,224	3,615	3,583
Water	6,982	6,075	0

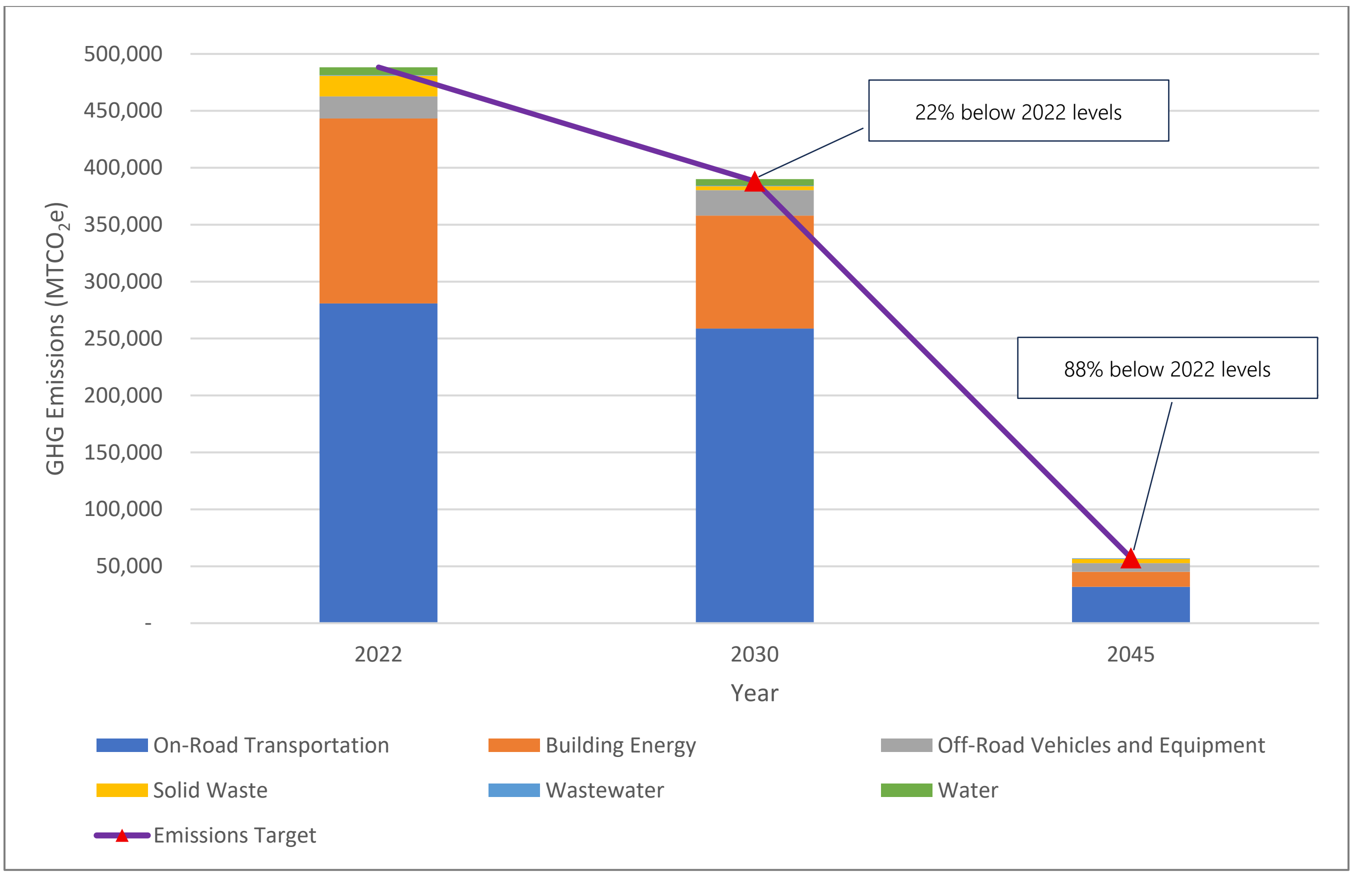
Data	2022	2030	2045
Wastewater	487	580	622
Total Emissions	488,339	383,919	56,971
Emissions removals through increased carbon sequestration	0	-133	-323
Effective total emissions, including carbon sequestration reductions	**488,339**	**383,786**	**56,648**
Percent Change from 2022 Levels	**NA**	**-21%**	**-88%**
Comparison of Projected GHG Emissions to CAAP Targets			
CAAP Target Emissions Levels	NA	388,224	57,278
CAAP Targets (percent reduction from 2022 levels)	NA	21%	88%
Difference between CAAP Targets and GHG Emissions with Implementation of GHG Strategies	NA	-4,438	-630
Target Met?	**NA**	**Yes**	**Yes**

Note: Totals may not sum exactly due to rounding. NA = Not applicable.

[1] GHG emissions sectors where there are zero emissions reductions from implementation of GHG strategies are not shown.

[2] GHG Emissions with Implementation of GHG Strategies shows the GHG Emissions Reductions from Implementation of Strategies subtracted from the Legislative-Adjusted Business-as-Usual Forecast.

Source: Modeled by Ascent in 2025.



Note: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Modeled by Ascent in 2025.

Figure 3 CAAP GHG Emissions Levels with Implementation of Strategies

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Attachment A

GHG Emissions Forecast

Detailed Methods and Results

INTRODUCTION

This document is an attachment to the City of Lake Elsinore's (City's) *Greenhouse Gas Emissions Forecast, Targets, and Reduction Measures Memorandum* (hereafter referred to as "GHG Memorandum"). This document presents detailed results of the greenhouse gas (GHG) emissions forecasts and explains the forecast methodology.

1 GREENHOUSE GAS EMISSIONS FORECASTS METHODOLOGY

The GHG emissions forecasts were developed by projecting the Lake Elsinore 2022 GHG emissions to the years 2030 and 2045 based on growth scaling factors and adjusting future emissions for the known impacts of currently adopted legislation on GHG emissions (e.g., adopted federal and California regulations, policies, and programs affecting fuels and energy efficiency). The growth scaling factors (e.g., population, employment, and service population[1]) were applied to activity growth factors (electricity consumption per housing unit and waste generation per service population) and then converted to future GHG emissions using the most appropriate GHG emissions factors.

The following section describes the methodology behind forecasting *business-as-usual scenario* (BAU) and *legislative-adjusted business-as-usual scenario* (legislative-adjusted BAU) emissions for each emissions sector included in the Lake Elsinore 2022 inventory. The BAU emissions forecast provides an assessment of how emissions generated by activities in Lake Elsinore will change over time without further State or federal action. The legislative-adjusted BAU emissions forecast includes adopted legislative and regulatory actions at the State and federal levels that would affect emissions without additional local action.

The scope of the analysis is intended to maintain consistency with the growth projections associated with the City's General Plan Update (GPU). As such, the analysis includes both the Lake Elsinore City Limits and Sphere of Influence (SOI), which are collectively referred to as "Lake Elsinore" throughout this memorandum unless otherwise specified. Table A-1 provides the growth projections for both the City Limits, SOI, and combined City Limits and SOI (e.g., Lake Elsinore). Values for 2022 and 2030 were interpolated between the 2018 baseline and 2045 horizon year.

1 Service population is the sum of population and number of employees in the city.

Table A-1 Population, Employment, and Service Population for City Limits and Sphere of Influence

Demographic Factor	2018	2022	2030	2045
Lake Elsinore City Limits				
Population	58,684	64,915	81,724	113,240
Employment	14,067	15,863	20,995	30,617
Service Population	72,751	80,789	102,726	143,857
Lake Elsinore Sphere of Influence (SOI)				
Population	20,985	23,043	28,103	38,652
Employment	1,999	2,598	4,831	10,178
Service Population	22,984	25,818	33,165	48,830
Lake Elsinore City Limits + SOI				
Population	79,669	87,958	109,827	151,892
Employment	16,066	18,461	25,826	40,795
Service Population	95,735	106,607	135,891	192,687

Notes: service population = population + employment; SOI = sphere of influence.

Data Source: Hermann, pers. comm., 2025.

1.1 BUSINESS-AS-USUAL ACTIVITY FORECAST

The following sections outline the different methods used to forecast emissions generating activity data (activity) for GHG emissions sectors included in the Lake Elsinore 2022 inventory.

1.1.1 On-road Transportation

On-road transportation activity is in the format of vehicle miles traveled (VMT) for different vehicle categories, including: autos, light trucks, medium trucks, and heavy trucks. Future VMT was modeled by Fehr and Peers using the Riverside County Transportation Model (RIVCOM), which provides daily VMT for four distinct trip types, listed below and converted to annual VMT assuming 353 travel days per year (Poss, pers. comm., 2024).

1) external-internal (the trip starts outside the boundaries of Lake Elsinore and ends inside the boundaries),
2) internal-external (the trip starts inside the boundaries of Lake Elsinore and ends outside the boundaries),
3) internal-internal (the trip both starts and ends inside the boundaries of Lake Elsinore), and
4) external-external (the trip both starts and ends outside the boundaries of Lake Elsinore).

To apportion VMT from the trips to Lake Elsinore, the VMT values for each of the trip types described above were assigned weights of 50, 50, 100, and 0 percent, respectively. This approach follows guidance from the Regional Targets Advisory Committee (RTAC). RTAC was formed by the California Air Resources Board (CARB) pursuant to Senate Bill (SB) 375 (Sustainable Communities and Climate Protection Act). SB 375 mandates that CARB work in consultation with the metropolitan planning organizations to set targets for vehicle emissions reductions, and that RTAC recommend methodologies for setting those targets.

The land use assumptions used to generate VMT estimates from RIVCOM were adjusted to align with the GPU. Annual VMT for the years 2030 and 2045 is provided in Table A-2.

Table A-2 On-road Transportation Activity for 2030 and 2045 (VMT)

RIVCOM Vehicle Category	2030	2045
City Limits		
Autos	624,391,695	852,589,604
Light Trucks	4,697,371	8,392,222
Medium Trucks	5,906,043	10,677,897
Heavy Trucks	13,585,205	24,621,044
City Limits Total	**648,580,314**	**896,280,767**
Sphere of Influence (SOI)		
Autos	184,402,964	228,559,734
Light Trucks	1,485,777	2,197,072
Medium Trucks	1,791,828	2,845,180
Heavy Trucks	4,132,924	6,738,064
SOI Total	**191,813,493**	**240,340,050**
City Limits + SOI		
Autos	808,794,659	1,081,149,338
Light Trucks	6,183,148	8,392,222
Medium Trucks	7,697,871	10,677,897
Heavy Trucks	17,718,129	24,621,044
City Limits + SOI Total	**840,393,807**	**1,124,840,501**

Notes: RIVCOM = Riverside County Transportation Model; RTAC = Regional Targets Advisory Committee; SOI = Sphere of Influence; VMT = vehicle miles traveled.

Totals may not sum exactly due to rounding.

Data Source: VMT analysis by Fehr and Peers in 2025, with summary available in Attachment C.

1.1.2 Off-road Equipment

The CARB Off-Road Web Query Tool was used to obtain data on the quantity of fuel used by off-road equipment for the entire Riverside County (including all cities and unincorporated areas) for the relevant off-road equipment categories (CARB 2025b). These fuel quantities were then downscaled to the city limits and SOI based on each equipment category's relevant scaling factor (employment, population, or service population [the sum of employment and population] expressed as a percentage of the corresponding demographic data for Riverside County). Employment data was sourced from the California Employment Development Department (2024) and population data from the California Department of Finance (2024). The downscaled fuel quantity results for the years 2030 and 2045 are provided in Table A-3. The Off-Road Web Query Tool incorporates the impacts of State regulations for off-road equipment for most equipment categories. Additional information on these regulations is included in Section 2.

Table A-3 Off-Road Equipment Activity for 2030 and 2045 (gallons)

		2030				2045			
Equipment Category	County-to-City Scaler	Scaler Value	Diesel	Gasoline	Natural Gas	Scaler Value	Diesel	Gasoline	Natural Gas
City Limits									
Industrial	Employment	1.84%	18,108	29,256	76,532	2.51%	24,339	44,705	135,063
Light commercial equipment	Employment	1.84%	10,834	109,948	9,126	2.51%	16,188	89,720	13,938
Portable equipment	Employment	1.84%	354,490	0	0	2.51%	649,768	0	0
Lawn and garden equipment	Population	3.67%	4,335	77,387	0	6.12%	8,271	22,282	0
Recreational equipment	Population	3.67%	0	54,295	0	6.12%	0	108,723	0
Pleasure craft	Population	3.67%	0	94,092	0	6.12%	0	186,506	0
Construction and mining	Service population	3.05%	902,654	13,890	0	4.68%	1,379,593	22,343	0
Transport refrigeration units	Service population	3.05%	198,827	0	0	4.68%	386,363	0	0
City Limits Total	**NA**	**NA**	**1,489,248**	**378,868**	**85,659**	**NA**	**2,464,521**	**474,280**	**149,001**
SOI									
Industrial	Employment	0.42%	4,166	6,731	17,609	0.83%	8,091	14,861	44,899
Light commercial equipment	Employment	0.42%	2,493	25,297	2,100	0.83%	5,381	29,826	4,633
Portable equipment	Employment	0.42%	81,561	0	0	0.83%	216,002	0	0
Lawn and garden equipment	Population	1.26%	1,491	26,611	0	2.09%	2,823	7,606	0
Recreational equipment	Population	1.26%	0	18,671	0	2.09%	0	37,110	0
Pleasure craft	Population	1.26%	0	32,356	0	2.09%	0	63,660	0
Construction and mining	Service population	0.98%	291,420	4,484	0	1.59%	468,281	7,584	0
Transport refrigeration units	Service population	0.98%	64,191	0	0	1.59%	131,145	0	0
SOI Total	**NA**	**NA**	**445,322**	**114,150**	**19,708**	**NA**	**831,724**	**160,647**	**49,532**
City Limits + SOI Total	*NA*	*NA*	*1,934,570*	*493,017*	*105,367*	*NA*	*3,296,245*	*634,927*	*198,533*

Notes: CO_2e = kilograms of carbon dioxide equivalent; kg = kilograms; MT = metric tons; NA = not applicable; SOI = Sphere of Influence.

Totals may not sum exactly due to rounding.

Data Source: Modeled by Ascent in 2025.

1.1.3 Building Energy, Water, Solid Waste, and Wastewater

The BAU forecasted activity for the Building Energy, Water, Solid Waste, and Wastewater sectors are estimated by scaling the 2022 baseline activity data by population, employment, and service population. The scaling factors are used as a basis for the forecasts of activity for most emissions sectors, with the exception of on-road transportation and off-road equipment, which are estimated using appropriate forecasting models. The scaling factors are assigned to different activities for emissions sectors and sub-sectors, depending on how each sector or sub-sector is affected.

These assignments are shown in Table A-4. For example, the activity for both the residential building energy sector and the nonresidential building energy sector is in kilowatt-hours (kWh) of electricity and therms of natural gas. Increases in residential building energy (in kWh and therms) are assumed to be proportional to the growth in population, whereas increases in nonresidential building energy (also in kWh and therms) are assumed to be proportional to the growth in employment.

Table A-4 BAU Growth Scaling Methods by Emissions Sector for Lake Elsinore Forecast

Sector	Sub-Sector	Activity Growth Method
Building Energy	Nonresidential	Employment
	Residential	Population
Solid Waste	Waste Generation	Service Population
Wastewater	Wastewater Treatment Plant (WWTP)	Service Population
Water	Local Deliveries	Service Population
	Imported (CRA)	Service Population
	Imported (SWP)	Service Population
	Groundwater	Service Population

Notes: BAU = business-as-usual; CRA = Colorado River Aqueduct; SWP = State Water Project.

Source: Compiled by Ascent in 2025.

The resulting scaled activity data used to calculate GHG emissions in the BAU forecast are shown in Table A-5.

Table A-5 BAU Activity Data Forecast by Emissions Sector

Sector	Source	Quantity Type	Quantity Units	Quantity	
				2030	2045
Building Energy	Residential	Electricity	MWh	298,917	413,409
	Nonresidential	Electricity	MWh	246,000	388,594
	Commercial (Nonresidential)	Natural Gas	therms	2,494,626	3,940,638
	Industrial (Nonresidential)	Natural Gas	therms	13,752	21,723
	Single-Family Residential	Natural Gas	therms	9,990,348	13,816,879
	Multi-Family Residential	Natural Gas	therms	1,480,902	2,048,121
	Backup Generation (Nonresidential)	Diesel	gallons	37,645	59,465
	Backup Generation (Nonresidential)	Gasoline	gallons	2,908	4,593
Solid Waste	Community-Generated Solid Waste	Waste	tons	106,552	151,086
Water	Groundwater	Electricity	MWh	2,552	3,574
	Imported (CRA)	Electricity	MWh	5,183	7,258
	Imported (SWP)	Electricity	MWh	29,227	40,929
	Local Deliveries	Electricity	MWh	1,200	1,681
Wastewater [1]	Centralized WWTP	Service Population	Service Population	135,890	192,687
	Septic Tanks	Service Population	Service Population	135,890	192,687
	Wastewater Treatment Energy	Electricity	MWh	766	1,067

Notes: BAU = business-as-usual; CRA = Colorado River Aqueduct; gal = gallon; MWh = megawatt-hours; NA = not applicable; SWP = State Water Project; VMT = vehicle miles traveled; WWTP = wastewater treatment plant.

[1] Activity data has not been scaled for Wastewater Treatment. Forecast emissions are estimated by scaling 2022 inventory emissions directly with service population.

Source: Data modeled by Ascent in 2025.

1.2 BUSINESS-AS-USUAL FORECAST DETAILED RESULTS

The combined results for each GHG emissions sector and source in Lake Elsinore are provided in Table A-6. GHG emissions were calculated by applying the GHG emissions factors that were used to calculate emissions in the Lake Elsinore 2022 GHG inventory to forecasted activity. The GHG emission factors used are available in Appendix B of the Lake Elsinore Climate Action and Adaptation Plan, *GHG Emissions Inventory Methodology*. Under the BAU scenario, it is assumed that baseline emission factors will remain unchanged in the future.

Table A-6 BAU GHG Emissions Forecast by Emissions Sector ($MTCO_2e$)

Sector	Source	Fuel Type/Emissions Detail	2030	2045
Building Energy	Residential	Electricity	75,101	103,867
	Nonresidential	Electricity	61,806	97,632
	Commercial (Nonresidential)	Natural Gas	13,275	20,970
	Industrial (Nonresidential)	Natural Gas	73	116
	Single-Family Residential	Natural Gas	53,163	73,525
	Multi-Family Residential	Natural Gas	7,881	10,899
	Backup Generation (Nonresidential)	Diesel	386	609
	Backup Generation (Nonresidential)	Gasoline	26	40
On-Road Transportation	Auto	Annual VMT	305,216	407,994
	Light Trucks	Annual VMT	31,771	44,149
	Medium Trucks	Annual VMT	2,752	3,735
	Heavy Trucks	Annual VMT	10,476	14,531
Off-Road Vehicles and Equipment	Diesel	Diesel	19,994	34,040
	Gasoline	Gasoline	4,531	5,787
	Natural Gas	Natural Gas	719	1,354
Solid Waste	Community-Generated Solid Waste	Waste	24,090	33,439
Water	Groundwater	Electricity	641	898
	Imported (CRA)	Electricity	1,176	1,647
	Imported (SWP)	Electricity	6,630	9,285
	Local Deliveries	Electricity	302	422
Wastewater	Centralized WWTP	Direct Emissions	345	489
	Septic Tanks	Direct Emissions	94	133
	Wastewater Treatment Energy	Electricity	176	242
Total			620,623	865,804

Notes: Totals in this table may not sum due to rounding. BAU = business-as-usual; CRA = Colorado River Aqueduct; SWP = State Water Project; VMT = vehicle miles traveled; WWTP = wastewater treatment plant.

Source: Data modeled by Ascent in 2025.

2 LEGISLATIVE-ADJUSTED BUSINESS-AS-USUAL FORECAST

The legislative-adjusted BAU scenario accounts for the effect of adopted legislative and regulatory actions at the State and federal levels on local emissions without additional action by the City. Table A-7 presents a summary of the legislative adjustments applied to Lake Elsinore's emissions under the legislative-adjusted BAU scenario. This is not an exhaustive list but is a list of the key actions considered in this analysis that would result in expected local GHG reductions.

Table A-7 Federal and State Legislative Adjustments Applied under the Legislative-Adjusted BAU Scenario

Source	Legislation/ Regulation	Description	Application to Legislative-Adjusted BAU
State	California's Building Energy Efficiency Standards (2022 and 2025 Title 24, Part 6)	Effective January 1, 2026, new residential and nonresidential buildings in California are required to comply with energy efficiency standards established by the California Energy Commission. The 2025 standards establish energy performance requirements that encourage energy-efficient approaches to building decarbonization by emphasizing electric heat pumps for space heating and water heating and extending the benefits of photovoltaic and battery storage systems and other demand flexible technology to work in combination with heat pumps.	Applied to the Building Energy sector, new growth in the Building Energy sector has reduced fuel consumption and increased solar photovoltaic installations compared to the existing building stock.
State	SB 100 (California Renewables Portfolio Standard Program, 2017)	Requires that 60 percent of retail electricity sold in California must come from renewable or zero-carbon resources by 2030 and 100 percent by 2045.	Applied to the Building Energy, Water, and Wastewater sectors; future grid-supplied electricity has a reduced carbon intensity based on SB 100 compliance.
State	SB 1020 (Clean Energy, Jobs, and Affordability Act of 2022)	Requires that eligible renewable energy resources and zero-carbon resources supply 90 percent of all retail sales of electricity to California end-use customers by December 31, 2035, 95 percent of all retail sales of electricity to California end-use customers by December 31, 2040, 100 percent of all retail sales of electricity to California end-use customers by December 31, 2045, and 100 percent of electricity procured to serve all state agencies by December 31, 2035.	Applied to the Building Energy, Water, and Wastewater sectors; future grid-supplied electricity has a reduced carbon intensity based on SB 1020 compliance.
State	AB 1440 (Biomethane Procurement Goals, 2018)	Requires that natural gas utilities procure and deliver a proportionate share of a statewide total of 32 billion cubic feet of biomethane from sources that have a first point of interconnection with the pipeline system in California.	Applied to the Building Energy sector, future natural gas consumption has a reduced carbon intensity consistent with utility procurement targets.
State	California Solar Policies and Programs	There are numerous incentive programs for the installation of solar available in California, including net energy metering (NEM), Disadvantaged Communities Single-family Solar Homes program, property tax exclusions, Self-Generation Incentive Program, and other financial incentives offered by utility providers. Additionally, California's Building Energy Efficiency Standards require solar installations on nearly all newly constructed buildings.	Applied to the Building Energy sector, increased solar photovoltaic installations reduce consumption of grid-supplied electricity.
State	Advanced Clean Car Standards I and II	Requires all new passenger cars, trucks, and Sports Utility Vehicles (SUVs) sold in California to meet increasingly stringent requirements regarding zero emissions technologies and emissions standards.	Applied to the On-road Transportation sector, increased zero-emissions vehicle penetration reduces fleetwide emissions.

Source	Legislation/ Regulation	Description	Application to Legislative-Adjusted BAU
State	Advanced Clean Fleets	Starting in 2036, all medium and heavy-duty trucks sold in California must be zero emissions with limited exceptions. In addition to this sales mandate, fleet owners must also purchase electric trucks on an accelerated timeline (CARB 2023). As of 2025, some components of the Advanced Clean Fleets are not currently being enforced. However, CARB has committed to continue to try to meet the zero emissions truck goals through programs such as the Clean Truck Partnership. (CARB 2025a)	Applied to the On-road Transportation sector, increased zero-emissions vehicle penetration reduces fleetwide emissions.
State	Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	Applied to the On-road Transportation sector, increased fuel efficiency reduces fleetwide emissions.
Federal	Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	Applied to the On-road Transportation sector, increased zero-emissions vehicle penetration reduces fleetwide emissions.
State	Off-Road Vehicle & Equipment Regulations	Establishes standards for air emissions from diesel off-road equipment, including the Regulation for In-Use Off-Road Diesel-Fueled Fleets and Off-Road Large Spark-Ignition Engine Fleet Requirements Regulation.	Applied to the Off-road Equipment sector, increased efficiency in the diesel-fueled off-road equipment reduces fleetwide emissions.
State	Small Off-road Equipment (SORE) Regulations	Establishes standards for air emissions from spark-ignition engines rated at or below 19 kilowatts, such as lawn and garden equipment, and sets bans on the sale of certain gas-fueled equipment.	Applied to the Off-road Equipment sector, increased efficiency and electrification of gasoline-fueled off-road equipment reduces fleetwide emissions.
State	Ultra-Low Emissions for Transportation Refrigeration Units (TRUs)	Requires that fleets with TRUs use either the cleanest TRU engines, retrofit TRUs, or use plug-in electric systems.	Applied to the Off-road Equipment sector, increased efficiency and electrification of TRUs reduces fleetwide emissions.

2.1 LEGISLATIVE-ADJUSTED BUSINESS-AS-USUAL FORECAST DETAILS BY EMISSIONS SECTOR

The following sections detail the legislative adjustments that were applied to the Lake Elsinore BAU scenario forecast. In cases where GHG emissions are unchanged from the BAU forecast, no additional information is provided. GHG emissions for the following sectors and sources of emissions are the same in both the BAU and legislative-adjusted BAU forecasts and are not discussed further:

- Building Energy – Backup Generation (Nonresidential)
- Solid Waste – Community-Generated Solid Waste
- Wastewater – Centralized WWTP
- Wastewater – Septic Tanks

BUILDING EFFICIENCY STANDARDS

The legislative-adjusted BAU forecast considers the effects of legislation on energy use in new residential and nonresidential buildings pursuant to California's Building Energy Efficiency Standards (California Code of Regulations Title 24 Part 6, hereafter referred to as "Title 24"), which affects emissions in the Building Energy emissions sector. For new buildings, BAU energy use is adjusted to reflect increased energy efficiency requirements under Title 24 between the 2019 and 2025 Title 24 standards. BAU Building Energy activity forecasts were developed based on energy consumption of the existing building stock, which is assumed to have been constructed primarily prior to 2020, when the 2019 Title 24 standards went into effect. Adjustment factors that compare the energy consumption of model buildings that meet the minimum standards between the 2019 and 2025 Title 24 standards were applied to growth above 2022 baseline levels to develop legislative-adjusted energy consumption forecasts.

To estimate adjusted future energy consumption resulting from Title 24 requirements in new residential and nonresidential building construction, electricity- and natural gas-specific adjustment factors are calculated using the difference in the average energy use in residential and nonresidential buildings between those built to 2019 Title 24 standards and those built to 2025 Title 24 standards. Adjustment factors are calculated using data available from the California Energy Commission (CEC) that were developed for the 2022 Title 24 standards and adjusted to account for an increased number of buildings constructed as all-electric under the 2025 Title 24 standards, which is assumed as 25 percent of new residential construction being all-electric. Residential energy use adjustments are further disaggregated by whether buildings are single-family or multi-family. Based on review of the existing conditions and growth forecasts, it is assumed that nearly all growth in the SOI will be multi-family, and 59% of growth in the city limits will be single-family and 41% multi-family.

The adjustment factors applied to new growth in natural gas and electricity use above 2022 levels are shown in A-8, for both the city limits and SOI. They are presented in terms of the percent change in energy use for buildings compliant with the 2025 Title 24 standards compared to those built to meet the 2019 Title 24 standards. Positive values indicate an anticipated increase in energy use (e.g., increased electrical demand from electrification of natural gas appliances), while negative values indicate an anticipated decrease in energy use (e.g., more energy efficiency, shifting away from natural gas appliances).

Table A-8 Title 24 Building Energy Adjustment Factors for 2025 Standards Compared to 2019 Standards

Building Type	Electricity	Natural Gas
City Limits		
Residential Buildings	19%	-40%
Nonresidential Buildings	-10%	-11%
Sphere of Influence (SOI)		
Residential Buildings	11%	-30%
Nonresidential Buildings	-10%	-11%

Source: Compiled by Ascent in 2025.

Applying the adjustment factors to new residential and nonresidential growth in the BAU forecast shows an increase in electricity use above the BAU, and a decrease in natural gas consumption. The legislative-adjusted BAU Building Energy sector energy use forecast is provided in Table A-9, including BAU energy use, growth above 2022 levels, and adjusted energy use.

Table A-9 Legislative-Adjusted Energy Consumption Forecast for Building Energy Sector

Building Type/Calculation Factor	2022	2030	2045
City Limits			
Residential – Electricity (MWh)			

Building Type/Calculation Factor	2022	2030	2045
BAU Forecast	176,681	222,429	308,208
BAU Growth Above 2022	0	45,749	131,528
Adjusted Growth Above 2022	0	64,434	185,246
Legislative-Adjusted BAU Forecast	176,681	274,112	394,925
Difference Between BAU and Legislative Adjusted BAU	0	-51,683	-86,717
Residential – Natural Gas (therms)			
BAU Forecast	6,780,306	8,535,966	11,827,829
BAU Growth Above 2022	0	1,755,660	5,047,523
Adjusted Growth Above 2022	0	641,907	1,845,482
Legislative-Adjusted BAU Forecast	6,780,306	4,741,729	5,945,304
Difference Between BAU and Legislative Adjusted BAU	0	3,794,237	5,882,525
Nonresidential – Electricity (MWh)			
BAU Forecast	151,104	199,987	291,644
BAU Growth Above 2022	0	48,883	140,540
Adjusted Growth Above 2022	0	40,002	115,005
Legislative-Adjusted BAU Forecast	151,104	176,690	251,693
Difference Between BAU and Legislative Adjusted BAU	0	23,297	39,950
Nonresidential – Natural Gas (therms)			
BAU Forecast	1,540,751	2,039,198	2,973,786
BAU Growth Above 2022	0	498,447	1,433,035
Adjusted Growth Above 2022	0	394,942	1,135,458
Legislative-Adjusted BAU Forecast	1,540,751	1,766,422	2,506,938
Difference Between BAU and Legislative Adjusted BAU	0	272,776	466,848
Sphere of Influence (SOI)			
Residential – Electricity (MWh)			
BAU Forecast	62,716	76,487	105,200
BAU Growth Above 2022	0	13,771	42,484
Adjusted Growth Above 2022	0	16,945	52,273
Legislative-Adjusted BAU Forecast	62,716	86,512	121,841
Difference Between BAU and Legislative Adjusted BAU	0	-10,025	-16,641
Residential – Natural Gas (therms)			
BAU Forecast	2,406,793	2,935,284	4,037,171
BAU Growth Above 2022	0	528,491	1,630,378
Adjusted Growth Above 2022	0	258,666	797,976
Legislative-Adjusted BAU Forecast	2,406,793	1,942,462	2,481,772

Building Type/Calculation Factor	2022	2030	2045
Difference Between BAU and Legislative Adjusted BAU	0	992,822	1,555,399
Nonresidential – Electricity (MWh)			
BAU Forecast	24,751	46,013	96,951
BAU Growth Above 2022	0	21,262	72,200
Adjusted Growth Above 2022	0	17,399	59,081
Legislative-Adjusted BAU Forecast	24,751	39,789	81,472
Difference Between BAU and Legislative Adjusted BAU	0	6,224	15,479
Nonresidential – Natural Gas (therms)			
BAU Forecast	252,382	469,180	988,575
BAU Growth Above 2022	0	216,798	736,193
Adjusted Growth Above 2022	0	171,779	583,319
Legislative-Adjusted BAU Forecast	252,382	396,433	807,973
Difference Between BAU and Legislative Adjusted BAU	0	72,747	180,602
City Limits + SOI			
Residential – Electricity (MWh)			
Legislative-Adjusted BAU Forecast	239,397	360,624	516,766
Difference Between BAU and Legislative Adjusted BAU	0	-61,708	-103,357
Residential – Natural Gas (therms)			
Legislative-Adjusted BAU Forecast	9,187,099	6,684,191	8,427,076
Difference Between BAU and Legislative Adjusted BAU	0	4,787,059	7,437,924
Nonresidential – Electricity (MWh)			
Legislative-Adjusted BAU Forecast	175,855	216,479	333,165
Difference Between BAU and Legislative Adjusted BAU	0	29,521	55,430
Nonresidential – Natural Gas (therms)			
Legislative-Adjusted BAU Forecast	1,793,133	2,162,855	3,314,911
Difference Between BAU and Legislative Adjusted BAU	0	345,523	647,450

Notes: Totals may not sum due to rounding. BAU = business-as-usual; MWh = megawatt-hour; SOI = Sphere of Influence.

Source: Compiled by Ascent in 2025.

Legislative reductions in emissions from the adjustment for Building Efficiency Standards are calculated by applying the BAU GHG emissions factor to the total change in energy consumption for between the BAU and legislative-adjusted BAU forecasts for both electricity and natural gas. This calculation and the results are provided in Table A-10, for the city limits and SOI combined.

Table A-10 Legislative Reductions from Building Efficiency Standards

Building Type/Calculation Factor	2030	2045
Residential – Electricity		
Difference Between BAU and Legislative Adjusted BAU (MWh)	-61,708	-103,357
GHG Emissions Factor ($MTCO_2e$/MWh)	0.251	0.251
GHG Reductions ($MTCO_2e$)	-15,504	-25,968
Residential – Natural Gas		
Difference Between BAU and Legislative Adjusted BAU (therms)	4,787,059	7,437,924
GHG Emissions Factor ($MTCO_2e$/therm)	0.00532	0.00532
GHG Reductions ($MTCO_2e$)	25,474	39,580
Nonresidential – Electricity		
Difference Between BAU and Legislative Adjusted BAU (MWh)	29,521	55,430
GHG Emissions Factor ($MTCO_2e$/MWh)	0.251	0.251
GHG Reductions ($MTCO_2e$)	7,417	13,926
Nonresidential – Natural Gas		
Difference Between BAU and Legislative Adjusted BAU (therms)	345,523	647,450
GHG Emissions Factor ($MTCO_2e$/therm)	0.00532	0.00532
GHG Reductions ($MTCO_2e$)	1,839	3,445
Total GHG Reductions ($MTCO_2e$)	**19,227**	**30,986**

Notes: Totals may not sum due to rounding. BAU = business-as-usual; MWh = megawatt-hour; SOI = Sphere of Influence.

Source: Compiled by Ascent in 2025.

RENEWABLE ELECTRICITY REQUIREMENTS

The legislative-adjusted BAU forecast considers changes to the carbon intensity of electricity generation under SB 100 and SB 1020 that would affect future electricity emission factors for grid-supplied electricity. These requirements, known as the Renewables Portfolio Standards (RPS), apply to all retail sales of electricity in California which must meet the following requirements:

- 60% of electricity is from carbon-free sources by 2030,
- 90% of electricity is from carbon-free sources by 2035,
- 95% of electricity is from carbon-free sources by 2040,
- 100% of electricity is from carbon-free sources by 2045.

As future grid-supplied electricity consumption in Lake Elsinore is procured from an increased percentage of carbon-free sources, the GHG emissions factor used to calculate emissions is expected to be reduced proportionally. This applies to electricity consumption in the following emissions sectors:

- Building Energy,
- Water, and

- Wastewater.

Electricity consumption accounted for in the GHG emissions inventory and forecast includes electricity delivered by Southern California Edison (SCE) and electricity delivered by unknown providers. Where it is known that SCE is the electricity provider, the SCE 2022 Power Content Label is used as reference to develop a baseline GHG emissions factor and percentage of electricity generated by carbon-free sources for forecasting future RPS-compliant emissions factors (SCE 2023). Where the electricity provider is unknown, the Emissions & Generation Resource Integrated Database (eGRID) emissions factor and percentage of electricity generated by carbon-free sources for the Western Electricity Coordinating Council California (CAMX) grid subregion is used (EPA 2024).

To calculate future emission factors, the SCE and CAMX 2022 electricity supply emissions factors were adjusted to reflect the additional carbon-free electricity mix percentage to meet the minimum RPS standards. The emission factors and carbon-free mix of electricity and associated GHG emissions factors for the legislative-adjusted BAU forecast are presented in A-11.

Table A-11 Electricity Emission Factors and Carbon-Free Mix of Electricity Used in the City of Lake Elsinore

Utility	Calculation Factor	2022	2030	2045
Southern California Edison	Emission Factor ($MTCO_2e$/MWh)	0.251	0.183	0.0
	Carbon-Free Electricity Mix (%)	45%	60%	100%
Western Electricity Coordinating Council California (CAMX) Subregion	Emission Factor ($MTCO_2e$/MWh)	0.226	0.181	0.0
	Carbon-Free Electricity Mix (%)	50%	60%	100%

Notes: $MTCO_2e$/MWh = metric tons of carbon dioxide equivalent per megawatt-hour.

Source: Analysis by Ascent in 2025.

The GHG emissions reductions for Lake Elsinore from renewable electricity requirements under SB 100 and SB 1020 are calculated by subtracting the projected electricity emissions with RPS-compliant emissions factors from projected electricity emissions without RPS-compliant emissions factors. To avoid double counting with reductions considered under the building efficiency standards, the projected electricity consumption used in this calculation is after adjustments of activity under the building efficiency standards. The calculations and results for the renewable electricity requirements legislative reductions are provided in Table A-12.

Table A-12 Renewable Electricity Requirements Legislative Adjustments Calculations and Results

Utility	Emissions Sector	Calculation Factor	2030	2045
Southern California Edison	All	Legislative-Adjusted Emission Factor ($MTCO_2e$/MWh)	0.183	0
		BAU Emission Factor ($MTCO_2e$/MWh)	0.251	0.251
	Building Energy	Legislative-Adjusted Consumption (MWh)	577,103	849,931
		Legislative Emissions Reductions ($MTCO_2e$)	39,544	213,540
	Water	Legislative-Adjusted Consumption (MWh)	3,753	5,255
		Legislative Emissions Reductions ($MTCO_2e$)	257	1,320
Western Electricity Coordinating Council California (CAMX) Subregion	All	Legislative-Adjusted Emission Factor ($MTCO_2e$/MWh)	0.181	0
		BAU Emission Factor ($MTCO_2e$/MWh)	0.227	0.227
	Water	Legislative-Adjusted Consumption (MWh)	34,409	48,187
		Legislative Emissions Reductions ($MTCO_2e$)	1,561	10,932
	Wastewater	Legislative-Adjusted Consumption (MWh)	776	1,067
		Legislative Emissions Reductions ($MTCO_2e$)	35	242
Total GHG Reductions ($MTCO_2e$)			**41,397**	**226,035**

Notes: BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent; MWh = megawatt-hour.

Source: Analysis by Ascent in 2025.

RENEWABLE NATURAL GAS REQUIREMENTS

The legislative-adjusted BAU forecast considers changes to the carbon intensity of natural gas under SB 1440 that would affect future natural gas emission factors. Known as the Renewable Gas Standards (RGS), SB 1440 requires that natural gas utilities procure and deliver a proportionate share of a statewide total of 32 billion cubic feet (bcf) of biomethane from sources that have a first point of interconnection with the pipeline system in California. This shift to increased biomethane is expected to reduce the GHG emissions associated with natural gas used by residential, commercial, and some industrial customers (known as "core customers"). This reduction applies to the Building Energy GHG emissions sector.

The proportion of renewable natural gas delivered to core customers was derived from the 2024 California Gas Report and the RGS targets for the year 2030. The California Public Utilities Commission (CPUC) established a RGS biomethane target of 72.8 bcf per year statewide by 2030 and continuing thereafter (CPUC 2022). Based on review of the statewide projections for natural gas deliveries for core customers for the years 2030 and 2040, this represents 13.96 percent and 18.02 percent of total projected deliveries, respectively (California Gas and Electric Utilities 2024).

The natural gas emissions factor used in the legislative-adjusted BAU forecast was adjusted to account for the increased proportion of biomethane delivered to core customers under the RGS. The carbon dioxide emissions factor used in the BAU forecast was reduced proportionately to account for increased biomethane, while the methane and nitrous oxide emissions factors remained constant. This method is based on the recommendations of the World Resources Institute for accounting for biomethane (WRI 2023). The emission factors and biomethane mix of natural gas and associated GHG emissions factors for the legislative-adjusted BAU forecast are presented in A-13.

Table A-13 Natural Gas Emission Factors and Renewable Natural Gas Mix Used in Lake Elsinore

Utility	Calculation Factor	2022	2030	2045
Southern California Gas Company	Emission Factor ($MTCO_2e$/therm)	0.00532	0.00458	0.00437
	Biomethane Mix (%)	0%	13.96%	18.02%

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

Source: Analysis by Ascent in 2025.

The GHG emissions reductions for Lake Elsinore from renewable natural gas requirements under SB 1440 are calculated by subtracting the projected natural gas emissions with RGS-compliant emissions factors from projected natural emissions without RGS-compliant emissions factors. To avoid double counting with reductions considered under the building efficiency standards, the projected natural gas consumption used in this calculation is after adjustments of activity under the building efficiency standards. The calculations and results for the renewable natural gas requirements legislative reductions are provided in Table A-14.

Table A-14 Renewable Electricity Requirements Legislative Adjustments Calculations and Results

Utility	Emissions Sector	Calculation Factor	2030	2045
Southern California Gas Company	All	Legislative-Adjusted Emission Factor ($MTCO_2e$/therm)	0.00458	0.00437
		BAU Emission Factor ($MTCO_2e$/therm)	0.00532	0.00532
	Building Energy	Legislative-Adjusted Consumption (therms)	8,847,046	11,741,987
		Legislative Emissions Reductions ($MTCO_2e$)	6,547	11,155
Total GHG Reductions ($MTCO_2e$)			**6,547**	**11,155**

Notes: BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis by Ascent in 2025.

SOLAR POLICIES AND MANDATES

There are numerous incentive programs for the installation of solar energy systems available in California, including net energy metering (NEM), Disadvantaged Communities Single-family Solar Homes program, property tax exclusions, Self-Generation Incentive Program, and other financial incentives offered by utility providers. Additionally, California's 2022 and 2025 Building Energy Efficiency Standards (Title 24) require solar installations on nearly all newly constructed buildings. With continued implementation of these programs, and nearly all new construction being required to incorporate solar, the reduction in grid-supplied electricity consumption associated with increased solar deployment can be accounted for in the legislative-adjusted BAU forecast. These reductions are applied to the Building Energy emissions sector.

Projections of future solar installations are estimated based on the historical average percentage of the regional total that installations in Lake Elsinore represent, and scaling percentage to projected future installations. The California Distributed Generation Statistics database includes capacities of behind-the-meter PV systems interconnected in a jurisdiction for each of the three Investor-Owned Utility planning areas, including SCE (CPUC 2025). The total cumulative solar installations in the Lake Elsinore city limits for the years 2020 through 2025 were compiled and converted into an estimated annual generation. These totals were then compared to the total installations in the SCE service territory, which was obtained from California Energy Demand, 2024-2040, published by California Energy Commission (CEC 2024). The results of this analysis show that solar generation in the Lake Elsinore city limits represents on average 1.06% of the total SCE service territory. Data used to calculate this average are provided in Table A-15.

Table A-15 Lake Elsinore Historical Solar Installations Compared to Regional Totals

Year	Lake Elsinore City Limits		Southern California Edison Planning Area	
	Cumulative Solar Capacity (kW)[1]	Estimated Annual Generation (GWh)[2]	Estimated Annual Generation (GWh)[3]	Percent of Planning Area Total in Lake Elsinore
2020	28,968	51.31	5,043	1.02%
2021	34,548	61.20	5,857	1.04%
2022	43,289	76.68	7,156	1.07%
2023	51,360	90.98	8,220	1.11%
2024	57,277	101.46	9,483	1.07%
2025	61,688	109.27	10,233	1.07%
Average over analysis time period				**1.06%**

Notes: GWh = gigawatt-hour; kW = kilowatt.

[1] Lake Elsinore city limits solar capacity obtained from the California Distributed Generation Statistics database (CPUC 2025).

[2] Lake Elsinore city limits estimated annual generation was estimated using the National Renewable Energy Laboratory PVWatts Calculator, available: https://pvwatts.nrel.gov/.

[3] Southern California Edison Planning Area estimated annual generation was obtained from California Energy Demand, 2024-2040, published by California Energy Commission (CEC 2024).

Source: Analysis by Ascent in 2025.

The California Energy Demand 2024–2040 Forecast, also has projections for solar capacity in the SCE planning area through 2040, including the impact of the residential and nonresidential solar mandates. By applying the average percent of the total generation in Lake Elsinore, compared to the total projected solar generation in the SCE planning area, estimates of future solar installations can be made to account for the impact of increased solar generation to reduce GHG emissions from grid-supplied electricity. To account for additional solar installations in the Lake Elsinore SOI, the total solar capacity for Lake Elsinore was increased by the ratio of SOI and city limits population. Additionally, projections of installations were projected forward from 2040 to 2045 based on the change in solar installations between 2030 and 2040. The calculation of future solar capacity installations and results are provided in Table A-17.

Table A-17 Projected Lake Elsinore Solar Installations

Year	Southern California Edison Planning Area	Lake Elsinore City Limits[2]		Lake Elsinore City Limits + Sphere of Influence[3]	
	Estimated Annual Generation (GWh)[1]	Cumulative Solar Capacity (kW)	Estimated Annual Generation (GWh)	Cumulative Solar Capacity (kW)	Estimated Annual Generation (GWh)
2030	13,055	78,972	139.89	107,005	189.54
2040	16,507	99,854	176.87	135,299	239.66
2045[4]	NA	120,735	213.86	163,592	289.78

Notes: GWh = gigawatt-hour; kW = kilowatt; NA = not applicable; SOI = sphere of influence.

[1] Southern California Edison Planning Area estimated annual generation was obtained from California Energy Demand, 2024-2040, published by California Energy Commission (CEC 2024).

[2] Lake Elsinore city limits solar capacity and estimated annual generation were calculated by applying the 1.06% factor for the regional capacity installed in Lake Elsinore to the projected annual generation for the Southern California Edison Planning Area.

[3] Estimates for the Lake Elsinore city limits + SOI were calculated based on the population in the SOI compared to the city limits, which results in a factor of 1.35 being applied to the Lake Elsinore city limits values for solar capacity and generation.

[4] Values for the estimated annual solar generation are not available for 2045 in the California Energy Demand, 2024-2040 report. Estimated values for Lake Elsinore were developed by linear extrapolation from 2030 and 2040.

Source: Analysis by Ascent in 2025.

The GHG emissions reductions from increased solar installations are calculated by estimating the cumulative solar generation above 2022 levels and applying the legislative-adjusted GHG emissions factor for grid supplied electricity from SCE. The calculations and GHG reduction results of the solar adjustments for the years 2030 and 2045 are provided in Table A-17.

Table A-17 Solar Adjustments Results

Calculation Factor	2030	2045
Annual solar generation above 2022 baseline (MWh)	85,644	185,879
Southern California Edison legislative-adjusted emissions factor (MTO_2e/MWh)	0.181	0.0
Annual emissions reductions from increased solar generation ($MTCO_2e$)	**15,649**	**0**

Notes: MWh = megawatt-hour; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis by Ascent in 2025.

FUEL EFFICIENCY STANDARDS AND ELECTRIC VEHICLE SALES

For the legislative-adjusted BAU forecast, the future vehicle emission factors are based on those from the CARB EMFAC2025 v2.0.0 webtool, which includes legislative adjustments from state and federal policies and regulations, including the Pavley Clean Car Standards, Advanced Clean Car II (ACC II) regulation, and the Advanced Clean Fleets (ACF) and Advanced Clean Trucks (ACT) regulations for medium- and heavy-duty trucks. The fleetwide average emissions factors by vehicle category for Riverside County, as obtained from EMFAC2025, are provided in Table A-18. These emissions factors are used to calculated the legislative-adjusted GHG emissions from the on-road transportation sector.

Table A-18 On-Road Transportation Legislative-Adjusted Emissions Factors (gCO_2e/VMT)

Vehicle Category	2022	2030	2045
Autos	377	273	62
Light Trucks	445	332	72
Medium Trucks	1,361	1,188	319
Heavy Trucks	1,793	1,522	594

Notes: gCO2e/VMT = grams of carbon dioxide equivalent per vehicle miles traveled; VMT= vehicle miles traveled.

Source: Compiled by Ascent in 2025.

The GHG emissions factors in Table A-18 were applied to the BAU scenario forecast VMT to estimate future GHG emissions in a legislative-adjusted scenario from the on-road transportation sector. The legislative-adjusted on-road transportation emissions for 2030 and 2045 are provided in Table A-19, including the total emissions reductions from the fuel efficiency standards and electric vehicle sales legislative adjustments.

Table A-19 On-Road Transportation Legislative-Adjusted BAU Forecasts and Total Legislative Reductions ($MTCO_2e$)

Source	2030	2045
Autos	220,561	67,436
Light Trucks	2,055	606
Medium Trucks	9,144	3,411
Heavy Trucks	26,959	14,619
Total Legislative-Adjusted Emissions	**258,720**	**86,072**
Total BAU Emissions	**350,215**	**470,410**
Total Emissions Reductions from Legislative Adjustments	**91,495**	**384,338**

Notes: BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: Analysis by Ascent in 2025.

2.1.1 Off-road Equipment Regulations

The Off-Road Web Query Tool used to estimate GHG emissions for the BAU scenario forecast already incorporates several regulations that will reduce future fuel consumption and emissions from off-road vehicles and equipment. Some of the key regulations included in the model that are relevant to Lake Elsinore include:

- Regulation for In-Use Off-Road Diesel-Fueled Fleets,
- Off-Road Large Spark-Ignition Engine Fleet Requirements Regulation, and
- Small Off-road Equipment (SORE) Regulations.

Additional adjustments are not performed to account for these regulations.

One regulation that is not included in the Off-Road Web Query Tool that will result in GHG emissions reductions in Lake Elsinore is the Ultra-Low Emissions for Transportation Refrigeration Units (TRUs). This regulation requires that fleets with TRUs use either the cleanest TRU engines, retrofit TRUs, or use plug-in electric systems.

To calculate the GHG emissions reductions associated with this regulation, data on the projected reduction in diesel fuel consumption by TRUs in Southern California was used to reduce diesel fuel consumption allocated to Lake Elsinore in the BAU forecast. Under the DRAFT Mobile Emissions Toolkit for Analysis (META), CARB projects that diesel fuel consumption by TRUs will be reduced below project fuel consumption in the Off-Road Web Query Tool by:

- 69.3 percent in 2030, and
- 98.9 percent in 2045.

These projected reductions in future diesel fuel consumption were applied to BAU scenario emissions projections for diesel fuel use by TRUs, to estimate legislative-adjusted scenario emissions and the associated emissions reductions. Table A-20 provides the legislative reductions from the Ultra-Low Emissions for TRUs regulations and the resulting legislative-adjusted emissions for the Off-road Vehicle and Equipment emissions sector.

Table A-20 Off-Road Vehicle and Equipment Legislative-Adjusted BAU Forecasts and Total Legislative Reductions ($MTCO_2e$)

Source	2030	2045
TRUs – Diesel GHG Emissions under BAU Scenario	2,694	5,301
Adjustment for Ultra-Low Emissions for TRUs regulations	-69.3%	-98.9%
Emissions Reductions from Legislative Adjustments	**1,865**	**5,243**
Total Legislative-Adjusted Emissions for Off-road Vehicle and Equipment	**23,380**	**35,938**

Notes: BAU = business-as-usual; $MTCO_2e$ = metric tons of carbon dioxide equivalent; TRUs = transportation refrigeration units.

Source: Analysis by Ascent in 2025.

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Attachment B

GHG Strategies Calculation

Methods and Assumptions

INTRODUCTION

This document is an attachment to the City of Lake Elsinore's (City's) Greenhouse Gas Emissions Forecast, Targets, and Reduction Measures Memorandum (hereafter referred to as "GHG Memorandum"). It provides technical documentation for quantification of the GHG reduction strategies. This attachment supports the substantiation of the estimated reductions summarized in Section 5 of the GHG Memorandum.

Table B-1 summarizes the quantification methods, assumptions, and data sources used to quantify the GHG reductions from the 10 quantified strategies identified in Section 5 of the GHG Memorandum. Detailed calculations and assumptions are available in spreadsheets included in this Attachment. Analysis of the vehicle miles traveled (VMT) reductions for Strategies TR-1, TR-2, and TR-4 was conducted by Fehr & Peers, and is available in Attachment C.

Table B-1 Summary of GHG Reduction Strategy Primary Assumptions, Methods, and Data

Strategy Number	Strategy Name	Assumptions/Measure Targets	Methods	Data Sources
BE-1	Energy Efficiency and Decarbonization	▸ Measure BE-1.3: 75% of new single-family residential units are constructed as all-electric with CALGreen Tier 1 efficiency standards. 25% of new single-family residential units assumed to be all-electric from the 2025 building code. ▸ Measure BE-1.4, Action BE-1.4.1: Implement CALGreen voluntary standards Section A4.204.1.1 by 2031. 70% of existing single-family residential units have replaced AC with heat pumps by 2045. 5% annual unit replacement from Cost Effectiveness Explorer assumptions. ▸ Measure BE-1.4, Action BE-1.4.2: 16% of existing single-family and multi-family residential units have electric water heaters and HVAC units by 2030, 74% by 2045. This target is 16% by 2030 for existing nonresidential retail building square footage, and 74% by 2045. Implementation is assumed to start in 2026. 3.9% replacement rate from American Council for Energy-Efficient Economy (ACEEE).	▸ BE-1.3: Adjustment factors used to develop the legislative-adjusted BAU forecast to account for building efficiency requirements (See Attachment A), were adjusted such that 75% of new construction is all-electric. This resulted in an increase in electricity consumption for new units and a decrease in natural gas consumption. ▸ BE-1.4.1: Annual gas savings and increased electricity use estimated from Cost Effectiveness Explorer model for a heat pump space conditioner policy. ▸ BE-1.4.2: Annual gas savings and increased electricity use estimated from Cost Effectiveness Explorer model for a heat pump space conditioner and electric heat pump water heater policy.	Local Energy Codes (n.d.) ACEEE (2016)
BE-2	Renewable Energy	▸ By 2030, there will be 35% participation in a 100% renewable or carbon-free electricity program through a Community Choice Aggregator, Southern California Edison, or a combination thereof.	Measure target for renewable and carbon-free energy supply was multiplied by forecasted building energy electricity emissions to obtain community-wide GHG reductions.	None
TR-1	Active Transportation	▸ Emissions factor for vehicles categorized as automobiles is 274 $MTCO_2e$/VMT in 2030 and 63 $MTCO_2e$/VMT in 2045.	Estimated VMT reductions for the following Fehr & Peers measures were accounted for under this strategy: AT.1 RD.2 RD.1 Vehicles in EMFAC2025 were categorized in in accordance with RIVCOM vehicle categories. "Automobiles" included the following EMFAC2025 vehicle types: LDA, MCY, MDV, and MH. To calculate the emissions factor, g CO_2e/VMT was averaged for all automobiles for the years 2030 and 2045.	CARB (2025) See Attachment C

Strategy Number	Strategy Name	Assumptions/Measure Targets	Methods	Data Sources
TR-2	Transit	▸ Emissions factor for vehicles categorized as automobiles is 274 $MTCO_2e$/VMT in 2030 and 63 $MTCO_2e$/VMT in 2045.	Estimated VMT reductions for the following Fehr & Peers measures were accounted for under this strategy: CM.1 CM.3 CM.4 CM.5 PT.1 PT.2 PT.3 ND.1 PT.6 PT.7 Vehicles in EMFAC2025 were categorized in accordance with RIVCOM vehicle categories. "Automobiles" included the following EMFAC2025 vehicle types: LDA, MCY, MDV, and MH. To calculate the emissions factor, g CO_2e/VMT was averaged for all automobiles for the years 2030 and 2045.	CARB (2025) See Attachment C
TR-3	Zero-Emission Vehicles and Equipment	▸ Measures TR-3.1 and TR-3-2: 90% of the vehicle fleet will be zero-emission vehicles (ZEVs). ZEVs included the EMFAC2025 categories of EVs, PHEVs, and fuel cell vehicles. ▸ Measure TR-3.3: 100% of construction equipment will be zero-emission by 2045.	▸ TR-3.1 and TR-3-2: Vehicles in EMFAC2025 were categorized in accordance with RIVCOM vehicle categories. To calculate the emissions factor, g CO_2e/VMT was averaged for each vehicle category for the years 2030 and 2045. 2045 emissions factors were calculated by taking the difference between existing ZEVs in the 2022 fleet and target ZEVs in 2045, multiplied by the existing emissions factor. Fehr & Peers 2045 VMT estimates were multiplied by the new emissions factors to calculate emissions reductions, after accounting for the reductions in VMT from implementation of measures. ▸ TR-3.3: Measure target was multiplied by legislative-adjusted forecasted GHG emission for construction equipment under the off-road vehicles and equipment sector.	CARB (2025) See Attachment C

Strategy Number	Strategy Name	Assumptions/Measure Targets	Methods	Data Sources
TR-4	Smart Growth	▸ Estimated Emissions factor for vehicles categorized as automobiles is 274 $MTCO_2e$/VMT in 2030 and 63 $MTCO_2e$/VMT in 2045.	Estimated VMT reductions for the following Fehr & Peers measures were accounted for under this strategy: LU.1 LU.2 LU.4 Vehicles in EMFAC2025 were categorized in accordance with RIVCOM vehicle categories. "Automobiles" included the following EMFAC2025 vehicle types: LDA, MCY, MDV, and MH. To calculate the emissions factor, g CO2e/VMT was averaged for all automobiles for the years 2030 and 2045.	CARB (2025) See Attachment C
W-1	Water Conservation	▸ Reduce water consumption to 44 gallons per capita per day (GCPD) 2030, and 20 GCPD by 2045. ▸ Reductions were applied to imported water first, as it is the costliest and highest energy intensity water source in Lake Elsinore.	Target water savings are from subtracting the GCPD savings from Elsinore Valley Municipal Water District's (EVMWD) 2018 Water Conservation Business Plan Program B and forecasted water use.	EVMWD (2018)
W-2	Recycled Water	▸ 17% increase in recycled water use by 2030, 50% increase by 2045. ▸ 1% increase in graywater use by 2030, 15% increase by 2045. Graywater has an intensity (kWh/AF) factor of 0. ▸ Reductions were applied to imported water first, as it is the costliest and highest energy intensity water source in Lake Elsinore.	Measure target was multiplied by forecasted imported water emissions to get community-wide reductions. The California Public Utilities Commission (CPUC) intensity factor of recycled water was subtracted from the intensity factor of imported water to calculate reduced fuel use. This was also applied to graywater.	CPUC (2014)
SW-1	Recycling and Compost.	▸ 30,000 tons of organic waste diverted from landfills by 2030, 44,200 tons of organic waste diverted from landfills by 2045.	2022 diversion rates were calculated using data from CalRecycle. Target was calculated by estimating 25% of 2014 organic waste tonnage that was landfilled, and dividing by forecasted organic waste landfilled in 2030 and 2045. Measure target was multiplied by forecasted solid waste emissions to get community-wide reductions.	CalRecycle (2025)
GC-2	Urban Tree Canopy	▸ 9% increase in canopy percent coverage by 2030, 20% by 2045. ▸ Average carbon stored per tree is 0.02 tons of CO_2.	Target tree canopy coverage estimated according to the Tree Equity Score tool. Targets allow Lake Elsinore to achieve a score of 65 out of 100.	American Forests (2025)

ACEEE = American Council for Energy-Efficient Economy, AF = acre-foot, CalRecycle = California Department of Resources Recycling and Recovery, CARB = California Air Resources Board, CPUC = California Public Utilities Commission, CO_2 = carbon dioxide, EVMWD = Elsinore Valley Municipal Water District, GCPD = gallons per capita per day, GHG = greenhouse gas, HVAC = heating, ventilation, and air conditioning, kWh = kilowatt hours, $MTCO_2e$ = metric tons of carbon dioxide equivalent, RIVCOM = Riverside County Model; VMT = Vehicle Miles Traveled; ZEV = zero-emission vehicle.

3 REFERENCES

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BE-1.3

Develop building performance standards that adhere to or go beyond CALGreen Tier 1 values.

		2030	2045
CALGreen Tier 1 for single-family residential shifts more new construction to all-electric through increased efficiency requirements (only applies to City Limits after 2030, as growth in SOI is expected to be primarily multifamily)			
Proportion of new single family units assumed to be all-electric from 2025 building code	0.25		
Proportion of new single family units with CALGreen Tier 1 efficiency standards	0.75		
New Growth Building Energy Adjustment Factors			
Residential Natural Gas with 2025 building code (applied to 2022 residential energy to develop Legislative Adjusted forecast)	0.60		
Residential Natural Gas with CALGreen Tier 1 (applied to growth between 2030 and 2045)	0.39		
Projected Natural Gas Consumption			
Residential Natural Gas with 2025 building code (therms)		4,741,729	5,945,304
Residential Natural Gas with CALGreen Tier 1 (after 2030) (therms)		4,741,729	5,454,895
Annual Gas Savings (therms)		-	490,410
Natural gas emissions factor - RGS adjusted (MTCO2e/therm)		0.00435	0.00435
GHG Reductions from natural gas savings (MTCO2e)		-	**2,132**

GHG emissions from increased electricity are not calculated, as they have zero emissions impact

BE-1.4
Retrofit existing residential and nonresidential buildings to use electric heating and cooling technology.

	2025	2030	2045
Calculations for CALGreen AC Replacements with heat pump at time-of-replacement, single-family			
Affected Units by Build Year(Existing Single Family Homes)			
Total City Limits	19,520		
Total SOI	4,198		
Total City Limits +SOI	**23,718**		
Local Energy Code Input Assumptions			
Average Age of A/C Units (years)	15		
Percentage of units replaced per year (Penetration Rate)	5%		
Installation Time (years)	1		
Applicability Rate (Percent of eligible homes that will actually install the required measure.)	50%		
Measure Start Year	2031		
Annual target replacement rate due to CALGreen measures			5%
Cumulative percentage of existing units replaced starting in 2031 [1]			70%
Number of units with heat pump replacement city limits			13,664
Number of units with heat pump replacement SOI			2,939
Total number of units with heat pump replacements City Limits + SOI			16,603
Annual Gas Savings City Limits (therms) [2]			1,560,000
Annual Gas Savings (therms) SOI [2]			336,478
Annual Gas Savings (therms) City Limits + SOI [2]			1,896,478
Natural gas emissions factor (MTCO2e/therm)			0.00435
GHG Reductions from natural gas savings (MTCO2e)			8,246
Annual Electricity Savings (kWh) [2]			(3,220,000)
Electricity emissions factor (MTCO2e/MWh)			-
Electricity-related Emissions reductions from Heat Pump HVAC Replacements (MTCO2e) (negative reduction = increased emissions)			-
Net GHG Reductions (MTCO2e)			**8,246**

	2025	2030	2045
Calculations for heat pump HVAC and water heating replacements through voluntary replacements, single-family and multifamily.			
Affected Units Existing Single and Multi Family Homes	55,157		
Measure Start Year	2026		
Annual replacement rate due to participation in loan/rebate program		3.9%	3.9%
Cumulative percentage of existing units replaced starting in 2026 [3]		16%	74%
Number of units with heat pump replacement		8,604	40,871
Annual Gas Savings per unit (therms)		158	158
Natural gas emissions factor (MTCO2e/therm)		0.00435	0.00435
GHG Reductions from natural gas savings (MTCO2e)		5,908	28,061
Annual Electricity Savings per unit (kWh)		(417)	(417)
Electricity emissions factor (MTCO2e/MWh)		0.18	-
Electricity-related Emissions reductions from Heat Pump Water Heater Replacements (MTCO2e) (negative reduction = increased emissions)		(656)	-

Net GHG Reductions (MTCO2e)		**5,251**	**28,061**

	2025	2030	2045
Calculations for heat pump HVAC and water heating replacements through voluntary replacements, nonresidential.			
Affected Existing Buildings Nonresidential (Retail)	205		
Square footage of affected nonresidential retail	3,280,000		
Local Energy Code Input Assumptions			
Annual Gas Savings (therms) [4]	667		
Retail average square footage [5]	24,563		
Annual gas savings per square foot (therms)	0.03		
Measure Start Year	2026		
Annual replacement rate due to participation in loan/rebate program		3.9%	3.9%
Cumulative percentage of existing units replaced starting in 2026 [3]		16%	74%
Number of units with heat pump replacement		32	152
Total square footage with heat pump replacement		511,680	2,430,480
Annual Gas Savings per unit (therms)		0.03	0.03
Natural gas emissions factor (MTCO2e/therm)		0.00435	0.00435
Total therms reduced		13,894.5	65,998.9
GHG Reductions from natural gas savings (MTCO2e)		60	287
Annual Electricity Savings per sq ft (kWh)		(0)	(0)
Electricity emissions factor (MTCO2e/MWh)		0.18	-
Electricity-related Emissions reductions from Heat Pump Water Heater Replacements (MTCO2e) (negative reduction = increased emissions)		(105)	-
Net GHG Reductions (MTCO2e)		**(44)**	**287**
Total GHG Reductions (MTCO2e)		**5,207**	**36,594**

Notes:

[1] Assumes that implementation starts in 2026 with a 3.5% achievable rate per year, based on the Mozingo study Table 59.https://www.researchgate.net/publication/359931845_Zero-Carbon_Buildings_in_California_A_Feasibility_Study

[2] Modeled in LocalEnergyCodes.com for the City of Lake Elsinore.

[3] Assumes a participation rate of 3.9% to 2016 ACEEE Summer Study on Energy Efficiency in Buildings Table 2. https://www.aceee.org/files/proceedings/2016/data/papers/2_765.pdf

Sources:

[4] Nonresidential AC to HP Replacements. https://localenergycodes.com/download/2049/file_path/fieldList/2025%20NR%20Alterations%20CostEff%20Report.pdf

[5] Nonresidential AC to HP Study Data.(RE HP-DCV v3 SCE) https://localenergycodes.com/download/2052/file_path/fieldList/2025%20NR%20AC%20to%20HP%20Study%20Data.xlsx

BE-1.4

Facilitate the transition of residential electricity use to 100% renewable energy sources.

	2030	2045
Building energy electricity consumption (MWh)	491,459	664,052
Southern California Edison Grid emissions factor (MTCO2e/MWh)	0.18	0
GHG Emissions from electricity consumption with SCE	89,801	-
Participation Rate in 100% carbon-free Program	35%	135%
Electricity purchased via carbon-free options	172,011	896,470
Carbon-free emissions factor (MTCO2e/MWh) [1]	-	-
Total GHG Emissions (MTCO2e)	**31,430**	**-**

TR-3.3
Transition away from fossil-fuel powered equipment.

	2045
Projected construction equipment emissions per fuel type:	
Conventional Diesel (MTCO2e)	19,194
Gasoline (MTCO2e)	207
Natural Gas (MTCO2e)	-
Projected portable equipment emissions per fuel type:	
Conventional Diesel (MTCO2e)	8,869
Target electric and renewable fuel usage rate for construction equipment	100%
Reduced GHG Emissions (MTCO2e)	**28,270**

Notes: Related electricity emissions from equipment charging are assumed to be zero in 2045.

TR-3.1 and TR-3.2

Increase the adoption of EVs through financial incentives and vehicle replacement policies.

Expand EV charging infrastructure.

	2045			
	Auto	Light Trucks	Medium Trucks	Heavy Trucks
Percent of total fleet EV, PHEV or Fuel Cell	75%	73%	67%	63%
Legislative-Adjusted Forecast Emissions Factor (gCO2e/VMT)	62.4	72.3	319.4	593.8
City Vehicle Miles Traveled	852,589,604	6,195,150	7,832,717	17,882,980
SOI Vehicle Miles Traveled	228,559,734	2,197,072	2,845,180	6,738,064
Total VMT	1,081,149,338	8,392,222	10,677,897	24,621,044
Target percent electrification for Fleet	90%	90%	90%	90%
New EF	24.71	26.53	96.73	160.20
GHG Emissions with updated ZEV target (MTCO2e)	**26,717**	**223**	**1,033**	**3,944**
Legislative-Adjusted GHG Emissions (MTCO2e)	**67,436**	**606**	**3,411**	**14,619**
GHG Reductions with updated ZEV target (MTCO2e)	**40,719**	**384**	**2,378**	**10,675**
Sum of GHG Emissions Reduced (MTCO2e)	**54,156**			

GHG Emissions (MTCO2e) from TR Strategies	**4,104**
Total GHG Emissions (MTCO2e)	**50,052**

CAP Measure	2030	2045
	MTCO2e Reductions	
TR-1.1	110	451
TR-4.1	853	1,254
TR-2.1	1,116	1,447
TR-2.2	471	952
Total	2,551	4,104

Leg-Adjusted Auto Emissions Factor	
Year	MTCO2e / VMT
2030	273.99
2045	62.72

Annualization Factor
353

Year	Level of Implementation	Measure ID	Measure Name	Daily VMT Reduction	Annual VMT Reduction	MTCO2e Reduction	CAP Measure
2030	Low	AT.1	End of Trip Bike Facilities	56	19,768	5	TR-1.1
2030	Low	LU.1	Increase Residential Density	2,619	924,507	253	TR-4.1
2030	Low	LU.2	Increase Job Density	1,667	588,451	161	TR-4.1
2030	Low	LU.4	Integrate Affordable Housing Development	1,595	563,035	154	TR-4.1
2030	Low	RD.2	Improved Pedestrian Network	626	220,978	61	TR-1.1
2030	Low	CM.1	Commute Trip Reduction Program (Voluntary)	1,139	402,067	110	TR-2.1
2030	Low	CM.3	Commute Trip Reduction Marketing	1,139	402,067	110	TR-2.1
2030	Low	CM.4	Employee Ridesharing Program	1,139	402,067	110	TR-2.1
2030	Low	CM.5	Employee Vanpool	3,847	1,357,991	372	TR-2.1
2030	Low	PT.1	Subsidized Transit Pass Program	259	91,427	25	TR-2.1
2030	Low	PT.2	Expanded Local Transit Coverage	660	232,980	64	TR-2.2
2030	Low	PT.3	Expanded Local Transit Frequency	486	171,558	47	TR-2.2
2030	Low	ND.1	Community-Based Travel Planning	649	229,097	63	TR-2.2
2030	Low	PT.6	Provide Transit Shelters	381	134,493	37	TR-2.2
2030	Low	PT.7	Park and Ride Expansion	1,288	454,664	125	TR-2.2
2030	Low	RD.1	Improve Bike Facilities	37	13,061	4	TR-1.1
2030	High	AT.1	End of Trip Bike Facilities	226	79,778	22	TR-1.1
2030	High	LU.1	Increase Residential Density	5,238	1,849,014	507	TR-4.1
2030	High	LU.2	Increase Job Density	3,333	1,176,549	322	TR-4.1
2030	High	LU.4	Integrate Affordable Housing Development	3,190	1,126,070	309	TR-4.1
2030	High	RD.2	Improved Pedestrian Network	1,251	441,603	121	TR-1.1
2030	High	CM.1	Commute Trip Reduction Program (Voluntary)	2,278	804,134	220	TR-2.1
2030	High	CM.3	Commute Trip Reduction Marketing	2,278	804,134	220	TR-2.1
2030	High	CM.4	Employee Ridesharing Program	2,278	804,134	220	TR-2.1
2030	High	CM.5	Employee Vanpool	7,647	2,699,391	740	TR-2.1
2030	High	PT.1	Subsidized Transit Pass Program	1,083	382,299	105	TR-2.1
2030	High	PT.2	Expanded Local Transit Coverage	1,320	465,960	128	TR-2.2
2030	High	PT.3	Expanded Local Transit Frequency	973	343,469	94	TR-2.2
2030	High	ND.1	Community-Based Travel Planning	1,298	458,194	126	TR-2.2
2030	High	PT.6	Provide Transit Shelters	762	268,986	74	TR-2.2
2030	High	PT.7	Park and Ride Expansion	1,932	681,996	187	TR-2.2
2030	High	RD.1	Improve Bike Facilities	73	25,769	7	TR-1.1
2045	Low	AT.1	End of Trip Bike Facilities	226	79,778	22	TR-1.1
2045	Low	LU.1	Increase Residential Density	3,505	1,237,265	339	TR-4.1
2045	Low	LU.2	Increase Job Density	2,231	787,543	216	TR-4.1
2045	Low	LU.4	Integrate Affordable Housing Development	2,910	1,027,230	281	TR-4.1
2045	Low	RD.2	Improved Pedestrian Network	1,674	590,922	162	TR-1.1
2045	Low	CM.1	Commute Trip Reduction Program (Voluntary)	1,473	519,969	142	TR-2.1
2045	Low	CM.3	Commute Trip Reduction Marketing	1,473	519,969	142	TR-2.1
2045	Low	CM.4	Employee Ridesharing Program	1,473	519,969	142	TR-2.1
2045	Low	CM.5	Employee Vanpool	4,977	1,756,881	481	TR-2.1
2045	Low	PT.1	Subsidized Transit Pass Program	335	118,255	32	TR-2.1
2045	Low	PT.2	Expanded Local Transit Coverage	1,766	623,398	171	TR-2.2
2045	Low	PT.3	Expanded Local Transit Frequency	1,302	459,606	126	TR-2.2
2045	Low	ND.1	Community-Based Travel Planning	840	296,520	81	TR-2.2
2045	Low	PT.6	Provide Transit Shelters	510	180,030	49	TR-2.2
2045	Low	PT.7	Park and Ride Expansion	2,576	909,328	249	TR-2.2
2045	Low	RD.1	Improve Bike Facilities	98	34,594	9	TR-1.1
2045	High	AT.1	End of Trip Bike Facilities	1,119	395,007	108	TR-1.1
2045	High	LU.1	Increase Residential Density	7,010	2,474,530	678	TR-4.1
2045	High	LU.2	Increase Job Density	4,461	1,574,733	431	TR-4.1
2045	High	LU.4	Integrate Affordable Housing Development	5,821	2,054,813	563	TR-4.1
2045	High	RD.2	Improved Pedestrian Network	3,348	1,181,844	324	TR-1.1
2045	High	CM.1	Commute Trip Reduction Program (Voluntary)	2,947	1,040,291	285	TR-2.1
2045	High	CM.3	Commute Trip Reduction Marketing	2,947	1,040,291	285	TR-2.1
2045	High	CM.4	Employee Ridesharing Program	2,947	1,040,291	285	TR-2.1

2045 High	CM.5	Employee Vanpool	9,892	3,491,876	957	TR-2.1
2045 High	PT.1	Subsidized Transit Pass Program	1,449	511,497	140	TR-2.1
2045 High	PT.2	Expanded Local Transit Coverage	3,533	1,247,149	342	TR-2.2
2045 High	PT.3	Expanded Local Transit Frequency	2,605	919,565	252	TR-2.2
2045 High	ND.1	Community-Based Travel Planning	1,680	593,040	162	TR-2.2
2045 High	PT.6	Provide Transit Shelters	1,020	360,060	99	TR-2.2
2045 High	PT.7	Park and Ride Expansion	3,864	1,363,992	374	TR-2.2
2045 High	RD.1	Improve Bike Facilities	195	68,835	19	TR-1.1
2030 Average	AT.1	End of Trip Bike Facilities	226	79,778	14	TR-1.1
2030 Average	LU.1	Increase Residential Density	3,505	1,237,265	380	TR-4.1
2030 Average	LU.2	Increase Job Density	2,231	787,543	242	TR-4.1
2030 Average	LU.4	Integrate Affordable Housing Development	2,910	1,027,230	231	TR-4.1
2030 Average	RD.2	Improved Pedestrian Network	1,674	590,922	91	TR-1.1
2030 Average	CM.1	Commute Trip Reduction Program (Voluntary)	1,473	519,969	165	TR-2.1
2030 Average	CM.3	Commute Trip Reduction Marketing	1,473	519,969	165	TR-2.1
2030 Average	CM.4	Employee Ridesharing Program	1,473	519,969	165	TR-2.1
2030 Average	CM.5	Employee Vanpool	4,977	1,756,881	556	TR-2.1
2030 Average	PT.1	Subsidized Transit Pass Program	335	118,255	65	TR-2.1
2030 Average	PT.2	Expanded Local Transit Coverage	1,766	623,398	96	TR-2.2
2030 Average	PT.3	Expanded Local Transit Frequency	1,302	459,606	71	TR-2.2
2030 Average	ND.1	Community-Based Travel Planning	840	296,520	94	TR-2.2
2030 Average	PT.6	Provide Transit Shelters	510	180,030	55	TR-2.2
2030 Average	PT.7	Park and Ride Expansion	2,576	909,328	156	TR-2.2
2030 Average	RD.1	Improve Bike Facilities	98	34,594	5	TR-1.1
2045 Average	AT.1	End of Trip Bike Facilities	1,119	395,007	65	TR-1.1
2045 Average	LU.1	Increase Residential Density	7,010	2,474,530	509	TR-4.1
2045 Average	LU.2	Increase Job Density	4,461	1,574,733	324	TR-4.1
2045 Average	LU.4	Integrate Affordable Housing Development	5,821	2,054,813	422	TR-4.1
2045 Average	RD.2	Improved Pedestrian Network	3,348	1,181,844	243	TR-1.1
2045 Average	CM.1	Commute Trip Reduction Program (Voluntary)	2,947	1,040,291	214	TR-2.1
2045 Average	CM.3	Commute Trip Reduction Marketing	2,947	1,040,291	214	TR-2.1
2045 Average	CM.4	Employee Ridesharing Program	2,947	1,040,291	214	TR-2.1
2045 Average	CM.5	Employee Vanpool	9,892	3,491,876	719	TR-2.1
2045 Average	PT.1	Subsidized Transit Pass Program	1,449	511,497	86	TR-2.1
2045 Average	PT.2	Expanded Local Transit Coverage	3,533	1,247,149	256	TR-2.2
2045 Average	PT.3	Expanded Local Transit Frequency	2,605	919,565	189	TR-2.2
2045 Average	ND.1	Community-Based Travel Planning	1,680	593,040	122	TR-2.2
2045 Average	PT.6	Provide Transit Shelters	1,020	360,060	74	TR-2.2
2045 Average	PT.7	Park and Ride Expansion	3,864	1,363,992	311	TR-2.2
2045 Average	RD.1	Improve Bike Facilities	195	68,835	14	TR-1.1

W-1
Water Conservation

	2030	2045
Population	81,724	113,240
Forecast MG/year	1,770	1,770
MG to Gallons	1,770,190,427	1,770,190,427
Days in a Year	365	365
GPCD Forecast	59	43
EVMWD 2022 GPCD	27	35
EVMWD 2030 GPCD	12	12
EVMWD 2022 GPCD - EVMWD 2030 GPCD	15	23
EVMWD GPCD (subtract this from our GPCD Forecast)	44	20
GPCD to AF	11.34	5.07
Total Imported Water-related Fuel Use (kWh) [1]	29,507,568	46,382,231
Annual potable water consumption (AF/year)	7,817	12,287
Rate of Fuel Use (kWh/AF/year)	3,775	3,775
Reduced Fuel Use (kWh)	42,826.75	19,149.48
kWh / MWH factor	1,000	1,000
Reduced Fuel Use (MWh)	43	19
Leg-Adjusted Average electricity emissions factor for imported water usage (MTCO2e/MWh)	0.17	0
Reduced GHG Emissions (MTCO2e)	**7.17**	**0**

Notes:

[1] Assuming reduction in imported water with efficiency savings.

Sources:

[2] EVMWD 2018 Water Conservation Business Plan Final Draft.Figure ES-2. Available: https://evmwd.com/wp-content/uploads/2022/09/Water-Conservation-Busines.pdf

W-2
Recycled Water

	2022	2030	2045
Imported Water (AF) [1]	5,433	7,817	12,287
Intensity factor (kWh/AF)	6,852	4,469	0
Recycled Water (AF)	0		
Intensity factor (kWh/AF) [2]	1200.4	782.87	0
Target Percent Increase in Recycled Water	0	17%	50%
Reduced Water Related Consumption (AF/year)		1,359	6,143
Difference Between Intensity Factors (kWh/AF)		3,686	-
kWh / MWH factor		1000	1000
Reduced Fuel Use (MWh)		5,011	-
Leg-Adjusted Electricity emissions factor (MTCO2e/MWh)		0.17	-
Reduced GHG Emissions (MTCO2e)		838.68	-
Graywater (AF)	0	0	0
Intensity factor (kWh/AF)	0	0	0
Target Percent Increase in Graywater		1%	15%
Total Number of Residents	71,586	108,833	201,949
Target Number of Residents with Graywater Systems		1,088	30,292
Reduced Water Related Consumption (AF/year)		78	1,843
Difference Between Intensity Factors		782.87	-
kWh / MWH factor		1,000	1,000
Reduced Fuel Use (MWh)		61	-
Leg-Adjusted Electricity emissions factor (MTCO2e/MWh)	0.23	0.17	-
Reduced GHG Emissions (MTCO2e)		10.24	-
Total Reduced GHG Emissions (MTCO2e)		**848.92**	**-**

Notes:

[1] Assuming reduction in imported water with increased recycled water.

Sources:

[2] Navigant CPUC Water/Energy Cost-Effectiveness Analysis 2015.

SW-1
Recycling and Composting

	2014	2022	2030	2045
Organics Landfilled (From 2014 and 2021 State Waste Characterization)				
Paper	14%	15.50%	15.50%	15.50%
Other Organic	37.40%	28.40%	28.40%	28.40%
Total Organic	**51.40%**	**43.90%**	**43.90%**	**43.90%**
Organics in Elsinore Waste Stream				
Total waste landfilled	41,290	63,347	80,547	112,789
Organic waste landfilled	21,223	27,809	35,360	49,514
Target landfilled organics	5,306	5,306	5,306	5,306
Organic waste reduction to meet target			30,054	44,209
% reduction in organics landfilled			0.85	0.89
Solid waste emissions from ABAU forecast (MTCO2e)			24,090	33,439
Reduced GHG Emissions (MTCO2e)			**20,475**	**29,856**

Notes:

From Cal Recycle 2021: Cal Recycle estimates that California's overall waste generation in 2021 was about 76.7 million tons. Of that total

Disposal = All solid waste disposed into landfill, incinerated, or other means [4]

Diversion = Generated - Disposed = Waste that is diverted from the waste stream through existing source reduction, recycling, and compostin

Sources:

[1] State of Disposal and Recycling for Calendar Year 2022. Cal Recycle 2023. Available: https://calrecycle.ca.gov/reports/stateof/

[2] Cal Recycle Jurisdiction Diversion/Disposal Rate Summary

[3] 2022 values calculated by scaling the Lake Elsinore rate by the disposal rates between Statewide and Lake Elsinore in 2022.

GC-2
Urban Tree Canopy

	2022	2030	2045
Target Number of Trees	66,044	71,614	79,571
Target Canopy Percent Coverage	8%	9%	10%
Number of Trees Equivalent to 1% Canopy	7,957		
Target Number of Trees to Plant		5,570	13,527
Total carbon sequestered (tons CO2)	1,579		
Carbon stored per tree (tons CO2/tree)	0.02		
Reduced GHG Emissions (MTCO2e)		**133**	**323**

Sources:

[1] Tree Equity Score. Tree Equity Score Location Insights: Lake Elsinore, CA. Available: https://www.treeequityscore.org/insights/place/lake-elsinore-ca

Fehr & Peers

Memo

Date: November 11th, 2025

To: Poonam Boparai – Ascent

From: Paul Herrmann, TE, Trevor Lien, Andre Pham – Fehr & Peers

Subject: Lake Elsinore Climate Action Plan (CAP) Vehicle Miles Traveled (VMT) Reduction Summary

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Fehr & Peers analyzed and quantified Vehicle Miles Traveled (VMT) reduction measures to support the City of Lake Elsinore's Climate Action Plan (CAP). Our analysis quantifies the VMT reduction potential of various transportation-related measures and forecasts these reductions for the CAP scenario years 2030 and 2045.

This memorandum summarizes our methodology and calculations and provides two implementation level scenarios for the city to consider.

Baseline VMT Inventory

Fehr & Peers used the latest version of the RIVCOM model to estimate VMT for the City and City's sphere of influence (SOI). The RIVCOM model is the most appropriate travel demand model for forecasting traffic volumes and VMT in the City and SOI as it reflects updated land use assumptions and is consistent with the latest City of Lake Elsinore 2045 general plan update and the 2020 Southern California Association of Governments Regional Transportation Plan and Sustainable Communities Strategy (SCAG RTP/SCS). The RTAC half-accounting method assigns 100% of the VMT for trips that begin and end within the city and 50% of the VMT for trips with one trip ending in Lake Elsinore and the other in a neighboring jurisdiction. **Table 1** summarizes daily average City and SOI VMT estimates and VMT per service population (VMT/SP) for years 2018, 2025, 2030, and 2045. Further details of the VMT inventory are provided in a separate memorandum (Lake Elsinore CAP VMT Inventory Memorandum).

Table 1: Lake Elsinore and SOI Daily Average Origin-Destination (OD) VMT Estimates

Year	Total (Full-Accounting) VMT			RTAC VMT[1]			Service Population[2]	RTAC VMT/SP		
		i	x	Total	Auto	Truck		Total	Auto	Truck
2018	i	215,033	1,566,607	1,736,082	1,673,969	62,113	95,735	18.13	17.49	0.65
	x	1,475,491	-							
2025	i	287,755	1,866,012	2,112,121	2,034,022	78,099	120,871	17.47	16.83	0.65
	x	1,782,721	-							
2030	i	339,699	2,079,872	2,380,720	2,291,203	89,517	138,825	17.15	16.50	0.64
	x	2,002,170	-							
2045	i	495,532	2,721,453	3,186,518	3,062,746	123,771	192,687	16.54	15.89	0.64
	x	2,660,519	-							

Notes: RTAC VMT = 100% internal-internal + 50% internal-external + 50% external-internal. Service Population = Population + Total Employment.
Source: RIVCOM; Fehr & Peers, 2025.

VMT Reduction Measures

VMT reduction measures aim to decrease reliance on single-occupancy vehicles by providing transportation alternatives and/or reducing the need for longer trip lengths. Some examples of reduction measures include:

- Promoting higher-density, mixed-use development
- Improving public transit
- Enhancing active transportation infrastructure
- Implementing telecommuting policies
- Encouraging carpooling or ride-sharing programs

In consultation with City staff, Fehr & Peers identified 16 VMT mitigation measures applicable to the City of Lake Elsinore related to:

- Land Use
- Trip Reduction Program
- Parking Management
- Transit
- Neighborhood Design

These measures were grouped into two scenarios based on scalability and ease of implementation, with one scenario representing a more conservative, low-level implementation and another representing a more aggressive, high-level implementation. VMT reductions were calculated for 2030 and 2045. **Table 2** presents the selected mitigation measures analyzed for VMT reduction and the two scenarios.

Table 2: VMT Reduction Measures Descriptions

Measure ID	Measure Name	Category	Low-Level Implementation Alternative	High-Level Implementation Alternative
AT.1	End of Trip Bike Facilities	Active Transportation	Provide secure bike parking and repair stations at all new workplaces.	Provide secure bike parking and repair stations with personal lockers and showers at all new workplaces.
LU.1	Increase Residential Density	Land Use	Modify zoning / land use to increase residential density by 10% in 5% of the City.	Modify zoning / land use to increase residential density by 20% in 5% of the City.
LU.2	Increase Job Density	Land Use	Modify zoning code / land use to increase employment by 10% across 10% of City.	Modify zoning code / land use to increase employment by 20% across 10% of City.
LU.4	Integrate Affordable Housing Development	Land Use	Provide 5% additional low and very-low-income housing additional to the SCAG RHNA Allocation.	Provide 10% additional low and very-low-income housing additional to the SCAG RHNA Allocation.
RD.2	Improved Pedestrian Network	Roadway Infrastructure	Fill 50% of sidewalk gap length identified in ATP.	Fill 100% of sidewalk gap length identified in ATP.
CM.1	Commute Trip Reduction Program (Voluntary)	Commuter Trips	Provide voluntary commute trip reduction programs for 5% of employees in City.	Provide voluntary commute trip reduction programs for 10% of employees in City.
CM.3	Commute Trip Reduction Marketing	Commuter Trips	Implement commute trip reduction marketing targeting 5% of employees in City.	Implement commute trip reduction marketing targeting 10% of employees in City.
CM.4	Employee Ridesharing Program	Commuter Trips	Provide rideshare program for 5% of employees in City.	Provide rideshare program for 10% of employees in City.
CM.5	Employee Vanpool	Commuter Trips	Provide vanshare program utilized by 0.5% of employees.	Provide vanshare program utilized by 1% of employees.
PT.1	Subsidized Transit Pass Program	Public Transportation	Implement program that subsidizes transit passes for 5% of employees via collaboration with large employers and RTA.	Implement program that subsidizes transit passes for 5% of employees and residents via collaboration with large employers, developers, and RTA.
PT.2	Expanded Local Transit Coverage	Public Transportation	Increase transit route coverage in the city by 10% (11.2 miles).	Increase transit route coverage in the city by 20% (22.4 miles).
PT.3	Expanded Local Transit Frequency	Public Transportation	Increase transit frequency by 20% across 50% of routes/service hours.	Increase transit frequency by 20% across 100% of routes/service hours.
ND.1	Community-Based Travel Planning	Neighborhood	Implement Community-Based Travel Planning program aimed towards 5% of residents.	Implement Community-Based Travel Planning program aimed towards 10% of residents.
PT.6	Provide Transit Shelters	Public Transportation	Improve bus stops with shelters and additional amenities only at the most-used stops.	Improve bus stops with shelters and additional amenities at stops across the City.
PT.7	Park and Ride Expansion	Public Transportation	Construct 100 Parking spaces to be used as a Park and Ride lot.	Construct 150 parking spaces to be used as a Park and Ride lot.
RD.1	Improve Bike Facilities	Roadway Infrastructure	Build out 50% of bikeway projects identified in the ATP.	Build out 100% of bikeway projects identified in the ATP.

Note: Further details on 2030 interim year assumptions and calculations are provided in **Appendix A**.

Methodology

Fehr & Peers quantified reduction estimates for each measure using the RIVCOM VMT estimates in conjunction with calculation methodologies detailed in the *Handbook for Analyzing Greenhouse Gas Emission Reduction, Assessing Climate Vulnerabilities, and Advancing Health and Equity (California Air Pollution Control Officers Association* (CAPCOA), 2024) report. This report provides a statewide standard for quantifying VMT and greenhouse gas (GHG) reductions from general mitigation strategies. For measures not included in the CAPCOA report, Fehr & Peers completed calculations using the RIVCOM VMT estimates and socioeconomic data along with off-model measurements and factors, such as review of published city documents.

Multiplicative dampening (the lessened effectiveness of VMT reductions to avoid double-counting when multiple measures are implemented together) was calculated using TDM+, a tool developed by Fehr & Peers that leverages regional data to estimate percent reductions in VMT from mitigation measures while accounting for decreased effectiveness when similar measures are implemented together. Full calculations including assumptions are presented in spreadsheet format in **Appendix A**.

VMT Reduction Estimates

Expected VMT reductions and post-reduction daily average VMT per alternative are presented for the interim year 2030 and future year 2045. **Table 3** presents VMT reductions per mitigation measure and level of implementation for the 2030 year. **Table 4** presents VMT reductions per mitigation measure and level of implementation for the 2045 year.

Table 3: 2030 Estimated Daily City and SOI VMT Reduction

Measure ID	Measure Name	Low-Level Implementation		High-Level Implementation	
		VMT Reduction	% VMT Reduction	VMT Reduction	% VMT Reduction
Pre-Reduction Daily Average VMT		**2,380,720**			
AT.1	End of Trip Bike Facilities	(56)	-0.0017%	(226)	-0.007%
LU.1	Increase Residential Density	(2,619)	-0.082%	(5,238)	-0.164%
LU.2	Increase Job Density	(1,667)	-0.052%	(3,333)	-0.105%
LU.4	Integrate Affordable Housing Development	(1,595)	-0.050%	(3,190)	-0.100%
RD.2	Improved Pedestrian Network	(626)	-0.020%	(1,251)	-0.039%
CM.1	Commute Trip Reduction Program (Voluntary)	(1,139)	-0.036%	(2,278)	-0.071%
CM.3	Commute Trip Reduction Marketing	(1,139)	-0.036%	(2,278)	-0.071%
CM.4	Employee Ridesharing Program	(1,139)	-0.036%	(2,278)	-0.071%
CM.5	Employee Vanpool	(3,847)	-0.121%	(7,647)	-0.240%
PT.1	Subsidized Transit Pass Program	(259)	-0.008%	(1,083)	-0.034%
PT.2	Expanded Local Transit Coverage	(660)	-0.021%	(1,320)	-0.041%
PT.3	Expanded Local Transit Frequency	(486)	-0.015%	(973)	-0.031%
ND.1	Community-Based Travel Planning	(649)	-0.020%	(1,298)	-0.041%
PT.6	Provide Transit Shelters	(381)	-0.012%	(762)	-0.024%
PT.7	Park and Ride Expansion	(1,288)	-0.040%	(1,932)	-0.061%
RD.1	Improve Bike Facilities	(37)	-0.001%	(73)	-0.002%
Multiplicative Dampening[2]		*1,139*	*0.036%*	*2,278*	*0.071%*
Total Reduction		**(16,447)**	**-0.516%**	**(32,881)**	**-1.032%**
Post-Reduction Daily Average VMT		**2,364,273**		**2,347,840**	

Notes:

1. VMT reduction calculations are rounded to the nearest whole number.
2. CM.1 typically incorporates multiple other measures presented (CM.3, CM.4, CM.5 and PT.1). Thus, it is a “conflicting” measure, and its reductions must be nulled to accurately reflect multiplicative dampening.

Source: Fehr & Peers, 2025.

Table 4: 2045 Estimated Daily City and SOI VMT Reduction

Measure ID	Measure Name	Low-Level Implementation		High-Level Implementation	
		VMT Reduction	% VMT Reduction	VMT Reduction	% VMT Reduction
Pre-Reduction Daily Average VMT		**3,186,518**			
AT.1	End of Trip Bike Facilities	(226)	-0.007%	(1,119)	-0.035%
LU.1	Increase Residential Density	(3,505)	-0.110%	(7,010)	-0.220%
LU.2	Increase Job Density	(2,231)	-0.070%	(4,461)	-0.140%
LU.4	Integrate Affordable Housing Development	(2,910)	-0.091%	(5,821)	-0.183%
RD.2	Improved Pedestrian Network	(1,674)	-0.053%	(3,348)	-0.105%
CM.1	Commute Trip Reduction Program (Voluntary)	(1,473)	-0.046%	(2,947)	-0.092%
CM.3	Commute Trip Reduction Marketing	(1,473)	-0.046%	(2,947)	-0.092%
CM.4	Employee Ridesharing Program	(1,473)	-0.046%	(2,947)	-0.092%
CM.5	Employee Vanpool	(4,977)	-0.156%	(9,892)	-0.310%
PT.1	Subsidized Transit Pass Program	(335)	-0.011%	(1,449)	-0.045%
PT.2	Expanded Local Transit Coverage	(1,766)	-0.055%	(3,533)	-0.111%
PT.3	Expanded Local Transit Frequency	(1,302)	-0.041%	(2,605)	-0.082%
ND.1	Community-Based Travel Planning	(840)	-0.026%	(1,680)	-0.053%
PT.6	Provide Transit Shelters	(510)	-0.016%	(1,020)	-0.032%
PT.7	Park and Ride Expansion	(2,576)	-0.081%	(3,864)	-0.121%
RD.1	Improve Bike Facilities	(98)	-0.003%	(195)	-0.006%
Multiplicative Dampening[2]		*1,473*	*0.046%*	*2,947*	*0.092%*
Total Reduction		**(25,897)**	**-0.813%**	**(51,889)**	**-1.628%**
Post-Reduction Daily Average VMT		**3,160,621**		**3,134,629**	

Note:
1. VMT reduction calculations are rounded to the nearest whole number.
2. CM.1 typically incorporates multiple other measures presented (CM.3, CM.4, CM.5, and PT.1). Thus, it is a "conflicting" measure, and its reductions must be nulled to accurately reflect multiplicative dampening.

Source: Fehr & Peers, 2025.

Conclusion

Implementation of VMT reduction measures in the City of Lake Elsinore and SOI could reduce daily VMT in 2030 by 32,881 VMT per day with full measure implementation or 16,447 VMT per day with more minimal measure implementation. By 2045, the city could reduce 51,889 VMT per day with full measure implementation or 25,897 VMT per day with partial measure implementation.

Attachments:

Appendix A: Lake Elsinore and SOI VMT CAP Quantification Spreadsheet

Click on GREEN cells to go to individual measure calculations.

Measure ID	Measure Name	Category	Low-Level Implementation	High-Level Implementation
AT.1	End of Trip Bike Facilities	Active Transportation	Provide secure bike parking and repair stations at all new workplaces.	Provide secure bike parking and repair stations with personal lockers and showers at all new workplaces.
LU.1	Increase Residential Density	Land Use	Modify zoning / land use to increase residential density by 10% in 5% of the City.	Modify zoning / land use to increase residential density by 20% in 5% of the City.
LU.2	Increase Job Density	Land Use	Modify zoning code / land use to increase employment by 10% across 10% of City.	Modify zoning code / land use to increase employment by 20% across 10% of City.
LU.4	Integrate Affordable Housing Development	Land Use	Provide 5% additional low and very-low income housing additional to the SCAG RHNA Allocation.	Provide 10% additional low and very-low income housing additional to the SCAG RHNA Allocation.
RD.2	Improved Pedestrian Network	Roadway Infrastructure	Fill 50% of sidewalk gap length identified in ATP.	Fill 100% of sidewalk gap length identified in ATP.
CM.1	Commute Trip Reduction Program (Voluntary)	Commuter Trips	Provide voluntary commute trip reduction programs for 5% of employees in City.	Provide voluntary commute trip reduction programs for 10% of employees in City.
CM.3	Commute Trip Reduction Marketing	Commuter Trips	Implement commute trip reduction marketing targeting 5% of employees in City.	Implement commute trip reduction marketing targeting 10% of employees in City.
CM.4	Employee Ridesharing Program	Commuter Trips	Provide rideshare program for 5% of employees in City.	Provide rideshare program for 10% of employees in City.
CM.5	Employee Vanpool	Commuter Trips	Provide vanshare program utilized by 0.5% of employees.	Provide vanshare program utilized by 1% of employees.
PT.1	Subsidized Transit Pass Program	Public Transportation	Implement program that subsidizes transit passes for 5% of employees via collaboration with large employers and RTA.	Implement program that subsidizes transit passes for 5% of employees and residents via collaboration with large employers, developers, and RTA.
PT.2	Expanded Local Transit Coverage	Public Transportation	Increase transit route coverage in the city by 10% (11.2 miles).	Increase transit route coverage in the city by 10% (22.4 miles).
PT.3	Expanded Local Transit Frequency	Public Transportation	Increase transit frequency by 20% across 50% of routes/service hours.	Increase transit frequency by 20% across 100% of routes/service hours.
ND.1	Community-Based Travel Planning	Neighborhood	Implement Community-Based Travel Planning program aimed towards 5% of residents.	Implement Community-Based Travel Planning program aimed towards 10% of residents.
PT.6	Provide Transit Shelters	Public Transportation	Improve bus stops with shelters and additional amenities only at the most-used stops.	Improve bus stops with shelters and additional amenities at stops across the City.
PT.7	Park and Ride Expansion	Public Transportation	Construct 100 parking spaces to be used as a PnR Lot.	Construct 150 parking spaces to be used as a PnR Lot.
RD.1	Improve Bike Facilities	Roadway Infrastructure	Build out 50% of bikeway projects identified in the ATP.	Build out 100% of bikeway projects identified in the ATP.

2030 VMT Reductions

Measure ID	Measure Name	Category	Description	VMT Reduction	% Reduction	Description	VMT Reduction	% Reduction
VMT Without Reduction								**2,380,720**
			Low-Level Implementation VMT Reduction			**High-Level Implementation VMT Reduction**		
AT.1	End of Trip Bike Facilities	Active Transportation	Provide secure bike parking and repair stations at all new workplaces.	(56)	-0.0017%	Provide secure bike parking and repair stations with personal lockers and showers at all new workplaces.	(226)	-0.007%
LU.1	Increase Residential Density	Land Use	Modify zoning / land use to increase residential density by 10% in 5% of the City.	(2,619)	-0.082%	Modify zoning / land use to increase residential density by 20% in 5% of the City.	(5,238)	-0.164%
LU.2	Increase Job Density	Land Use	Modify zoning code / land use to increase employment by 10% across 10% of City.	(1,667)	-0.052%	Modify zoning code / land use to increase employment by 20% across 10% of City.	(3,333)	-0.105%
LU.4	Integrate Affordable Housing Development	Land Use	Provide 5% additional low and very-low income housing additional to the SCAG RHNA Allocation.	(1,595)	-0.050%	Provide 10% additional low and very-low income housing additional to the SCAG RHNA Allocation.	(3,190)	-0.100%
RD.2	Improved Pedestrian Network	Roadway Infrastructur	Fill 50% of sidewalk gap length identified in ATP.	(626)	-0.020%	Fill 100% of sidewalk gap length identified in ATP.	(1,251)	-0.039%
CM.1	Commute Trip Reduction Program (Voluntary)	Commuter Trips	Provide voluntary commute trip reduction programs for 5% of employees in City.	(1,139)	-0.036%	Provide voluntary commute trip reduction programs for 10% of employees in City.	(2,278)	-0.071%
CM.3	Commute Trip Reduction Marketing	Commuter Trips	Implement commute trip reduction marketing targeting 5% of employees in City.	(1,139)	-0.036%	Implement commute trip reduction marketing targeting 10% of employees in City.	(2,278)	-0.071%
CM.4	Employee Ridesharing Program	Commuter Trips	Provide rideshare program for 5% of employees in City.	(1,139)	-0.036%	Provide rideshare program for 10% of employees in City.	(2,278)	-0.071%
CM.5	Employee Vanpool	Commuter Trips	Provide vanshare program utilized by 0.5% of employees.	(3,847)	-0.121%	Provide vanshare program utilized by 1% of employees.	(7,647)	-0.240%
PT.1	Subsidized Transit Pass Program	Public Transportation	Implement program that subsidizes transit passes for 5% of employees via collaboration with large employers and RTA.	(259)	-0.008%	Implement program that subsidizes transit passes for 5% of employees and residents via collaboration with large employers, developers, and RTA.	(1,083)	-0.034%
PT.2	Expanded Local Transit Coverage	Public Transportation	Increase transit route coverage in the city by 10% (11.2 miles).	(660)	-0.021%	Increase transit route coverage in the city by 20% (22.4 miles).	(1,320)	-0.041%
PT.3	Expanded Local Transit Frequency	Public Transportation	Increase transit frequency by 20% across 50% of routes/service hours.	(486)	-0.015%	Increase transit frequency by 20% across 100% of routes/service hours.	(973)	-0.031%
ND.1	Community-Based Travel Planning	Neighborhood	Implement Community-Based Travel Planning program aimed towards 5% of residents.	(649)	-0.020%	Implement Community-Based Travel Planning program aimed towards 10% of residents.	(1,298)	-0.041%
PT.6	Provide Transit Shelters	Public Transportation	Improve bus stops with shelters and additional amenities only at the most-used stops.	(381)	-0.012%	Improve bus stops with shelters and additional amenities at stops across the City.	(762)	-0.024%
PT.7	Park and Ride Expansion	Public Transportation	Construct 100 parking spaces to be used as a PnR Lot.	(1,288)	-0.040%	Construct 150 parking spaces to be used as a PnR Lot.	(1,932)	-0.061%
RD.1	Improve Bike Facilities	Roadway Infrastructur	Build out 50% of bikeway projects identified in the ATP.	(37)	-0.001%	Build out 100% of bikeway projects identified in the ATP.	(73)	-0.002%
Pre-Dampening Reduction				**(17,586)**	**-0.552%**		**(35,158)**	**-1.103%**
Multiplicative Dampening				**1,139**	**0.036%**		**2,278**	**0.071%**
Total Reduction				**(16,447)**	**-0.516%**		**(32,881)**	**-1.032%**
Post-Reduction VMT					**2,364,273**			**2,347,840**

2045 VMT Reductions

Measure ID	Measure Name	Category	Description	VMT Reduction	% Reduction	Description	VMT Reduction	% Reduction
VMT Without Reduction								**3,186,518**
			Low-Level Implementation VMT Reduction			**High-Level Implementation VMT Reduction**		
AT.1	End of Trip Bike Facilities	Active Transportation	Provide secure bike parking and repair stations at all new workplaces.	(226)	-0.007%	Provide secure bike parking and repair stations with personal lockers and showers at all new workplaces.	(1,119)	-0.035%
LU.1	Increase Residential Density	Land Use	Modify zoning / land use to increase residential density by 10% in 5% of the City.	(3,505)	-0.110%	Modify zoning / land use to increase residential density by 20% in 5% of the City.	(7,010)	-0.220%
LU.2	Increase Job Density	Land Use	Modify zoning code / land use to increase employment by 10% across 10% of City.	(2,231)	-0.070%	Modify zoning code / land use to increase employment by 20% across 10% of City.	(4,461)	-0.140%
LU.4	Integrate Affordable Housing Development	Land Use	Provide 5% additional low and very-low income housing additional to the SCAG RHNA Allocation.	(2,910)	-0.091%	Provide 10% additional low and very-low income housing additional to the SCAG RHNA Allocation.	(5,821)	-0.183%
RD.2	Improved Pedestrian Network	Roadway Infrastructur	Fill 50% of sidewalk gap length identified in ATP.	(1,674)	-0.053%	Fill 100% of sidewalk gap length identified in ATP.	(3,348)	-0.105%
CM.1	Commute Trip Reduction Program (Voluntary)	Commuter Trips	Provide voluntary commute trip reduction programs for 5% of employees in City.	(1,473)	-0.046%	Provide voluntary commute trip reduction programs for 10% of employees in City.	(2,947)	-0.092%
CM.3	Commute Trip Reduction Marketing	Commuter Trips	Implement commute trip reduction marketing targeting 5% of employees in City.	(1,473)	-0.046%	Implement commute trip reduction marketing targeting 10% of employees in City.	(2,947)	-0.092%
CM.4	Employee Ridesharing Program	Commuter Trips	Provide rideshare program for 5% of employees in City.	(1,473)	-0.046%	Provide rideshare program for 10% of employees in City.	(2,947)	-0.092%
CM.5	Employee Vanpool	Commuter Trips	Provide vanshare program utilized by 0.5% of employees.	(4,977)	-0.156%	Provide vanshare program utilized by 1% of employees.	(9,892)	-0.310%
PT.1	Subsidized Transit Pass Program	Public Transportation	Implement program that subsidizes transit passes for 5% of employees via collaboration with large employers and RTA.	(335)	-0.011%	Implement program that subsidizes transit passes for 5% of employees and residents via collaboration with large employers, developers, and RTA.	(1,449)	-0.045%
PT.2	Expanded Local Transit Coverage	Public Transportation	Increase transit route coverage in the city by 10% (11.2 miles).	(1,766)	-0.055%	Increase transit route coverage in the city by 20% (22.4 miles).	(3,533)	-0.111%
PT.3	Expanded Local Transit Frequency	Public Transportation	Increase transit frequency by 20% across 50% of routes/service hours.	(1,302)	-0.041%	Increase transit frequency by 20% across 100% of routes/service hours.	(2,605)	-0.082%
ND.1	Community-Based Travel Planning	Neighborhood	Implement Community-Based Travel Planning program aimed towards 5% of residents.	(840)	-0.026%	Implement Community-Based Travel Planning program aimed towards 10% of residents.	(1,680)	-0.053%
PT.6	Provide Transit Shelters	Public Transportation	Improve bus stops with shelters and additional amenities only at the most-used stops.	(510)	-0.016%	Improve bus stops with shelters and additional amenities at stops across the City.	(1,020)	-0.032%
PT.7	Park and Ride Expansion	Public Transportation	Construct 100 parking spaces to be used as a PnR Lot.	(2,576)	-0.081%	Construct 150 parking spaces to be used as a PnR Lot.	(3,864)	-0.121%
RD.1	Improve Bike Facilities	Roadway Infrastructur	Build out 50% of bikeway projects identified in the ATP.	(98)	-0.003%	Build out 100% of bikeway projects identified in the ATP.	(195)	-0.006%
Pre-Dampening Reduction				**(27,370)**	**-0.859%**		**(54,836)**	**-1.721%**
Multiplicative Dampening				**1,473**	**0.046%**		**2,947**	**0.092%**
Total Reduction				**(25,897)**	**-0.813%**		**(51,889)**	**-1.628%**
Post-Reduction VMT					**3,160,621**			**3,134,629**

TAZ ID	RTAC VMT				HBW VMT			
	2018	2025	2030	2045	2018	2025	2030	2045
Citywide	1,736,082	2,112,121	2,380,720	3,186,518	435,705	513,723	569,451	736,634

TAZ ID	SED											
	2018 Population	2025 Population	2030 Population	2045 Population	2018 Employees	2025 Employees	2030 Employees	2045 Employees	2018 Household	2025 Household	2030 Household	2045 Household
Citywide	79,669	94,177	106,131	151,892	16,066	20,456	24,309	40,795	23,377	27,957	31,768	46,610

TAZ ID	Acreage	HB VMT			
		2018	2025	2030	2045
Citywide	24,474	#########	3,249,351	3,593,090	4,624,306

HB VMT / Res				HBW VMT / Emp				HB VMT / SP			
2018	2025	2030	2045	2018	2025	2030	2045	2018	2025	2030	2045
34.75	34.50	33.86	30.44	27.12	25.11	23.43	18.06	28.91	28.35	27.55	24.00

Variables	Meaning	Unit	Value	Upgraded	Source
B	Bike mode adjustment factor		1.78	4.86	CAPCOA
C	Existing bicycle trip length for all trips in region	miles	2.2		CAPCOA
D	Existing vehicle trip length for all trips in region	miles	11.7		CAPCOA
E	Existing bicycle mode share for work trips in region	%	0.4%		CAPCOA
F	Existing vehicle mode share for work trips in region	%	95.3%		CAPCOA

Back to Measures Summary

Equation CAPCOA * HBW VMT * (New Workers / Total Workers)

CAPCOA Equation $\frac{C \times (E - (B \times E))}{D \times F}$

EOT Bike Faciliites for all new employers / employees

Implementation Level	Employees 2025 (Interpolated)	New Employees 2030	New Employees 2045	CAPCOA	2030 Reduction	2045 Reduction
Standard EOT Bike Faciliti	20,456	3,853	20,339	-0.06%	(56)	(226)
Upgraded EOT Bike Facilit	20,456	3,853	20,339	-0.30%	(275)	(1,119)

ID	Variable	Value	Unit	Source
B	Proposed Density	Density Table	du/acre	Model
C	Existing Density	Density Table	du/acre	Model
D	Elasticity of VMT with respect to residential density	-0.22	unitless	CAPCOA

Back to Measures Summary

Equation CAPCOA * RTAC VMT

CAPCOA Formula $\frac{B-C}{C} \times D$

Increasing Residential Density by 10% in 5% of the City:

TAZ Acreage	2030 TAZ Households	2045 TAZ Households	2025 Density (Model)	2030 Density	2045 Density	2030 Proposed Density	2045 Proposed Density	CAPCOA	CAPCOA	2030 Reduction	2045 Reduction
24,473.60	31,768	46,610	1.14	1.30	1.90	1.3045	1.9140	-0.11%	-0.11%	(2,619)	(3,505)

Increasing Residential Density by 20% in 5% of the City

TAZ Acreage	2030 TAZ Households	2045 TAZ Households	2025 Density (Model)	2030 Density	2045 Density	2030 Proposed Density	2045 Proposed Density	CAPCOA	CAPCOA	2030 Reduction	2045 Reduction
24,473.60	31,768	46,610	1.14	1.30	1.90	1.3110	1.9235	-0.22%	-0.22%	(5,238)	(7,010)

ID	Variable	Value	Unit	Source
B	Increased Job Density	See Table Below	emp/acre	Model
C	BAU City Job Density	See Table Below	emp/acre	Model
D	Elasticity of VMT with respect to job density	-0.07	unitless	CAPCOA

Back to Measures Summary

Equation CAPCOA * RTAC VMT

CAPCOA Formula $\frac{B - C}{C} \times D$

Implementation Level	Acreage	2030 Employees	2045 Employees	2030 Density	2045 Density	2030 Proposed Density	2045 Proposed Density	CAPCOA	CAPCOA	2030 Reduction	2045 Reduction
10% more employees across 10% of city	24,474	24,309	40,795	0.993290324	1.666898209	1.0032	1.6836	-0.07%	-0.07%	(1,667)	(2,231)
20% more employees across 10% of the City	24,474	24,309	40,795	0.993290324	1.666898209	1.0132	1.7002	-0.14%	-0.14%	(3,333)	(4,461)

ID	Variable	Value	Unit	Source
B	**Percent of new multifamily units dedicated as affordable (additional affordable requirement over total requirement)**	**5-10%**	**%**	**Assumption**
C	Percent reduction in VMT for qualified units compared to market rate units	-28.6%	%	CAPCOA

Back to Measures

Equation: CAPCOA * RTAC VMT per HH * RHNA Allocated Units

CAPCOA Equation: $B \times C$

Notes: **Assumes half completion of target by 2030.**

Increasing affordable for new units, on top of RHNA Allocation:

Implementation Level	SCAG RHNA Allocated Units	SCAG RHNA Allocated Low and Very Low	Proposed Additional Allocation	CAPCOA	2030 Reduction	2045 Reduction
5% additional affordable housing requirement	6,681	2,977	149	-0.64%	(1,595)	(2,910)
10% additional affordable housing requirement	6,681	2,977	298	-1.27%	(3,190)	(5,821)

Variables	Meaning	Unit	Value	Upgraded	Source
B	Existing Sidewalk Length	miles	211.90		LE Centerline Assumption
C	**Sidewalk Length with Measure**	**miles**	**236.64**	**261.38**	**Assumption**
D	Elasticity of household VMT with respect to ratio of sidewalk to streets	miles	-0.05		CAPCOA
E	Sidewalk Infill Length	miles	49.48		LE ATP

Back to Measures Summary

Equation: CAPCOA * RTAC VMT * % People that Live and Work in

CAPCOA Equation:

$$A = \left(\frac{C}{B} - 1\right) \times D$$

Notes: Assumes reduction application to those that live and work in City as CAPCOA research reveals pedestrian network

Assumes half completion of target by 2030.

Fill sidewalk infill goal identified in ATP: 49.48

Implementation Level	2030 CAPCOA	2045 CAPCOA	2030 Reduction	2045 Reduction
Fill 50% of gap length (24.74 m	-0.29%	-0.58%	(626)	(1,674)
Fill 100% of gap length (49.48 r	-0.58%	-1.17%	(1,251)	(3,348)

Variables	Meaning	Unit	Value	Upgraded Value	Source
B	**% employees eligible**	**%**	**5.0%**	**10.0%**	**Assumption**
C	% reduction in commute VMT from eligible employees	%	-4%		CAPCOA

Back to Measures

Equation CAPCOA * HBW VMT

CAPCOA Formula $B \times C$

Implementation Level	CAPCOA	2030 Reduction	2045 Reduction
5% of Employees	-0.20%	(1,139)	(1,473)
10% of Employee	-0.40%	(2,278)	(2,947)

Variables	Meaning	Unit	Value	Upgraded Value	Source
B	**% employees eligible**	**%**	**5.0%**	**10.0%**	**Assumption**
C	% reduction in commute VMT from eligible employees	%	-4%		CAPCOA

Back to Measures

Equation CAPCOA * HBW VMT

CAPCOA Formula $B \times C$

Implementation Level	CAPCOA	2030 Reduction	2045 Reduction
5% of Employees	-0.20%	(1,139)	(1,473)
10% of Employee	-0.40%	(2,278)	(2,947)

Rideshare

Variable	Meaning	Value	Column1	Unit	Source
B	**Percent of employees eligible for program**	**5%**	**10%**	**%**	**Assumption**
C	Percent reduction in employee commute vehicle trips	-4%		%	CAPCOA

Back to Measures Summary

Equation CAPCOA Formula * HBW VMT

Rideshare CAPCOA Formula $B \times C$

Vanpool CAPCOA Formula $\frac{\left((1-B) \times C \times F\right) + \left(B \times \frac{D}{E} \times G\right)}{\left((1-B) \times C \times F\right) + (B \times D \times F)} - 1$

Vanpool

Variable	Meaning	Value	Column1	Unit	Source
B	**Percent of employees that participate**	**0.50%**	**1.000%**	**%**	**Assumption**
C	Avg length of one-way vehicle commute trip in region	18.62		miles	CAPCOA
D	Avg length of one-way vanpool commute trip	42		miles	CAPCOA
E	Avg Vanpool Occupancy + Driver	6.25		occupants	CAPCOA
F	Avg emission factor of employee vehicle	307.5		g CO2e per m	CAPCOA
G	Vanpool emission factor	763.4		g CO2e per m	CAPCOA

Implementation Level	% Participating Vanpool Employees in City	% Employees Eligible	Rideshare CAPCOA	Vanpool CAPCOA	2030 Rideshare Reduction	2045 Rideshare Reduction	2030 Vanpool Reduction	2045 Vanpool Reduction
0.5% Vanpool Users, 5% Rideshare Eligible	0.50%	5%	-0.20%	-0.68%	(1,139)	(1,473)	(3,847)	(4,977)
1% Vanpool Users, 10% Rideshare Eligible	1.00%	10%	-0.40%	-1.34%	(2,278)	(2,947)	(7,647)	(9,892)

ID	Variable	Value	Unit	Column1	Source
B	Average transit fare without subsidy	60	$		RTA Monthly
C	Subsidy amount	60	$		RTA Monthly
D	**Percent eligible for subsidy**	**5%**	**%**	**10.0%**	**Assumption**
E	Percent of project-generated VMT from employees and residents	100%	%		Assumption
F	Transit mode share of all trips	4.23%	%		CAPCOA
G	Elasticity of transit boardings with respect to transit fare price	-0.43	unitless		CAPCOA
H	Percent of transit trips that would otherwise be made in a vehicle	50%	%		CAPCOA
I	Conversion factor of vehicle trips to VMT	1	unitless		CAPCOA

Back to Measures

Employee Only Equation: CAPCOA * HBW VMT

Equation: CAPCOA * RTAC VMT

CAPCOA Formula: $A = \frac{C}{B} \times G \times D \times E \times F \times H \times I$

Implementation Level	% Employees Eligible	CAPCOA	2030 Reduction	2045 Reduction
Subsidize transit passes for 5% of employees	5.0%	-0.045%	(259)	(335)
Subsidize transit passes for 5% of employees AND residents	5.0%	-0.045%	(1,083)	(1,449)

Variables	Meaning	Unit	Value	Upgraded	Source
B	Total transit service miles in city	miles	111.54		RTA GTFS
C	**Total transit miles in city after expansion**	**miles**	**122.694**	**141.0981**	**Assumption**
D	Transit mode share in community (All trips)	%	1.37%		CAPCOA
E	Elasticity of transit with respect to service miles	unitless	0.7		CAPCOA
F	Statewide mode shift factor	%	57.80%		CAPCOA
G	Ratio of trip reduction to VMT	unitless	1		CAPCOA

Back to Measures Summary

Equation: CAPCOA * RTAC VMT

CAPCOA Equation:

$$A = -1 \times \frac{C - B}{B} \times D \times E \times F \times G$$

Notes: **Assumes half completion of target by 2030.**

Implementation Level	Existing Transit Miles	% Increase	Transit Miles After Increase	CAPCOA	2030 Reduction	2045 Reduction
10% increase in total route coverage (11.2 miles)	111.54	10%	122.694	-0.06%	(660)	(1,766)
20% increase in total route coverage (22.4 miles)	111.54	20%	133.848	-0.11%	(1,320)	(3,533)

Variables	Meaning	Unit	Value	Upgraded	Source
B	**% increase in transit service frequency**	**%**	**20.00%**		**Assumption**
C	**Level of implementation**	**%**	**50.00%**	**100.00%**	**Assumption**
D	Elasticity of transit ridership with respect to frequency of service	unitless	0.5		CAPCOA
E	Transit mode share in Area	%	1.37%		CAPCOA
F	Vehicle mode share in Area	%	96.88%		CAPCOA
G	Statewide mode shift factor	%	57.80%		CAPCOA

Implementation Level	Level of Implementation	% Increase	CAPCOA	2030 Reduction	2045 Reduction
20% increase in frequency across 50% of routes/service hours	50%	20%	-0.04%	(486)	(1,302)
20% increase in frequency across 100% of routes/service hours	100%	20%	-0.08%	(973)	(2,605)

Back to Measures

Equation CAPCOA * RTAC VMT

CAPCOA Equation $-C \times \frac{B \times E \times D \times G}{F}$

Notes: **Assumes half completion of target by 2030.**

Variables	Meaning	Unit	Value	Upgraded	Source
B	Total Residences	%	100.00%		Assumption
C	**Residences targeted with CBTP %**	**%**	**5.00%**	**10.00%**	**Assumption**
D	Percent targeted residences that will participate	%	19.00%		CAPCOA
E	Percent vehicle trip reduction from participating residents	%	12.00%		CAPCOA
F	Trips to VMT adjustment factor	unitless	1.00		CAPCOA

Back to Measures Summary

Equation CAPCOA * HBW VMT

CAPCOA Equation $A = \frac{C}{B} \times D \times -E \times F$

Implementation Level	CAPCOA	2030 Reduction	2045 Reduction
Target 5% Residences	-0.11%	(649)	(840)
Target 10% Residences	-0.23%	(1,298)	(1,680)

Variables	Meaning	Unit	Value	Source
B	CAPCOA Reduction Range from Transit Shelter Construction	%	-0.01% - 0.32%	CAPCOA

Back to Measures Summary

Equation B * RTAC VMT

Implementation Level	Assumed Reduction	2030 Reduction	2045 Reduction
Low Implementation	-0.02%	(380.92)	(509.84)
High Implementation	-0.03%	(761.83)	(1,019.69)

Notes: **Assumes half completion of target by 2030.**
Lack of transit ridership information to provide more detailed quantification

Variables	Meaning	Unit	Value	Source
B	Average Trip Length Using Public Transit	miles	11.45	2017 NHTS
C	Average Trip Length to PnR Lot	miles	16.50	RivCo Streetlight Analysis
D	Proposed Number of Spaces	spaces	100-150	CAPCOA
E	Vehicle Occupancy	people per car	1.50	2017 NHTS
F	Parking Occupancy of PNR Lots	%	75.00%	Assumption

Back to Measures Summary

Equation (D*F*E)*(((B+C)*2)-(C*2))

Notes: **Assumes half completion of target by 2030.**

Implementation Level	PnR Spaces Added	2030 Reduction	2045 Reduction
100 PnR Spaces Added	100.00	(1,288.13)	(2,576.25)
150 PnR Spaces Added	150.00	(1,932.19)	(3,864.38)

Variables	Meaning	Unit	Value	Upgraded	Source
B	Existing bikeway miles in plan/community	miles	31.38		LE ATP
C	**Bikeway miles in plan/community with measure**	**miles**	**64.44**	**97.50**	**Assumption**
D	Bicycle mode share in plan/community	%	0.06%		CAPCOA
E	Vehicle mode share in plan/community	%	96.88%		CAPCOA
F	Average one-way bicycle trip length in plan/community	miles per trip	2.2		CAPCOA
G	Average one-way vehicle trip length in plan/community	miles per trip	11.7		CAPCOA
H	Elasticity of bike commuters with respect to bikeway miles per 10,000 population	unitless	0.25		CAPCOA
I	Proposed bikeway miles	miles	66.12		LE ATP

Back to Measures Summary

Equation CAPCOA * RTAC VMT

CAPCOA Formula $-1 \times \frac{\left(\frac{C-B}{B}\right) \times D \times F \times H}{E \times G}$

Notes: **Assumes half completion of target by 2030.**

Implementation Level	Existing Bikeway Miles	Proposed Increase	Bikeway Miles after Increase	CAPCOA	2030 Reduction	2045 Reduction
50% Buildout of ATP	31.38	33.06	64.44	-0.003%	(37)	(98)
100% Buildout of ATP	31.38	66.12	97.50	-0.006%	(73)	(195)