CHAPTER 2

Greenhouse Gas Emissions

2 GREENHOUSE GAS EMISSIONS

This chapter presents the countywide greenhouse gas (GHG) emissions inventory, forecasts, and reduction targets, which are inclusive of all six local jurisdictions within Napa County (hereinafter referred to as "Napa County Jurisdictions" when describing the collective government entities of the County of Napa, the Cities of American Canyon, Calistoga, Napa, and St. Helena, and the Town of Yountville). Additionally, it includes a brief discussion on the county's carbon stock and short-lived climate pollutants (SLCPs), which technically fall outside the scope of the GHG inventory and forecasts, but are still important to appropriately contextualize in the broader scope of this Napa County Regional Climate Action and Adaptation Plan (RCAAP).

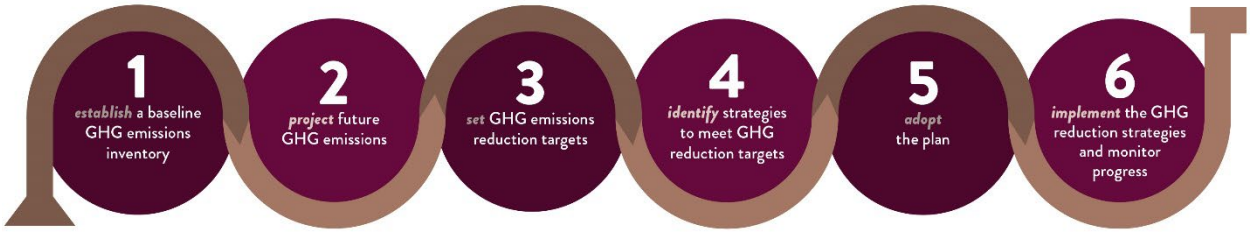
2.1 WHY PREPARE A GREENHOUSE GAS EMISSIONS INVENTORY?

The critical first step in the overall climate action planning process—specifically, the planning process for reducing GHG emissions—is to prepare a GHG emissions inventory, as shown in **Figure 2.1**. To develop and implement a climate action plan that will effectively reduce GHG emissions, local governments must first have a comprehensive understanding of the emissions generated by sources and activities within their jurisdictions. GHG emissions inventories serve to provide this knowledge and act as the basis for measuring progress and providing local governments a framework to track emissions over time and assess the effectiveness of plan implementation. The GHG inventory encompassing all the Napa County Jurisdictions is presented and discussed further in **Section 2.2**.

A GHG emissions inventory is a snapshot of the emissions associated with a jurisdiction's community-wide activities, or in the case of this RCAAP, the community-wide emissions associated with all the Napa County Jurisdictions.

The standard GHG emissions inventory in climate action planning processes estimates GHG emissions generated from sources and activities within a defined geographic boundary during a specified year. It identifies the sectors in which activities are producing these emissions and their relative contributions, while also providing a baseline for forecasting future emissions trends. This information is used to set reduction targets consistent with the State of California government (State) objectives and, ultimately, to develop, memorialize, and implement strategies and measures for reducing emissions consistent with the established targets.

Figure 2.1 Planning Process for Reducing Greenhouse Gas Emissions



Note: GHG = greenhouse gas.

Source: **Developed by Ascent in 2025**.

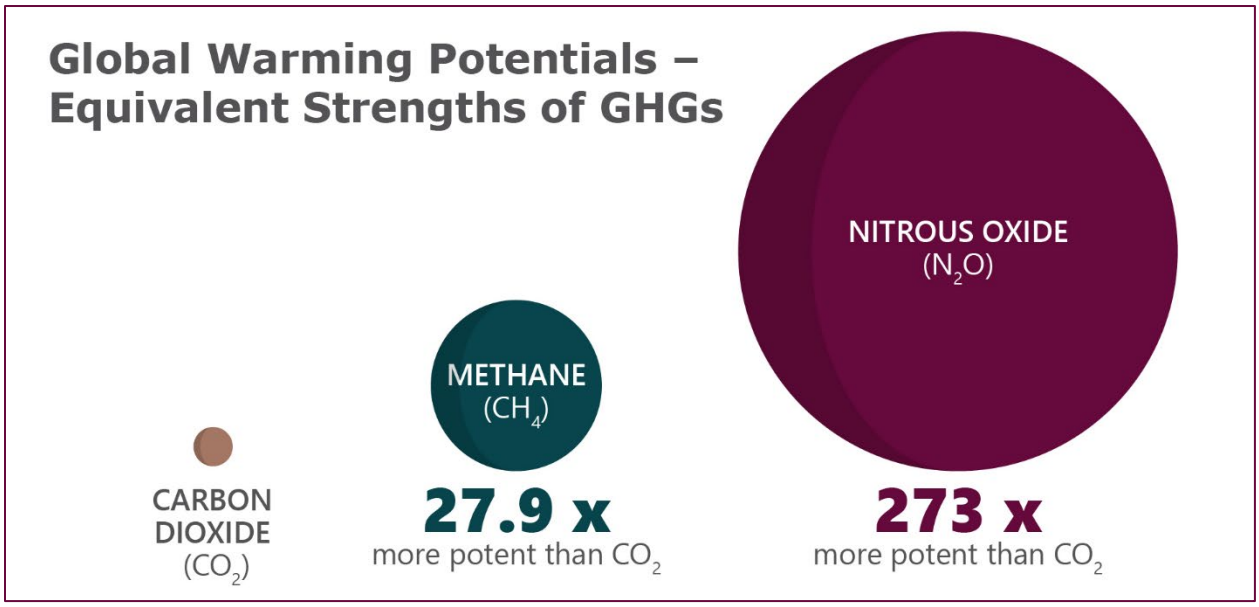
2.2 BASELINE GREENHOUSE GAS EMISSIONS INVENTORY

Generally, GHG emissions inventories identify the sources, activities, and sectors that represent emissions within a jurisdiction and the relative contributions of each. This RCAAP uses 2019 as the baseline year for its GHG inventory, which provides a snapshot of GHG emissions and may influence related policy decisions to reduce emissions. The GHG inventory was prepared in accordance with the *U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* (Community Protocol), developed by the International Council for Local Environmental Initiatives – Local Governments for Sustainability (ICLEI). The California Air Resources Board (CARB) advises local governments to utilize the Community Protocol for GHG emissions assessments and climate action planning processes. The basic calculation for estimating GHG emissions involves two primary inputs: (1) activity data; and (2) emissions factors. Activity data refer to the relevant measurement of an activity resulting in GHG emissions within the county, while emissions factors represent the amount of GHGs emitted per unit of activity. Emissions factors are applied to activity data (i.e., the two values are multiplied) to estimate GHG emissions. See **Appendix B** for more details on the methods used to prepare the GHG inventory.

The three primary GHGs included in the countywide GHG inventory are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Emissions of these gases were converted to a comparable unit by multiplying each non-CO_2 gas by its global warming potential (GWP), which enables the reporting of emissions in terms of carbon dioxide equivalent (CO_2e). For example, CH_4 has a GWP value of 27.9, meaning it is 27.9 times more potent than CO_2—which has a GWP value of one—over a 100-year period. The GWPs of each GHG are visualized in **Figure 2.2** below. This conversion allows consideration of all GHGs in comparable terms and makes it easier to communicate how various types of GHG emissions contribute to climate change. GHG emissions are reported in metric tons of CO_2e ($MTCO_2e$), the standard measurement for the amounts of GHG emissions created and released into the atmosphere, using the GWP values derived from the Intergovernmental Panel on Climate Change (IPCC) *Sixth Assessment Report*.

GWPs are used to allow comparisons of the global warming impacts of different GHGs and to allow policymakers to compare reduction opportunities across different sectors and gases—the larger the GWP, the more that a given gas warms the Earth compared to CO_2 over a given period.

Figure 2.2 Global Warming Potentials Visualization



Note: GHG = greenhouse gas; x = times.

Source: **Developed by Ascent in 2025**.

The 2019 GHG emissions inventory results, as summarized in **Table 2.1** and **Figure 2.3** below, show that total countywide emissions were 1,221,861 $MTCO_2e$. When broken down by sector, the three largest were on-road transportation, building energy, and solid waste, representing 39, 23, and 16 percent of total emissions, respectively. The four remaining sectors (i.e., off-road equipment, agriculture, wastewater, and imported water), in total, accounted for about 22

percent of countywide emissions. Comparatively, when broken down by jurisdiction, the City of Napa accounted for the largest percentage of countywide emissions at 43 percent, followed by the unincorporated county at 31 percent, American Canyon at 16 percent, and each of St. Helena, Calistoga, and Yountville at 5 percent or under.

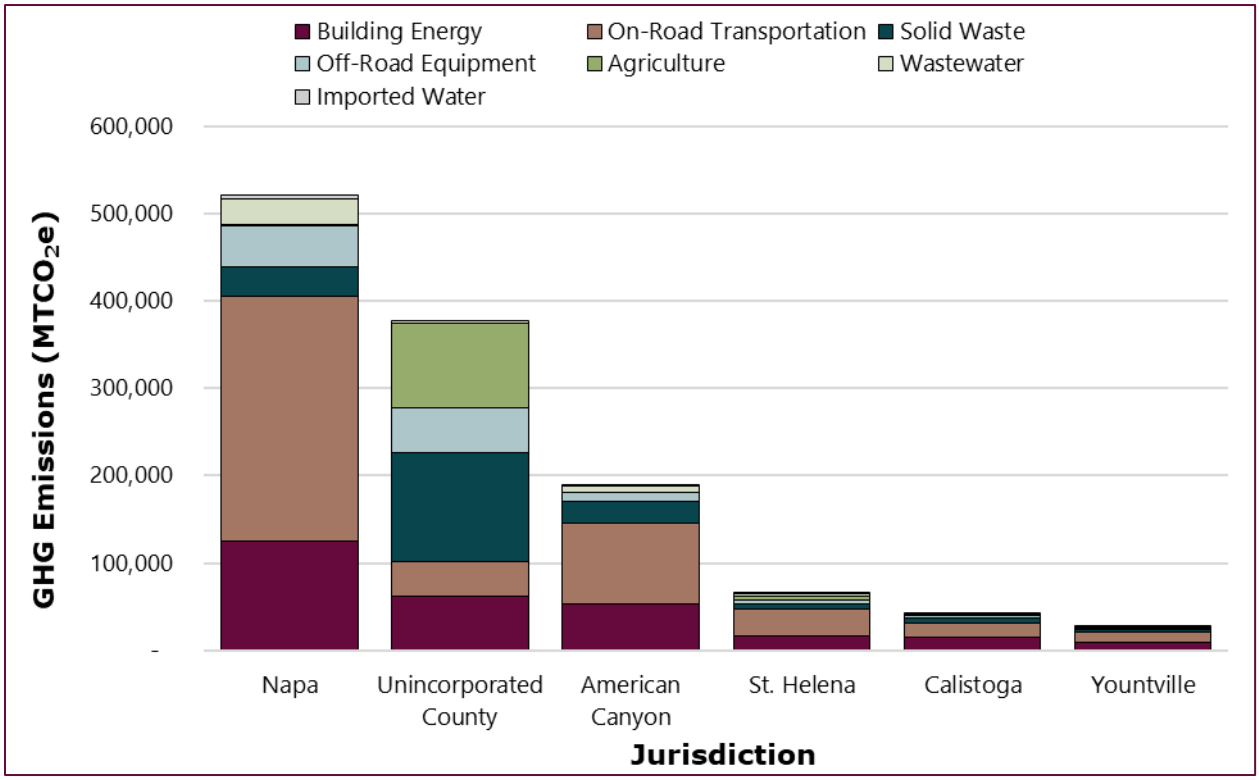
Table 2.1 Napa County Regional 2019 Greenhouse Gas Emissions Inventory by Sector and Jurisdiction

Sector or Jurisdiction	2019 GHG Emissions ($MTCO_2e$)	Percent of Total GHG Emissions
By Sector		
On-Road Transportation	472,677	39%
Building Energy	279,592	23%
Solid Waste	198,862	16%
Off-Road Equipment	115,548	9%
Agriculture	103,381	8%
Wastewater	45,858	4%
Imported Water	5,943	<1%
Total	**1,221,861**	**100%**
By Jurisdiction		
Napa	522,363	43%
Unincorporated County	377,731	31%
American Canyon	189,156	16%
St. Helena	64,575	5%
Calistoga	41,990	3%
Yountville	26,047	2%
Total	**1,221,861**	**100%**

Notes: Individual percentages displayed in this table have been rounded to the nearest whole percent and were conducted independently after all calculations were made; thus, the total sum of individual percentages may not equate exactly to 100 percent. % = percent; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: **Analysis conducted by Ascent in 2022**.

Figure 2.3 Napa County Regional 2019 Greenhouse Gas Emissions Inventory by Sector and Jurisdiction



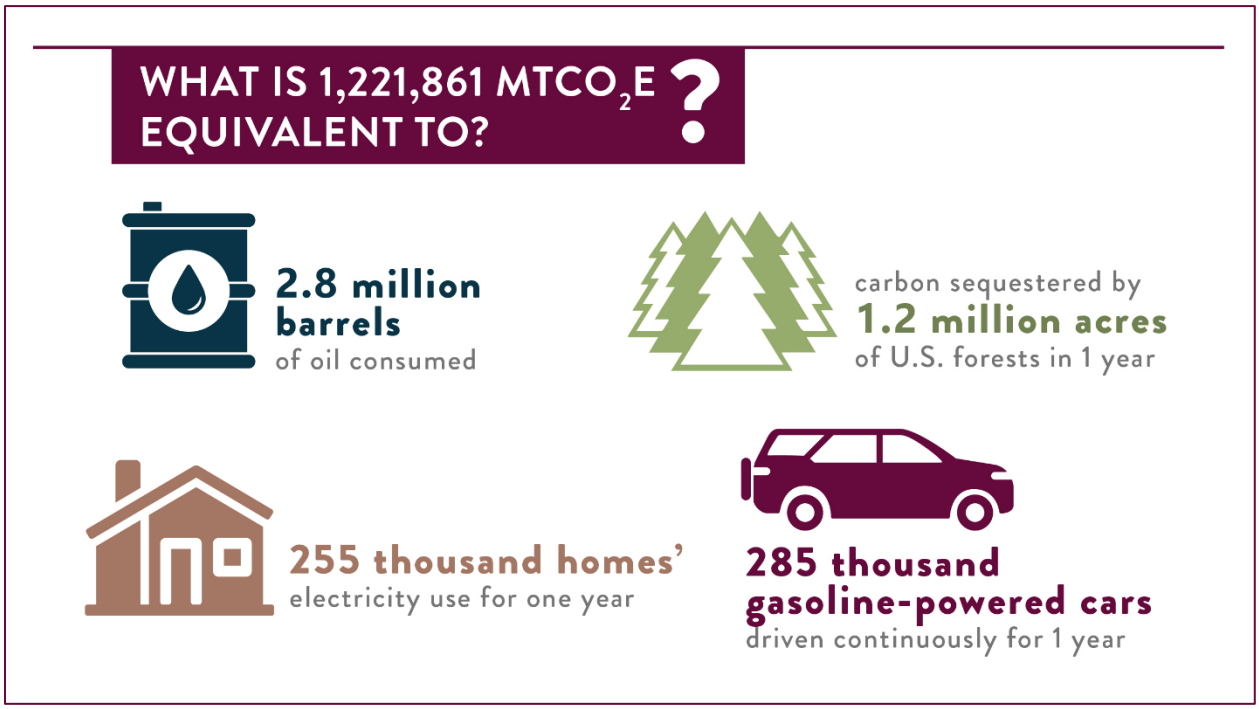
Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: **Developed by Ascent in 2025**.

Photo Credit: City of American Canyon.

As shown in **Figure 2.4** below for illustrative purposes, Napa County's total GHG emissions in 2019 of approximately 1,221,861 $MTCO_2e$ are equivalent to: (1) roughly 2,800,000 barrels of oil consumed; (2) about 255,000 homes' electricity use for one year; (3) the carbon sequestered by 1,200,000 acres of forest in one year; and (4) about 285,000 gasoline-powered cars driven continuously for one year (EPA 2024).

Figure 2.4 Greenhouse Gas Emissions Equivalencies



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

Source: **EPA 2024**; **developed by Ascent in 2025**.

Carbon Stock

Preserving and enhancing the county's carbon stock plays a critical role in mitigating climate change. Carbon stock refers to the amount of carbon stored in vegetation, soils, and other natural systems, while carbon sequestration is the process by which these systems absorb and store atmospheric CO_2 over time. Maintaining and expanding carbon stock can provide long-term climate benefits by offsetting emissions from human activities. However, due to the complexities of forecasting carbon stock changes and the current limitations in standardized GHG accounting methodologies, carbon stock and sequestration are not included in the GHG emissions inventory or forecasts presented in this chapter.

Unlike emissions from traditional GHG sectors (e.g., building energy, transportation), which follow relatively predictable trends, carbon stock and sequestration rates are highly variable and influenced by numerous dynamic factors, including land use changes, climate conditions, soil health, and vegetation growth or loss. Additionally, while GHG inventories focus on emissions generated within a specific reporting year, carbon stock changes can occur gradually over

decades, making them difficult to measure within accounting frameworks used for climate action planning. Furthermore, land-based carbon sequestration is inherently reversible; disturbances such as wildfires, land conversion, or extreme drought can release stored carbon back into the atmosphere, adding further uncertainty to long-term sequestration forecasts.

Despite these challenges, the *Regional Carbon Stock Inventory Report for Napa County*, prepared in 2023 (which can be found in **Appendix C**), provides valuable insights into the county's existing carbon stocks and sequestration potential. The report quantifies the amount of carbon stored in vegetation and soils across different land cover types, including forests, grasslands, shrublands, wetlands, and more. By understanding the distribution of stored carbon, the Napa County Jurisdictions can better identify opportunities to enhance sequestration through conservation, reforestation, regenerative agricultural practices, and improved land management. While carbon stock is not included in the RCAAP's GHG inventory, the findings from the carbon stock inventory helped inform the sequestration-related measures included in **Chapter 3**.

Photo Credit: City of Napa.

Short-Lived Climate Pollutants

Short-lived climate pollutants (SLCPs) are a group of highly potent GHGs that remain in the atmosphere for a much shorter duration than CO_2 but have a significantly higher GWP over a 20-year period. These pollutants, which include methane (CH_4), black carbon, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), also contribute to degraded air quality and associated public health risks. While SLCPs play a major contributing role to near-term climate change, most SLCPs are not included in the GHG emissions inventory or forecasts presented in this chapter due to several key factors.

First, standard GHG inventories, including those developed at the State level, are designed to align with reporting protocols that focus primarily on long-lived climate pollutants (e.g., CO_2). Apart from CH_4 (due to its well-established anthropogenic sources and inclusion in global accounting frameworks), SLCPs are not accounted for in the State's GHG reduction goals established by Senate Bill (SB) 32 or Assembly Bill (AB) 1279. Black carbon, for example, is difficult to quantify with the same level of accuracy as long-lived GHGs, as it is not a single

chemical compound but a component of fine particulate matter, making its measurement and long-term forecasting more complex. Additionally, a significant portion of black carbon emissions in Napa County originates from wildfires, which are categorized as non-anthropogenic under State and international GHG accounting methodologies. Other SLCPs, such as HFCs, PFCs, and SF_6, largely stem from industrial and commercial sources, which are often regulated at the State level rather than through local or regional climate action planning efforts. However, even though SLCPs are technically out of the scope of this RCAAP: (1) a separate technical memorandum inventorying SLCPs within the county was prepared, which can be found in **Appendix D**; and (2) several of the measures presented in **Chapter 3** and **Chapter 5** would inherently result in the reduction of SLCPs within the county.

Photo Credit: County of Napa.

2.3 GREENHOUSE GAS EMISSIONS FORECASTS

GHG emissions forecasts provide a modeled estimate of future emissions levels based on a continuation of current trends in activity, population, and job growth while also accounting for known regulatory actions by regional, State, and federal agencies (i.e., "legislative" actions) that are expected to reduce emissions in the future. Emissions forecasts provide insights into the scale of local reductions needed to achieve GHG emissions reduction targets after applying anticipated reductions from regulatory actions.

This RCAAP includes two forecast scenarios. The first scenario is a "business-as-usual" (BAU) forecast based on various scaling factors for each sector, which assumes no additional legislative or regulatory actions will occur in the future. It serves as a basis for understanding how GHG emissions levels may change with growth and how far GHG emissions will need to be reduced in future years to meet GHG reduction targets (which are discussed further in **Section 2.4**). The second scenario is a forecast with legislative reductions, where the BAU forecast is adjusted to account for the effects of regional, State, and federal regulations on forecasted emissions. Each forecast scenario estimates emissions for 2030, 2035, and 2045.

Business-As-Usual Greenhouse Gas Emissions Forecast

The BAU forecast estimates GHG emissions based on assessing how emissions generated by community activities will change over time without federal, State, regional, or local action. The BAU forecast considers projected population, housing, and job growth changes within the county. Based on 2019 GHG emissions levels (i.e., 1,221,861 $MTCO_2e$), the BAU forecast (as shown in **Table 2.2**) estimates annual GHG emissions in the county to increase slightly to 1,277,959 $MTCO_2e$ by 2030, 1,263,720 $MTCO_2e$ by 2035, and 1,265,143 $MTCO_2e$ by 2045. In other words, if all activities in the county continued as usual without any additional governmental interventions, GHG emissions would increase over time, compared to 2019 baseline emissions.

Table 2.2 Napa County Regional Business-As-Usual Greenhouse Gas Emissions Forecast by Sector for 2030, 2035, and 2045

Sector	2019 GHG Emissions ($MTCO_2e$)	2030 GHG Emissions ($MTCO_2e$)	2035 GHG Emissions ($MTCO_2e$)	2045 GHG Emissions ($MTCO_2e$)
GHG Emissions ($MTCO_2e$)				
On-Road Transportation	472,677	450,387	438,275	430,763
Building Energy	279,592	326,969	324,880	327,387
Solid Waste	198,862	217,407	215,942	216,139
Off-Road Equipment	115,548	118,539	118,318	119,557
Agriculture	103,381	105,244	106,690	109,538
Wastewater	45,858	52,621	52,772	54,585
Imported Water	5,943	6,793	6,845	7,174
Total	**1,221,861**	**1,277,959**	**1,263,720**	**1,265,143**
Percent Change from 2019				
On-Road Transportation	N/A	-5%	-7%	-9%
Building Energy	N/A	+17%	+16%	+17%
Solid Waste	N/A	+9%	+9%	+9%

Sector	2019 GHG Emissions ($MTCO_2e$)	2030 GHG Emissions ($MTCO_2e$)	2035 GHG Emissions ($MTCO_2e$)	2045 GHG Emissions ($MTCO_2e$)
Off-Road Equipment	N/A	+3%	+2%	+3%
Agriculture	N/A	+2%	+3%	+6%
Wastewater	N/A	+15%	+15%	+19%
Imported Water	N/A	+14%	+15%	+21%
Total	**N/A**	**+5%**	**+3%**	**+4%**

Notes: Individual percentages displayed in this table have been rounded to the nearest whole percent and were conducted independently after all calculations were made. / % = percent; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; N/A = not applicable.

Source: **Analysis conducted by Ascent in 2024**.

Greenhouse Gas Emissions Forecast with Legislative Reductions

The forecast with legislative reductions evaluates how countywide GHG emissions would change over time, accounting for legislative and regulatory actions at the regional, State, and federal levels, such as requirements to increase vehicle fuel efficiency. This forecast provides the Napa County Jurisdictions with the information needed to focus efforts on specific emissions sectors and sources with the most GHG reduction opportunities. **Table 2.3** includes the regional, State, and federal regulations that will result in quantifiable GHG emissions reductions for this RCAAP's forecast years of 2030, 2035, and 2045. Further details on these federal and State regulations can be found in **Appendix E**.

Table 2.3 Regional, State, and Federal Regulations Applied as Legislative Reductions

Laws or Regulations[1]	Description	Applicable Sector
Regional		
MCE Power Procurements	MCE aims to continue procuring 95 percent of its energy from GHG-free sources.	Building Energy
Bay Area Air District Zero NOx Appliance Rule	Prohibits the sale and installation of NOx-emitting water heaters by 2027, furnaces by 2029, and large commercial water heaters by 2031 in the Bay Area Air District's jurisdiction. Currently, the only technology available to meet these rules is electric.	Building Energy
State		
California's Building Energy Efficiency Standards	Requires all new buildings in California to comply with energy efficiency standards established by the CEC. Accounts for the energy efficiency gains associated with lighting, heating, cooling, ventilation, and water heating improvements, as well as onsite solar photovoltaic requirements for low-rise residential.	Building Energy

Laws or Regulations[1]	Description	Applicable Sector
Renewables Portfolio Standard	Requires California energy utilities to procure 60 percent of electricity from renewable sources by 2030 and 100 percent carbon-free electricity by 2045.	Building Energy
SB 1020: Clean Energy, Jobs, and Affordability Act	Requires that 90 percent of retail electricity be procured from zero-carbon sources by 2035 and 100 percent renewable electricity be procured to serve all State agencies by December 31, 2035. This also affects water imported from DWR.	Imported Water
AB 1346: Small Off-Road Engines	Prohibits exhaust or evaporative emissions from new small off-road engines produced on or after January 1, 2024. It also requires CARB to fund commercial rebates or similar incentives through local air districts.	Off-Road Equipment
Advanced Clean Car Regulations	Establishes GHG emission reduction standards for model years 2017-2025 that are more stringent than federal CAFE standards.	On-Road Transportation
Advanced Clean Cars II Regulations	Assumes 100 percent of new light-duty vehicles would be ZEV or PHEV by model year 2035. Requirements begin at a 35 percent ZEV or PHEV for the 2026 model year.	On-Road Transportation
Advanced Clean Fleets (ACF) Regulation[2]	Establishes zero-emissions targets for heavy-duty vehicles in fleets operating in California.	On-Road Transportation
Truck and Bus Regulation	Requires diesel trucks and buses that operate in California to be upgraded to reduce GHG emissions.	On-Road Transportation
Federal		
Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles	Establishes fuel efficiency standards for medium- and heavy-duty engines and vehicles.	On-Road Transportation
EPA Off-Road Compression Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Equipment

Notes: SB 1383, described previously in Table 1.3 in Chapter 1, is anticipated to reduce emissions of methane from the solid waste sector by requiring local jurisdictions to separately collect organic waste statewide by 2022. However, waste collection services in the region have already begun to collect organics separately. Because of the bill's reliance on local compliance, the impact of SB 1383 is excluded from the legislative-adjusted BAU forecasts for the region. See Appendix E for further details. / AB = Assembly Bill; ACF = Advanced Clean Fleets; CAFE = Corporate Average Fuel Economy; CARB = California Air Resources Board; CEC = California Energy Commission; DWR = California Department of Water Resources; EPA = United States Environmental Protection Agency; GHG = greenhouse gas; MCE = Marin Clean Energy; NOx = nitrogen oxide; PHEV = plug-in hybrid electric vehicle; SB = Senate Bill; State = State of California government; ZEV = zero-emission vehicle.

[1] The U.S. Congress voted in Spring 2025 to limit California's authority to regulate vehicle emissions under existing programs provided through a waiver of the Clean Air Act. As of June 2025, the State of California is challenging the legality of Congress' action, and given the pending litigation, it is assumed CARB will continue to enforce these programs for the purpose of the legislative-adjusted forecasts in the RCAAP.

[2] As of June 2025, CARB is evaluating next steps regarding the ACF Regulation and is not enforcing the existing portions of the ACF Regulation that require a federal waiver or authorization, such as the portions of the ACF Regulation that apply to high priority and drayage fleets. However, not all elements of the ACF Regulation require a federal waiver or authorization and the State and local government fleets portion of the ACF Regulation remains unaffected.

Source: **Compiled by Ascent in 2025**.

The adjusted forecast after applying these legislative reductions from regional, State, and federal regulations (as shown in **Table 2.3**) can be found in **Table 2.4** and **Figure 2.5** below. As shown, the forecast with legislative reductions results in much lower emissions estimates for 2030, 2035, and 2045 compared to the BAU forecast. For comparison, BAU emissions for 2030, 2035, and 2045 all fall between 1,200,000 and 1,300,000 $MTCO_2e$, while the forecast with legislative reductions estimates emissions for the same years at 898,904, 747,956, and 547,378 $MTCO_2e$, respectively.

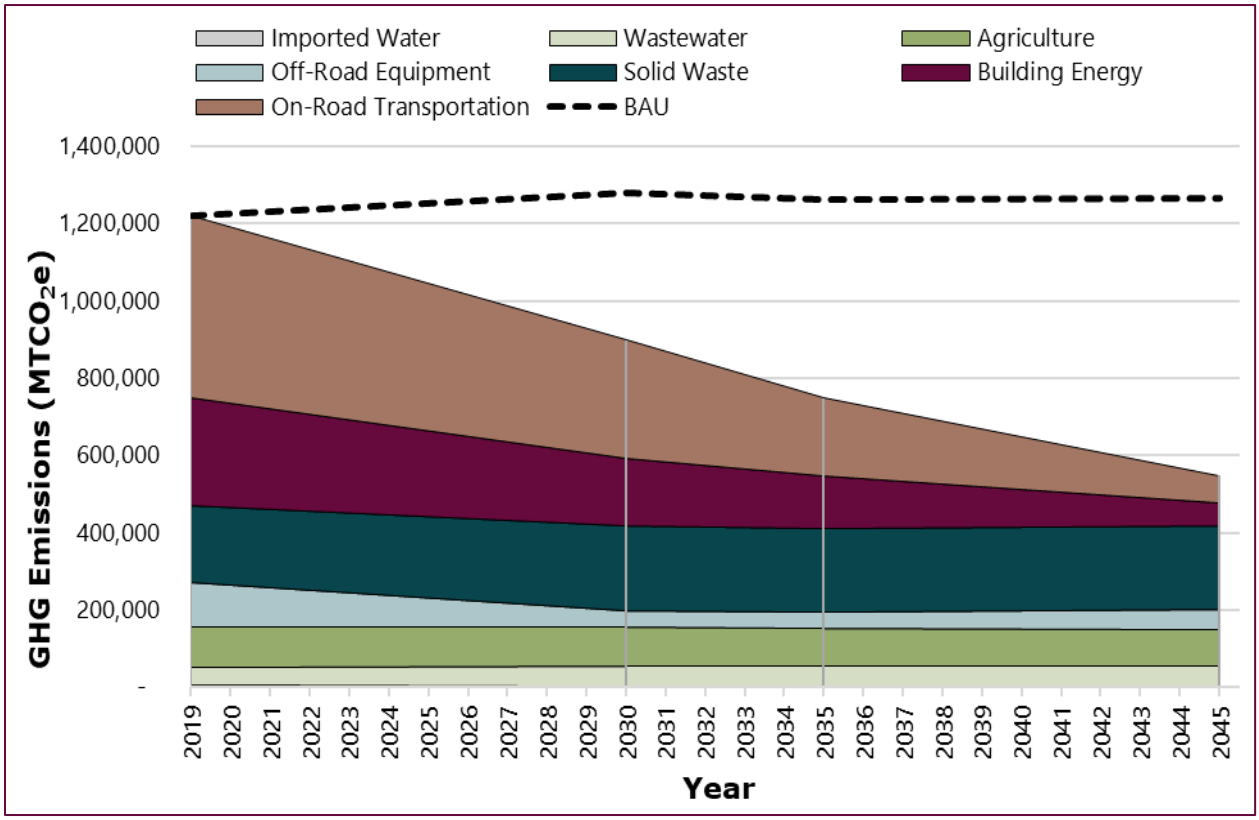
Table 2.4 Napa County Regional Greenhouse Gas Emissions Forecast with Legislative Reductions by Sector for 2030, 2035, and 2045

Sector	2019 GHG Emissions ($MTCO_2e$)	2030 GHG Emissions ($MTCO_2e$)	2035 GHG Emissions ($MTCO_2e$)	2045 GHG Emissions ($MTCO_2e$)
GHG Emissions ($MTCO_2e$)				
On-Road Transportation	472,677	307,817	201,923	71,157
Building Energy	279,592	174,638	134,828	59,733
Solid Waste	198,862	217,407	215,942	216,139
Off-Road Equipment	115,548	43,886	43,767	49,694
Agriculture	103,381	99,240	98,018	96,070
Wastewater	45,858	52,621	52,772	54,585
Imported Water	5,943	3,296	707	0
Total	**1,221,861**	**898,904**	**747,956**	**547,378**
Percent Change from 2019				
On-Road Transportation	N/A	-35%	-57%	-85%
Building Energy	N/A	-38%	-52%	-79%
Solid Waste	N/A	+9%	+9%	+9%
Off-Road Equipment	N/A	-62%	-62%	-57%
Agriculture	N/A	-4%	-5%	-7%
Wastewater	N/A	+15%	+15%	+19%
Imported Water	N/A	-45%	-88%	-100%
Total	**N/A**	**-26%**	**-39%**	**-55%**

Notes: Individual percentages displayed in this table have been rounded to the nearest whole percent and were conducted independently after all calculations were made. / % = percent; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; N/A = not applicable.

Source: **Analysis conducted by Ascent in 2024**.

Figure 2.5 Napa County Regional Greenhouse Gas Emissions Forecast with Legislative Reductions by Sector through 2045



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

Source: **Developed by Ascent in 2025**.

2.4 GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

A core component of this RCAAP is establishing GHG reduction targets to determine the reductions needed from the GHG reduction measures prepared for this plan, which are detailed in **Chapter 3**. The RCAAP targets were developed to align with the statewide GHG reduction targets established by SB 32 and AB 1279. As directed in SB 32 and AB 1279, the State aims to reduce annual GHG emissions to:

- **40 percent below 1990 levels by 2030**, and
- **85 percent below 1990 levels by 2045**, with net-zero emissions achieved through CO_2 removal.

While State legislative targets are based on 1990 statewide GHG emissions levels, the Napa County Jurisdictions do not have a countywide inventory from the year 1990 and must apply the 2019 inventory prepared for this RCAAP to 1990 levels using statewide GHG emissions data. As such, and consistent with the State's targets, the Napa County Jurisdictions aim to reduce annual countywide GHG emissions to:

- **42 percent below 2019 levels by 2030** (aligned with SB 32); and
- **85 percent below 2019 levels by 2045** (aligned with AB 1279), with a goal of carbon neutrality that would be achieved primarily through natural carbon sequestration.

See **Appendix F** for further explanations of how these locally specific targets were established. These targets, along with the reductions needed to achieve the targets, are detailed further in **Table 2.5** below. Two scenarios are presented in the table related to the 2045 target year, one without carbon neutrality and one with carbon neutrality. The scenario without carbon neutrality shows the reductions that would be needed to reduce countywide GHG emissions to 85 percent below 2019 levels by 2045. In contrast, the scenario with carbon neutrality shows the net reductions that would be needed to achieve net-zero GHG emissions by 2045. The Napa County Jurisdictions will need to undertake additional efforts to close the "gap" in reductions that are still needed to achieve its targets, and these additional efforts come in the form of the GHG reduction strategies, measures, and actions presented in **Chapter 3**.

The RCAAP's GHG emissions reduction targets are aligned with the State's targets, despite being based on different baseline years.

Photo Credit: City of American Canyon.

Table 2.5 Napa County Regional Greenhouse Gas Emissions Reduction Targets for 2030, 2035, and 2045

Analysis	2030	2035	2045
Without Carbon Neutrality by 2045:			
Total Forecasted GHG Emissions with Legislative Reductions ($MTCO_2e$)	898,904	747,956	547,378
Target GHG Emissions Levels ($MTCO_2e$)	709,685	520,547	178,836
Target GHG Emissions Levels Below 2019 Levels	42%	57%	85%
Total Reductions Needed to Meet Target ($MTCO_2e$)	**189,219**	**227,410**	**368,542**
With Carbon Neutrality by 2045:			
Total Forecasted GHG Emissions with Legislative Reductions ($MTCO_2e$)	898,904	747,956	547,378
Goal Net-GHG Emissions Levels ($MTCO_2e$)	709,685	520,547	0
Goal Net-GHG Emissions Levels Below 2019 Levels	42%	57%	100%
Total Net Reductions Needed to Meet Goal ($MTCO_2e$)	**189,219**	**227,410**	**547,378**

Notes: % = percent; GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: **Analysis conducted by Ascent in 2024**.