CITY OF SANTA ROSA
COMMUNITY-WIDE GREENHOUSE GAS REDUCTION STRATEGY

Public Review Draft
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Prepared by:
City of Santa Rosa
100 Santa Rosa Avenue
Santa Rosa, California, 95404

Prepared in collaboration with:
PlaceWorks
2040 Bancroft Way, Suite 400
Berkeley, California, 94704

SANTA ROSA FORWARD
Plan Our Future Together

SANTA ROSA AVANZA
Planeamos Nuestro Futuro

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List of Abbreviations

AB	Assembly Bill
BAAQMD	Bay Area Air Quality Management District
BFB^{SM}	Bicycle Friendly Business
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCAP	Community Climate Action Plan
CEQA	California Environmental Quality Act
CH_4	methane
CO_2	carbon dioxide
EDR	Energy Design Rating
EIR	environmental impact report
EV	electric vehicle
GHG	greenhouse gas
GIS	geographic information system
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
LAFCO	Local Agency Formation Commission
MCAP	Municipal Climate Action Plan
$MTCO_2e$	metric tons carbon dioxide equivalent
N_2O	nitrous oxide
NPDES	National Pollutant Discharge Elimination System
PG&E	Pacific Gas and Electric Company
RCPA	Regional Climate Protection Authority
RPS	Renewables Portfolio Standard
SB	Senate Bill
SCP	Sonoma Clean Power
SOI	sphere of influence
TDM	transportation demand management
UGB	urban growth boundary
VMT	vehicle miles traveled
ZEV	zero-emission vehicle

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1. Introduction

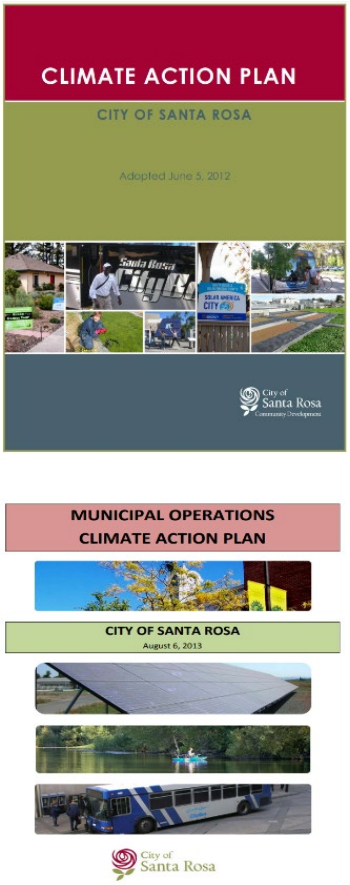
What is a GHG Reduction Strategy?

The Community-wide Greenhouse Gas (GHG) Reduction Strategy or Reduction Strategy is an update to and replacement of the City's 2012 Community Climate Action Plan (CCAP). The Reduction Strategy, prepared as part of the General Plan 2050, will serve as the City's strategic plan to reduce community-wide GHG emissions through 2050 and beyond. The Reduction Strategy establishes a roadmap to reduce the community's GHG emissions to a minimum of 40 percent below 1990 levels by 2030 and 85 percent below 1990 levels by 2045, consistent with State-mandated emission reduction targets.

Reducing GHG emissions and promoting community sustainability are priorities of the City and the General Plan 2050. This GHG Reduction Strategy is a technical companion to the General Plan 2050, highlighting the State's latest GHG reduction requirements, the steps that the City has taken to reduce emissions since publication of the 2012 CCAP, and anticipated GHG emissions savings to be achieved through implementation of the General Plan 2050.

What is the relationship between this Strategy and the City's CCAP?

The GHG Reduction Strategy is an update to and replacement of the City's CCAP. This Reduction Strategy includes GHG reduction measures and implementation programs based on the City's ongoing implementation of the CCAP through 2023, additional measures and programs identified to further reduce GHGs, an updated GHG emissions inventory, and projections of future GHG emissions. The GHG Reduction Strategy also includes some measures, as applicable, from the Municipal Operations Climate Action Plan (MCAP) but does not fully replace it. This Reduction Strategy also includes new municipal measures. Individual City departments will continue to implement some measures from the MCAP in addition to the new measures in this Reduction Strategy, but the MCAP will not continue to be updated as a formal City document. Instead, the City, together with all other businesses, institutions, and entities in the City, will be required to implement measures in the GHG Reduction Strategy so that there is one consolidated strategy for reaching climate neutrality by 2045, in accordance with the State's mandate.

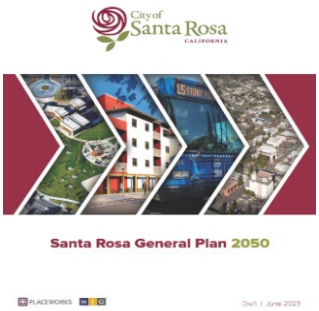


Santa Rosa's 2012 CCAP and 2013 MCAP

The City of Santa Rosa has been a leader in climate protection activities since the mid-1990s. The City and the community have been working together toward shared environmental objectives, and the City has been leading by example in its municipal operations through energy-efficiency upgrades and several GHG emissions-reducing projects, programs, and policies.

What is the relationship between this Strategy and the General Plan 2050 and General Plan 2050 Environmental Impact Report?

Santa Rosa's General Plan serves the foundational role of regulating all land uses in the city; it is the top-level planning document, providing direction for all zoning regulations, ordinances, guidelines, and area or specific plans. The goals and policies throughout the General Plan are interrelated and should be considered together when making decisions related to land use, mobility, growth, and development. City staff apply General Plan policies to give direction to development applicants and land use analysis for the City Council, Planning Commission, and other boards and commissions. In addition, the General Plan actions comprise a detailed implementation program to guide City department work programs and budgeting.



Santa Rosa's General Plan 2050

The Santa Rosa General Plan 2050 consolidates the mandated elements into six chapters that address both required and optional General Plan topics. Mandated elements include land use, transportation, open space, conservation, safety, noise, environmental justice, and housing. The General Plan 2050 presents an integrated and cross-sector approach to reducing GHG emissions in Santa Rosa. The General Plan includes goals, policies, and actions in most elements that work to reduce GHG emissions from community-wide sources and municipal operations. This stand-alone GHG Reduction Strategy, which replaces the 2012 CCAP, incorporates many of these goals, policies, and actions. It consolidates these items into a set of GHG emissions reduction measures and implementation programs and presents detailed quantification and other details consistent with California Environmental Quality Act (CEQA) Guidelines Section 15183.5, to support ongoing reductions through 2050.

The General Plan 2050 Environmental Impact Report (EIR) addresses the potential environmental impacts associated with General Plan 2050 at a programmatic level, consistent with CEQA Guidelines Section 15168. The program-level EIR evaluates the environmental impacts associated with the broad policies of General Plan 2050, including this GHG Reduction Strategy, and the likely type and amount of development allowed through the General Plan horizon of 2050.

Consistent with the State CEQA Statute and Guidelines and BAAQMD's 2022 CEQA Guidelines[1], lead agencies may use adopted GHG emissions reduction plans to assess the cumulative impacts of projects on climate change at a programmatic level (see State CEQA Guidelines Section 15183.5(a)). CEQA requires many new development projects to identify how the project may impact the environment, including the degree to which the project increases GHG emissions. The State CEQA Guidelines include provisions authorizing local governments to use adopted/qualified plans for reducing GHG emissions to address the cumulative impacts of individual future projects on GHG emissions (see State CEQA Guidelines Section 15183.5(b)(1)). Applicants for new development projects that are consistent with the community's adopted GHG emissions reduction approach may then streamline their own environmental impact review process by using these CEQA-qualified GHG reduction plans along with their associated environmental review documents to assess the cumulative impacts of proposed development projects on GHG emission levels.

[1] Refer to BAAQMD's 2022 CEQA Guidelines Appendix B, *CEQA Thresholds for Evaluating the Significance of Climate Impacts,* and Appendix C, *Guidance for Greenhouse Gas Reduction Strategies*, available at https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines.

A project-specific environmental review that relies on this Reduction Strategy for its cumulative impact analysis must show consistency with the Reduction Strategy by preparing a Consistency Checklist, which allows the applicant to identify specific GHG reduction measures from this Reduction Strategy that are applicable to the project and demonstrate how the project will implement these measures. Project applicants and City staff will identify which specific measures are applicable to each project during project review. Applicable measures and actions must be incorporated as mitigation measures and/or conditions of approval for the project.

This GHG Reduction Strategy is consistent with both the State's CEQA Guidelines (Section 15183.5) and the Bay Area Air Quality Management District's (BAAQMD) CEQA Guidelines. BAAQMD's CEQA Guidelines recommend that cities and counties develop General Plans and GHG reduction plans to be consistent with the State's goals to reduce emissions to 40 percent below 1990 levels by 2030 and carbon neutrality by 2045. In addition, BAAQMD recommends that local GHG reduction plans demonstrate their consistency with CEQA Guidelines. This Reduction Strategy includes the following elements that demonstrate it is consistent with CEQA Guidelines Section 15183.5(b)(1).

a. Quantifies emissions, both existing and projected over a specified period, resulting from activities within a defined geographic area. As discussed in Chapter 2, this GHG Reduction Strategy quantifies past, current, and future GHG emissions through the year 2050 within City Limits and the Planning Area for the General Plan 2050.
b. Establishes a level, based on substantial evidence, below which the contribution of emissions from activities covered by the plan would not be cumulatively considerable. Chapter 3 of this Reduction Strategy identifies the City's GHG emissions reduction target, consistent with the State's regulatory goals, which are to, at a minimum:
    - Reduce emissions to 40 percent below 1990 levels by 2030.
    - Reduce emissions to 85 percent below 1990 levels by 2045.
    - Support statewide net carbon neutrality by 2045.
c. Identifies and analyzes the emissions resulting from specific actions or categories of actions anticipated within the geographic area, as discussed in Chapter 3 and the Appendix.
d. Specifies a set of strategies, including implementation programs and performance standards, that, if implemented on a project-by-project basis, substantial evidence demonstrates they would collectively achieve the specified emissions level, as discussed in Chapter 3 and the Appendix.
e. Establishes a mechanism to monitor the plan's progress toward achieving specific levels and to require amendment if the plan is not achieving those levels, as discussed in Chapter 3. This Reduction Strategy and the General Plan 2050 include commitments by the City to implement the new measures and implementing programs presented and to continue implementation of existing and planned City programs presented in Chapter 3. The City will monitor and report on implementation progress, conduct GHG emissions inventories regularly and update this Strategy as needed to ensure progress toward the City's GHG reduction targets.
f. Includes an environmental review. This GHG Reduction Strategy is evaluated by the Santa Rosa 2050 General Plan Environmental Impact Report.

What area is covered by the GHG Reduction Strategy?

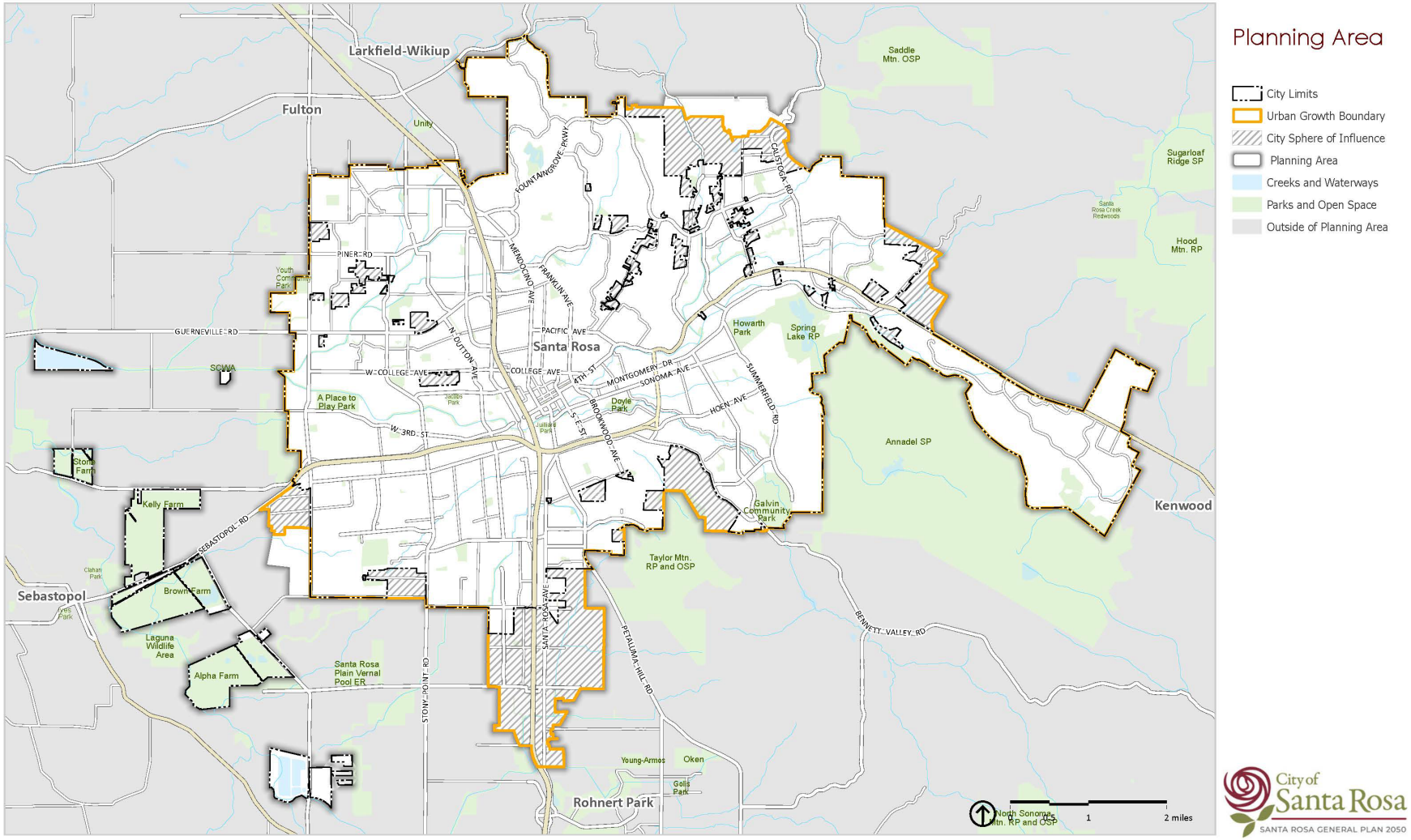
The GHG Reduction Strategy considers GHG emissions produced within the Santa Rosa City Limits and within the City's Planning Area, as shown in **Figure 1**. For each GHG emissions reduction measure, GHG emissions reductions are presented for both the City Limits and Planning Area. The Planning Area for the General Plan defines where the City has an interest in land use and includes land within the incorporated city, sphere of influence (SOI), and urban growth boundary (UGB). The Santa Rosa Planning Area covers about 49 square miles.

The Santa Rosa City Limits encompass approximately 41 square miles, 67 percent of which is developed or is developable. An additional 13 percent of the city is made up of local, regional, and state parkland and open space, including creeks and waterways. The remaining 20 percent of the city is undevelopable because it is unusable due to topography such as steep terrain, or right-of-way (roads and railroads).

The SOI is the unincorporated area adjacent to the city that receives services from the city or may in the future. As shown on **Figure 1**, the Sonoma County Local Agency Formation Commission (LAFCO) identifies unincorporated neighborhoods north, northeast, south, and southwest of the City Limit, in addition to unincorporated islands in the city as within Santa Rosa's SOI. To be eligible for annexation by the City, land must be in the city's LAFCO-designated SOI.

As the name suggests, the UGB separates urban areas from the surrounding natural and agricultural lands, or greenbelts, and limits how far out a city can expand. In 1990, Santa Rosa voters approved a five-year UGB, followed by a two-decade UGB measure in 1996 and an extension in 2010 to ensure that the current UGB will not be significantly changed until at least 2035. The UGB, as shown on **Figure 1**, covers about 45.5 square miles and encompasses all incorporated city land plus some unincorporated land expected to be annexed at some point in the future. The UGB is coterminous with the outer bounds of the SOI.

Figure 1 City Limits and Planning Area



Source: City of Santa Rosa 2023

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2. Community Greenhouse Gas Emissions

This section presents the results of the community's inventory of past and present GHG emissions, as well as projections for future GHG emissions if no action is taken to reduce emissions. This Reduction Strategy uses "community" to refer to the broader community of Santa Rosa and "city-wide" to refer to the area specifically within the City Limits. This Reduction Strategy also analyzes GHG emissions resulting in development of the Planning Area as identified in the General Plan 2050 for consistency. Refer to **Figure 1** for boundaries.

A GHG emissions inventory identifies GHG emissions that result from activities of residents, employees, and other community members occurring within the community. Municipal agencies like the City of Santa Rosa (City) prepare GHG inventories to better understand the sources and quantities of GHGs attributed to day-to-day activities. The City has in the past prepared community GHG inventories for the calendar years 2000 and 2007 and City operations (also referred to municipal or government operations) GHG inventories for the calendar years 2000, 2007, and 2010.

As part of preparation of General Plan 2050 and this Reduction Strategy, the City reviewed and updated the 2007 community GHG emissions inventory, prepared a new inventory for the 2019 calendar year, and forecasted GHG emissions through 2050. As such, the community inventories and associated GHG projections do not account for any potential changes in transportation or resource use directly resulting from the COVID-19 pandemic, the long-term effects of which are not currently known.

The City's 2007 inventory serves as the City's emissions baseline, which is necessary for estimating 1990 GHG emissions, tracking the City's progress towards meeting the State's GHG emission reduction targets, and projecting future GHG emissions. Comparing the updated 2007 inventory to the more recent 2019 inventory provides a more recent picture of contributors to community emissions, and helps the City identify which GHG emissions-reduction actions have been most successful. As the City continues to implement its GHG reduction measures, City staff will use the 2019 inventory and future inventories to track future progress.

GHG Emissions Inventory Protocols

A series of guidance documents called protocols provide recommendations on how to assess a community's GHG emissions. Protocols indicate which sectors are analyzed in local government GHG inventories and emissions from those sectors are measured. Following protocols is a standardized approach for all GHG inventories and results in reliable estimates of local emissions levels that can be compared across multiple years and communities.

The City updated the 2007 community-wide GHG emissions inventory and prepared a 2019 community-wide GHG emissions inventory following standard protocols, methods, and best practices supported by the California Governor's Office of Planning and Research, California Air Resources Board (CARB), BAAQMD, and the California Air Pollution Control Officers Association (CAPCOA). The City followed two protocols: (1) the United States Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (U.S. Community Protocol), and (2) the Global Protocol for Community-Scale Greenhouse Gas Inventories (Global Protocol) to assess GHG emissions from sources that are not covered in the U.S. Community Protocol.[2]

[2] The Bay Area Air Quality Management District recommends use of these protocols in local government planning efforts in its 2022 CEQA Guidelines (https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines). The California Air

Units of Measure and Emission Factors

GHG emissions are generated by various activities that are common in daily life. Some daily activities release GHG emissions in the location of the activity, such as emissions from combustion of natural gas used in community homes or businesses. Other activities cause GHG emissions to be released elsewhere, such as GHG emissions from power plants in other communities that generate the electricity that is used in Santa Rosa. In a few cases, the activity occurs partially in Santa Rosa and partially elsewhere, such as emissions from vehicle trips between Santa Rosa and another community. Overall, the community inventory is an assessment of GHG emissions that are attributed to Santa Rosa, although the emissions themselves or even the activities may not actually occur within the Santa Rosa City Limits or Planning Area.

The community GHG inventories include emissions from three GHGs: (1) carbon dioxide (CO_2), (2) methane (CH_4), and (3) nitrous oxide (N_2O). Although there are other GHGs inventoried by the State of California and the federal government, local government inventories focus on these three primary GHGs that are the most abundant at the community level and have known data sources. GHGs are measured in a unit called carbon dioxide equivalent (CO_2e), which is a standard unit of measure for GHGs analyzed in the inventory. Carbon dioxide equivalent is a metric used to compare the relative potency of GHGs based on their global warming potential (GWP) by converting the amounts of gases to the equivalent amount of CO_2. **Table 1** shows the GWPs used in Santa Rosa's inventories. These inventories report amounts of GHGs in metric tons of CO_2e ($MTCO_2e$), equal to 1,000 kilograms or approximately 2,205 pounds.

The City calculated most of the GHG emissions using data on GHG-generating activities in combination with emission factors. An emissions factor describes how many metric tons of CO_2e emissions are released per unit of an activity. Some sectors, including agriculture and off-road emissions, do not have specific emission factors, because they are calculated using formulae or models.

Sectors

Consistent with the U.S. Community Protocol and Global Protocol for Community-Scale Greenhouse Gas Inventories, the City's community GHG inventory assesses GHG emissions from the following categories of activities, known as sectors.

- **Transportation.** GHG emissions created by driving on-road vehicles, including passenger and freight vehicles, in Santa Rosa. In the 2019 inventory, this sector also includes emissions from fuel use on SMART trains.
- **Residential energy.** GHG emissions attributed to the use of electricity and natural gas in residential buildings.
- **Nonresidential energy.** GHG emissions attributed to the use of electricity and natural gas in nonresidential buildings.
- **Solid waste.** GHG emissions released from trash collected from residents and businesses in Santa Rosa.

Resources Board recommends use of these protocols in its 2017 Climate Change Scoping Plan (https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf).

- **Off-road equipment.** GHG emissions from equipment that does not provide on-road transportation, such as tractors for construction, agricultural equipment, and equipment used for landscape maintenance.
- **Agriculture.** GHG emissions from fertilizer used for crop cultivation. GHG sequestration from agricultural and other undeveloped land is accounted for in the land use and sequestration category. This sector can include GHG emissions from livestock when present. Livestock were not included in the 2007 and 2019 inventories.
- **Water and wastewater.** This sector accounts for the community's energy-related emissions from water supply pumping and wastewater treatment, disposal, and recycled water distribution, as well as methane and nitrous oxide emissions from the wastewater treatment process.
- **Land use and sequestration.** Emissions released into the atmosphere from development of previously undeveloped land (a carbon source) and GHG emissions absorbed and stored in trees and soils on locally controlled lands as part of healthy ecosystems (a carbon sink, or something that removes GHGs from the atmosphere).
- **Stationary sources.** Emissions from fuel use at major industrial facilities permitted by state and regional air quality authorities. Stationary source emissions are informational and are not included in the community total.
- **Wildfire and prescribed burns.** Emissions released by wildfires and prescribed fires.

2007 City-wide GHG Emissions

In 2007, the City prepared a city-wide GHG emissions inventory to serve as the baseline year of analysis for the 2012 CCAP and ongoing climate action activities. As part of the development of this Reduction Strategy, the City updated the 2007 inventory to be consistent with current guidance and best practices, including the addition of new sectors and the use of updated methodologies for calculating GHG emissions.

- **Global Warming Potentials.** The City updated these values to be consistent with the Sixth Intergovernmental Panel on Climate Change (IPCC) Assessment Report.
- **Sectors and Subsectors.** The City added emissions from land use (a carbon source) and sequestration (a carbon sink, or something that removes GHGs from the atmosphere) activities to the 2007 inventory.
- **Sector-Specific Methods.** The City updated activity and emissions data for the on-road transportation and off-road equipment sectors, updated agricultural acreage, and updated emissions factors for the solid waste sector using State databases or models.

Update to Global Warming Potentials

One major revision to the 2007 city-wide GHG emissions inventory was to revise the global warming potentials (GWPs) to account for the relative difference in potencies of different GHGs. These numbers have changed as the science of GHGs has advanced. The original version of Santa Rosa's 2000 and 2007 city-wide GHG emissions inventories used

GWPs from IPCC's Second Assessment Report,[3] released in 1995. For the 2019 and updated 2007 inventories, the City updated these values to use the GWPs from the Sixth IPCC Assessment Report,[4] released in 2021. **Table 1** below shows the GWPs by gas in both the second and the sixth assessment reports.

Table 1 Change in Global Warming Potentials by GHG

Gas	Second Assessment Report GWP	Sixth Assessment Report GWP
Carbon dioxide (CO_2)	1	1
Methane (CH_4) (fossil origin)	21	29.8
Methane (CH_4) (non-fossil origin)	21	27.2
Nitrous oxide (N_2O)	310	273

New Sectors and Subsectors

The City added emissions from land use and sequestration activities to the 2007 inventory. This sector accounts for GHG emissions from the conversion of land from open space or agriculture to urban land uses (a carbon source) and carbon dioxide absorbed by urban trees in urban areas (a carbon sink, or something that removes GHGs from the atmosphere).

Wildfire emissions, which include emissions associated with wildfires and prescribed fires, are typically provided for informational purposes to supplement city-wide GHG inventories. However, because there were no wildfires in 2007, wildfire emissions are not included in the 2007 city-wide GHG inventory.

Updates to Sector-Specific Methods

The City made the following additional updates to the 2007 inventory:

- Updated the emissions associated with on-road transportation and off-road equipment using data from EMFAC 2021, the latest emissions model for these two sectors developed by the California Air Resources Board (CARB). Using EMFAC 2021 instead of the OFFROAD 2007 model to calculate off-road emissions results in greater accuracy but yielded an increase in off-road emissions in the updated 2007 inventory compared with the original inventory.
- Updated the agriculture sector's fertilizer emissions estimates using geographic information system (GIS) acreage data from the California Department of Conservation's Farmland Mapping and Monitoring and Program database for the mapping of agricultural land.
- Updated emissions factors, sourced from CalRecycle, for the solid waste sector.
- Updated vehicle miles traveled (VMT) data and emissions factors for on-road vehicles to reflect the most current and accurate data available. The original inventory used CARB's EMFAC 2007 model as

[3] IPCC, 1996: Climate Change 1995, the Science of Climate Change. Contribution of WGI to the Second Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T., Miera Filho, L.G., Callander, B.A., Harris, N., Kattenburg, A., and Maskell, K. (eds)]. Cambridge University Press, Cambridge, United Kingdom, New York, NY, USA, and Oakleigh, Melbourne, Australia.
[4] IPCC, 2021: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp. doi:10.1017/9781009157896.

a way of estimating emissions from VMT, which only provided CO_2 emissions from the transportation sector. The City used the latest model, EMFAC 2021, to provide a more accurate assessment of VMT emissions from the transportation sector.

- Updated the GWP of methane (CH_4) and nitrous oxide (N_2O).
- Updated estimate of nonresidential electricity use.
- Updated methodology for calculating emissions associated with waste, in accordance with the Air Resources Board Landfill Tool version 1.3.
- Category added for emissions associated with land use and sequestration.

The City did not change data sources for sectors included in the 2007 inventory nor update transportation modeling.

Results of Updates to 2007 City-wide Inventory

The City updated the 2007 city-wide inventory to reflect changes to methods and protocols since 2010. This update resulted in changes to the results of most sectors, with notable increases in the off-road and agriculture sectors and decreases in the water and wastewater and waste sectors. The transportation and energy sectors experienced minor changes. Using the new methods of calculating community-wide emissions for 2007, the results show a 7 percent decrease in total emissions. **Table 2** below shows the results of the updates to the 2007 baseline inventory.

Table 2 Updates to 2007 City-Wide Baseline Inventory

Sector	Original Results	Updated Results	Percentage Change
Transportation	684,280	666,720	-3%
Nonresidential energy	209,880	209,610	Less than 1%
Residential energy	259,640	257,150	-1%
Off-road equipment	17,670	34,960	98%
Solid waste	139,770	52,800	-62%
Water and wastewater	9,840	8,070	-18%
Agriculture	170	220	29%
Land use and sequestration	-	3,200	-
Total Annual $MTCO_2e$	**1,321,250**	**1,232,730**	**-7%**
Informational items[1]			
Stationary sources	28,440	28,440	-
Wildfires and prescribed burns	-	0	-

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

[1] GHG emissions from stationary sources are regulated by the Bay Area Air Quality Management District (BAAQMD) and the California Air Resources Board (CARB). Because the City does not regulate these GHG emissions, stationary sources are provided as informational items and not included in the community-wide GHG inventory total.

2019 City-wide Inventory

As part of the preparation of the City's GHG Reduction Strategy, the City prepared a city-wide GHG emissions inventory for the year 2019. The City selected 2019 as the most recent year because the COVID-19 pandemic resulted in significant changes in activity for various sectors, many of which may not reflect "normal" levels for 2020 and 2021 and making them less useful as a foundation for estimating future emissions. The year 2019 is also used as the General Plan base year for the purposes of environmental impact analysis as required by the CEQA Guidelines. The 2019 inventory covers all sectors included in the 2007 inventory plus some subsector activity data that reflects community changes since 2007. For example, the City estimated 2019 emissions from SMART rail ridership based on annual passenger mileage for trips to and from Santa Rosa. Since there were no wildfires in 2019, wildfire emissions are not included in the 2019 city-wide GHG inventory. In 2019, Santa Rosa's city-wide GHG emissions totaled 872,300 $MTCO_2e$, as shown in **Table 3** below**.**

Table 3 2019 GHG City-wide Inventory Results

Sector	2019	2019 Proportion of total
Transportation	507,810	58%
Nonresidential energy	153,200	18%
Residential energy	148,280	17%
Off-road equipment	37,930	4%
Solid waste	31,560	4%
Water and wastewater	5,170	Less than 1%
Agriculture	200	Less than 1%
Land use and sequestration	-11,850	-1%
Total Annual $MTCO_2e$	**872,300**	**100%**
Informational items[1]		
Stationary sources	12,400	-
Wildfires and prescribed burns	0	0%

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

[1] Stationary sources are not included in the city-wide GHG inventory total. They are provided as informational items.

Transportation remained the highest-emitting sector, representing 58 percent of emissions in 2019. The transportation sector is followed by nonresidential energy, residential energy, and off-road equipment as the second, third, and fourth-highest emitting sectors, respectively, in 2019.

In the 2019 city-wide GHG emissions inventory, the City included activity data and GHG emissions from the local public power provider, Sonoma Clean Power (SCP). The City joined SCP in 2014, so there are no SCP emissions in the 2007 community-wide inventory. SCP provides two types of electricity purchase options for its customers, CleanStart and EverGreen. CleanStart is the default service powered by a diverse mix of energy that, in 2019, was 96 percent carbon-free (sourced from 50 percent renewable energy, 46 percent hydroelectric power, and 4 percent from

other sources). EverGreen is 100 percent locally generated renewable power offered at all times of the day and night, by sourcing solar energy when the sun is shining and geothermal energy during the night.[5]

The land use and sequestration sector includes development activities (changes in land use, typically the development of previously undeveloped space) and urban tree sequestration. Both take into account the ability of organic processes to sequester carbon. Development activities typically increase GHG emissions because they reduce the amount of land area available for sequestration. Urban trees lower community emissions by sequestering carbon. In 2019, urban trees sequestered more carbon than was emitted by development activities, resulting in negative emissions for this sector. This sector sequesters approximately 1 percent of community-wide emissions.

Summary of Changes in City-wide GHG Emissions, 2007 and 2019

Between 2007 and 2019, Santa Rosa's city-wide GHG emissions decreased by 29 percent. While most community-wide sectors experienced a decrease in GHG emissions during this time, the off-road sector experienced an increase in emissions. The land use and sequestration sector also contributed to a decrease in net city-wide GHG emissions due to the ability of open space and trees to sequester carbon. **Table 4** and **Figure 2** below show city-wide GHG emissions by sector in 2007 and 2019, including how GHG emissions changed over time during this period.

Table 4 City-Wide GHG Inventory Results, 2007 and 2019

Sector	2007	2019	Percentage Change
Transportation	666,720	507,810	-24%
Nonresidential energy	209,610	153,200	-27%
Residential energy	257,150	148,280	-42%
Off-road equipment	34,960	37,930	8%
Solid waste	52,800	31,560	-40%
Water and wastewater	8,070	5,170	-36%
Agriculture	220	200	-9%
Land use and sequestration	3,200	-11,850	-470%
Total Annual $MTCO_2e$	**1,232,730**	**872,300**	**-29%**

Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Santa Rosa's city-wide GHG emissions decreased between 2007 and 2019 despite significant population and economic growth. The sectors that experienced significant decreases in annual GHG emissions between 2007 and 2019 are the land use and sequestration sector (470 percent decline), the residential energy sector (42 percent decline), the solid waste sector (40 percent decline), the water and wastewater sector (36 percent decline), the nonresidential energy sector (27 percent decline), and the transportation sector (24 percent decline).

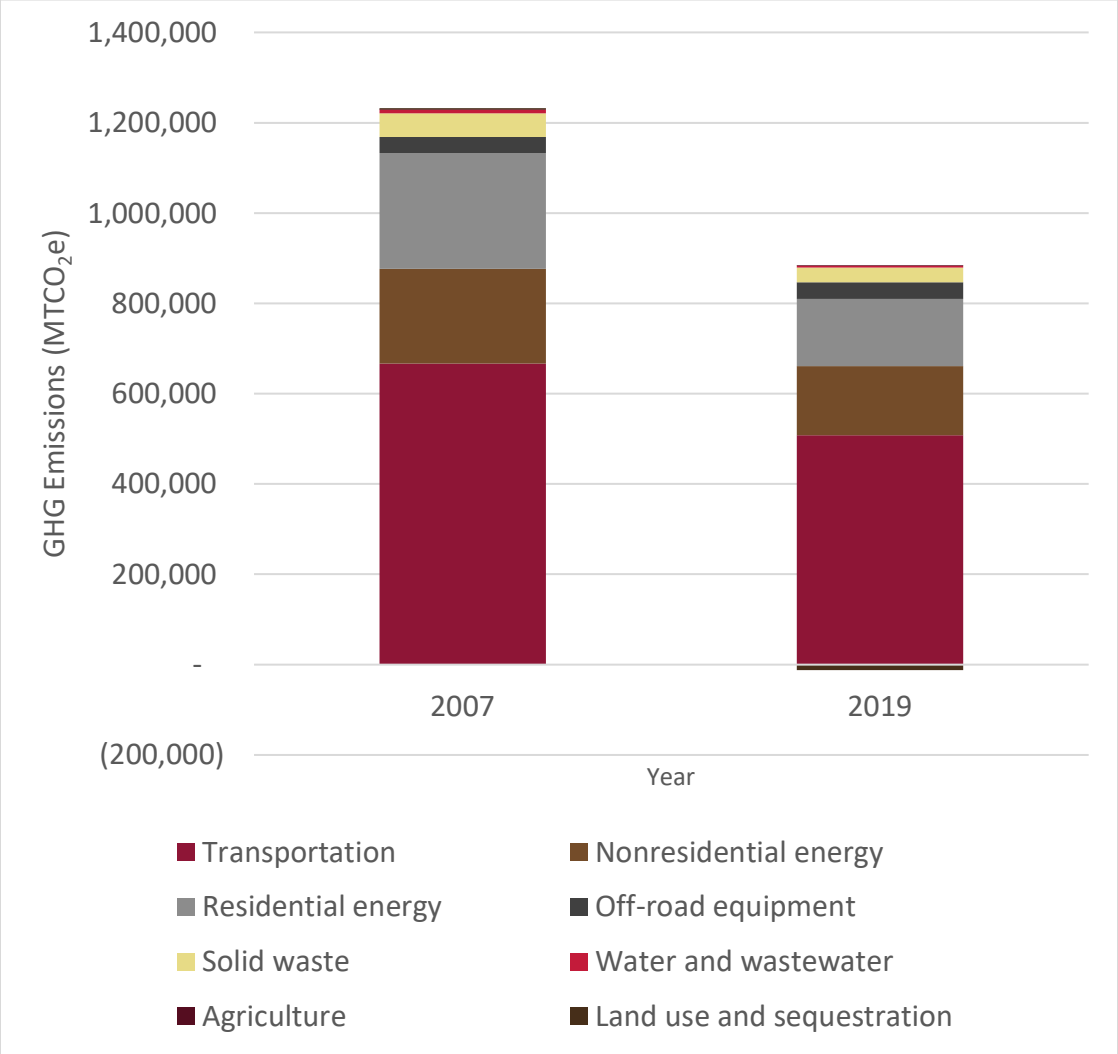
The large drop in land use and sequestration-related emissions comes from a decrease in greenfield development (i.e., conversion of agricultural lands or open space to developed areas) and increase in infill development. While residential

[5] Sonoma Clean Power, 2022, "Evergreen." Sonoma Clean Power. Retrieved online at https://sonomacleanpower.org/programs/evergreen.

electricity use declined approximately 6 percent between 2007 and 2019, likely due to increases in energy efficiency, much of the decline in residential energy GHG emissions is attributed to the community's transition to renewable and carbon-free sources of electricity. Similarly, the dramatic decline in emissions from the nonresidential sector is due to a significant increase in renewable and carbon-free electricity supplies.

A decrease in water and wastewater sector GHG emissions is in part attributed to the increased availability of renewable and carbon-free electricity and a decrease in natural gas use. Changes in how these emissions are calculated also play a part. The decrease in solid waste-related emissions appears to be due to changes in methods and data sources. Changes to transportation-related emissions are a result of decreases in total VMT (a function of changes in VMT modeling) combined with increased vehicle fuel efficiency.

Figure 2 City-wide GHG Inventory Results in, 2007 and 2019



2019 GHG Emissions in Planning Area

The GHG emission inventory results discussed in previous sections are for the City Limits of Santa Rosa. This is the area formally incorporated as part of the city, covering approximately 41 square miles. The GHG Reduction Strategy, as part of Santa Rosa's General Plan Update, also assesses GHG emissions from the Santa Rosa Planning Area. The Planning Area for the General Plan includes land within the incorporated city, SOI, and UGB, covering about 49 square miles. Under State law, a general plan must address all areas within the jurisdiction's Planning Area. **Figure 1** above shows the boundaries of these different areas.

Using the land use and demographics in the Planning Area, combined with per-capita activity data for the City Limits, the City estimated the total GHG emissions for the entirety of the Planning Area. In 2019, Santa Rosa's Planning Area-wide GHG emissions totaled 928,530 $MTCO_2e$, as shown in **Table 5** below.

Table 5 2019 Planning Area GHG Inventory Results

Sector	2019	2019 Proportion of Total
Transportation	541,140	58%
Nonresidential energy	162,400	17%
Residential energy	158,340	17%
Off-road equipment	40,290	4%
Solid waste	33,630	4%
Water and wastewater	5,510	1%
Agriculture	280	Less than 1%
Land use and sequestration	-13,060	-1%
Total Annual $MTCO_2e$	**928,530**	**100%**

Note: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

The 2019 Planning Area GHG inventory results mirror the city-wide inventories with the transportation sector being the highest-emitting sector, followed by nonresidential energy, residential energy, and off-road equipment, as the second, third, and fourth-highest emitting sectors, respectively. As in the city-wide inventory, the land use and sequestration sector has a net negative effect on community-wide emissions in Santa Rosa's Planning Area.

GHG Emissions Forecasts for 2030, 2045, and 2050

A GHG emissions forecast provides information about anticipated changes in GHG emission levels and helps inform where reductions are necessary to achieve future GHG emissions reduction targets. The GHG Reduction Strategy includes forecasts for the calendar years 2030, 2045, and 2050. The forecasts are based on the 2019 city-wide and Planning Area-wide GHG emissions inventories combined with Santa Rosa's 2019 and future demographic projections. Demographic projections for the City Limits are shown in **Table 6** below and for the entire Planning Area in **Table 7**.

Table 6 Forecast Demographic Indicators in City Limits

Indicator	2019	2030	2045	2050
Population	185,396	207,249	237,049	246,983
Households	71,033	79,038	89,954	93,592
Jobs	73,199	77,915	84,346	86,490
Service Population	258,595	285,164	321,395	333,472
Geographic Area (square miles)	41.1	41.1	41.1	41.1

Table 7 Forecast Demographic Indicators in Planning Area

Indicator	2019	2030	2045	2050
Population	197,976	221,312	253,134	263,742
Households	75,853	84,401	96,058	99,943
Jobs	77,593	82,593	89,411	91,683
Service Population	275,569	303,905	342,545	355,425
Geographic Area (square miles)	49.3	49.3	49.3	49.3

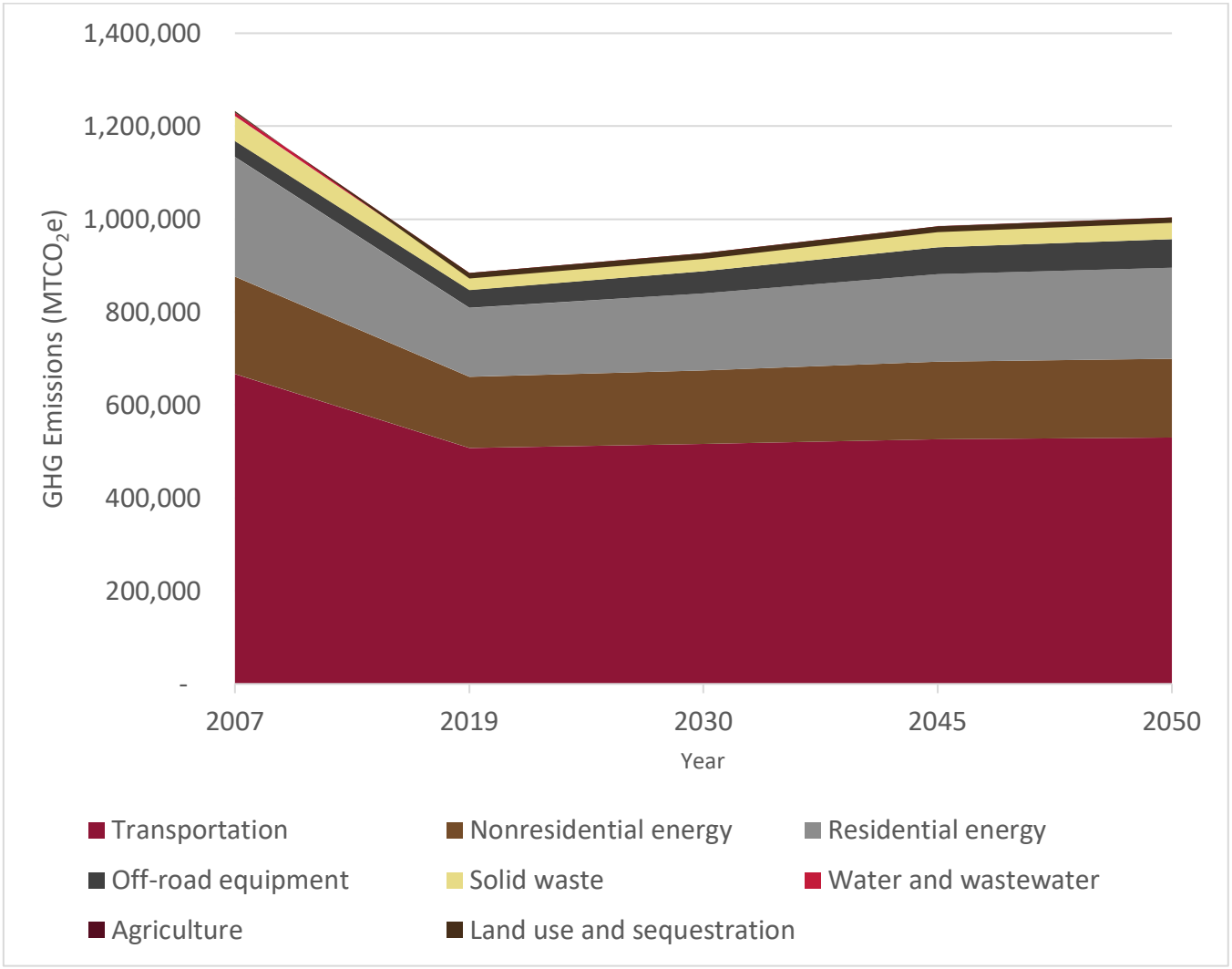
Tables 8 and **9** and **Figures 3** and **4** below show 2007 and 2019 inventories and business-as-usual emissions forecasts for 2030 through 2050 for the City Limit and entire Planning Area, respectively. A business-as-usual forecast identifies the level of GHG emissions that the City Limit or Planning Area would be expected to generate in the absence of any additional actions to reduce GHG emissions at the state, regional, or local level, including actions that have been adopted but not yet implemented. The results of the 2007 and 2019 inventories are included for comparison purposes. GHG Emissions from most individual sectors are projected to remain below 2007 levels, except the off-road vehicles and equipment sector, which is forecast to generate increased GHG emissions through 2050. **Table 8** and **Figure 3** show the city's forecasted GHG emissions in the absence of any intervention.

Table 8 Inventory and Business-as-Usual GHG Emissions Forecast for the City Limits

Sector	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Transportation	666,720	507,810	515,890	526,910	530,570	-20%
Nonresidential energy	209,610	153,200	158,780	166,390	168,940	-19%
Residential energy	257,150	148,280	164,980	187,780	195,360	-24%
Off-road equipment	34,960	37,930	47,670	58,870	62,660	79%
Solid waste	52,800	31,560	34,800	39,230	40,700	-23%
Water and wastewater	8,070	5,170	5,180	5,170	5,170	-36%
Agriculture	220	200	130	40	10	-95%
Land use and sequestration	3,200	-11,850	-12,900	-12,150	-11,900	-472%
Total	**1,232,730**	**872,300**	**914,530**	**972,240**	**991,510**	**-20%**

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.
Data shown for 2007 and 2019 reflect GHG emission inventories and are provided as a reference to illustrate change over time. The data shown for 2040, 2045, and 2050 are GHG emission forecasts that predict future emissions. The forecast numbers for 2030, 2045, and 2050 are based on projections from the 2019 inventory.

Figure 3 Inventory and Business-as-Usual GHG Emissions Forecast for the City Limits



Similarly, overall Planning Area GHG emissions are expected to gradually increase between 2019 and 2050, while remaining below 2007 levels. GHG emissions from most individual sectors are also expected to remain below 2007 levels by 2050, except for emissions from offroad vehicles and equipment.

Table 9 and **Figure 4** show the Planning Area's forecasted GHG emissions in the absence of any new intervention.

Table 9 Inventory and Business-as-Usual GHG Emissions Forecast for the Planning Area

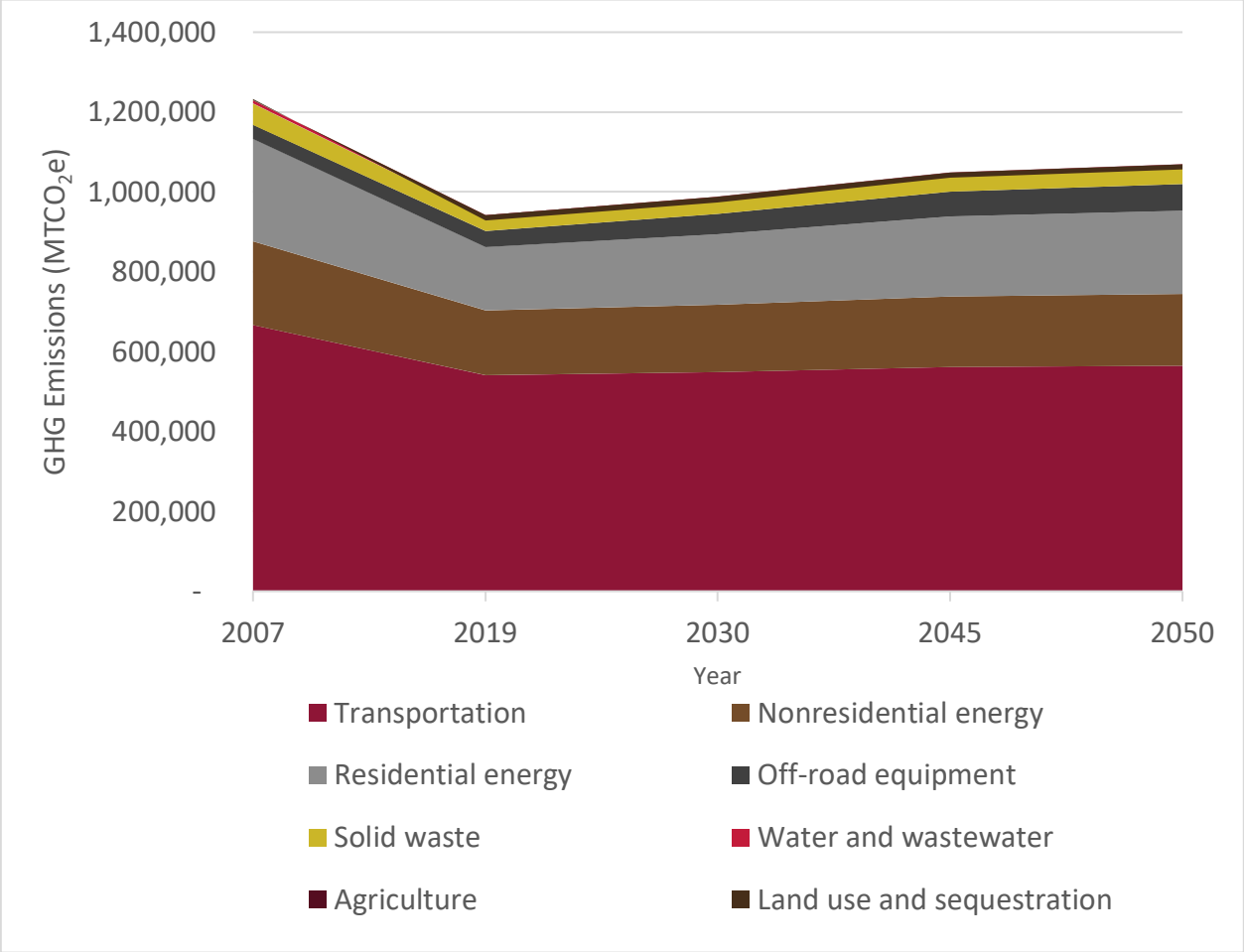
Sector	2007 Inventory $MTCO_2e$ *	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Transportation	666,720	541,140	549,620	561,180	565,020	-15%
Nonresidential energy	209,610	162,400	168,310	176,380	179,080	-15%
Residential energy	257,150	158,340	176,180	200,520	208,620	-19%
Off-road equipment	34,960	40,290	51,300	63,400	67,490	93%
Solid waste	52,800	33,630	37,090	41,810	43,380	-18%
Water and wastewater	8,070	5,510	5,550	5,540	5,540	-31%
Agriculture	220	280	180	50	10	-95%
Land use and sequestration	3,200	-13,060	-14,160	-13,110	-12,750	-498%
Total	**1,232,730**	**928,530**	**974,070**	**1,035,770**	**1,056,390**	**-14%**

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.
*Estimates of the 2007 GHG inventory are identical to that of the City Limits due to absence of data.
Data shown for 2007 and 2019 reflect GHG emission inventories and are provided as a reference to illustrate change over time. The data shown for 2040, 2045, and 2050 are GHG emission forecasts that predict future emissions. The forecast numbers for 2030, 2045, and 2050 are based on projections from the 2019 inventory.

GHG Emissions Reduction Targets

As part of efforts to reduce GHG emissions, both the State of California and City of Santa Rosa have established GHG emission reduction targets. In establishing GHG reduction targets, the City and State declared an objective of reducing GHG emissions to a certain level by a specific future date. This GHG Reduction Strategy is required to demonstrate compliance with GHG targets set by the State, at a minimum, for consistency with the State's CEQA Guidelines and to be considered a qualified GHG reduction plan and available for use to streamline analysis of potential GHG impacts of future projects under CEQA. Both State- and City-defined targets help direct development, resource use, and circulation policy and decision-making; help the City track its progress over time; and indicate the importance of reducing the community's climate change impact to the greatest extent feasible, as quickly as possible. This section presents the City's GHG emissions reduction targets, both regulatory and aspirational.

Figure 4 Inventory and Business-as-Usual GHG Emissions Forecast for the Planning Area



State Targets

Senate Bill (SB) 32, adopted in 2016, requires that the State reduce statewide GHG emissions to 40 percent below 1990 levels by 2030.[6] Executive Order B-55-18 (2018) established a goal for the state to achieve net carbon neutrality by 2045. Assembly Bill (AB) 1279, adopted in 2022, codified this goal into law, directing statewide achievement of net zero GHG emissions (GHGs released to the atmosphere are balanced by removals of GHG emissions) as soon as possible, but no later than 2045. AB 1279 also directs maintenance of net negative GHG emissions thereafter, and to ensure that by 2045, statewide human caused GHG emissions are reduced to at least 85 percent below 1990 levels by 2045.

[6] The State's AB 32 Scoping Plan identifies 15 percent below 2005–2008 emissions levels as the local government equivalent of 1990 GHG emissions levels. The City uses 2007 as the baseline year.

Santa Rosa's Community-wide Targets

2020 and pre-2020 Community-wide GHG Emissions Reduction Targets

In August 2005, the Santa Rosa City Council adopted Resolution Number 26341, which set a community-wide GHG emissions reduction target of 25 percent from 1990 levels by 2015. In 2012, the City Council adopted a Community-wide Climate Action Plan (CCAP), which established a pathway to achieve and exceed the 2020 target (equivalent of emitting 842,290 $MTCO_2e$ per year) and to continue GHG reductions in support of the State's goal to reduce statewide GHG emissions 80 percent below 1990 levels by 2050.

City of Santa Rosa Climate Emergency Resolution (2020)

On January 14, 2020, the City Council adopted Resolution Number RES-2020-002 declaring a climate emergency and requiring immediate mobilization to restore a safe climate. This Resolution committed the City to ongoing efforts related to climate change and GHG emissions reductions through the implementation of Climate Action Subcommittee direction, the work of City departments, and collaboration with the Regional Climate Protection Authority (RCPA). The Climate Emergency Resolution includes a goal to reach carbon neutrality by 2030.

Post-2020 Community-wide GHG Emissions Reduction Targets

To meet the State's reduction targets, the City must reduce community-wide GHG emissions to 40 percent below 1990 levels by 2030 and 85 percent below 1990 levels by 2045, at a minimum. **Table 10** below presents GHG emissions for the past years used to establish the baseline (1990 and 2007) and the GHG emission targets for 2030 and 2045.

Table 10 Santa Rosa's City Limits GHG Emission Reduction Targets

Target	$MTCO_2e$
1990 Emissions (15% below 2007 Baseline)	1,047,820
2007 Baseline	1,232,730
2030 Target (40% below 1990 levels)	628,690
2045 Target (85% below 1990 levels and net carbon neutrality)	157,170
2050 Target (minimum 85% below 1990 levels and net carbon neutrality) *	157,170

* The State has not adopted a quantitative GHG emissions reduction target beyond 2045; however, the State, aspires to achieve net zero GHG emissions as soon as possible, but no later than 2045, and to achieve and maintain net negative greenhouse gas emissions thereafter.

This GHG Reduction Strategy is designed to achieve net carbon neutrality by 2045 (e.g., reduce emissions 85 percent below 1990 levels and support sequestration or other activities to balance out the remaining 15 percent), consistent with the State target established by AB 1279 (California Climate Crisis Act; California Health and Safety Code Section 38562.2) in 2022. This Reduction Strategy sets the 2030, 2045, and 2050 emissions targets based on the best available science for inventorying and establishing local GHG emissions reduction targets and guidance from

BAAQMD,[7] CAPCOA,[8] and CARB,[9] which guided preparation of the GHG inventories and forecasts completed for General Plan 2050 and this Reduction Strategy (as presented in this chapter and detailed in the **Appendix**). The GHG emissions inventories, GHG emissions forecasts, and quantification of GHG reduction potential of measures to achieve these targets (presented in Chapter 3 and detailed in the **Appendix**) are also supported by best available science and best practices, the City's past efforts to prepare the MCAP and CCAP, as well to implement both plans, and ongoing work by RCPA to inventory GHG emissions and track climate action progress.

As noted previously, the City has adopted a Climate Emergency Resolution calling on Santa Rosa to achieve net carbon neutrality by 2030. Achieving net carbon neutrality by 2030 is a notable aspirational goal shared by several cities and communities around the world. At this time, achievement of carbon neutrality community-wide by 2030 would require a significant increase in City resources, technologies, staff time, and community participation, well beyond what is currently available to the City. This Reduction Strategy proposes measures and actions to achieve minimum GHG reduction targets for 2030 and 2045 to demonstrate the community's consistency with and support the State's GHG reduction targets to achieve carbon neutrality statewide no later than 2045. Although this GHG Reduction Strategy shows a quantitative path to achieving net carbon neutrality by 2045, City staff, decision makers, and community members should continue aggressive efforts to reduce GHG emissions beyond the levels identified in this strategy as opportunities allow.

Both the State and City of Santa Rosa have implemented policies and programs to help meet these ambitious GHG reduction targets. The emission impacts of these actions are discussed in the next chapter, along with the new reduction measures introduced as part of this Reduction Strategy.

Carbon Neutrality

Net carbon neutrality refers to the idea of achieving net-zero carbon emissions by balancing those emissions so that they are equal to or less than emissions that are removed from the atmosphere through sequestration or related efforts. Achieving carbon neutrality requires both significantly reducing community GHG emissions and supporting the ecosystems that sequester carbon. The City of Santa Rosa has long been committed to achieving carbon neutrality, and this GHG Reduction Strategy presents a pathway to achieving State-defined carbon neutrality targets by 2045.

[7] Bay Area Air Quality Management District. 2022. *California Environmental Quality Act Guidelines, Appendix C: Guidance for GHG Reduction Strategies*. https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/appendix-c-ghg-reduction-strategies_final_edits-for-ascent-pdf.pdf?rev=8e5bb7d8ad504dd6accd3c04e58bdf87.
[8] California Air Pollution Control Officers Association. 2022. *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity.* https://www.caleemod.com/handbook/index.html.
[9] California Air Resources Board. 2022. *2022 Scoping Plan for Achieving Carbon Neutrality, Appendix D: Local Actions*. https://ww2.arb.ca.gov/sites/default/files/2022-11/2022-sp-appendix-d-local-actions.pdf

3. GHG Emissions Reduction Measures and Programs

This section describes GHG emissions reduction measures implemented on the state and local levels. It includes existing measures that have already started to be implemented, and new measures that are being introduced for the first time as part of this GHG Reduction Strategy. Projected GHG emissions reductions within the City Limits are presented for the years 2030, 2045, and 2050 for both new and existing measures. Descriptions of new measures also include implementation information, including the applicability of the measure and its supporting actions and performance assumptions.

State Reduction Measures

California has adopted and committed to implementing policies to decrease GHG emissions statewide, including from several of the major GHG-emitting sectors that are also present in Santa Rosa. Many of these policies are identified in California's Climate Change Scoping Plan, which was originally adopted in 2008 in response to the California Global Warming Solutions Act. The Scoping Plan outlines several regulatory and market-based solutions to achieving California's GHG emissions reduction goals. Successive updates to the Scoping Plan in 2014, 2017, and 2022 have revised these state actions and identified additional opportunities for GHG emissions reductions.

While the Scoping Plan and related documents lay out several policies to reduce GHG emissions, the GHG Reduction Strategy focuses on the measures that have the most direct and apparent benefits to Santa Rosa. The GHG Reduction Strategy includes an assessment of Santa Rosa's GHG emissions reduction benefits from California's policies, allowing the community to receive "credit" for the state's efforts. These efforts are:

- The Renewables Portfolio Standard (RPS), which requires increases in renewable electricity supplies.
- The Clean Car Standards, which require increased fuel efficiency of on-road vehicles and decreased carbon intensity of vehicle fuels. In 2022, the State adopted the Advanced Clean Cars II standards, which apply to vehicles produced from 2026 to 2035 and require that all new light-duty vehicles sold in California be zero-emission by 2035. Similar standards, known as the Advanced Clean Trucks, Advanced Clean Fleets, and Innovative Clean Transit regulations, require GHG reductions for larger vehicles and organizations that operate vehicle fleets.
- The updated Title 24 building energy-efficiency standards, which require new buildings to achieve increased energy-efficiency targets. The current version of these standards went into effect January 1, 2023.
- The Short-Lived Climate Pollutant Reduction Strategy, also known as SB 1383, which requires that jurisdictions provide organic waste collection services, qualifying businesses recover and donate edible food, and that all individuals and businesses dispose of organic waste in their green waste collection carts.

The projected GHG reduction benefits of these actions within the City Limits are presented in **Table 11** below.

Table 11 Santa Rosa City Limits GHG Emissions Reductions from State Actions, 2007 to 2050

State Emissions Reduction Measure	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Forecast emissions without state actions	**1,232,730**	**872,300**	**914,530**	**972,240**	**991,510**	**-20%**
Renewables Portfolio Standard (RPS)	-	-	-20,490	-83,050	-83,590	-
Clean Car Standards	-	-	-103,480	-192,900	-201,700	-
Title 24	-	-	-7,490	-29,190	-37,970	-
SB 1383	-	-	-9,060	-10,210	-10,590	-
Reductions from all state actions	-	-	-140,520	-315,350	-333,850	-
Emissions with state actions	**1,232,730**	**872,300**	**774,010**	**656,890**	**657,660**	**-47%**

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

Existing Community-wide Reduction Measures

The City of Santa Rosa has been a long-time leader in reducing GHG emissions. The City's 2012 CCAP identified early GHG emissions reduction actions, such as installing and using renewable energy, conducting energy-efficiency upgrades, supporting alternative modes of transportation and electric vehicles, and reducing waste. Since the 2012 CCAP was adopted, the City has worked to implement these actions alongside the community and in partnership with regional agencies. The 2019 community-wide GHG inventory accounts for the implementation of the 2012 CCAP and other climate action measures between 2012 and 2019. All City-led actions that have been implemented or increased participation since 2019 can be credited for additional GHG emissions reductions.

Existing actions whose GHG emissions reductions have been quantified include:

- **Participation in Sonoma Clean Power**. The City of Santa Rosa is a participant in Sonoma Clean Power (SCP), a community choice electricity provider that on average provides higher levels of renewable energy than the Pacific Gas and Electric Company (PG&E). In 2019, SCP provided approximately 86 percent of Santa Rosa's residential and 90 percent of its nonresidential electricity, excluding direct access electricity. All municipal accounts are enrolled in SCP's EverGreen program.
- **Solar system installations**. Since 2019, approximately 4,500 residential and 80 commercial solar energy systems have been installed in Santa Rosa.
- **Micro-mobility programs**. Between July 2022 and June 2023, the City's Bird Scooter program provided nearly 9,000 scooter rides.
- **Installation of public electric vehicle (EV) chargers**. According to the Alternative Fuels Data Center, Santa Rosa has approximately 69 public EV charging locations, corresponding to over 160 charging ports.

- **Installation of graywater systems**. Since the beginning of 2020, the City has rebated the installation of seven graywater systems.
- **Cash for Grass Rebate Program**. The City's Cash for Grass Rebate Program provides rebates for qualifying residents and building owners who replace their lawns with water-efficient landscaping. Between 2020 and 2023, the Cash for Grass Rebate Program resulted in the conversion of 639 sites and removal of 700,984 square feet of lawn.
- **WaterSmart Check-up Program**. The City's WaterSmart Check-up Program provides free water-efficient fixtures and reviews the customer's irrigation system for inefficiencies. The program saves approximately 1.3 million gallons of water per year.
- **Expansion and upgrading of the City's bike network**. Since 2020, the City has constructed 0.6 miles of new bike lanes and has upgraded 5.6 miles, primarily from Class II to Class IIB bike lanes.[10] The City has committed to adding another 4 miles of bike lanes to the bike network by the end of 2024.
- **Electric new construction reach code**. On November 19, 2019, the City passed a reach code that requires new residential construction of three stories and below to be all electric. In 2022, the City extended the all-electric reach code requirement for low-rise residential buildings through the 2022 California Building Code cycle (Ordinance 2022-015). The 2022 reach code provides exemptions for reconstructed buildings lost in a disaster, attached dwelling units, and new construction where existing utility infrastructure would have to be removed at the owner's expense. The GHG reductions beyond 2024, as shown in **Table 12**, reflect the annual benefits of all-electric buildings built during implementation of the 2019 and 2022 reach codes, through June 30, 2024.[11]

The projected GHG reduction benefits of these actions within the City Limits are presented in **Table 12** below.

[10] Class II bike lanes are on-street facilities designated for bicyclists using stripes and stencils. Class IIB bike lanes include buffer striping to provide greater separation between bicyclists and parked or moving vehicles.

[11] The City has suspended its enforcement of Ordinance 2022-015 because of a decision on January 2, 2024, by the U.S. Court of Appeals 9th Circuit that invalidated a City of Berkeley ordinance that prohibited natural gas infrastructure in new buildings, precluding cities and counties from adopting ordinances that prohibit the installation of gas plumbing in buildings. The City is currently evaluating options for a replacement reach code that will achieve similar objectives for energy efficiency and GHG emissions reductions in a manner that is consistent with the recent court decision.

Table 12 Santa Rosa City Limits GHG Emissions Reductions from Municipal Actions, 2007 to 2050

State Emissions Reduction Measure	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Forecast emissions with state actions	**1,232,730**	**872,300**	**774,010**	**656,890**	**657,660**	**-47%**
Sonoma Clean Power	-	-	-10,810	0	0	-
Solar installations	-	-	-150	0	0	-
Micro-mobility	-	-	Less than -10	Less than -10	Less than -10	-
Public EV chargers	-	-	-6,720	-5,750	-5,690	-
Graywater systems			Less than -10	Less than -10	Less than -10	
Cash for Grass Rebate Program			Less than -10	Less than -10	Less than -10	
WaterSmart Check-up Program			Less than -10	Less than -10	Less than -10	
New bike lanes			-10	-10	-10	
All-electric reach code (or equivalent)			-5,490	-5,520	-5,520	
Reductions from all municipal actions	-	-	-23,180	-11,280	-11,220	-
Emissions with municipal actions	**1,232,730**	**872,300**	**750,830**	**645,610**	**646,440**	**-48%**

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

These GHG emissions reductions are an important contributor to the City's ability to meet its community-wide GHG reduction targets. However, the City must implement additional emissions-reducing actions to meet state targets. This GHG Reduction Strategy builds on the City's already significant progress through the new measures described below.

New Community-wide Reduction Measures and Programs

This GHG Reduction Strategy presents 17 new climate action measures. All measures are expected to further reduce GHG emissions and help the City meet its climate action, sustainability, and resilience goals. However, lack of both reliable data and a standardized protocol for quantifying emissions reductions for three of these measures (Measures 15, 16, and 17) prevents them from being quantified. Due to the City's already high rates of recycled water use, Measure 13 (Expand water catchment and reuse opportunities) also does not result in quantifiable emissions reductions. These three measures are classified as supportive measures. The GHG Reduction Strategy demonstrates a feasible pathway to reduce GHG emissions to at least 40 percent below 1990 levels by 2030 and 85 percent below 1990 levels no later than 2045 with a commitment to accelerate reductions, as feasible, in support of the City's and State's carbon neutrality goals. (Supported by General Plan Policy 3-7.1)

The measures are designed to help meet the City's GHG reduction goal to achieve net carbon neutrality by 2045 (Goal 3-7 of the General Plan 2050) and are organized by the following five objectives. **Table 13** below lists the objectives and their associated measures. Each of the first four objectives corresponds to a GHG emissions sector: transportation and off-road equipment, residential and nonresidential building energy use, solid waste, water and wastewater, and land use and sequestration.

1. Objective: Decrease Community-Wide Vehicle Miles Traveled (VMT) And Increase The Use Of Zero-Emission Vehicles And Equipment.
2. Objective: Reduce Community-Wide Energy Use And Transition To Carbon-Free Energy Sources.
3. Objective: Achieve A Zero-Waste Future For Santa Rosa.
4. Objective: Use Water Efficiently And Enhance Drought Resilience.
5. Objective: Enhance Sustainable And Carbon-Free Practices Community-Wide.

When implemented, these measures will reduce GHG emissions, improve community adaptation and resilience to climate change-related hazards, and address other sustainability issues. The Project Team developed these GHG reduction measures following current best practices and guidance, the lessons learned through implementation of the 2012 CCAP, and input and feedback from residents and key stakeholders who represent many different community organizations and businesses.

Objectives and measures are supported by a series of General Plan goals, which are identified below the corresponding objective or measure language. Each measure is enacted through a series of implementing programs, some of which are policies or actions from the General Plan and identified as such with their General Plan policy or action number. This integration of the General Plan into the GHG Reduction Strategy helps ensure that the documents are consistent and that they form a unified approach to reduce Santa Rosa's GHG emissions.

Implementation programs are organized in three categories, as follows:

- **Municipal programs** refer to programs over which the City has sole authority, including operation, maintenance, and management of City facilities, services, and programs, such as making changes to municipal facilities or purchasing policies.
- **Regulatory programs** refer to the passage, development, or implementation of local regulations, such as amendments to the municipal code.

- **Education, outreach, and coordination programs** include efforts to inform the community about sustainability issues, initiatives, and benefits and to create and sustain partnerships that support the successful implementation of the measure.

Table 13 New Community-wide GHG Emissions Reduction Objectives and Measures

OBJECTIVE: DECREASE COMMUNITY-WIDE VEHICLE MILES TRAVELED (VMT) AND INCREASE THE USE OF ZERO-EMISSION VEHICLES AND EQUIPMENT.	
Measure 1	Locate and design new development to minimize vehicle dependence.
Measure 2	Improve the frequency, coverage, and effectiveness of local and regional transit and rail networks
Measure 3	Develop and expand transportation demand management (TDM) programs to reduce VMT and dependence on single-occupancy vehicle trips.
Measure 4	Enhance active transportation and micromobility systems.
Measure 5	Accelerate the adoption of zero-emission light-duty and heavy-duty vehicles.*
Measure 6	Transition to zero-emission motorized equipment, including construction and landscaping equipment.
OBJECTIVE: REDUCE COMMUNITY-WIDE ENERGY USE AND TRANSITION TO CARBON-FREE ENERGY SOURCES.	
Measure 7	Reduce community-wide energy use, increase energy efficiency, and advance electrification in existing buildings, including municipal buildings.
Measure 8	Transition to carbon neutral new buildings.
Measure 9	Increase local renewable energy generation and the use of renewable, carbon free, and distributed energy systems, including energy storage, throughout the city.
OBJECTIVE: ACHIEVE A ZERO-WASTE FUTURE FOR SANTA ROSA.	
Measure 10	Reduce the amount of recyclable and compostable material sent to landfills.
Measure 11	Reduce total waste generation.
OBJECTIVE: USE WATER EFFICIENTLY AND ENHANCE DROUGHT RESILIENCE.	
Measure 12	Improve indoor and outdoor water use efficiency.
Measure 13[1]	Expand water catchment and reuse opportunities.
OBJECTIVE: ENHANCE SUSTAINABLE AND CARBON-FREE PRACTICES COMMUNITY-WIDE.	
Measure 14	Increase local natural carbon sequestration opportunities.
Measure 15[1]	Reduce embedded carbon in goods and services used by the City and community members.
Measure 16[1]	Maximize opportunities for local food production.
Measure 17[1]	Integrate climate action across all City departments and programs.

[1] These measures do not result in quantifiable GHG emissions reductions.
*For regulatory purposes, medium-duty vehicles are classed with heavy-duty vehicles.

Achievement of State and local GHG reduction targets requires the City to implement the measures in this GHG Reduction Strategy and to regularly report on the progress made. Each measure in this Reduction Strategy is accompanied by substantive evidence and implementation guidance that ensures that each measure is assigned to a lead City department responsible for implementation. Details about how the GHG emissions savings for each measure were calculated are presented in the **Appendix**.

Each measure is presented in this chapter with its supporting implementation programs and details. The description of each measure includes narrative text to describe the measure, its projected GHG emissions savings within City Limits (if applicable), implementing programs, supportive General Plan policies, measure performance standards, applicability, measure type, timeframe, lead department(s), supporting department(s), supporting partners, and Expected Funding Sources, as defined below.

- **Performance Standards**: Quantifies the development and activity change that the City needs to implement by 2030, 2045, and 2050 to achieve the full projected GHG emission reductions from each measure. Additional quantitative details and substantial evidence for each measure can be found in the **Appendix**.
- **Applicability:** The people, development, land uses, activities, and other aspects of the community that the measure applies to.
- **Timeframe of Implementation:** Identifies the year by which a measure should be effective by the fiscal year's end. The exact status of a measure will vary based on its actions, and many measures will be ongoing through and beyond 2030. An effective measure will be one that is actively on track to achieve its targeted GHG emissions reductions, supports adaptation to climate change effects, or achieves long-term resilience. For a measure to be effective, the necessary programs and efforts should be active, and any infrastructure or other capital improvements should be in place. The effective year is not the end year—many of the measures are intended to remain in effect for the foreseeable future, so they do not have end dates. Time frames for effectively setting up the measures are:
    - Short-term (by 2024)
    - Medium-term (by 2027)
    - Long-term (by 2030)
- **Responsible and Supporting City Departments:** The lead City department(s) tasked with implementing the measure and City departments that have a supporting role in implementation.
- **Supporting Community Partners:** Example of local organizations that the City will partner with to implement the given policy. This is not an exhaustive list; additional community partners will be welcome.
- **Funding Sources**: Expected sources of funding for the measure.

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Vehicle travel is a significant part of daily life. However, personal and commercial vehicles are currently one of Santa Rosa's primary sources of GHG emissions and air pollutants. The State of California has long recognized transportation's contribution to GHG emissions and has taken several actions to increase the use of zero-emission vehicles (ZEVs). Most recently, the State adopted new regulations that require all new passenger vehicles sold in California to be zero-emission by 2035. Locally, recent shifts towards telecommuting have helped reduce commute emissions.

The GHG Reduction Strategy establishes a framework for reducing vehicle and equipment emissions by reducing the VMT of personal and commercial vehicles, promoting public and active transportation, changing development patterns to promote affordable housing[12] and facilitate easy access to goods and services, expanding micro-mobility options, and accelerating the switch to zero-emission fuels for vehicles and equipment. In addition to reducing GHG emissions, these measures will also improve public health, air quality, and overall quality of life in Santa Rosa.

Measures included under this objective are:

- **Measure 1:** Locate and design development to minimize vehicle dependence.
- **Measure 2:** Improve the frequency, coverage, and effectiveness of local and regional transit and rail networks.
- **Measure 3:** Develop and expand transportation demand management (TDM) programs to reduce VMT and dependence on single-occupancy vehicle trips.
- **Measure 4:** Enhance active transportation and micro-mobility systems.
- **Measure 5:** Accelerate the adoption of zero-emission light-duty and heavy-duty vehicles.

Supportive General Plan Goals:

General Plan Goal 2-1: Ensure that growth and change serve community needs, protect the environment, improve the City's fiscal stability, and enhance quality of life for all members of the community.

General Plan Goal 2-2: Promote city-centered growth and investment with a neighborhood-focused approach to create complete and connected communities that provide community members' daily needs within easy walking or biking distance.

General Plan Goal 2-3: Create dense and varied housing types near transit to reduce greenhouse gas emissions and promote livability.

General Plan Goal 2-8: Enliven and maintain vibrant, convenient, and attractive commercial centers.

General Plan Goal 3-1: Provide an integrated land use and transportation system with safe and efficient movement of people and goods for all modes of travel that prioritizes reduction of VMT and transportation-related GHG emissions.

General Plan Goal 3-2: Provide a safe and accessible active and public transportation network that emphasizes active transportation connections and service to Equity Priority Areas and Areas of Change.

[12] Affordable housing provides greater opportunity for lower-income households to live closer to job centers and achieve a jobs/housing balance match near transit. It is also an important tool to address the limited availability of affordable housing that might force residents to live far from jobs or school, requiring longer commutes.

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Measure 1: Locate and design new development to minimize vehicle dependence.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
12,040	10,090	11,940

Implementing Programs:

Regulatory Programs:

1.1. Implement the City's General Plan and update the Zoning Code to maximize new development in mixed-use areas and around Transit Emphasis Corridors and Key Transit Hubs, including upzoning vacant and underused parcels in suitable areas, and encourage the establishment of neighborhood-scale services in suitable locations in residential areas, including, but not limited to, implementing the following General Plan Actions:

a. Work with landowners and developers to encourage development that will increase access to goods and services that support daily life, such as access to fresh produce, recreation and sporting opportunities, community gathering places, active transportation infrastructure, and transit. (General Plan Action 2-2.1)

b. Explore ways to encourage development in Areas of Change that includes services within one-half mile walking and biking distance of residential neighborhoods. (General Plan Action 2-2.5)

c. Explore ways to encourage shared parking areas and shared driveways / vehicle access points in private development. (General Plan Action 2-2.6)

d. Update the Zoning Code to permit residential and mixed-use development by right in some nonresidential zoning districts, as mandated by State law. (General Plan Action 2-3.1)

e. Identify barriers and/or incentives to mixed-use redevelopment in areas that are currently lacking components of a complete neighborhood and mitigate/implement these. (General Plan Action 2-3.2)

f. Require development at the midpoint or higher of the density range in the Medium and Medium High Density Residential land use designations, unless topography, parcel configuration, heritage trees, historic preservation, safety, hazard, or utility constraints make achieving the midpoint infeasible. (General Plan Action 2-3.4)

g. Work with developers and landowners to direct region-serving, high volume retail outlets to locations within one-quarter mile of Highway 101 to minimize traffic on city streets. (General Plan Action 2-8.2)

h. Identify new program options to allow and support micro-entrepreneurship and home businesses. (General Plan Action 2-5.4)

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.	
1.2.	Require Transportation Demand Management (TDM) strategies for new developments in order to reduce VMT and reduce parking demand
Supportive General Plan Policies:	
General Plan Policy 2-2.1:	Support development of complete neighborhoods, especially in Areas of Change, ensuring they offer convenient, equitable access to goods and services needed to support daily life, such as healthy food, recreation, active transportation infrastructure, and transit.
General Plan Policy 2-2.2:	Encourage a compact, rather than a scattered, development pattern for new development proposals, particularly in Areas of Change.
General Plan Policy 2-2.3:	Maintain close land use/transportation relationships to promote multi-modal transportation and discourage travel by automobile in all private development, capital improvement projects, and area plans.
General Plan Policy 2-3.1:	Ensure that residential developments, including subdivisions and neighborhoods, are designed to foster livability, maintain local and historic character of neighborhoods, and offer diverse housing types to satisfy a wide range of needs and retain local character.
General Plan Policy 2-3.2:	Ensure that residential developments achieve the density potential of the project site and include a variety of housing types with a full range of affordability, in accordance with General Plan Land Use Diagram (General Plan Figure 2-6).
General Plan Policy 3-1.3:	Promote land use, development, and transportation demand management (TDM) strategies that reduce VMT and dependence on single-occupancy vehicle trips.

Measure 1 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
New multifamily units designated through deed restrictions as affordable – City Limits (cumulative)	480 (1% of City-wide housing units)	1,140 (2% of City-wide housing units)	1,690 (2% of City-wide housing units)
New multifamily units designated through deed restrictions as affordable – External Planning Area (cumulative)	30	80	110
Percentage increase in residential density (City limits)	10%	30%	30%
Percentage increase in job density (City Limits)	10%	20%	20%

Measure 1 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
Residential and nonresidential new development	Long-term	Development fees, General Fund, grant funding
Responsible and Supporting City Departments		**Supporting Community Partners**
Planning & Economic Development, Housing & Community Services, Parking, and Transportation and Public Works		Sonoma County, developers, Sonoma County Regional Climate Protection Authority

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Measure 2: Improve the frequency, coverage, and effectiveness of local and regional transit and rail networks.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
10,160	13,980	16,030

Implementing Programs:

Municipal Programs:

2.1. Continue to implement and periodically update Transit Master Plans such as Reimagining CityBus and the Short-Range Transit Plan, and work with MTC and other agencies on regional transit- supporting initiatives. (General Plan Action 3-3.13)

2.2. Improve the reliability, efficiency, frequency, travel time, comfort, operating hours (including during nights and weekends), and safety of transit service to meet or exceed performance standards of the most recent Santa Rosa CityBus Short Range Transit Plan and improve transit service along corridors where increased densities exist or are planned, with a goal to maximize convenience and ridership across Sonoma County bus service providers. Encourage Sonoma County Transit and SMART to regularly conduct similar efforts. (Supported by General Plan Actions 3-1.4, 3-3.15, and 3-3.20)

2.3. Explore ways to ensure that transit hubs in the city, especially the Transit Mall, Downtown SMART Station, and North SMART Station, are active, safe, and efficiently accessed by local transit. (General Plan Action 3-3.21)

2.4. Identify strategies to increase residents' access, especially in low-income areas, to transit hubs, jobs, and areas with goods and services, such as by enhancing existing transit hubs, constructing new transit hubs, and/or providing new first/last mile services. (General Plan Action 3-3.27)

2.5. Identify opportunities to improve pedestrian, bicycle, micromobility (such as bicycle or scooter share), and bus transit connections between existing transit stations, to SMART stations, and to future mobility hubs. (General Plan Action 3-3.17)

2.6. Maintain and enhance local transit and paratransit services to ensure that these services meet the needs of persons with access and functional needs.

2.7. Identify first/last mile challenges citywide and work with transit and rideshare companies to provide solutions. (General Plan Action 3-3.10)

2.8. Improve transit corridors to increase efficiency and reliability of bus transit, including transit signal prioritization, queue jumps, and/or designation of bus rapid transit lanes or transit only lanes on routes subject to congestion, especially during peak commute periods.

2.9. Identify and analyze high-commute-trip corridors and improve them by ensuring that they are designed for multimodal travel and with an increased focus on safety by working with regional partners to identify locations for park-and-ride lots adjacent to primary travel corridors to the city in conjunction with transit hubs and high frequency transit service.

2.10. Expand the CityBus Unlimited Pass program to a multi-operator unlimited pass.

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

2.11. Ensure that public transit service in Santa Rosa meets the needs of community members living in Equity Priority Areas.

2.12. Reduce the cost of transit, especially for low-income individuals, by expanding the unlimited Pass Program that serves students through grade 12, SRJC students, City employees, paratransit users, and veterans. (General Plan Action 3-3.24)

2.13. Evaluate local transit services to identify and rectify accessibility barriers. (General Plan Action 3-3.23)

2.14. Coordinate plans for transit system changes and expansions with local land use planning to ensure consistency. (General Plan Action 3-3.18)

2.15. Work with regional partners to support SMART efforts to increase ridership and expand service by, at a minimum, implementing the following actions:

a. Preserve options for future SMART rail stations by zoning land in proximity to the potential station sites for higher-residential densities and/or mixed-use development. (General Plan Action 3-3.28)

b. Support efforts to promote SMART for commuting and tourism and to provide and maintain convenient and accessible routes to transit, including shared-use paths. (General Plan Action 3-3.29)

Regulatory Programs:

2.16. Establish standards that require new development to provide transit improvements to meet demand from the project, including, but not limited to:

a. Direct, paved pedestrian access to transit stops.

b. Bus turnouts and weather-protected shelters.

c. Bus-ready travel lanes. (General Plan Action 3-3.14)

d. Park-n-rides

e. Real-time information displays

Education, Outreach, and Coordination Programs:

2.17. Provide information on funding opportunities and other incentives designed to encourage developers of sites in Transit Priority Areas and Priority Development Areas to integrate transit-supportive components, such as unlimited pass programs, transit-serving pedestrian infrastructure, and/or transit subsidies, as appropriate. (General Plan Action 3-1.13)

2.18. Work with private and public sector partners on “safe ride home” transit programs and advertising campaigns targeting wine industry tourists or anyone under the influence of alcohol. (General Plan Action 3-3.19)

2.19. Encourage ridership on public transit systems through marketing and promotional efforts and incentives. (General Plan Action 3-3.9)

2.20. Work with Sonoma County Transportation Authority (SCTA) and local transit operators to explore financial incentives, reduced fares for public transportation, and a subregional or countywide universal basic mobility program. (General Plan Action 3-3.26)

2.21. Work with local and regional transportation agencies to coordinate multimodal connections throughout the city, including timed transfers connecting different transit routes and future rail service, bicycle parking and lockers at transit centers, and transit stops at park-and-ride lots. Integrate the provision of passenger

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.	
information, real-time arrival, fare structures, and service planning. (General Plan Actions 3-3.16 and 3-3.22).	
2.22. Work with regional transit providers (Golden Gate Transit, Sonoma County Transit, SMART, Mendocino Transit, Amtrak, and Greyhound) to improve regional connections and service, especially to regional employment and recreation hubs.	
Supportive General Plan Policies:	
General Plan Policy 3-3.3:	Encourage transit ridership to reduce GHG emissions and provide convenient and efficient public transportation to workplaces, shopping, and other destinations.
General Plan Policy 3-3.4:	Provide convenient, efficient transit routes to major employment, education, recreation, community, and shopping centers throughout the city, SMART stations, and shopping centers.
General Plan Policy 3-3.5:	Work with SCTA and MTC to promote Safe Routes to Transit projects and programs and submit applications for funding of local Safe Routes to Transit projects and programs.
General Plan Policy 3-3.6:	Ensure that the transit system serves all members of the community equitably, especially in Equity Priority Areas.

Measure 2 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Percentage increase in transit network coverage – City Limits and External Planning Area to follow increase density/development	10%	10%	10%
Percentage increase in transit network revenue hours – City Limits and External Planning Area	10%	25%	30%
Percentage of routes on which frequency is increased	25%	40%	50%
Percentage increase in transit frequency on routes on which frequency is increased	10%	35%	40%
Percentage of transit routes that receive supportive treatments (transit-only lanes, transit signal prioritization, bulb-outs at transit stops, etc.) – City Limits and External Planning Area	20%	40%	50%
Percentage of riders receiving discount from base transit fare (averaged across community) – City Limits and External Planning Area	55%	60%	65%

Measure 2 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Medium-term	Capital improvement funds, development fees, General Fund, grant funding, transit revenue
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works	SMART, Sonoma County Transit, Sonoma County Transportation Authority, MTC, Golden Gate Transit, Mendocino Transit, Amtrak, Greyhound, Transportation Network Companies, Sonoma County Regional Climate Protection Authority	

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Measure 3: Develop and expand transportation demand management (TDM) programs to reduce VMT and dependence on single-occupancy vehicle trips.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
570	1,000	1,070

Implementing Programs:

Regulatory Programs:

3.1. Continue to require transit-supportive TDM measures for new development, including CityBus / Sonoma County Transit / SMART pass products. (General Plan Action 3-3.12)

Municipal Programs:

3.2. Implement a TDM program for City employees—potentially in partnership with other local governments, public agencies, and transit providers—and promote the program as a model for larger local employers. (General Plan Action 3-3.2)

3.3. Implement initiatives and incentives to reduce GHG emissions associated with City employee commutes.

Education, Outreach, and Coordination Programs:

3.4. Continue to promote Sonoma Commute Rewards and work with County partners to continually enhance this program.

3.5. Work with SCTA to support the development of a Transportation Management Association for employment centers in Santa Rosa.

3.6. Work with local employers and existing residential and commercial development to expand TDM programs and related efforts to help meet employee transportation needs through modes that reduce VMT from single-occupancy automobile for trips less than 5 miles, such as:

a. Unlimited access to transit service (CityBus, Sonoma County Transit, and SMART).
b. Pay for increased transit frequency to facility.
c. Paid incentives to active transportation and micromobility users, including a transportation allowance and/or secure onsite bicycle parking, lockers and similar supportive facilities, showers, and other facilities that support bicycle commuting to and from work.
d. Programs and incentives to expand carpooling, vanpooling, and car sharing.
e. Trip reduction incentive programs.
f. Staggered work shifts, flex time (e.g., 9/80 work schedule), and telecommuting.
g. Paid-parking disincentives for single-occupant vehicles and/or parking cash-out incentives. (General Action 3-3.1)

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.	
3.7.	Track the city's mode split and progress towards reducing single-occupancy vehicle use. (General Plan Action 3-1.6)
Supportive General Plan Policies:	
General Plan Policy 3-1.2:	Promote a citywide mode shift away from single occupancy vehicles to support ambitious VMT and GHG reduction goals.
General Plan Policy 3-1.3:	Promote land use, development, and transportation demand management (TDM) strategies that reduce VMT and dependence on single-occupancy vehicle trips.

Measure 3 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Businesses in TDM programs – City Limits	1,420	2,430	2,590
Businesses in TDM programs – External Planning Area	90	150	160

Measure 3 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing nonresidential development, Municipal	Medium-term	Capital improvement funds, development fees, General Fund, grant funding, transit revenue
Responsible and Supporting City Departments		**Supporting Community Partners**
Transportation and Public Works, Planning & Economic Development, Water, Human Resources		Sonoma County Transit, SMART, local employers, Sonoma County Regional Climate Protection Authority

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Measure 4: Enhance active transportation and micro-mobility systems.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
1,580	2,810	3,290

Implementing Programs:

Municipal Programs:

4.1. Establish specific and trackable mode shift goals and conduct regular assessments of mode share to track progress towards reducing single-occupancy vehicle use. (Supported by General Plan Action 3-1.6)

4.2. Develop a process that invests in and prioritizes non-automobile modes of transportation in capital improvement projects to reduce VMT and GHGs, prioritizing, in order:

a. Active transportation modes, including walking and bicycling.
b. Public transportation, including inter-city and regional systems.
c. Other shared vehicles such as carpool, vanpool, and rideshare / transportation network companies. (General Plan Action 3-1.5)

4.3. Prioritize addressing active transportation deficiencies in Equity Priority Areas. (General Plan Action 3-2.18)

4.4. Identify and analyze high-commute-trip corridors and improve them by:

a. Preparing and implementing corridor plans.
b. Developing Park-n-Ride lots to encourage mixed-mode commuting.

4.5. Implement traffic-calming techniques on local streets that experience high-speed or cut-through traffic to improve neighborhood livability by:

a. Narrow streets.
b. Add on-street parking.
c. Add chicanes, chokers, or diverters.
d. Rough-pave crosswalks.
e. Add rumble strips.
f. Add planted islands. (Supported by General Plan Action 3-2.31)

4.6. Improve connections in the active transportation network to ensure that all who choose to walk, roll, or ride have adequate access to public transportation amenities, especially in Equity Priority Areas and Areas of Change. (General Plan Action 3-2.4)

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.	
4.7.	Support efforts to acquire local, regional, State, and federal funding for transportation improvements. (General Plan Action 3-2.8)
4.8.	Support pedestrians and bicyclists by incorporating their needs and interests into regular planning activities for all City projects including, at a minimum, any project on the Capital Improvements Project list. (General Plan Action 3-2.11)
4.9.	Ensure that there are no physical barriers to bicyclists or pedestrians as they cross high traffic roadways at intersections of Class I or Class IV facilities through improvements such as crosswalks and beacon lights. (General Plan Action 3-2.13)
4.10.	Continue to provide streetlights, landscaping, seating, shade, and other streetscape improvements in the public right-of-way. (Supported by General Plan Action 3-2.5)
4.11.	Ensure that the needs of seniors, children, people with disabilities, and those using strollers are addressed through sufficient and continuous sidewalks, crosswalks, and reasonable crossing distances. (General Plan Action 3-2.15)
4.12.	Support Safe Routes to Schools programs to ensure all students can safely travel to and from school using any mode of transportation, with emphasis on active modes. (General Plan Action 3-2.17)
4.13.	Inventory and map the city's existing active transportation network and add new facilities to the map as they are completed. (General Plan Action 3-2.1)
4.14.	Prioritize bicycle and pedestrian pathways in areas that connect to, or enhance, regional active transportation facilities such as the Joe Rodota Trail and Santa Rosa Creek Trail. (General Plan 3-2.21)
4.15.	Identify and prioritize funding for missing linkages in the existing street and trail bike network.
4.16.	Continue to maintain a Bicycle Friendly Community designation through the League of American Bicyclists.
4.17.	Improve the City's Bicycle Friendly Community designation from Silver to Platinum status no later than 2030.
4.18.	Continue to work on establishing bicycle and scooter share pilot programs with regional partners. Emphasize an equitable pricing structure and access to community members in Disadvantaged Communities and Equity Priority Areas. Ensure safety for pedestrians and other street users.
4.19.	Identify opportunities to improve pedestrian, bicycle, micromobility (such as bicycle or scooter share), and bus transit connections between existing transit stations, to SMART stations, and to future mobility hubs. (General Plan Action 3-3.17)
4.20.	Regularly identify areas with narrow, damaged, or missing sidewalks. Make timely improvements to impacted areas with a focus on sidewalks that impact schools and transit access.
4.21.	Ensure that the needs of seniors, children, people with disabilities, and those using strollers are addressed through sufficient and continuous sidewalks, crosswalks, and reasonable crossing distances. Continue to upgrade curb ramps and other pedestrian infrastructure in compliance with the Americans with Disabilities Act. (General Plan Action 3-2.15, General Plan Action 3-2.16)

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

4.22. Integrate shared-use paths along creek corridors, railroad rights-of-way, and include them in park master planning and design (General Plan Action 3-2.22)

Regulatory Programs:

4.23. Implement and update the City's Active Transportation Plan (formerly known as the Bicycle and Pedestrian Master Plan), as appropriate, recognizing that:

a. The Active Transportation Plan will create a blueprint for the City to construct a low-stress active transportation network for all ages and abilities.

b. The Active Transportation Plan will prioritize protected and separated bicycle lanes in order to increase user safety and comfort.

c. Each update of the Active Transportation Plan will result in a General Plan Amendment and will therefore become policy and action incorporated into the General Plan.

4.24. Update the Zoning Code to discourage cul-de-sac design and require any new developments with cul-de-sacs or other limited street connectivity layouts to provide enhanced connectivity for pedestrians and bicyclists to sites adjacent to or behind the new developments. (General Plan Action 3-1.10)

4.25. Update City design standards to ensure that safe, appropriate infrastructure is included in new development projects by default as appropriate.

4.26. Continue to identify and designate passenger-loading areas in commercial, office, and mixed-use areas and school zones while also ensuring that loading and unloading activities do not interfere with flow and access to bicycle lanes.

4.27. Require new development to provide direct, paved pedestrian access to transit stops. (Supported by General Plan Action 3-3.14)

4.28. Work with developers to ensure new development improves multimodal transportation infrastructure in front of, and adjacent to the development, with effective connections to existing infrastructure or the means to accommodate future connections. (General Plan Action 3-1.11)

4.29. Use the Urban Streets Design Guide and the Urban Bikeways Design Guide created by the National Association of City Transportation Officials (NACTO) as guides to implement a low-stress network for all ages and abilities, specifically through protected and separated bicycle lanes. (General Plan Action 3-2.10)

4.30. Work with developers in the beginning phases of project conception to install Class I and Class IV bicycle lanes, wherever feasible. (General Plan Action 3-1.12)

Education, Outreach, and Coordination Programs:

4.31. Work with local businesses and the League of American Bicyclists to encourage more businesses in Santa Rosa to pursue a Bicycle Friendly Business (BFB℠) designation.

4.32. Work with regional and local partners to provide bicycle safety training to community members, including drivers.

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.	
4.33.	Promote available tax credits and other incentives available to residents for the purchase of bicycles, including electric-assist bicycles. Consider establishing additional incentive programs as needed, especially for low-income community members and those without reliable access to personal vehicles.
Supportive General Plan Policies:	
General Plan Policy 3-1.2:	Promote a citywide mode shift away from single occupancy vehicles to support ambitious VMT and GHG reduction goals.
General Plan Policy 3-2.2:	Continue to expand and improve the active transportation network toward completing a safe, continuous, convenient, and attractive network of designated routes that connect all neighborhoods and that is equitably accessible for all ages and abilities.
General Plan Policy 3-2.5:	Address traffic volumes and speeds in neighborhoods in order to reduce cut-through traffic and promote use of existing low stress streets for active transportation travel.

Measure 4 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Total sidewalk network length (miles) – City Limits and External Planning Area	650 (15% increase from 2019)	730 (30% increase from 2019)	760 (35% increase from 2019)
Total bike network length (miles) – City Limits (cumulative)	130 (20% increase from 2019)	148 (35% increase from 2019)	154 (40% increase from 2019)

Measure 4 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing nonresidential development, municipal	Medium-term	Capital improvement funds, development fees, General Fund, grant funding
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works, Planning & Economic Development, Police,	Sonoma County, micro-mobility companies, schools, bike and pedestrian advocacy organizations, senior service providers, Sonoma County Regional Climate Protection Authority	

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.

Measure 5: Accelerate the adoption of zero-emission light-duty and heavy-duty vehicles.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
47,280	233,450	240,700

Implementing Programs:

Municipal Programs:

5.1. Expand installation and operation of electric vehicle charging stations on City properties, including curbside in areas of the community where other options are limited. (General Plan Action 3-6.37)

5.2. Require all new EV chargers installed by the City to have bi-directional charging capabilities. Encourage private property owners to select EV chargers with bi-directional charging capabilities when installing EV chargers on their properties. (General Plan Action 3-7.20)

5.3. Budget for clean fuels and zero-emission vehicles in the City's long-range capital expenditure plans to transition the existing fleet of gasoline- and diesel-powered vehicles, and work to make the City's fleet among the cleanest in the North Bay by:

a. Purchasing zero-emission vehicles whenever possible that meet or exceed requirements under the California Advanced Clean Fleets Regulation. If zero-emission vehicles are not available, purchase plug-in hybrids or other vehicle types to minimize emissions.

b. Using biodiesel and pollution-reducing fuel additives in the City's diesel fuel vehicles. (General Plan Action 3-6.38)

5.4. Assess options and launch a zero-emission vehicle car-sharing program with widespread distribution, including in Disadvantaged Communities and Equity Priority Areas.

5.5. Continue implementation of the Citywide Electric Vehicle Master Plan and CityBus' Zero Emissions Rollout Plan.

5.6. Assess the effectiveness of the City's environmentally sensitive preferred purchasing and green fleet conversion programs and update the programs, as needed, to support the City's GHG reduction goals. (General Plan Action 3-7.10)

Regulatory Programs:

5.7. Require all new development to be electric vehicle charging ready at a minimum. Explore opportunities to amend the City's municipal codes to require new development to install electric vehicle charging infrastructure beyond the minimum State requirements. (General Plan Action 3-6.33)

5.8. Review and amend the City's Building Code and Zoning Code to facilitate the installation of electric vehicle charging infrastructure. (General Plan Action 3-6.35)

5.9. Explore improvements to the Building and Safety Code and Zoning Code that establish stricter requirements for installing electric vehicle charging infrastructure, including requiring new and significantly renovated large commercial and logistic facilities to install charging and hydrogen fueling equipment for heavy-duty vehicles.

Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.
5.10. Update the City's Building Code and Zoning Code, as necessary, to require existing gas stations and automobile-serving uses, including car washes and car repair establishments, to install electric vehicle charging infrastructure when such uses are subject to building or land use permits for site renovations. 5.11. Explore efforts to require charging or clean fuel stations on private property, including hydrogen and sustainably sourced biofuels. (General Plan Action 3-6.36) **Education, Outreach, and Coordination Programs:** 5.12. Widely publicize and distribute information about available zero-emission vehicle incentive programs. Evaluate options to provide or support additional incentive programs, especially for low-income community members.
Supporting General Plan Policies:
General Plan Policy 3-6.9: Achieve and maintain ambient air quality standards.

Measure 5 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Number of community's light-duty vehicle fleet converted from conventional fuel to electric – City limit and External Planning Area	27,440	132,320	135,830
Number of community's heavy-duty vehicle fleet converted from conventional fuel to electric – City limit and External Planning Area	500	2,560	2,920
Number of community's heavy-duty vehicle fleet converted to hydrogen – City limit and External Planning Area	500	4,260	5,010

Measure 5 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Medium-term	Capital improvement funds, development fees, General Fund, grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works, Police, Fire Department, Planning & Economic Development	large commercial facilities, PG&E, automotive services, Sonoma County Regional Climate Protection Authority	

Measure 5 Implementation Details
Objective: Decrease community-wide vehicles miles traveled (VMT) and increase the use of zero-emission vehicles and equipment.
Measure 6: Transition to zero-emission motorized equipment, including construction and landscaping. 

GHG Emissions Savings ($MTCO_2e$):		
2030	**2045**	**2050**
12,330	29,900	36,540

Implementing Programs:

Regulatory Programs:

6.1. Explore a ban on the sale and use of diesel and gasoline-powered landscaping equipment.

6.2. Require the use of hybrid or zero-emission construction equipment for new development projects as a condition of approval.

Education, Outreach, and Coordination Programs:

6.3. Publicize available incentives and other financial resources to support transitioning landscaping, construction, and other off-road equipment to zero-emission models. Consider establishing additional incentives, as needed, especially for low-income community members.

Supportive General Plan Policies:

General Plan Policy 3-6.9: Achieve and maintain ambient air quality standards.

Measure 6 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Percentage landscaping equipment converted to electric – City Limits and Ext. Planning Area	50%	95%	95%
Percentage construction equipment converted to electric – City Limits and Ext. Planning Area	40%	70%	75%
Percentage other equipment converted to electric – City Limits and Ext. Planning Area	15%	35%	45%

Measure 6 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Short-term	Development fees, General Fund, grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works, Planning & Economic Development	Landscaping and construction companies, Sonoma County Regional Climate Protection Authority	

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.

Homes, businesses, government facilities, and community-based organizations all rely on energy to power their daily activities. As Santa Rosa continues to grow, the community's energy needs will likely increase. It is imperative that the City make buildings more energy efficient and replace the burning of fossil fuels with electricity created through renewable sources, such as solar and wind.

Both the City and State have already taken significant steps to accelerate building electrification. Since 2019, the City of Santa Rosa has implemented a reach code requiring that all new residential construction of three stories or less be all electric The 2022 State Building Code, including the Energy Efficiency Code and CALGreen, include requirements for partial electrification, electric-readiness, more aggressive electric vehicle charging requirements, efficiency improvements and opportunities for energy storage, among other requirements. During each triennial State building code cycle, cities and counties may adopt local ordinances (reach codes) that exceed minimum state requirements and accelerate decarbonization.

In March 2023, the Bay Area Air Quality Management District (BAAQMD) adopted a regulation to replace natural-gas-powered space heaters and water heaters with electrical models when the natural gas-powered units reach the end of their operational life. This regulation will take effect in 2027 or 2031 for water heaters (depending on the capacity of the unit) and in 2029 for space heaters. This regulation will accelerate the transition of natural gas appliances to electric appliances in existing homes and nonresidential buildings, which will result in a higher adoption rate of these technologies.

Effective January 1, 2020, State legislation requires new single-family and multifamily buildings up to three stories in height to include solar panels. As of January 2023, many new businesses and larger multifamily buildings are also required to install solar and battery storage systems. While these requirements for solar and battery storage systems may increase the up-front cost of new construction, they are expected to result in long-term cost savings in the form of reduced monthly electricity bills, ultimately paying for themselves. In addition to cost savings, the installation of solar systems results in community benefits in the form of increased energy resilience, improved air quality, and job creation. While installation of a battery storage system does not by itself reduce GHG emissions, it is still recommended as a measure to increase community-wide energy resilience.

The State's Renewables Portfolio Standard (RPS) requires increases in renewable and carbon-free electricity supplies. RPS requires all electricity providers in the state to obtain at least 60 percent of their electricity from eligible renewable resources by the end of 2030 and all their electricity from carbon-free resources by the end of 2045. GHG savings from RPS are reported in **Table 11**. Santa Rosa's electric supply is already largely renewable. Approximately 86 percent of Santa Rosa's residential electricity and 90 percent of its nonresidential energy (excluding direct access electricity) comes from Sonoma Clean Power. Subscribers to Sonoma Clean Power can choose from two tiers, CleanStart and Evergreen, which provide 48 percent and 100 percent renewable electricity, respectively.

Reducing the burning of fossil fuels within the built environment comes with several community benefits, including cleaner air, increased resilience to the effects of climate change, reduced costs to residents and building owners, and a stronger local economy. This GHG Reduction Strategy builds on the actions already taken on the local and state level via the following measures:

- **Measure 7:** Reduce community-wide energy use, increase energy efficiency, and advance electrification in existing buildings, including municipal buildings.
- **Measure 8:** Transition to carbon neutral new buildings.

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.

- **Measure 9:** Increase local renewable energy generation and the use of renewable, carbon free, and distributed energy systems, including energy storage, throughout the city.

Measure 7: Reduce community-wide energy use, increase energy efficiency, and advance electrification in existing buildings, including municipal buildings.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
29,630	171,190	179,850

Implementing Programs:

Municipal Programs:

7.1. Require regular energy audits of existing City-owned and operated structures, identifying levels of existing energy use and potential conservation and efficiency measures. (General Plan Action 3-7.5)

7.2. Develop a capital project list and funding strategy to complete energy-efficiency projects for City-owned and operated structures and adjust the list annually to add new projects as needed. (General Plan Action 3-7.6)

7.3. Continue using 100 percent renewable/carbon free electricity for municipal facilities. (General Plan Action 3-7.27)

7.4. Retrofit existing City facilities to be zero net energy. (General Plan Action 3-7.23)

7.5. Continue to enhance the City's ability to optimize energy use, minimize energy costs, prepare for emergencies, and power provider outages, protect public health, sustain natural resources, and reduce municipal GHG emissions. (General Plan Action 3-7.25)

Regulatory Programs:

7.6. Amend the building or energy code to incentivize building owners to upgrade residential appliances, including water and space heaters, to increase energy efficiency and reduce GHG emissions. (General Plan Action 3-7.22)

7.7. Evaluate the feasibility of requiring replacement of gas-fueled appliances in existing homes and businesses during major retrofits or at time of sale.

Education, Outreach, and Coordination Programs

7.8. Encourage energy audits and energy-efficient retrofits of buildings throughout the city. (Supported by General Plan Action 3-7.7)

7.9. Use education and incentives to promote and sustain energy-conserving design and practices. (General Plan Action 3-7.11)

7.10. Widely promote and encourage participation in local, regional, and State programs that provide financial incentives for energy-efficiency improvements in existing buildings, including programs offered through

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.

BayREN (Bay Area Regional Energy Network), Sonoma Clean Power, Sonoma County Energy Independence Program, and other groups.

7.11. Prioritize funding to support conversion of natural gas fueled appliances to carbon free appliances in existing buildings for renters, low-income homeowners, and persons living in Equity Priority Areas.

7.12. Support Bay Area Air Quality Management District enforcement and education activities related to Bay Area Air Quality Management District requirements to replace water and space heaters with zero-NO_2 models beginning in 2027.

7.13. In partnership with Sonoma Clean Power and other appropriate organizations, continue to provide educational materials about available incentives and the benefits of retrofitting existing buildings to be all-electric.

7.14. Continue to provide information on the cost-savings potential and other benefits of energy audits and energy-efficient retrofits to encourage their preparation for buildings throughout the city. (General Plan Action 3-7.7)

7.15. Distribute educational material about energy-efficiency retrofit benefits and opportunities on the City's website and through social media, at City facilities, and during in-person events. Work with community partners to secure funding to provide free or low-cost home energy audits for low-income homeowners and tenants.

7.16. Encourage regional utilities to establish bulk buying programs to lower the cost of energy-efficient appliances for community members.

Supportive General Plan Policies:

General Plan Policy 3-7.2:	Reduce energy use and increase energy efficiency in existing and new commercial, industrial, and public structures.
General Plan Policy 3-7.4:	Reduce the use of fossil fuels as an energy source in new and existing buildings.
General Plan Policy 3-7.5:	Continue the City's role as a leader in sustainability and climate action.

Measure 7 Performance Standards

Performance Standard	2030	2045	2050
Number of existing homes receiving efficiency retrofits - City Limits	10,270	27,380	30,800
Number of existing businesses receiving efficiency retrofits - City Limits	540	1,880	2,150
Number of existing homes receiving efficiency retrofits – External Planning Area	700	1,860	2,090
Number of existing businesses receiving efficiency retrofits – External Planning Area	30	110	130
Number of residential HVAC conversions – City Limits	10,760	51,110	51,110
Number of residential water heater conversions – City Limits	7,100	67,480	67,480
Number of residential clothes drying conversions – City Limits	7,100	35,520	42,620

Measure 7 Performance Standards			
Number of residential cooktop conversions – City Limits	3,550	39,070	46,170
Number of nonresidential HVAC conversions – City Limits	200	3,020	3,830
Number of nonresidential water heater conversions – City Limits	400	3,830	3,830
Number of nonresidential cooktop conversions – City Limits	400	1,610	2,010
Number of residential HVAC conversions – External Planning Area	730	3,470	3,470
Number of residential water heater conversions – External Planning Area	480	4,580	4,580
Number of residential clothes drying conversions – External Planning Area	480	2,410	2,890
Number of residential cooktop conversions – External Planning Area	240	2,650	3,130
Number of nonresidential HVAC conversions – External Planning Area	10	180	230
Number of nonresidential water heater conversions – External Planning Area	20	230	230
Number of nonresidential cooktop conversions – External Planning Area	20	100	120

Measure 7 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Medium-term	Development fees, General Fund, grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development, Transportation and Public Works	BayREN, Sonoma Clean Power, Sonoma County Energy Independence Program, PG&E, regional utilities, solar installers, developers, contractors, Sonoma County Regional Climate Protection Authority	

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.

Measure 8: Transition to carbon neutral new buildings.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
1,650	7,890	9,080

Implementing Programs:

Municipal Programs:

8.1. Develop new City facilities to be zero net energy. (General Plan Action 3-7.23)

Regulatory Programs:

8.2. Evaluate and adopt changes to the building code or other municipal codes and policies to require new nonresidential and residential buildings to achieve high performance energy efficiency and to minimize GHG emissions through adoption and implementation of new codes that do not mandate a specific energy efficiency technology but rather offer various options for achieving the desired energy performance levels and GHG emissions reductions (including but not limited to all electric appliances). (Supported by General Plan Action 3-7.21)

8.3. Guide project applicants toward site planning, solar orientation, cool roofs, and landscaping that decrease summer cooling and winter heating needs. (General Plan Action 3-7.8)

Education, Outreach, and Coordination Programs:

8.4. In partnership with Sonoma Clean Power and other appropriate organizations, continue to provide educational materials about available incentives and the benefits of constructing new buildings or retrofitting existing buildings to be all-electric.

8.5. Use education and incentives to promote and sustain energy-conserving design and practices. (General Plan Action 3-7.11)

8.6. Identify incentives to encourage new buildings to exceed State energy efficiency requirements and/or meet or exceed the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) Program or equivalent standards. (General Plan Action 3-7.9)

8.7. Engage the local developer and trade communities in planning and promoting the City's electrification initiatives and incentives.

8.8. As needs and opportunities arise, plan for decommissioning or reusing fossil fuel facilities that are no longer needed to meet community energy needs, in a manner that protects human and environmental health and is consistent with federal, state, and local regulations and authorities.

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.			
Supportive General Plan Policies:			
General Plan Policy 3-7.3:	Increase the use of renewable, carbon free, and distributed energy resources throughout the city.		
General Plan Policy 3-7.4:	Reduce the use of fossil fuels as an energy source in new and existing buildings.		
General Plan Policy 3-7.5:	Continue the City's role as a leader in sustainability and climate action.		
Measure 8 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Number of new performance-based reach compliant residential units	8,120	19,190	22,890
Number of new performance-based reach -compliant commercial buildings	350	820	980
Residential HVAC conversions - City Limits	430	4,880	5,820
Residential water heater conversions - City Limits	430	4,880	5,820
Commercial HVAC conversions - City Limits	10	250	380
Commercial water heater conversions - City Limits	10	250	380
Residential HVAC conversions - External Planning Area	30	330	390
Residential water heater conversions - External Planning Area	40	230	270
Commercial HVAC conversions - External Planning Area	Less than 10	Less than 10	Less than 10
Commercial water heater conversions - External Planning Area	Less than 10	Less than 10	Less than 10

Measure 8 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development	Medium-term	Development fees, General Fund, outside grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development, Housing & Community Services, Transportation and Public Works, Water	Bay Area Air Quality Management District, Sonoma Clean Power, PG&E, developers, contractors, Sonoma County Regional Climate Protection Authority	

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.

Measure 9: Increase local renewable energy generation and the use of renewable, carbon free, and distributed energy systems, including energy storage, throughout the city.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
70	0	0

Implementing Programs:

Municipal Programs:

9.1. Implement the recommendations of the City's Energy Efficiency, Renewables, and Microgrid Feasibility Study, prioritizing the installation of solar, battery, and microgrid systems and lighting improvements at Municipal Service Center North and additional review of funding options available for heating, ventilation, and air conditioning (HVAC) improvements at City facilities.

9.2. Continue using 100 percent renewable energy for all City buildings. (General Plan Action 3-7.27)

9.3. Continue to participate in utility-sponsored renewable energy programs that allow the city to receive a significant portion of energy from renewable sources. (General Plan Action 3-7.15)

9.4. Continue to evaluate the feasibility of installing mid-size renewable energy generation projects at City facilities.

9.5. Participate in State and local efforts to develop appropriate policies and review procedures for the installation of photovoltaic solar and other forms of distributed energy generation. (General Plan Action 3-7.14)

9.6. Support State and utility efforts to improve grid resilience and capacity. (General Plan Action 3-7.19)

Regulatory Programs:

9.7. Revise any existing codes and policies that constrain or prohibit the installation of environmentally acceptable forms of distributed energy generation. (General Plan Action 3-7.12)

9.8. Explore requiring existing buildings to install solar energy and battery systems at times of major retrofits.

9.9. Explore requiring all new and significantly renovated buildings to install energy storage systems or to be pre-wired for these systems, especially new or renovated buildings with solar energy installations, municipal buildings that provide essential community services, and buildings in areas of elevated wildfire hazards or with an increased risk of being subject to Public Safety Power Shutoff events.

Education, Outreach, and Coordination Programs:

9.10. Encourage participation in financial incentive programs that increase the installation of solar energy generation and battery energy storage systems. Continue to publicize the availability of these incentive programs to community members.

9.11. Identify incentives and other means to encourage new and existing buildings to include battery energy storage systems, especially buildings with solar energy installations and municipal buildings that provide essential community services. (General Plan Action 3-7.13)

Objective: Reduce community-wide energy use and transition to carbon-free energy sources.	
9.12.	Support the development of local-serving renewable energy projects that expand the availability of local renewable energy, provide sustainable local jobs, and support local and regional housing, economic development, and sustainability goals and initiatives. (General Plan Action 3-7.17)
9.13.	Encourage the establishment of neighborhood renewable energy microgrids to support resilience, with an emphasis on improving energy resilience for critical facilities, key community services, and in Equity Priority Areas. (Supported by General Plan Action 3-7.18)
9.14.	Seek and identify resources to assist low-income homeowners and small business owners with identifying financing options for installation of rooftop solar energy systems, energy storage, and electrification of existing buildings. (General Plan Action 3-7.16)
Supporting General Plan Policies:	
General Plan Policy 3-7.3:	Increase the use of renewable, carbon free, and distributed energy resources throughout the city.
General Plan Policy 3-7.4:	Reduce the use of fossil fuels as an energy source in new and existing buildings.
General Plan Policy 3-7.5:	Continue the City's role as a leader in sustainability and climate action.

Measure 9 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Residential solar systems installed - City Limits	2,130	3,550	5,680
Residential solar systems installed – External Planning Area	140	240	390
Nonresidential solar systems installed – City Limits	50	160	270
Nonresidential solar systems installed – External Planning Area	Less than 10	10	20

Measure 9 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Medium-term	Development fees, General Fund, grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development, Transportation and Public Works, Water	Solar installers, developers, PG&E, Sonoma Clean Power, contractors, utilities, Sonoma County Regional Climate Protection Authority	

Objective: Achieve a zero-waste future for Santa Rosa.

Waste generates GHG emissions as it decomposes in landfills. Organic waste is an especially significant producer of methane and carbon dioxide emissions. However, if recovered properly, these materials can avoid landfills and live on as precursors to new material goods.

The most effective way to reduce waste is to reduce the production of materials that will end up in landfills, an approach that not only reduces waste but also reduces the energy, emissions, and material demands of production. Once a material or object has been produced, it is important to find opportunities for that material to be reused.

The State of California has long recognized the importance of compost and recycling programs. Most recently, SB 1383, which went into effect at the beginning of 2022, aims to reduce organics waste disposed in landfills by 75 percent (from 2014 levels) by 2025. The legislation also aims to recover 20 percent of edible food and redirect it to food-insecure Californians. SB 1383 requires residents and businesses to sort food scraps, yard debris, and food-soiled paper into an organic waste stream. It also requires waste customers to subscribe to an organic waste collection service.

Efforts to divert waste away from landfills and into composting and recycling programs reduce emissions and help make valuable recycled materials available to the broader community. The City has already taken significant steps to reduce the amount of waste sent to landfills. In January 2020, the City approved the Zero Waste Master Plan, which aims to reduce landfill disposal to less than one pound per person per day of franchised waste and achieve at least 75 percent diversion of franchised waste from landfill disposal by 2030. Zero Waste Master Plan Strategies include development of a Reusable and Compostable Foodware Ordinance, which was passed in 2021 (as the Zero Waste Food Ware Ordinance). The Zero Waste Master Plan also includes strategies to expand recycling and composting programs, update the City's Construction and Demolition Ordinance, and provide education and engagement to help community members reduce waste. These efforts have resulted in over 800 multi-family buildings, businesses, and schools starting composting programs; a 12 percent decline in tonnage of waste send to landfills since 2018; and an overall 98 percent compliance rate with SB 1383.

The GHG Reduction Strategy helps further reduce community waste reduction through the following measures:

- Measure 10: Reduce the amount of recyclable and compostable material sent to landfills.
- Measure 11: Reduce total waste generation.

Supportive General Plan Goal:

General Plan Goal 5-9: Provide adequate and high-quality city services for water, wastewater, recycled water, stormwater, and solid waste.

Transporting waste also releases GHG emissions. Measures 10 and 11 only address emissions from the decomposition of waste. Measures 1 and 5, which promote compact development and the adoption of electric heavy-duty vehicles, respectively, would both help reduce emissions from the transportation of waste.

Objective: Achieve a zero-waste future for Santa Rosa.

Measure 10: Reduce the amount of recyclable and compostable material sent to landfills.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
6,500	10,150	10,530

Implementing Programs:

Municipal Programs:

10.1. Work to increase local diversion rates above state minimums for all waste types, including for organics and construction and demolition waste.
10.2. Increase capacity for data collection and monitoring of waste disposal and diversion rates.
10.3. Work with local waste haulers to ensure that they are fulfilling their franchise agreement and continuing to provide annual diversion rate reporting.
10.4. Identify locations that can support small-scale community compost locations.
10.5. Ensure beneficial use of compost made from organics collected from residents and businesses. (General Plan Action 3-6.30)
10.6. Implement the most current Energy Optimization Plans for water and wastewater.
10.7. Continue to identify and implement beneficial reuses of byproducts of the City's wastewater treatment processes.
10.8. Explore innovative opportunities for the use of biodigester gas.
10.9. Pursue long-term strategies and regional solutions for wastewater biosolids handling and application.

Regulatory Programs:

10.10. Require that new development and proposed renovations requiring a building permit have sufficient and appropriate room to store waste bins, including for organic waste.
10.11. Amend the composting ordinance to advance compost infrastructure and support soil carbon sequestration activities. (General Plan Action 3-6.29)

Education, Outreach, and Coordination Programs:

10.12. Continue public education programs about waste reduction, including recycling, composting, yard waste, wood waste, and household hazardous waste. (General Plan Action 5-9.34)
10.13. Engage commercial entities such as restaurants and landscaping businesses that produce compostable material in the City's composting programs.
10.14. Work with multifamily and commercial building owners and occupants to increase awareness of correct composting practices and increase access to adequate composting services.
10.15. Increase the types of materials that can be recycled and composted in Santa Rosa, as the market allows.
10.16. Work with Zero Waste Sonoma to increase diversion of construction and demolition debris, including by adopting the County's Model Construction and Demolition Ordinance.

Objective: Achieve a zero-waste future for Santa Rosa.	
Supportive General Plan Policy:	
General Plan Policy 5-9.5:	Meet the city's solid waste disposal needs while maximizing opportunities for waste reduction and recycling.

Measure 10 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Tons of compostables diverted from municipal solid waste – City Limits	2,780	3,140	3,260
Tons of recyclables diverted from municipal solid waste – City Limits	22,220	30,400	31,550
Tons of compostables diverted from municipal solid waste – External Planning Area	180	210	210
Tons of recyclables diverted from municipal solid waste – External Planning Area	1,460	2,000	2,080
Tons of construction and demolition debris diverted from landfills – Combined City Limits and External Planning Area	13,200	14,030	14,030

Measure 10 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Medium-term	General Fund, grant funding, waste hauling franchise fees
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works, Water	Multifamily and commercial building owners, restaurants, landscaping companies, Recology, Sonoma County Regional Climate Protection Authority, Zero Waste Sonoma	

Objective: Achieve a zero-waste future for Santa Rosa.

Measure 11: Reduce total waste generation.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
1,950	3,770	4,890

Implementing Programs:

Municipal Programs:

11.1. Continue to implement and update the City's Zero Waste Master Plan and Program. (General Plan Action 5-9.33)

11.2. Assess the effectiveness of the City's environmentally sensitive preferred purchasing and green fleet conversion programs and update the programs, as needed, to support the City's GHG reduction goals. (General Plan Action 3-7.10)

11.3. Provide more frequent and accessible opportunities to dispose of non-recyclable waste.

11.4. Identify ways to go beyond State guidance to encourage sustainable deconstruction of buildings.

11.1. Provide and maintain public drinking fountains and bottle fillers in high traffic and outdoor recreation areas to reduce demand for bottled water. (General Plan Action 5-9.38)

Regulatory Programs:

11.2. Continue to enforce the City's Zero-Waste Food Ware Ordinance and share information and resources with food vendors to help facilitate compliance. (General Plan Action 5-9.35)

11.1. Continue to enforce the City's Environmentally Preferable Purchasing policies and identify opportunities to reduce use of single-use plastics in municipal operations and at City events. (General Plan Action 5-9.36)

Education, Outreach, and Coordination Programs:

11.2. Establish and support existing sharing, exchange, and reuse programs, including fix-it clinics, swap events, and second-hand markets.

Supportive General Plan Policy:

General Plan Policy 5-9.5: Meet the city's solid waste disposal needs while maximizing opportunities for waste reduction and recycling.

Measure 11 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Tons of municipal solid waste reduced – City Limits	7,880	16,680	21,630
Tons of municipal waste reduced – External Planning Area	520	1,100	1,420

Measure 11 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development, Municipal	Short-term	General Fund, grant funding, waste hauling franchise fees
Responsible and Supporting City Departments	**Supporting Community Partners**	
Transportation and Public Works	Recology, Sonoma County Regional Climate Protection Authority, Zero Waste Sonoma	

Objective: Use water efficiently and enhance drought resilience.

Increasing water-use efficiency and reducing overall water use lowers GHG emissions by reducing the energy needed to transport, heat, and process water. In addition to saving energy, water conservation and efficiency protects one of California's most precious resources and helps Santa Rosa become more resilient to drought and water shortage. In addition, reducing water use in individual homes and businesses can reduce water costs.

The City's existing recycled water infrastructure represents a significant step towards community water conservation and resilience. The GHG Reduction Strategy helps Santa Rosa further reduce water use through the following measures:

- Measure 12: Improve indoor and outdoor water-use efficiency.
- Measure 13: Expand water catchment and reuse opportunities.

Supportive General Plan Goal:

General Plan Goal 5-9:	Provide adequate and high-quality city services for water, wastewater, recycled water, stormwater, and solid waste.

Objective: Use water efficiently and enhance drought resilience.

Measure 12: Improve indoor and outdoor water-use efficiency.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
Less than 10	10	10

Implementing Programs:

Municipal Programs:

12.1. Regularly monitor water quality to maintain high levels of water quality for human consumption and for other life systems in the region. (General Plan Action 5-9.12)

12.2. Continue to comply with statewide regulations for long-term urban water use efficiency. (General Plan Action 5-9.14)

12.3. Continue to provide financial incentives for water-use efficiency improvements and look for opportunities to increase the value of incentives and the types of programs with available incentives.

12.4. Ensure that water-efficiency rebates are available and encouraged for rental properties.

Regulatory Programs:

12.5. Require new development projects to provide water-efficient landscaping in accordance with the City's Water Efficient Landscape Ordinance. (General Plan Action 5-9.13)

12.6. Regularly review and update the Water Efficient Landscape Ordinance, as needed.

Objective: Use water efficiently and enhance drought resilience.
12.7. Work with property owners to incorporate sustainable, energy-efficient, water-efficient, and environmentally regenerative features into facilities, landscapes, and structures. 12.8. In an ongoing manner, review landscaping codes to improve consistency of water-use efficiency and fire-resistance landscaping regulations and the Hazardous Vegetation and Fuels Reduction Ordinance. **Education, Outreach, and Coordination Programs:** 12.9. Promote water efficiency through public education, incentives, rebates, technical assistance, and information about indoor and outdoor water use efficiency measures. (General Plan Action 5-9.15) 12.10. Provide information and explore incentive opportunities to encourage property owners to install catchment, graywater systems, and other water recycling systems; remove paving; and install low-impact development features, such as permeable pavers, bioswales, and other green infrastructure components. (General Plan Action 5-9.16)
Supportive General Plan Policies:
General Plan Policy 5-9.1: Ensure water quality, water service delivery, and wastewater treatment are sufficient to meet the needs of current and future residents. General Plan Policy 5-9.2: Maintain water quality and encourage Santa Rosa Water customers to save water. General Plan Policy 5-9.3: Ensure that water distribution lines are adequate for existing and future populations.

Measure 12 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Residential units receiving WaterSmart Checkups (water efficiency audits) since 2024 - City Limits	560	1,970	2,430
Residential units built by 2019 receiving WaterSmart Checkups (water efficiency audits) since 2024 - City Limits	500	1,560	1,840
Residential units built after 2019 receiving WaterSmart Checkups (water efficiency audits) since 2024 - City Limits	60	410	590
Residential units receiving WaterSmart Checkups (water efficiency audits) since 2024– External Planning Area	40	130	170
Residential units built by 2019 receiving WaterSmart Checkups (water efficiency audits) since 2024- External Planning Area	40	100	130
Residential units built after 2019 receiving WaterSmart Checkups (water efficiency audits) since 2024- External Planning Area	Less than 10	30	40
New developments with water-efficient landscaping - City Limits	7,930	18,750	22,360
New developments with water-efficient landscaping - External Planning Area	540	1,270	1,510

Measure 12 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development	Medium-term	Development fees, General Fund, grant funding, incentives, Enterprise Fund
Responsible and Supporting City Departments		**Supporting Community Partners**
Water, Planning & Economic Development		Sonoma Clean Power, PG&E

Objective: Continue to use water efficiently and enhance drought resilience.

Measure 13: Expand water catchment and reuse opportunities.

GHG Emissions Savings ($MTCO_2e$):

Due to the City's already high rates of water reuse, this measure is not expected to result in any additional quantifiable GHG emission reductions.

Implementing Programs:

Municipal Programs:

13.1. Maintain water, wastewater, and recycled water system integrity and capacity by continuing to prioritize maintenance and preserve funding for maintenance, rehabilitation, and replacement of existing infrastructure. (General Plan Action 5-9.3)

13.2. Continue to evaluate the City's long-term water supply strategies, including development of new and enhanced sources of water supply and enhanced water-use efficiency programs. (Supported by General Plan Action 5-9.8)

13.3. Continue to improve stormwater management to increase infiltration, provide treatment, promote groundwater recharge, reduce flood risk, capture trash, and/or enhance the environment. (General Plan Action 5-9.28)

13.4. Evaluate stormwater capture and reuse consistent with goals of the Santa Rosa Citywide Creek Master Plan and the MS4 NPDES (National Pollutant Discharge Elimination System) permit to preserve natural conditions of waterways, minimize channelization of creeks, and protect water quality; identify, educate, label, and promote community awareness that storm drains flow untreated into creeks. (General Plan Action 5-9.30)

Regulatory Programs:

13.5. Implement mitigation measures to mimic the pre-development water balance through infiltration, evapotranspiration, and capture and reuse of stormwater. (General Plan Action 5-9.29)

13.6. Explore requiring graywater systems for new developments.

Education, Outreach, and Coordination Programs:

13.7. Provide information and explore incentive opportunities to encourage property owners to install catchment, graywater systems, and other water recycling systems; remove paving; and install low-impact development features, such as permeable pavers, bioswales, and other green infrastructure components. (General Plan Action 5-9.16)

Supportive General Plan Policies:

General Plan Policy 5-9.2: Maintain water quality and encourage Santa Rosa Water customers to save water.

Measure 13 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development	Medium-term	Capital improvement funds, General Fund, grant funding, incentives, Enterprise Fund
Responsible and Supporting City Departments		**Supporting Community Partners**
Water, Planning & Economic Development		Sonoma County Regional Climate Protection Authority

Objective: Enhance sustainable and carbon-free practices community-wide.

The measures presented herein will significantly reduce the amount of GHG emissions produced by the Santa Rosa community. However, they are not sufficient to achieve carbon neutrality. To make Santa Rosa truly carbon neutral, the community must nurture and maintain its natural ecosystems and agricultural lands. These natural features, when well cared for, not only absorb carbon but also provide opportunities for recreation, improve public health, help mitigate the effects of climate change hazards such as flooding and landslide, and help sustain flourishing and diverse natural communities.

While difficult to definitively measure, the carbon used in the production and delivery of everyday goods and services constitutes a significant contributor to global resource consumption, energy use, and carbon emissions. Addressing this distributed source of emissions means assessing complex and diverse systems of production and delivery that occur within Santa Rosa and ensuring that these activities are aligned with the City's sustainability objectives. Actions to reduce these emissions include attracting green businesses to Santa Rosa, using low-carbon building materials, and investing in local food systems. These activities have the additional benefits of supporting local economic activity, promoting public health, and increasing the resilience of the local food system.

Finally, the City of Santa Rosa intends to uphold its role as one of California's leaders in sustainability and resilience. This is an ambitious goal, requiring proactive and meaningful partnership between City agencies, community organizations, local service providers, and engaged citizens. The potential impacts of climate change must be considered across City departments and in all stages of the planning process, and both the City and community must make a sustained commitment to achieving deep carbon reductions.

The GHG Reduction Strategy meets these goals through the following measures:

- Measure 14: Increase local natural carbon sequestration opportunities.
- Measure 15: Reduce embedded carbon in goods and services used by the City and community members.
- Measure 16: Maximize opportunities for local food production.
- Measure 17: Integrate climate action across all City departments and programs.

Supportive General Plan Goal:

General Plan Goal 3-5: Protect, expand, maintain, and restore natural resources, open space, and agricultural land.

Objective: Enhance sustainable and carbon-free practices community-wide.

Measure 14: Increase local natural carbon sequestration opportunities.

GHG Emissions Savings ($MTCO_2e$):

2030	2045	2050
3,880	13,250	16,310

Implementing Programs:

Municipal Programs:

14.1. Conduct a carbon sequestration feasibility study of City-owned open space, parks, agricultural lands, and other conservation lands, and implement the recommendations. This study should assess carbon storage potential by land use type and identify strategies to facilitate carbon sequestration. (General Plan Action 3-6.21)

14.2. Establish pilot programs, and consider providing incentives, for efforts to increase the carbon sequestration potential on local agricultural and open space land, including on City-owned parks.

14.3. Expand tree planting, maintain heritage trees, and replant street trees, when they are removed for safety or health reasons, and continue to maintain Santa Rosa's Tree City USA designation.

14.4. Increase the city's urban tree canopy, starting with Equity Priority Areas, and expand urban greening throughout the city to reduce the heat Island effect and support natural carbon sequestration. (Action 5-6.15)

14.5. Seek resources to conduct a community-wide tree canopy assessment to quantify how much of the City's land area is covered by trees, including streets with street tree canopy cover; identify the location of those trees; and identify opportunities to plant trees. (Action 5-6.16)

14.6. Update the Santa Rosa Street Tree list so that it is consistent with the list developed by the City's Water Use Efficiency Team and the Master Gardeners, and identify native, drought-tolerant, and low-water- use tree species that are appropriate for street landscaping. (Action 5-6.17)

14.7. Work with the Water Team and Master Gardeners to refine guidelines on specific tree species and management procedures that integrate carbon sequestration, ecosystems services, and biodiversity. (Action 5-6.18)

14.8. Where woody vegetation is appropriate, maximize planting of coast live oak and other native trees and shrubs in the public realm. (Action 5-6.19)

14.9. Work to complement the street tree network by increasing the number of street trees in the sidewalk and tree wells. (Action 5-6.20)

14.10. Preserve mature trees during infrastructure modifications using solutions to retain them such as bulb-outs, basin expansion, and sidewalk re-routing. (Action 5-6.21)

14.11. Seek resources to create and regularly update an Urban Greening Plan to increase the urban tree canopy, open spaces, and green roofs to reduce the heat island effect, giving priority to areas of the city with vulnerable populations. (Action 5-6.23)

14.12. Explore incentives for shading features such as large eaves and cantilevers on south and west facing walls to reduce air conditioning requirements and heat island effects that contribute to the entire community's

Objective: Enhance sustainable and carbon-free practices community-wide.

reduced quality of life, but especially those living in high- density, low-income neighborhoods. (Action 5-6.24)

14.13. Continue to apply biosolid byproducts of the wastewater treatment process onto City-owned property, and to work with the Bay Area Biosolids Coalition to identify new local and regional opportunities for biosolids use and expansion of processing facilities.

14.14. Inventory wetlands, floodplains, marshlands, and adjacent lands that could potentially support climate adaptation (e.g., through flood management, filtration, or other beneficial ecosystem services) and mitigation (e.g., carbon sequestration). (General Plan Action 3-5.8)

14.15. Conduct carbon sequestration farming pilot projects and research as part of ongoing ecological restoration of degraded habitats. (General Plan Action 3-6.22)

14.16. Implement regenerative land management practices at the city scale to reduce GHG emissions and improve watershed and human health. (General Plan Action 3-6.26)

Regulatory Programs:

14.17. Require tree planting and other landscaping in all new development and redevelopment that supports other community benefits, such as shade for walking and biking, and include greening elements as a primary project scoring criteria for bicycle improvements. (Action 5-6.22)

14.18. Ensure that agricultural easements have standards for Best Management Practices and prioritize conservation of agricultural properties that use or agree to implement regenerative agriculture practices. (General Plan Action 3-6.28)

Education, Outreach, and Coordination Programs:

14.19. Promote regenerative agricultural techniques for local farmers and ranchers, in partnership with the Sonoma County Agricultural Preservation and Open Space District, the Sonoma County Resource Conservation District, regional agricultural groups, the UC (University of California) Cooperative Extension, and others.

14.20. Work with the County to support the implementation of forest management practices that protect existing carbon stocks by reducing the risk of catastrophic wildfire. At the same time, support activities such as mulching in place, prescribed fire, conservation burns, and off site uses, including compost and mulch production. (General Plan Action 3-6.23)

14.21. Work with regional partners on strategic land protection and stewardship actions that increase carbon sequestration, minimize conversion to land uses that have a lower capacity to sequester carbon, and preserve contiguous open space areas to better protect ecosystems that are under pressure from a changing climate, allowing greater mobility of species. (General Plan Action 3-6.24)

Supportive General Plan Policies:

General Plan Policy 3-5.3:	Conserve and protect creeks, wetlands, vernal pools, wildlife ecosystems, rare plant habitats, and waterways from development.
General Plan Policy 5-6.5:	Support the preservation and restoration of natural landscapes to reduce the heat island effect, improve air quality, and improve community health.
General Plan Policy 3-6.6:	Conserve agricultural land and soils.

Objective: Enhance sustainable and carbon-free practices community-wide.	
General Plan Policy 3-6.8:	Capture and sequester more carbon in soils and plants.

Measure 14 Performance Standards			
Performance Standard	**2030**	**2045**	**2050**
Cumulative trees planted - City Limits	600	2,100	2,600
Cumulative trees planted – External Planning Area	100	350	430

Measure 14 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
Municipal	Medium-term	General Fund, grant funding, incentives
Responsible and Supporting City Departments	**Supporting Community Partners**	
Water, Recreation & Parks	Sonoma County, Sonoma County Agricultural Preservation and Open Space District, Sonoma County Resource Conservation District, North Coast Soil Hub, UC Extension, farmers and ranchers, community gardens, Sonoma County Regional Climate Protection Authority	

Objective: Enhance sustainable and carbon-free practices community-wide.

Measure 15: Reduce embedded carbon in goods and services used by the City and community members.

GHG Emissions Savings ($MTCO_2e$):

This measure does not result in quantifiable GHG emission reductions.

Implementing Programs:

Regulatory Programs:

15.1. Continue to update the Building Code, consistent with State law, to increase the use of low carbon construction materials. (General Plan Action 3-7.24)

Education, Outreach, and Coordination Programs:

15.2. Continue to promote Santa Rosa as the North Bay's premier location for clean/green technologies and entrepreneurial businesses that create new products and business models that will attract national and international interest. (General Plan Action 2-5.8)

15.3. Support the growth of green businesses in Santa Rosa that support a carbon-neutral economy (General Plan Action 3-7.32). Emphasize businesses that use locally or regionally sourced materials, including upcycled materials, or conduct local and sustainable manufacturing activities.

15.4. Continue to promote "Buy Local" programs, in partnership with the Santa Rosa Metro Chamber of Commerce and other business organizations.

15.5. Continue to encourage businesses to participate in the Sonoma County Green Business Certification program.

Supportive General Plan Policies:

General Plan Policy 3-7.4: Reduce the use of fossil fuels as an energy source in new and existing buildings.

General Plan Policy 3-7.5: Continue the City's role as a leader in sustainability and climate action.

Measure 15 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New development, Nonresidential	Short-term	General Fund, grant funding
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development	Sonoma County, Santa Rosa Metro Chamber of Commerce, local businesses, Sonoma County Regional Climate Protection Authority	

Objective: Enhance sustainable and carbon-free practices communitywide.

Measure 16: Maximize opportunities for local food production.

GHG Emissions Savings ($MTCO_2e$):

Implementing programs included under this measure are anticipated to help reduce community GHG emissions by reducing emissions associated with growth, processing, and transportation of food; by supporting soil-based carbon sequestration; and by reducing paved area. However, lack of both reliable data and a standardized protocol for quantifying emissions reductions from these activities at the time of preparation means that Measure 16 is classified as supportive.

Implementing Programs:

Municipal Programs:

16.1. Support retention of the city's existing community gardens and encourage development of new community gardens. (General Plan Action 6-6.6)

Regulatory Programs:

16.2. Consider updating the Zoning Code to allow urban agriculture where appropriate. (General Plan Action 6-6.8)

16.3. Consider developing an Urban Agriculture ordinance that includes strategies to increase access to healthy food—particularly in Equity Priority Areas and Healthy Food Priority Areas—and standards for operation and soil mitigation. (General Plan Action 6-6.9)

16.4. Explore the feasibility of enacting an Urban Agriculture Incentive Zone (per Government Code Section 51040) to allow landowners to receive tax incentives for putting land into agricultural use. (General Plan Action 6-6.10)

Education, Outreach, and Coordination Programs:

16.5. Support partner agencies in providing education about the nutritional, social, economic, and environmental benefits of urban farming and locally grown and ecologically sound foods; urban agriculture opportunities; food production safety; food literacy; cooking; and food waste reduction. (General Plan Action 6-6.14)

16.6. Support the creation of additional community gardens or other urban agriculture opportunities, particularly in Equity Priority Areas and Healthy Food Priority Areas. (General Plan Action 6-6.7)

16.7. Encourage private property owners and developers to provide opportunities for residential gardening and urban agriculture, and similar opportunities to food producers who are emerging, have limited resources, and/or are people of color. (General Plan Action 6-6.15)

Objective: Enhance sustainable and carbon-free practices communitywide.	
Supportive General Plan Policies:	
General Plan Policy 6-6.1:	Attract and support a range of healthy food retailers, particularly in Equity Priority Areas and Healthy Food Priority Areas, so that all residents have access to healthy foods within one half mile of where they live.
General Plan Policy 6-6.3:	Facilitate urban agriculture, farming, gardening, and local food production, especially in Equity Priority Areas and Healthy Food Priority Areas.

Measure 16 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
New and existing residential and nonresidential development	Medium-term	General Fund, grant funding
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development	Sonoma County, Sonoma County Agricultural Preservation and Open Space District, County Department of Health Services, schools, local farmers and community gardens, faith-based organizations, neighborhood organizations, homeowners' associations, multifamily building owners and managers, Sonoma County Regional Climate Protection Authority	

Objective: Enhance sustainable and carbon-free practices community-wide.

Measure 17: Integrate climate action across all City departments and programs.

GHG Emissions Savings ($MTCO_2e$):

This measure does not result in quantifiable GHG emission reductions on its own, but it is necessary to confirm the City's commitment to ongoing and accelerated reduction of GHG emissions from municipal and community-wide sources.

Implementing Programs:

Municipal Programs:

17.1. Consider the effects of climate change in updating or amending the General Plan, disaster planning, City projects, infrastructure planning, future policies, and City investments. (General Plan Action 3-7.1)

17.2. Integrate GHG emissions reduction and climate resilience into all municipal projects, policies, and procedures as applicable. (General Plan Action 3-7.28)

17.3. Ensure that implementation of the City's GHG Reduction Strategy considers the needs of and provides benefits to Disadvantaged Communities and Equity Priority Areas and that the program actively and meaningfully engages with residents and stakeholders in these areas.

17.4. Fund and implement the GHG emission reduction actions in the General Plan and GHG Reduction Strategy. (Supported by General Plan Action 3-7.2)

17.5. Continue to regularly monitor and report to the City Council and the community on climate action and GHG Reduction Strategy implementation progress. Regular monitoring and reporting should assess the City's progress toward achievement of the GHG reduction targets in the General Plan and Reduction Strategy and identify opportunities to update the Reduction Strategy when needed to ensure achievement of the City's targets.

17.6. Identify City staff with clear responsibilities for implementing the GHG Reduction Strategy, and ensure that staff have adequate authority, funding, time, and other resources and support for implementation.

- a. Designate a Climate Action Manager, or similar position within the city or in coordination with regional partners, to lead implementation of the City's GHG Reduction Strategy and climate policies and actions in the General Plan 2050.
- b. Designate and support a Climate Action Lead in each City department. (General Plan Action 3-7.30)
- c. Continue to support an Interdepartmental Climate Action Implementation Committee. (General Plan Action 3-7.31)
- d. Direct each City department to create a climate action work plan that demonstrates how the department will implement the climate and sustainability strategies in the General Plan and Reduction Strategy.

17.7. Work with the City's information technology department to implement and maintain a public-facing dashboard to track the City's progress in meeting its climate goals.

17.8. Continue regular inventories of community-wide and municipal GHG emissions, at least every five years, consistent with the GHG Reduction Strategy and this General Plan. (Supported by General Plan Action 3-7.3)

Objective: Enhance sustainable and carbon-free practices community-wide.

17.9. Assess the effectiveness of the City's environmentally sensitive preferred purchasing and green fleet conversion programs and update the programs, as needed, to support the City's GHG reduction goals. (General Plan Action 3-7.10)

17.10. Enhance efforts to reduce GHG emissions in municipal operations after understanding the scope, effectiveness, and resource commitments of existing GHG reduction initiatives. General Plan Action 3-7.26)

17.11. Continue to implement existing clean energy and green practices such as capturing energy from digestion of wastewater solids and implementing energy efficient capital improvement projects such as the 2022 ultraviolent disinfection system upgrade at the Laguna Treatment Plant. (General Plan Action 3-7.29)

17.12. Explore opportunities to divest the City's resources from fossil fuel interests.

17.13. Advanced monitoring technology and protocols are emerging in the wastewater sector that promise to provide improved characterization of GHG emissions from specific wastewater processes. Santa Rosa Water will investigate utilizing these emerging technologies to better characterize site-specific GHG emissions at the Laguna Treatment Plant to better inform updates to the Municipal GHG inventory in the future.

Regulatory Programs:

17.14. Establish a policy to use carbon offsets, if needed, to meet the City's net carbon neutrality goals, after all feasible efforts have been made to reduce community-wide GHG emissions. Offsets shall be verifiable and trackable, located in California, and ideally be situated in Sonoma County or Santa Rosa and meaningfully benefit the community. Offsets shall not be used to allow for new or continued polluting activities and shall only be used as an option of last resort to address GHG emissions that cannot be reduced by any other feasible local action.

Education, Outreach, and Coordination Programs:

17.15. Provide public information to educate residents and businesses on the GHG Reduction Strategy and to support individual changes in energy and water use, transportation mode choices, material use, and waste reduction. (General Plan Action 3-7.4)

17.16. Continue to participate in collaborative partnerships with local, regional, and state agencies, businesses, and community groups to support implementation of the GHG Reduction Strategy.

17.17. Continue to participate in Sonoma County Regional Climate Protection Authority (RCPA) programs, activities, and planning efforts to reduce GHG emissions countywide. (General Plan Action 3-7.33)

Supportive General Plan Policies:

General Plan Policy 3-7.5: Continue the City's role as a leader in sustainability and climate action.

Measure 17 Implementation Details		
Applicability	**Timeframe of Implementation**	**Expected Funding Sources**
Municipal	Medium-term	General Fund, grant funding
Responsible and Supporting City Departments	**Supporting Community Partners**	
Planning & Economic Development	Sonoma County Regional Climate Protection Authority, local businesses, and community groups	

Conclusion: Progress to Targets

In total, implementation of the GHG Reduction Strategy is projected to reduce Santa Rosa's GHG emissions to 623,190 $MTCO_2e$ by 2030, 148,120 $MTCO_2e$ by 2045, and 116,200 $MTCO_2e$ by 2050, as shown in **Table 14** and **Figure 5**. This will reduce 2030 emissions to 41 percent below 1990 levels and 2045 emissions to 86 percent below 1990 levels, allowing Santa Rosa to achieve its 2030 and 2045 GHG reduction targets and support California's goal of statewide net carbon neutrality.

The measures and implementation programs and their associated GHG emissions reductions detailed in this Reduction Strategy are achievable and feasible based on current and best available information. Successful implementation will also depend on leveraging grants and funding opportunities, partnerships with community-based organizations, local employers and businesses and academic institutions, collaboration with regional agencies and public agencies in Sonoma County, and ongoing education and outreach to community members and stakeholders. The City has a long history and successful track record of climate action and GHG emissions reductions through implementation of the CCAP and MCAP and regional initiatives. If the City has the financial and municipal resources to implement the measures at a higher level or faster rate, Santa Rosa's GHG emissions may decrease by a greater amount or quicker than shown here, bringing the community closer to net carbon neutrality.

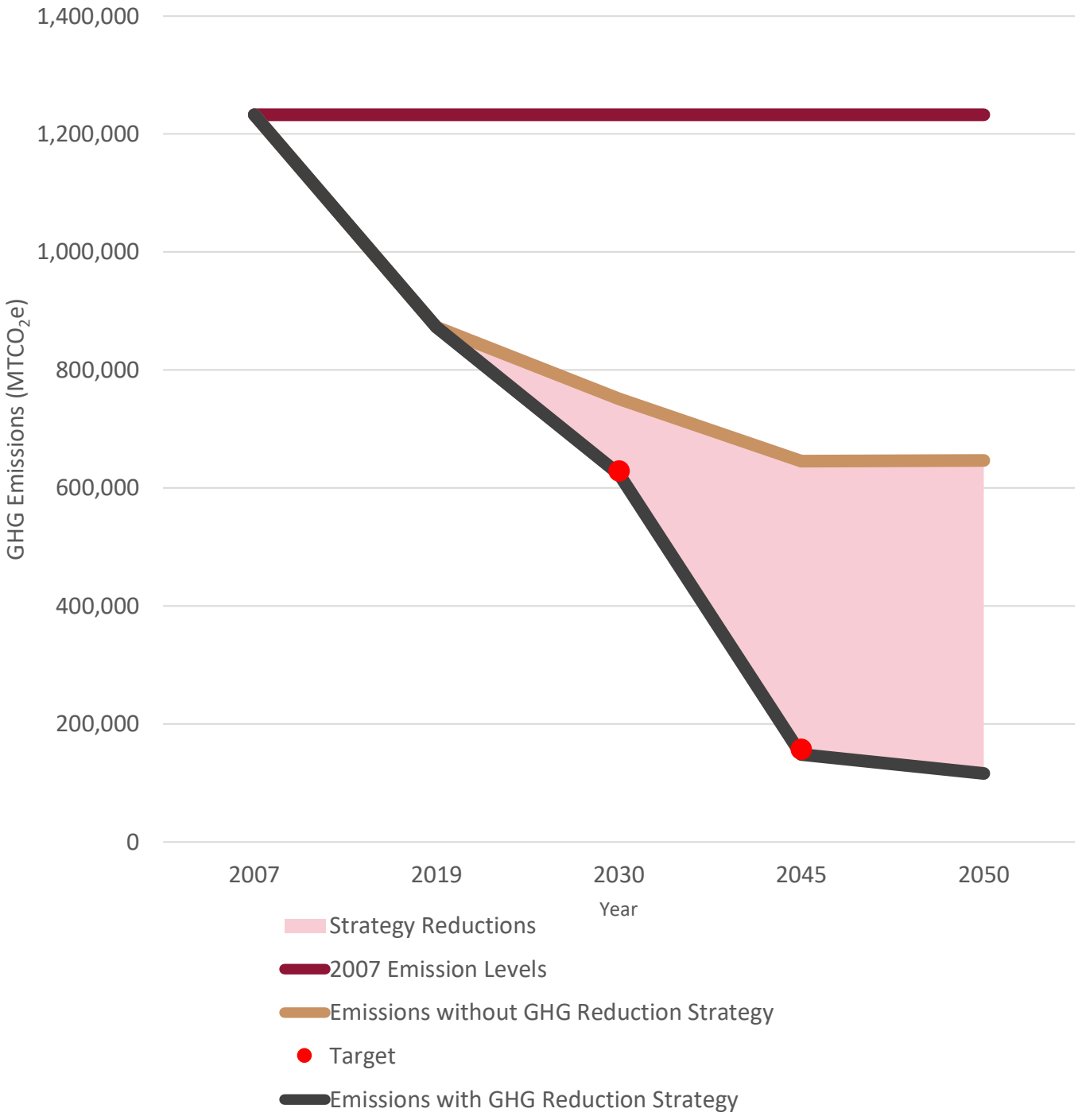
It is likely that new policies and regulations, technologies, personal and economic behaviors and preferences, and other factors will emerge in future years that will impact GHG emissions. These changes cannot be accurately forecasted in the Reduction Strategy, but they will support GHG emissions reductions beyond the levels identified here. Future updates to the Reduction Strategy will be able to better assess emerging trends and unexpected changes and include them as part of the City's GHG Reduction Strategy as appropriate, including being able to quantitatively present a path to net carbon neutrality. Future revisions to the Reduction Strategy may include more stringent GHG quantified reduction targets as they are feasible and appropriate.

Table 14 Santa Rosa City Limits GHG Emissions Reductions with the GHG Reduction Strategy, 2007 to 2050

State Emissions Reduction Measure	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Forecast emissions with existing state and municipal actions	**1,232,730**	**872,300**	**750,830**	**645,610**	**646,440**	**-48%**
Emissions reductions in transportation	-	-	71,630	261,330	273,030	-
Emissions reductions in energy use	-	-	31,350	179,080	188,930	-
Emissions reductions in off-road equipment			12,330	29,900	36,540	
Emissions reductions in solid waste	-	-	8,450	13,920	15,420	-
Emissions reductions in water and wastewater	-	-	Less than 10	10	10	-
Emissions reductions in natural resources			3,880	13,250	16,310	
Emissions with GHG Reduction Strategy	**1,232,730**	**872,300**	**623,190**	**148,120**	**116,200**	**-91%**
State-mandated GHG emissions target	**-**	**-**	**628,690**	**157,170**	**157,170**	**-**
Target achieved?			**Yes**	**Yes**	**Yes**	

Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

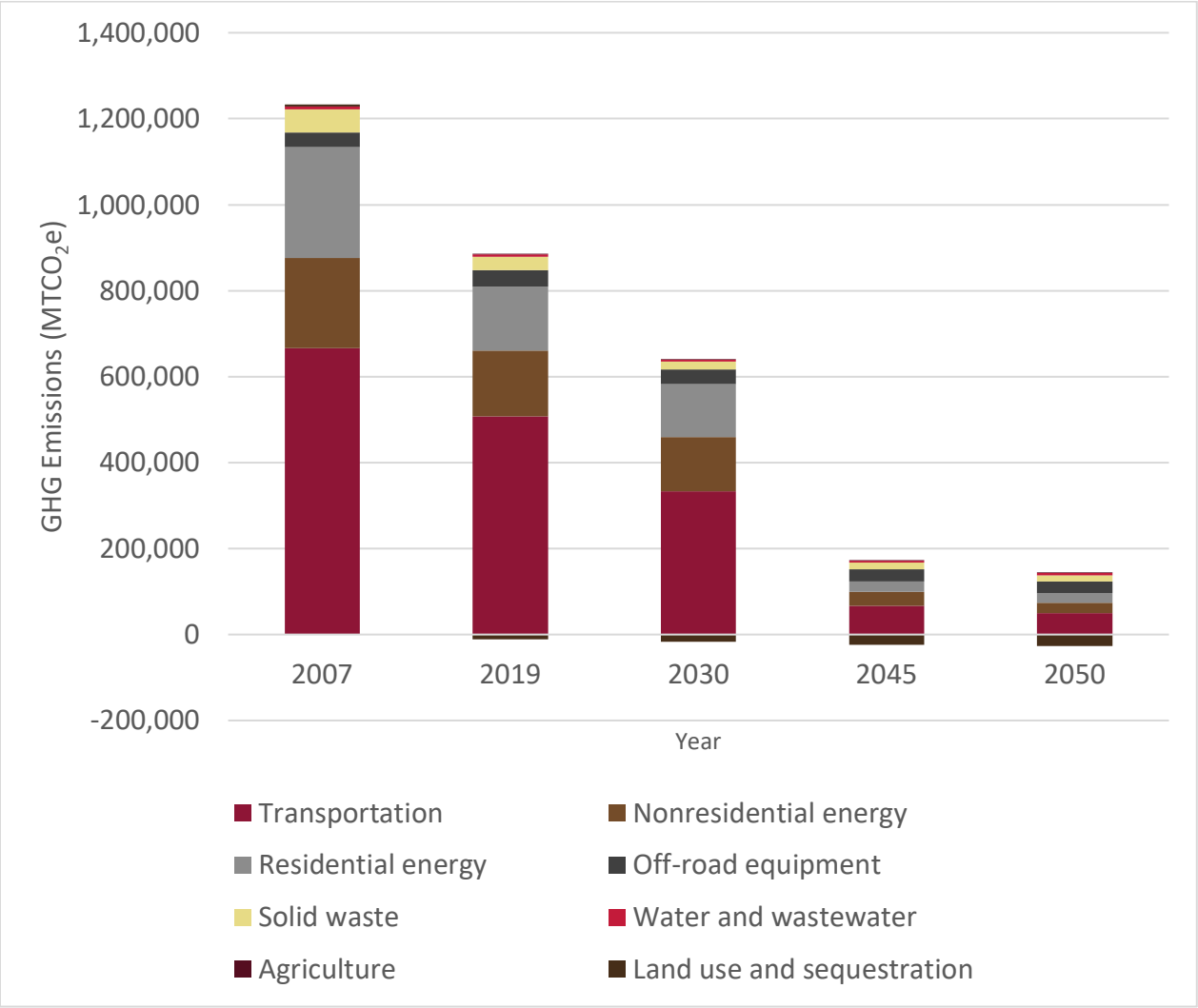
Figure 5 Santa Rosa Emissions Reductions with the GHG Reduction Strategy, 2007 to 2050



Notes: All numbers are rounded to the nearest 10. Totals may not equal the sum of individual rows.

With implementation of the Reduction Strategy, GHG emissions are projected to decrease 91 percent between 2007 and 2050. The largest percentage reductions are projected to occur in the land use and sequestration, residential energy, agricultural, and transportation sectors, as seen in **Figure 6**.

Figure 6 GHG Emissions by Sector in City Limits with the GHG Reduction Strategy, 2007 to 2050



The Reduction Strategy paves the way for a sustainable Santa Rosa by dramatically reducing natural gas use, solid waste, and VMT compared to the 2007 baseline. With implementation of the Reduction Strategy, transportation emissions are expected to decline by 92 percent between 2007 and 2050; nonresidential energy emissions are projected to decline by 91 percent, and residential energy emissions are projected to decline by 89 percent.

Appendix. Technical GHG Appendix

This appendix provides details for the technical details and findings from the Greenhouse Gas (GHG) Reduction Strategy quantification analysis. It also provides information on the data sources, assumptions, and performance metrics used to assess the potential for GHG savings from State and local existing and planned efforts, as well as from the measures within the GHG Reduction Strategy.

State Actions

The State of California has adopted and committed to implementing policies that reduce GHG emissions statewide, including in Santa Rosa. Many of these policies are laid out in the Climate Change Scoping Plan (Scoping Plan), a State document that outlines regulatory and market-based solutions to achieving California's GHG emission reduction goals. The Scoping Plan was first prepared in 2008, with successive updates in 2014, 2017, and 2022. These updates revised the State-level actions and identified additional opportunities for GHG emission reductions.

The Scoping Plan and related documents lay out several policies to reduce California's GHG emissions, although not all are directly applicable to Santa Rosa. The project team assessed Santa Rosa's GHG emissions, GHG emissions from the City's External Planning Area (EPA) and identified five State policies that are directly relevant to the community. This allows the GHG Reduction Strategy to provide "credit" to Santa Rosa for these policies. These State efforts are:

- **The Renewables Portfolio Standard (RPS)**, which requires increases in renewable and carbon-free electricity supplies. RPS was first established in 2002 and has been amended multiple times, most recently by Senate Bill (SB) 1020 in 2022. It requires all electricity providers in the state to obtain at least 60 percent of their electricity from eligible renewable resources by the end of 2030 and all their electricity from carbon-free (although not necessarily eligible renewable) resources by the end of 2045. This policy reduces GHG emissions from electricity use, including the electricity used to transport and process water and wastewater, and the electricity used for electric vehicles.
- **The Clean Car Standards,** which require increased fuel efficiency of on-road vehicles and decreased carbon intensity of vehicle fuels. In 2002, California adopted Assembly Bill (AB) 1493, the New Passenger Motor Vehicle Greenhouse Gas Emission Standards, or Pavley standard. It required a reduction in tailpipe GHG emissions from new vehicles produced from 2009 to 2015. In 2012, the California Air Resources Board (CARB) adopted an extension of this policy, the Advanced Clean Car Standards, which requires more stringent reductions in tailpipe GHG emissions from vehicles produced from 2016 to 2025. In August 2022, CARB adopted another expansion of these standards, known as the Advanced Clean Cars II standards. This regulation requires that all new light-duty vehicles (e.g., passenger cars, small trucks, and sport-utility vehicles [SUVs]) sold in the state be zero-emission by 2035, with interim targets for new light-duty vehicle sales beginning in 2026. There are some limited exceptions for plug-in hybrid vehicles. CARB adopted similar rules for heavy-duty vehicles and state and local government fleets in 2020 (Advanced Clean Trucks) and 2023 (Advanced Clean Fleets).

- **The updated Title 24 building energy-efficiency standards** require new buildings to achieve increased energy-efficiency targets. California Code of Regulations, Title 24, Part 6 are California's energy-efficiency standards for new and renovated buildings, which are applied at the local level through the project review and building permit process. The standards are strengthened every three years, with the ultimate goal of making new buildings net-zero energy, meaning that they would generate as much energy as they use. The most recent set of Title 24 standards, known as the 2022 standards, went into effect on January 1, 2023. The 2022 Title 24 standards encourage efficient electric heat pumps, establish electric-ready requirements for new homes, expand solar photovoltaic and battery storage standards, and strengthen ventilation standards.
- **The Short-Lived Climate Pollutant Reduction Strategy**, also known as SB 1383, requires that communities divert 75 percent of organic waste (e.g., food scraps, grass, and plant trimmings) away from landfills and toward alternatives such as composting or energy generation. As a part of this requirement, all jurisdictions must offer curbside composting to single-family and small multifamily properties (less than five units). Larger multifamily properties and businesses must either participate in curbside composting or self-haul organic waste to a composting program or collection site. SB 1383 also includes requirements related to diverting surplus food to people in need, increasing the use of products made from recycled organics, and providing more detailed reporting statistics.

Overall, these existing policies are expected to reduce Santa Rosa's future GHG emissions. Without these policies in place, GHG emissions within the City Limits are expected to be 20 percent below 2007 levels by 2050. With these policies enacted, community-wide GHG absolute emissions are projected to be 47 percent below 2007 levels. **Table A-1** shows the absolute reductions achieved by these policies.

Table A-1 Absolute GHG Emissions with Existing Actions within City Limits (2007 – 2050)

	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Forecasted emissions without state actions	**1,232,730**	**872,300**	**914,530**	**972,240**	**991,510**	**-20%**
Reductions from RPS	-	-	-20,490	-83,050	-83,590	-
Reductions from Clean Car standards	-	-	-103,480	-192,900	-201,700	-
Reductions from Title 24	-	-	-7,490	-29,190	-37,970	-
SB 1383	-	-	-9,060	-10,210	-10,590	
Reductions from all state actions	-	-	-140,520	-315,350	-333,850	-
Emissions with state actions	**1,232,730**	**872,300**	**774,010**	**656,890**	**657,660**	**-47%**

Note: Values in this table have been rounded to the nearest 10. Totals in columns may not equal the sum of component rows.

$MTCO_2e$ = metric tons of carbon dioxide equivalent

Existing Local Actions

Since the City's 2012 Climate Action Plan (CCAP) was adopted, the City has continued to act in partnership with regional agencies. Existing activities that have been implemented since 2019, or have increased participation since 2019, can be credited for additional GHG emissions reductions if changes to activity data have been determined by the City. The CCAP includes an assessment of Santa Rosa's local GHG benefits from these efforts, allowing the community to receive "credit" for its efforts. These efforts include:

- Participating in Sonoma Clean Power to increase the renewable electricity supply to the community and allow for greater local control over electricity service.
- Increasing solar photovoltaic (PV) capacity.
- Launching scooter-share programs.
- Installing publicly available electric vehicle (EV) chargers.
- Customers installing graywater systems.
- Operating the Cash for Grass program.
- Operating the WaterSmart Checkup program.
- Installing new and expanding existing bike lanes.
- Requiring new residential development of three stories or less to be carbon neutral.

Existing Local Action 1: Sonoma Clean Power.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$) – City Limits	10,810	0	0
GHG reduction ($MTCO_2e$) – EPA	650	0	0

Key Assumptions

	2030	2045	2050
Proportion of Sonoma Clean Power electricity that is renewable	100%	100%	100%
PG&E emissions factor (MTCO2e/kWh)	0.000022	0.000000	0.000000

Performance Targets

	2030	2045	2050
Proportion of Sonoma Clean Power electricity that is renewable	100%	100%	100%

Sources

Sonoma Clean Power. 2022. "Standard LSE Plan." https://sonomacleanpower.org/uploads/documents/soma_public_v1.pdf.

Existing Local Action 2: Solar Installations.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$) – City Limits	150	0	0

Key Assumptions

	2030	2045	2050
Number of residential installations as of 2019	4,521	4,521	4,521
Number of nonresidential installations as of 2019	82	82	82

Performance Targets

	2030	2045	2050
Electricity generated from solar (kWh)	54,958,280	54,958,280	54,958,280

Sources

Energy Solutions. "Distributed Generation Interconnection Program Data." 2023. https://www.californiadgstats.ca.gov/downloads/.

PVWatts. "PVWatts Calculator." https://pvwatts.nrel.gov/pvwatts.php.

Existing Local Action 3: Scooter Share.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Total scooter trips per year as of 2023	10,965	10,965	10,965
Vehicle to scooter substitution rate	38.5%	38.5%	38.5%
Average vehicle trip length (miles)	5.4	5.4	5.4

Performance Targets

	2030	2045	2050
Vehicle VMT avoided	6,130	6,530	6,670

Sources

Wilson, T. Personal communication. Jun 15, 2023.

Existing Local Action 4: Public EV Chargers.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	6,720	5,750	5,690

Key Assumptions

	2030	2045	2050
Number of public EV chargers as of 2023	162	162	162
kWh use per charging station	52,010	52,010	52,010
Electric VMT provided by each charging station	158,590	158,590	158,590

Performance Targets

	2030	2045	2050
Newly electric VMT	25,691,990	25,691,990	25,691,990
Increase in kWh use	8,425,660	8,425,660	8,425,660

Sources

Alternative Fuels Data Center. "Electric Vehicle Charger Selection Guide." 2018. https://afdc.energy.gov/files/u/publication/EV_Charger_Selection_Guide_2018-01-112.pdf.

Wilson, T. Personal communication. Jun 15, 2023.

Existing Local Action 5: Graywater Systems.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Residents in homes with graywater systems as of 2023	18	18	18
Gallons of water used per day per occupant - bathroom	25	25	25
Gallons of water used per day per occupant - laundry	15	15	15

Performance Targets

	2030	2045	2050
Reduction in water use (gallons)	10,560	10,560	10,560
Reduction in electricity use (kWh)	30	30	30

Sources

Kobayashi, Y., Ashbolt, N.J., Davies, E.G.R., Liu, Y. 2020. "Life cycle assessment of decentralized greywater treatment systems with reuse at different scales in cold regions." *Environment International* (134). https://www.sciencedirect.com/science/article/pii/S0160412019318707#s0220.

Meads, S. Personal communication.

Existing Local Action 6: Cash for Grass Program.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Square feet of turf removed as of 2023	557,514	557,514	557,514

Performance Targets

	2030	2045	2050
Reduction in water use (gallons)	8,710,600	8,710,600	8,710,600
Reduction in electricity use (kWh)	12,290	12,290	12,290

Sources

Meads, S. Personal communication.

Model Water Efficient Landscape Ordinance (2023).

Existing Local Action 7: WaterSmart Checkup Program.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Percentage of water use occurring indoors	40%	40%	40%

Performance Targets

	2030	2045	2050
Reduction in water use (gallons)	1,290,600	1,290,600	1,290,600
Reduction in electricity use (kWh)	2,690	2,580	2,540

Sources

Nordlie, C. Personal communication.

Existing Local Action 8: Bike Lane Expansion.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	10	10	10

Key Assumptions

	2030	2045	2050
Miles of bike lanes prior to 2020	104.6	104.6	104.6
Total miles of bike lanes including new and planned miles as of 2023	109.8	109.8	109.8

Performance Targets

	2030	2045	2050
Total miles of bike lanes including new and planned miles as of 2023	109.8	109.8	109.8
Reduction in VMT	25,010	26,660	27,210

Sources

American Community Survey. 2021. B08006: Sex of Workers by Means of Transportation to Work. https://data.census.gov/table/ACSDT5Y2021.B08006?q=B08006&g=160XX00US0670098.

Caltrans. 2021. *California Public Road Data*. https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/california-public-road-data/prd-2021.pdf.

City of Santa Rosa. 2019. *Bicycle & Pedestrian Master Plan*. https://www.srcity.org/DocumentCenter/View/24312/Bicycle-and-Pedestrian-Master-Plan-Update-2018-final-version_PRINT.

Existing Local Action 9: Carbon Neutral New Construction.[13]

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$)	5,490	5,520	5,520

Key Assumptions

	2030	2045	2050
Percentage of new residential units in buildings three stories or less	86%	86%	86%
New residential units in buildings three stories or less	2,800	2,800	2,800

Performance Targets

	2030	2045	2050
Reduction in natural gas use (therms)	1,036,420	1,036,420	1,036,420
Increase in electricity use (kWh)	11,543,480	11,543,480	11,543,480

Sources

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). ND. "ASHRAE Technical FAQ."

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

California Energy Commission. 2020. "2019 Residential Appliance Saturation Study." https://www.energy.ca.gov/data-reports/surveys/2019-residential-appliance-saturation-study

California Energy Commission. 2006. "2006 California Commercial End-Use Survey (CEUS)." https://www.energy.ca.gov/data-reports/surveys/california-commercial-end-use-survey/2006-california-commercial-end-use-survey

Greenblatt, JB., 2015. "Modeling California policy impacts on greenhouse gas emissions." https://eta-publications.lbl.gov/sites/default/files/lbnl-7008e.pdf

[13] The City has suspended its enforcement of Ordinance 2022-015 because of a decision on January 2, 2024, by the U.S. Court of Appeals 9th Circuit that invalidated a City of Berkeley ordinance that prohibited natural gas infrastructure in new buildings, precluding cities and counties from adopting ordinances that prohibit the installation of gas plumbing in buildings. The City is currently evaluating options for a replacement reach code that will achieve similar objectives for energy efficiency and GHG emissions reductions in a manner that is consistent with the recent court decision. The GHG reductions beyond 2024 reflect the annual benefits of all-electric buildings built during implementation of the 2019 and 2022 reach codes through June 30, 2024.

U.S. Census. 2021: ACS 5-Year Estimates Detailed Tables. "B25024: Units in Structure." https://data.census.gov/table?t=Units+and+Stories+in+Structure&g=160XX00US0670098&tid=ACSDT5Y2021.B25024

U.S. Census. 2021: ACS 5-Year Estimates Detailed Tables. "B25040: House Heating Fuel." https://data.census.gov/table?q=b25040&g=160XX00US0670098&tid=ACSDT5Y2021.B25040

Collectively, all existing and planned activities (state, regional, and local) are projected to reduce the City of Santa Rosa's 2045 GHG emissions approximately 48 percent below 2007 levels. **Table A-2** shows the projected GHG emission reductions from these existing and planned local activities. Benefits from local and regional efforts are only shown if they will reduce GHG emissions beyond the level achieved by State efforts.

Table A-2. Santa Rosa City Limits Projected GHG Emission Reductions from Existing and Planned Local and Regional Activities, 2007 to 2050

	2007 Inventory $MTCO_2e$	2019 Inventory $MTCO_2e$	2030 Forecast $MTCO_2e$	2045 Forecast $MTCO_2e$	2050 Forecast $MTCO_2e$	Percentage Change 2007 to 2050
Forecasted emissions with State actions	1,232,730	872,300	774,010	656,890	657,660	-47%
Increases in Sonoma Clean Power participation	-	-	-10,810	0	0	-
Renewable energy installations	-	-	-150	0	0	-
Scooter-share programs	-	-	Less than 10	Less than 10	Less than 10	-
New public EV chargers	-	-	-6,720	-5,750	-5,690	-
New graywater systems	-	-	Less than 10	Less than 10	Less than 10	-
Cash for Grass program	-	-	Less than 10	Less than 10	Less than 10	-
WaterSmart Checkup program			Less than 10	Less than 10	Less than 10	
New and expanded bike lanes	-	-	-10	-10	-10	-
Carbon neutral new residential construction	-	-	-5,490	-5,520	-5,520	-
Reductions from all local and regional actions	-	-	-23,180	-11,280	-11,220	-
Forecasted emissions with all existing and planned actions	1,232,730	872,300	750,830	645,610	646,440	-48%

Note: Values in this table have been rounded to the nearest 10. Totals in columns may not equal the sum of component rows.

Technical Data for GHG Reduction Measures

This section discusses the data sources, methods, and assumptions for the quantification of the GHG-reduction measures included in the Santa Rosa 2023 GHG Reduction Strategy. In addition to the sources presented here, these calculations also rely on the GHG inventory and forecast. The quantification calculations also rely on emission factors that reflect the reductions already achieved by the existing actions discussed in the previous section. **Table A-3** shows these emission factors.

Table A-3. Emission Factors with Existing Actions (2019 – 2050)

Activity Type	Units	2019	2030	2045	2050
Electricity (PG&E)	MTCO2e/kWh	0.000027	0.000025	0.000000	0.000000
Electricity (SCP – Evergreen)	MTCO2e/kWh	0.000018	0.000000	0.000000	0.000000
Electricity (SCP – CleanStart)	MTCO2e/kWh	0.000019	0.000000	0.000000	0.000000
Electricity (direct access)	MTCO2e/kWh	0.000419	0.000300	0.000000	0.000000
Electricity (PG&E and SCP)	MTCO2e/kWh	0.000020	0.000003	0.000000	0.000000
Natural gas	MTCO2e/Therms	0.005324	0.005324	0.005324	0.005324
Passenger vehicle transportation	MTCO2e/VMT	0.000347	0.000262	0.000224	0.000222
Commercial vehicle transportation	MTCO2e/VMT	0.001124	0.001019	0.0006751	0.000630
Solid waste (MSW)	MTCO2e/Tons	0.277890	0.277920	0.277900	0.277920

kWh = kilowatt-hour; $MTCO_2e$ = metric tons of carbon dioxide equivalent; VMT = vehicle miles traveled.

For each strategy, this appendix discusses the following items for both the City limits and EPA.

- The savings in activity data (e.g., kilowatt- hours [kWh] of electricity or tons of solid waste) in 2030, 2045, and 2050 resulting from implementing the strategy as described. A negative value indicates an increase in activity data.
- The decreases in GHG emissions in 2030, 2045, and 2050 resulting from implementing the strategy as described.
- The assumptions made about the strategy's performance, such as the level of community participation required to achieve the specified reductions by 2030, 2045, and 2050.
- The performance targets, which are quantifiable metrics about the projected level of success the strategy must meet to achieve the specified reductions by 2030, 2045, and 2050.
- Sources: Key studies, analyses, and other sources of data used to inform the quantification. This does not include the GHG inventory, forecast, or other technical analyses prepared as part of the GHG Reduction Strategy.

Measure 1: Locate and design new development to minimize vehicle dependence.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	12,040	10,090	11,940
GHG reduction (MTCO2e) – EPA	1,700	1,470	1,610

Key Assumptions

	2030	2045	2050
Percentage of new multifamily units dedicated through deed restrictions as affordable	20%	15%	15%
Percentage reduction in residential parking supply relative to demand	10%	20%	25%
Average percentage increase in public parking price	10%	15%	20%
Percentage of vehicle miles traveled (VMT) that takes place in area with priced parking	10%	20%	25%

Performance Targets

	2030	2045	2050
New multifamily units dedicated through deed restrictions as affordable - City limits	480	1,140	1,690
New multifamily units dedicated through deed restrictions as affordable - EPA	30	80	110
Percentage increase in residential density – City Limits	10%	30%	30%
Percentage increase in job density – City limits	10%	20%	20%

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

City of Santa Rosa. 2023. "Affordable Housing Complexes." https://www.srcity.org/DocumentCenter/View/29876/City-of-Santa-Rosa-Affordable-Housing-Complexes-2023?bidId=

Sonoma County Transportation Authority. 2020. "Sonoma County Travel Behavior Study." https://scta.ca.gov/wp-content/uploads/2020/02/Sonoma_TBS_2-7-2020_web.pdf

Measure 2: Improve the frequency, coverage, and effectiveness of local and regional transit and rail networks.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	10,160	13,980	16,030
GHG reduction (MTCO2e) – EPA	700	950	1,090

Key Assumptions

	2030	2045	2050
Percentage increase in transit network coverage	10%	10%	10%
Percentage increase in transit network hours	10%	25%	30%
Percentage of routes on which frequency is increased	25%	40%	50%
Percentage increase in transit frequency on routes on which frequency is increased	10%	35%	40%
Percentage of transit routes that receive supportive treatments	20%	40%	50%
Percentage reduction in transit fares (averaged across community)	25%	30%	30%
Percentage of transit routes receiving reduced fares	100%	100%	100%
Percentage of riders receiving discount from base transit fare	55%	60%	65%

Performance Targets

	2030	2045	2050
Percentage increase in transit network coverage	10%	10%	10%
Percentage increase in transit network hours	10%	25%	30%
Percentage of routes on which frequency is increased	25%	40%	50%
Percentage increase in transit frequency on routes on which frequency is increased	10%	35%	40%
Percentage of transit routes that receive supportive treatments	20%	40%	50%
Percentage reduction in transit fares (averaged across community)	25%	30%	30%
Percentage of transit routes receiving reduced fares	100%	100%	100%
Percentage of riders receiving discount from base transit fare	55%	60%	65%

Sources

California Air Pollution Control Officers Association. 2021. “Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity.” https://www.caleemod.com/documents/handbook/full_handbook.pdf

Sonoma County Transportation Authority. 2021. "Moving Forward 2050: Sonoma County Comprehensive Transportation Plan." https://scta.ca.gov/wp-content/uploads/2021/09/SCTA-CTP21_v8.pdf

Measure 3: Develop and expand transportation demand management (TDM) programs to reduce VMT and dependence on single-occupancy vehicle trips.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction ($MTCO_2e$) – City Limits	570	1,000	1,070
GHG reduction ($MTCO_2e$) – EPA	40	90	90

Key Assumptions

	2030	2045	2050
Percentage employees eligible for TDM programs	20%	30%	30%

Performance Targets

	2030	2045	2050
Businesses in TDM programs – City Limits	1,420	2,430	2,590
Businesses in TDM programs – EPA	90	150	160

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

Sonoma County Transportation Authority. 2020. "Sonoma County Travel Behavior Study." https://scta.ca.gov/wp-content/uploads/2020/02/Sonoma_TBS_2-7-2020_web.pdf

Measure 4: Enhance active transportation and micro-mobility systems.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	1,580	2,810	3,290
GHG reduction (MTCO2e) – EPA	100	180	210

Key Assumptions

	2030	2045	2050
Percentage increase in community sidewalk length	15%	30%	35%
Percentage increase in bike network length	20%	35%	40%

Performance Targets

	2030	2045	2050
Total community sidewalk length (miles)	650	730	760
Total bike network length (miles)	132	148	154

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

Measure 5: Accelerate the adoption of zero-emission light-duty and heavy-duty vehicles.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	47,280	233,450	240,700
GHG reduction (MTCO2e) – EPA	3,220	15,430	15,720

Key Assumptions

	2030	2045	2050
Percentage of community's light-duty vehicle fleet converted from conventional fuel to electric	20%	90%	92%
Percentage of heavy-duty vehicles converted from conventional fuel to electric	5%	30%	35%
Percentage of heavy-duty vehicles converted from conventional fuel to hydrogen	5%	50%	60%

Performance Targets

	2030	2045	2050
Number of community's light-duty vehicle fleet converted from conventional fuel to electric (City Limits and EPA)	27,440	132,320	135,830
Number of community's heavy duty vehicle fleet converted from conventional fuel to electric	500	2,560	2,920
Number of community's heavy-duty vehicle fleet converted to hydrogen	500	4,260	5,010

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

California Air Resources Board. 2023. "Emissions Inventory." https://arb.ca.gov/emfac/emissions-inventory/ac4484c482a533363cb2e97c7561d2aedea3b073

National Renewable Energy Laboratory. 2021. "Incorporating Residential Smart Electric Vehicle Charging in Home Energy Management Systems." https://www.nrel.gov/docs/fy21osti/78540.pdf

U.S. Department of Energy. 2022. "Compare Fuel Cell Vehicles." https://www.fueleconomy.gov/feg/fcv_sbs.shtml.

Measure 6: Transition to zero-emission motorized equipment, including construction and landscaping equipment.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	12,330	29,900	36,540
GHG reduction (MTCO2e) – EPA	910	2,220	2,730

Key Assumptions

	2030	2045	2050
Percentage of landscaping equipment converted to electric	50%	95%	95%
Percentage of construction equipment converted to electric	40%	70%	75%
Percentage of other equipment converted to electric	15%	35%	45%

Performance Targets

	2030	2045	2050
Percentage of landscaping equipment converted to electric	50%	95%	95%
Percentage of construction equipment converted to electric	40%	70%	75%
Percentage of other equipment converted to electric	15%	35%	45%

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

California Air Resources Board. 2023. "Emissions Inventory." https://arb.ca.gov/emfac/emissions-inventory/ac4484c482a533363cb2e97c7561d2aedea3b073

California Air Resources. 2020. "2020 Emissions Model for Small Off-Road Engines – SORE2020." https://ww2.arb.ca.gov/sites/default/files/2020-09/SORE2020_Technical_Documentation_2020_09_09_Final_Cleaned_ADA.pdf

California Air Resources Board. ND. "MSEI – Documentation – Off-Road – Diesel Equipment." https://ww2.arb.ca.gov/msei-documentation-road-diesel-equipment-0

Measure 7: Reduce community-wide energy use, increase energy efficiency, and advance electrification in existing buildings, including municipal buildings.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	29,630	171,190	179,850
GHG reduction (MTCO2e) – EPA	1,950	11,180	11,710

Key Assumptions

	2030	2045	2050
Existing residential buildings receiving standard efficiency retrofits	15%	40%	45%
Existing nonresidential buildings receiving standard efficiency retrofits	10%	35%	40%
Existing residential gas space heaters converted	20%	95%	95%
Existing residential gas water heaters converted	10%	95%	95%
Existing residential cooktops converted	5%	55%	65%
Existing residential dryers converted	10%	50%	60%
Existing commercial gas rangers converted	10%	40%	50%
Existing commercial gas space heaters converted	5%	75%	95%
Existing commercial gas water heaters converted	10%	95%	95%
Existing commercial buildings eligible for electrification retrofits	75%	75%	75%

Performance Targets

	2030	2045	2050
Number of existing homes receiving efficiency retrofits – City Limits	10,270	27,380	30,800
Number of existing businesses receiving efficiency retrofits – City Limits	540	1,880	2,150
Number of existing homes receiving efficiency retrofits – EPA	700	1,860	2,090
Number of existing businesses receiving efficiency retrofits – EPA	30	110	130
Number of residential HVAC conversions - City Limits	10,760	51,110	51,110
Number of residential water heater conversions – City Limits	7,100	67,480	67,480
Number of residential clothes drying conversions – City Limits	7,100	35,520	42,620
Number of residential cooktop conversions – City Limits	3,550	39,070	46,170
Number of nonresidential HVAC conversions – City Limits	200	3,020	3,830
Number of nonresidential water heater conversions – City Limits	400	3,830	3,830
Number of nonresidential cooktop conversions – City Limits	400	1,610	2,010
Number of residential HVAC conversions - EPA	730	3,470	3,470

	2030	2045	2050
Number of residential water heater conversions – EPA	480	4,580	4,580
Number of residential clothes drying conversions – EPA	480	2,410	2,890
Number of residential cooktop conversions – EPA	240	2,650	3,130
Number of nonresidential HVAC conversions – EPA	10	180	230
Number of nonresidential water heater conversions – EPA	20	230	230
Number of nonresidential cooktop conversions – EPA	20	100	120

Sources

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Measure 8: Transition to carbon neutral new buildings.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	1,650	7,890	9,080
GHG reduction (MTCO2e) – EPA	80	1,050	1,150

Key Assumptions

	2030	2045	2050
Cumulative percentage of new residential construction influenced by performance-based reach code (once implemented)	95%	95%	95%
Cumulative percentage of new eligible nonresidential construction influenced by performance-based reach code (once implemented)	95%	95%	95%
Cumulative percentage of new nonresidential buildings eligible for performance-based reach code:	54%	54%	54%
Year performance-based reach code is first implemented	2025	2025	2025
New mixed-fuel residential buildings electrifying space heaters	20%	95%	95%
New mixed-fuel residential buildings electrifying water heaters	10%	95%	95%
New mixed-fuel residential buildings electrifying cooktops	5%	55%	65%
New mixed-fuel residential buildings electrifying clothes dryers	10%	50%	60%
New mixed-fuel nonresidential buildings electrifying cooktops	10%	40%	50%
Proportion of new residential units are in buildings of 3+ stories	14%	14%	14%
New mixed-fuel nonresidential buildings electrifying space heaters	5%	75%	95%

	2030	2045	2050
New mixed-fuel nonresidential buildings electrifying water heaters	10%	95%	95%
Percentage of nonresidential buildings covered by performance-based reach code	75%	75%	75%
Proportion of new residential buildings that are multifamily	30%	40%	50%

Performance Targets

	2030	2045	2050
Number of new performance-based reach-compliant residential units	8,120	19,190	22,890
Number of new performance-based reach-compliant commercial buildings	350	820	980
Residential HVAC conversions - City Limits	430	4,880	5,820
Residential water heater conversions - City Limits	430	4,880	5,820
Commercial HVAC conversions - City Limits	10	250	380
Commercial water heater conversions - City Limits	10	250	380
Residential HVAC conversions - EPA	30	330	390
Residential water heater conversions - EPA	40	230	270
Commercial HVAC conversions - EPA	Less than 10	Less than 10	Less than 10
Commercial water heater conversions - EPA	Less than 10	Less than 10	Less than 10

Sources

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Measure 9: Increase local renewable energy generation and the use of renewable, carbon free, and distributed energy systems, including energy storage, throughout the city.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	70	Less than 10	Less than 10
GHG reduction (MTCO2e) – EPA	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Proportion of existing residential units with solar systems installed – City limits	3%	5%	8%
Proportion of existing residential units with solar systems installed – EPA	3%	5%	8%
Existing commercial units with solar systems installed – City limits	1%	3%	5%
Existing commercial units with solar systems installed – EPA	1%	3%	5%

Performance Targets

	2030	2045	2050
Residential solar systems installed – City Limits	2,130	3,550	5,680
Residential solar systems installed – EPA	140	240	390
Commercial solar systems installed – City Limits	50	160	270
Commercial solar systems installed – EPA	Less than 10	10	20

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

Measure 10: Reduce the amount of recyclable and compostable material sent to landfills.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	6,500	10,150	10,530

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – EPA	430	670	690

Key Assumptions

	2030	2045	2050
Percentage of compostables diverted from municipal solid waste (MSW)	85%	85%	85%
Percentage of recyclables diverted from MSW	70%	85%	85%
Percentage of construction and demolition debris diverted from MSW	80%	85%	85%

Performance Targets

	2030	2045	2050
Tons of compostables diverted from MSW – City Limits	2,780	3,140	3,260
Tons of recyclables diverted from MSW – City Limits	22,220	30,400	31,550
Tons of compostables diverted from MSW – EPA	180	210	210
Tons of recyclables diverted from MSW – EPA	1,460	2,000	2,080
Tons of construction and demolition debris diverted from landfills – Combined City limits and External Planning Area	13,200	14,030	14,030

Sources

California Air Resources Board. ND. "Landfill Methane Regulation." https://ww2.arb.ca.gov/our-work/programs/landfill-methane-regulation

City of Santa Rosa. 2019. "City of Santa Rosa Zero Waste Master Plan." https://www.srcity.org/DocumentCenter/View/23532/Draft-Zero-Waste-Plan

Measure 11: Reduce total waste generation.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	1,950	3,770	4,890
GHG reduction (MTCO2e) – EPA	130	70	340

Key Assumptions

	2030	2045	2050
Percentage reduction in MSW generated	10%	20%	25%

Performance Targets

	2030	2045	2050
Tons of MSW reduced – City Limits	7,880	16,680	21,630
Tons of MSW reduced – EPA	520	1,100	1,420

Sources

California Air Resources Board. ND. "Landfill Methane Regulation." https://ww2.arb.ca.gov/our-work/programs/landfill-methane-regulation.

Measure 12: Improve indoor and outdoor water efficiency.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	Less than 10	10	10
GHG reduction (MTCO2e) – EPA	Less than 10	Less than 10	Less than 10

Key Assumptions

	2030	2045	2050
Percentage of housing units receiving WaterSmart Checkups	1%	2%	3%
Percentage of housing units receiving WaterSmart Checkups that existed in 2019	90%	79%	76%
Percentage of new development with all water-efficient landscaping (as required by the WELO)	95%	95%	95%

Performance Targets

	2030	2045	2050
Residential units receiving WaterSmart Checkups - City limits	560	1,970	2,430
Residential units built by 2019 receiving WaterSmart Checkups - City limits	500	1,560	1,840

	2030	2045	2050
Residential units built after 2019 receiving WaterSmart Checkups - City limits	60	410	590
Residential units receiving WaterSmart Checkups - EPA	40	130	170
Residential units built by 2019 receiving WaterSmart Checkups - EPA	40	100	130
Residential units built after 2019 receiving WaterSmart Checkups - EPA	Less than 10	30	40
New developments with water-efficient landscaping - City Limits	7,930	18,750	22,360
New developments with water-efficient landscaping - EPA	540	1,270	1,510

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

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Measure 14: Increase natural carbon sequestration opportunities in Santa Rosa.

GHG Savings

	2030 $MTCO_2e$	2045 $MTCO_2e$	2050 $MTCO_2e$
GHG reduction (MTCO2e) – City Limits	3,880	13,250	16,310
GHG reduction (MTCO2e) – EPA	670	2,220	2,710

Key Assumptions

	2030	2045	2050
Trees planted per year (City Limits)	100	100	100
Percentage of agricultural land with improved sequestration potential	10%	25%	30%

Performance Targets

	2030	2045	2050
Cumulative trees planted – City Limits	600	2,100	2,600
Cumulative trees planted – EPA	100	350	430

Sources

California Air Pollution Control Officers Association. 2021. "Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity." https://www.caleemod.com/documents/handbook/full_handbook.pdf

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