Memo

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Date: March 29, 2022

To: Stefan Heisler and Darcy Goulart (City of Rancho Cordova)

From: Alyssa Way, Andrew Martin, and Honey Walters (Ascent Environmental)

Subject: City of Rancho Cordova Climate Action Plan, Greenhouse Gas Emissions Forecasts and Reduction Targets – Technical Memorandum

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INTRODUCTION

In 2009, the County of Sacramento prepared a baseline inventory for the unincorporated county and the incorporated cities, including specifically a 2005 baseline year inventory for the City of Rancho Cordova (City). The Sacramento Area Council of Governments (SACOG) 2020 Metropolitan Transportation Plan / Sustainable Communities Strategy (MTP/SCS) Draft Environmental Impact Report included a greenhouse gas (GHG) emissions inventory and forecast for 2016, 2030, 2040, and 2050 that included the City. Though the City was considered in both efforts, an updated communitywide GHG emissions inventory using the latest methodologies with a more recent 2019 baseline year has been prepared for the City's Climate Action Plan (CAP). The next step in this update process is to forecast these GHG emissions for the 2030 target year and 2045 goal. This technical memorandum provides the results of these forecasts as well as associated methods, assumptions, emissions factors, and data sources.

The GHG emissions forecasts will provide a foundation for the forthcoming steps of the CAP development process, including the development of GHG emissions reduction targets and identification of measures the City can take to reduce GHG emissions from activities and sources located in Rancho Cordova.

ORGANIZATION OF THIS MEMORANDUM

This memorandum consists of two main parts:

- Section 1: Summary of Inventory Results presents an overview of the updated GHG emissions inventory (baseline 2019).

- Section 2: Emissions Forecasts summarizes the forecasted GHG emissions under "business-as-usual" (BAU) and legislative-adjusted BAU scenarios for years 2030 and 2045. A BAU scenario is one in which no GHG reductions from actions taken by local, regional, State, or federal agencies are included. A legislative-adjusted BAU scenario reflects GHG reductions from legislative or regulatory actions enacted by regional, State, and federal agencies, without considering any local (City) actions to reduce GHG emissions.

1 SUMMARY OF INVENTORY RESULTS

1.1 2019 COMMUNITY INVENTORY RESULTS

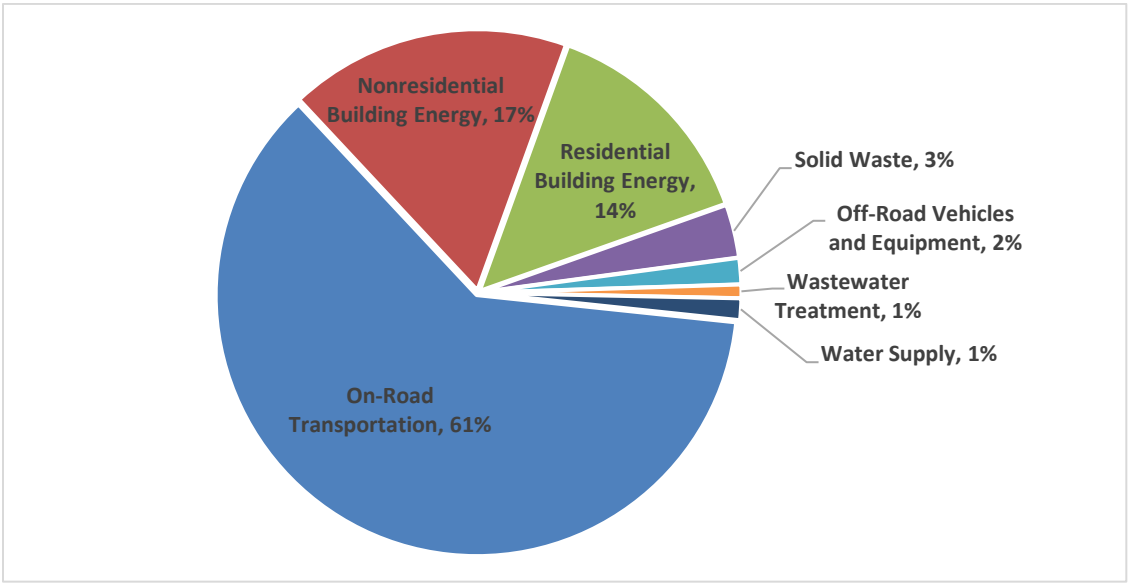
Based on the modeling conducted, community activities in 2019 generated approximately 679,706 metric tons of carbon dioxide equivalent ($MTCO_2e$). Major emissions sectors included on-road transportation, residential and nonresidential building energy use, solid waste, water use, and wastewater generation. Table 1 and Figure 1 present the city's 2019 GHG emissions inventory by sector. A description of each emissions sector, including key sources of emissions, is provided in the Inventory Technical Memorandum, dated March 29, 2022.

Table 1 2019 City of Rancho Cordova Community Greenhouse Gas Emissions Inventory

Sectors	$MTCO_2e$/year	Percent of Total
On-Road Transportation	417,145	61%
Nonresidential Building Energy	118,801	17%
Residential Building Energy	95,575	14%
Solid Waste	22,397	3%
Off-Road Vehicles and Equipment	11,027	2%
Water Supply	9,071	1%
Wastewater Treatment	5,690	1%
Total	**679,706**	**100%**

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

Source: Ascent Environmental 2022



Source: Ascent Environmental 2022

Figure 1 2019 City of Rancho Cordova Community Greenhouse Gas Emissions Inventory

2 GREENHOUSE GAS EMISSIONS FORECASTS TO 2030

2.1 COMMUNITY FORECAST RESULTS

The BAU GHG emissions forecasts provide an assessment of how emissions generated by community activities will change over time without further local, State, or federal action. In addition to accounting for the city's growth under a BAU scenario, an adjusted BAU forecast was prepared, which includes adopted legislative and regulatory actions at the State and federal levels that would affect emissions without any local action, such as regulatory requirements to increase vehicle fuel efficiency and increase renewable energy sources in grid electricity portfolios. It is important to note that the legislative-adjusted BAU emissions forecasts only include emissions reductions associated with implementation of adopted federal and State legislation and regulations and do not include goals established by executive orders or targets established by federal or State agencies outside of adopted legislation and regulations. These forecasts provide the City with the information needed to focus efforts on emissions sectors and sources that have the greatest opportunities for GHG emissions reductions.

The BAU forecasts described in this section for 2030 and 2045 are aligned with the following State GHG reduction target and goal years established in key legislation and policies, including Senate Bill (SB) 32 and Executive Order (EO) B-55-18. The long-term goal of 2045 was chosen to better align with newer State GHG goal such as the statewide carbon neutrality, rather than the previously issued 2050 goal of 80 percent reduction from 1990 levels as directed in EO S-3-05. The statewide GHG reduction target and goal are:

- reduce Statewide emissions to 40 percent below 1990 levels by 2030 (Senate Bill [SB] 32); and
- achieve carbon neutrality Statewide no later than 2045 (Executive Order [EO] B-55-18).

Estimated BAU emissions forecasts were based on population and employment from the SACOG Growth Forecast for the 2020 Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS). The SACOG Growth Forecast provides population and employment for 2016 and 2040. These values were interpolated and extrapolated to identify values for 2019, 2030, and 2045. Population and employment are expected to increase by 62 and 36 percent from 2019 to 2045, respectively. These growth factors were used to forecast BAU emissions for most sectors. Additional information regarding the growth factors used for each sector is included in the following sections. Fehr & Peers provided annual vehicle miles traveled (VMT) projections for the years 2027, 2035, and 2040 based on origin-destination data provided by SACOG. Based on these data, annual VMT was interpolated for year 2030 and projected out for 2045. Annual VMT by 2045 is projected to increase by 42 percent from 2019. VMT projections were used to scale emissions from the on-road transportation sector. Table 2 shows projections growth in the city from 2019 to 2045.

Table 2 Rancho Cordova Demographic and Vehicle Miles Traveled Projections

Forecast Factor	2019	2030	2045
Population	77,579	102,122	125,427
Employment	61,991	73,604	84,213
Annual VMT	919,218,798	1,071,357,646	1,307,495,381

Notes: VMT = vehicle miles traveled.

Source: SACOG Growth Forecast for the 2020 MTP/SCS; Fehr & Peers; adapted by Ascent Environmental in 2022.

Table 3 shows baseline emissions in 2019 and a BAU emissions forecast for 2030, and 2045.

Table 3 2019 Rancho Cordova Greenhouse Gas Emissions Inventory and BAU Forecast ($MTCO_2e$/year)

Sector	2019	2030	2045
On-Road Transportation	417,145	486,187	593,347
Nonresidential Building Energy	118,801	141,055	161,388
Residential Building Energy	95,575	125,811	154,521
Solid Waste	22,397	29,483	36,211
Off-Road Vehicles and Equipment	11,027	14,772	18,488
Water Supply	9,071	11,940	14,665
Wastewater Treatment	5,690	7,490	9,200
Total	**679,706**	**816,738**	**987,820**

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecast prepared by Ascent Environmental in 2022.

Legislative-adjusted BAU emissions forecasts were prepared using the same demographic and VMT data that were used for the BAU forecasts, while accounting for regional, State, and federal legislative actions that would affect local emissions. These forecasts provide the City with a more robust understanding to assist with the prioritization of emissions reduction measures developed to meet the GHG targets. A summary of the legislative reductions applied is provided in Table 4.

Table 4 Legislative Reductions Summary

Source	Legislative Reduction	Description	Sectors Applied
Regional	2030 Zero Carbon Plan	Establishes a target for SMUD to supply 100 percent renewable electricity by 2030.	Residential and Nonresidential Building Energy, Water Supply
State	California's Building Energy Efficiency Standards (2019 Title 24, Part 6)	Requires all new buildings in California to comply with energy efficiency standards established by 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.	Residential and Nonresidential Building Energy
State	Advanced Clean Car I Standards	Establishes GHG emission reduction standards for model years 2017 through 2025 that are more stringent than federal CAFE standards.	On-Road Transportation
State	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
Federal	EPA Off-Road Compression-Ignition Engine Standards	Establishes standards for phasing of EPA diesel engine tiers for off-road compression-ignition equipment.	Off-Road Vehicles and Equipment

Notes: CAFE = Corporate Average Fuel Economy; CEC = California Energy Commission; EPA = U.S. Environmental Protection Agency; GHG = greenhouse gas; SMUD = Sacramento Municipal Utility District

Source: Forecasts prepared by Ascent Environmental in 2022.

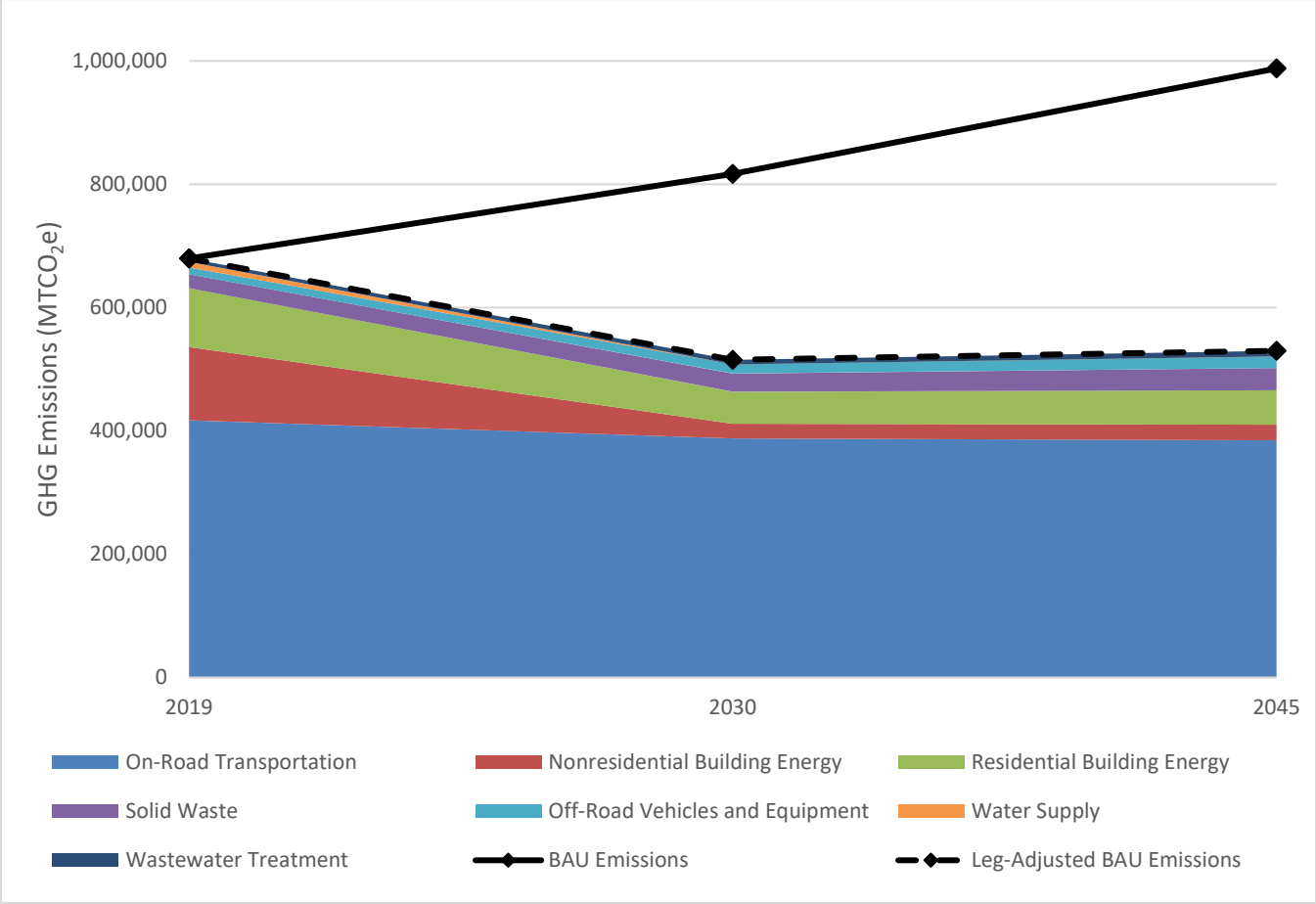
The city's legislative-adjusted BAU emissions would decrease by approximately 22 percent between 2019 and 2045, as shown below in Table 5 and Figure 2. Figure 2 also shows the emissions trend that would occur without anticipated legislative reductions, accounting only for population, employment, and annual VMT increases. Without the legislative reductions (the BAU forecast), emissions would be 86 percent higher in 2045 compared to the legislative-adjusted BAU forecast. Emissions forecasts are detailed for each sector and discussed below beginning with Section 2.1.1.

Table 5 2019 Rancho Cordova Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Sector	2019	2030	2045
On-Road Transportation	417,145	387,784	384,651
Nonresidential Building Energy	118,801	23,605	25,335
Residential Building Energy	95,575	52,217	55,903
Solid Waste	22,397	29,483	36,211
Off-Road Vehicles and Equipment	11,027	14,772	18,488
Water Supply	9,071	0	0
Wastewater Treatment	5,690	7,490	9,200
Total	**679,706**	**515,352**	**529,788**

Notes: Total may not sum exactly due to independent rounding. BAU = business-as-usual; MTCO2e/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.



Source: Ascent Environmental 2022

Figure 2 2019 Rancho Cordova Greenhouse Gas Emissions Inventory with BAU and Legislative-Adjusted BAU Forecasts

2.1.1 Building Energy

Emissions from future electricity, natural gas, and backup generator use for buildings were estimated by multiplying anticipated energy use with forecasted emissions factors. Future energy use was forecasted in three parts. First, energy use was scaled by population and employment growth factors detailed in Table 2. Second, electricity emissions factors were adjusted to reflect the Sacramento Metropolitan Utility District's (SMUD) 2030 Zero Carbon Plan of 100 percent by 2030. Electricity emissions factors are anticipated to decline based on current regulations, while natural gas and diesel emissions factors are anticipated to be constant. Third, energy intensity factors were adjusted to reflect increased stringency under California's Building Energy Efficiency Standards (California Code of Regulations Title 24 Part 6, hereafter referred to as "Title 24"). The 2019 Title 24 standards, which became effective in 2020, are expected to achieve decreases in electricity consumption in new construction. The assumptions for energy efficiency and future electricity emissions factors are described below. Table 6 summarizes the scaling factors and legislative reductions used to forecast building use by energy type.

Table 6 Building Energy Emissions Forecast Methods and Legislative Reductions by Source

Energy Type	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Electricity	Scaled by population growth for residential building energy; scaled by employment growth for nonresidential building energy.	Scheduled targets (i.e., 100 percent renewable by 2030) applied to SMUD's emissions factors. Accounts for Title 24 energy efficiency gains in new construction based on the best available data for average building energy efficiency.
Natural Gas		
Backup Generators	Scaled by employment growth for nonresidential building energy.	Accounts for Title 24 energy efficiency gains in new nonresidential construction.

Notes: SMUD = Sacramento Metropolitan Utility District.

Source: Forecasts prepared by Ascent Environmental in 2022.

RESIDENTIAL BUILDING ENERGY

Between 2019 and 2045, electricity and natural gas emissions from residential buildings would decrease by approximately 42 percent from 95,575 to 55,903 $MTCO_2e$ per year with legislative adjustments and overall population growth of 62 percent over the same time. While GHG emissions associated with residential electricity usage are anticipated to decline through 2045 and reflect SMUD's goal for zero carbon electricity by 2030, emissions from residential natural gas consumption are expected to rise gradually. This increase is due to population growth in the city and reflects adopted legislation. Table 7 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the residential building energy sector by energy type for 2030 and2045.

Table 7 2019 Residential Building Energy Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Emissions Forecasts ($MTCO_2e$/year)

Energy Type	2019	2030	2045
Electricity	47,238	0	0
Natural Gas	48,336	52,217	55,903
Total	**95,575**	**52,217**	**55,903**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.

NONRESIDENTIAL BUILDING ENERGY

Between 2019 and 2045, electricity, natural gas, and back-up generator emissions from nonresidential buildings would decrease by 79 percent from 118,801 to 25,335 $MTCO_2e$ per year with legislative adjustments and overall employment growth of 36 percent over the same time. GHG emissions associated with nonresidential electricity usage are anticipated to decline through 2045 and reflect SMUD's carbon neutrality goals and emissions from nonresidential natural gas consumption and backup generators are expected to rise gradually. Table 8 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions for the nonresidential building energy sector by energy type for 2030 and 2045.

Table 8 2019 Nonresidential Building Energy Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Energy Type	2019	2030	2045
Electricity	97,089	0	0
Natural Gas	20,769	22,580	24,235
Backup Generators	943	1,025	1,101
Total	**118,801**	**23,605**	**25,335**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.

Electricity Emissions Factors

Electricity emissions from the building sector are anticipated to decrease to zero by 2030 and beyond without additional City action, despite growth, due to State and regional measures already in place that affect the carbon intensity of grid electricity. SMUD's emissions factor for CO_2 in 2019 was provided by SMUD. Electricity emissions factors for methane (CH_4) and nitrous oxide (N_2O) were obtained from the U.S. Environmental Protection Agency's (EPA's) Emissions & Generation Resource Integrated Database (eGRID) 2018 Annual Output Emissions Rates (EPA 2020).

California utility providers, including SMUD, were scheduled to reach a 33 percent renewable electricity generation mix in 2020 and, pursuant to SB 100, are scheduled to achieve 60 percent renewable electricity by 2030 and 100 percent carbon-free electricity by 2045. However, SMUD's is scheduled to achieve 100 percent renewable by 2030 under the utility's carbon neutrality goal. SMUD's 2019 emissions factors is 232.1 grams of CO_2 per kilowatt hour (g CO_2/kWh). The carbon-free electricity requirement results in a 2030 and 2045 emissions factor of zero g CO_2/kWh. CH_4 and N_2O electricity emissions factors in future years are assumed to follow the same trends as the CO_2 emissions factors.

Natural Gas Emissions Factors

Natural gas emissions are based on emissions factors obtained from The Climate Registry's (TCR's) 2020 Default Emission Factors, which are estimated to be 5,306 pounds of carbon dioxide equivalent per therm (g CO_2e/therm) for stationary combustion in buildings. Emissions factors associated with natural gas combustion are not anticipated to change over time, as there are no legislative actions that would reduce the energy intensity of natural gas.

Diesel Emissions Factors

Emissions from diesel fuel used to power backup generators are based on emissions factors from TCR, which are estimated to be 10,210 grams of carbon dioxide equivalent per gallon (g CO_2e/gal). Emissions factors associated with diesel combustion are not anticipated to change over time, as there are no legislative actions that would reduce the energy intensity of diesel.

Energy Efficiency

Title 24 standards apply to both new construction and existing buildings. The 2019 Title 24 standards went into effect January 2020. The California Energy Commission (CEC) estimates that new residential buildings built to the 2019 standards are 53 percent more efficient than residential buildings built to the previous standards (CEC 2018). CEC estimates that new nonresidential buildings built to the 2019 standards are 30 percent more efficient than nonresidential buildings built to the previous standards (CEC 2018).

In addition to the current iteration of Title 24, previous versions of the standards have also achieved energy efficiencies for residential and nonresidential buildings. Energy efficiency savings have been quantified by CEC and the collective effect of Title 24 was accounted for in the forecasted emissions. Based on these data, the analysis assumes that all new residential construction occurring between 2020 and 2045 would be 75 percent more energy efficient than buildings constructed under previous Title 24 standards, and nonresidential construction would be 53 percent more energy efficient compared to buildings constructed under previous Title 24 standards. This includes the energy efficiencies gained through the 2008, 2013, 2016, and 2019 versions of Title 24. Additional efficiencies to be achieved in future code cycles are yet unknown and therefore not factored into the forecast.

2.1.2 Transportation

ON-ROAD TRANSPORTATION

Between 2019 and 2045, annual legislative-adjusted BAU GHG emissions from on-road vehicles would decrease by approximately 8 percent from 417,147 to 384,651 $MTCO_2e$ per year based on future vehicle emission factors modeled in the California Air Resources Board's (CARB's) Emission Factor (EMFAC) 2017 model, despite an increase in VMT of 42 percent. VMT projections were provided by Fehr & Peers based on origin-destination data from SACOG. With respect to the legislative adjustments included in this forecast, State and federal regulations incorporated in the on-road vehicle sector include the Advanced Clean Car I (ACC) Standards, and fuel efficiency standards for medium- and heavy-duty vehicles. These standards are included in EMFAC2021's emissions factor estimates and forecasts. It should be noted that the Low Carbon Fuel Standard was excluded in EMFAC2021 forecasts because the emissions benefits originate from upstream fuel production and do not directly reduce vehicle tailpipe emissions that affect the city's GHG emissions forecasts. Table 9 summarizes the scaling factor and legislative reductions used to forecast on-road transportation emissions.

Table 9 On-Road Transportation Forecast Methods and Legislative Reductions

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
On-Road Vehicles	Scaled by VMT estimates provided by Fehr & Peers.	EMFAC2021 forecasts vehicle fleet distributions by vehicle type and the emissions factors anticipated for each vehicle category based on both vehicle emissions testing and approved legislative reductions. EMFAC2021's forecasts incorporate the effects of the ACC I Standards, and fuel efficiency standards for medium- and heavy-duty vehicles, as well as truck and bus regulations.

Notes: ACC I = Advanced Clean Cars I; CAFE = Corporate Average Fuel Economy; EMFAC2021 = California Air Resources Board's EMisson FACtor 2021 model.

Source: Forecasts prepared by Ascent Environmental in 2022.

Table 10 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from on-road transportation for 2030 and 2045.

Table 10 2019 On-Road Transportation Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

EMFAC Vehicle Category	EMFAC Vehicle Category Description	2019	2030	2045
LDA	Passenger Cars	148,453	132,269	142,439

LDT2	Light-Duty Trucks (GVWR <6000 lb)	78,535	73,483	80,220
MDV	Medium-Duty Trucks (GVWR 5751-8500 lb)	65,206	60,725	65,244
LDT1	Light-Duty Trucks (GVWR <6000 lb)	17,554	17,356	18,083
LHD1	Light-Heavy-Duty Trucks (GVWR 8501- 10000 lbs)	29,056	28,522	19,887
T7 Trucks	Heavy-Heavy Duty Trucks	38,318	36,057	31,532
T6 Trucks	Medium-Heavy Duty Trucks	23,818	23,123	14,868
LHD2	Light-Heavy-Duty Trucks (GVWR 10001- 14000 lb)	7,083	7,041	5,053
MCY	Motorcycles	891	987	1,161
MH	Motor Homes	1,826	2,033	2,440
UBUS	Urban Buses	1,597	1,384	7
OBUS	Other Buses	1,515	1,516	915
SBUS	School Buses	897	935	667
All Other Buses	All Other Buses	749	743	849
PTO	Power Take Off	1,138	1,051	658
Motor Coach	Motor Coach	511	561	630
Total	-	**417,145**	**387,784**	**384,651**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.

OFF-ROAD VEHICLES AND EQUIPMENT

Between 2019 and 2045, emissions associated with off-road vehicles and equipment used in the city would increase by 69 percent from 12,470 to 21,074 $MTCO_2e$ per year, with legislative adjustments applied and overall growth in various demographics. Emissions were obtained from CARB's OFFROAD2007 and OFFROAD2021 models. With respect to the legislative adjustments in the off-road vehicle sector, CARB's latest off-road emissions model, OFFROAD2021, was used, which incorporates regulatory actions such as reformulated fuels and more stringent emission standards. However, some off-road vehicle and equipment sources that are included in the OFFROAD2007 model are excluded from OFFROAD2021. For these sectors, emissions were obtained from OFFROAD2007. In addition, OFFROAD2021 provides CO_2 emissions but does not provide emissions from CH_4 and N_2O. Ratios of CH_4 and N_2O to CO_2 reported in OFFROAD2007 were calculated and applied to CO_2 data from OFFROAD2021 to calculate CH_4 and N_2O emissions, as recommended by CARB.

Sacramento County-level emissions from off-road vehicles and equipment were scaled using changes in city-specific demographic factors. Table 11 summarizes the scaling factors and legislative reductions used to forecast off-road vehicle and equipment emissions.

Table 11 Off-Road Vehicles and Equipment Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Construction and Mining Equipment	Service Population	OFFROAD2007 and OFFROAD2021 emission factor considerations include EPA off-road
Entertainment Equipment	Employment	

Industrial Equipment	Employment	compression-ignition engine standards implementation schedule.
Lawn and Garden Equipment	Population	
Light Commercial Equipment	Employment	
Portable Equipment	Employment	
Recreational Equipment	Population	
Transportation Refrigeration Units	Service Population	

Notes: EPA = U.S. Environmental Protection Agency; OFFROAD2007 = California Air Resources Board's OFFROAD2007 model; OFFROAD2021 = California Air Resources Board's OFFROAD2021 model.

Source: Forecasts prepared by Ascent Environmental in 2022.

Table 12 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the off-road vehicles and equipment sector for 2030 and 2045.

Table 12 2019 Off-Road Vehicles and Equipment Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Source	2019	2030	2045
Construction and Mining Equipment	5,350	7,500	9,675
Entertainment Equipment	54	67	80
Industrial Equipment	1,426	1,787	2,129
Lawn and Garden Equipment	138	211	287
Light Commercial Equipment	839	1,052	1,253
Portable Equipment	2,478	3,105	3,699
Recreational Equipment	81	123	168
Transportation Refrigeration Units	661	927	1,196
Total	**11,027**	**14,772**	**18,488**

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.

2.1.3 Solid Waste

Between 2019 and 2045, solid waste emissions generated from community activities in the city would increase by approximately 62 percent from 22,397 to 36,211 $MTCO_2e$, due to overall population growth of approximately 62 percent over the same period. Solid waste sector emissions include CH_4 emissions from the decay of waste generated annually, which were scaled by population growth within the city between 2019 and 2045. There are no applicable legislative reductions to apply to this sector and future disposal rates, so legislative-adjusted BAU emissions are equivalent to BAU emissions. Table 13 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the solid waste sector for 2030 and 2045.

Table 13 2019 Solid Waste Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Source	2019	2030	2045
Community-Generated Solid Waste	22,397	29,483	36,211

Notes: Totals may not sum exactly due to independent rounding. BAU = business-as-usual; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Source: Forecasts prepared by Ascent Environmental in 2022.

2.1.4 Water Supply

Between 2019 and 2045, water supply emissions from community activities in the city would be reduced to zero by 2030 onward due to SMUD's 2030 Zero Carbon Plan.

Table 14 summarizes the scaling factor and legislative reduction used to forecast water supply emissions.

Table 14 Water Supply Forecast Methods and Legislative Reductions by Source

Source	Forecast Methods	
	Scale Factor	Applied Legislative Reductions
Water Consumption	Scaled by population growth.	Assumes electricity use for extraction, conveyance, distribution, and treatment follow the 2030 utility goal carbon-free electricity requirements.

Source: Forecasts prepared by Ascent Environmental in 2022.

Table 15 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from the water supply sector for 2030 and 2045.

Table 15 2019 Water Supply Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Source	2019	2030	2045
Water Supply	9,070	0	0

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

Source: Forecasts prepared by Ascent Environmental in 2022.

2.1.5 Wastewater Treatment

Between 2019 and 2045, wastewater treatment emissions from the community would increase by 62 percent from 5,690 to 9,200 $MTCO_2e$ per year, accounting for overall population growth of 62 percent over the same time. Wastewater treatment-related emissions are generated from centralized wastewater treatment plants (WWTPs). Table 16 shows the 2019 inventory and legislative-adjusted BAU forecasted emissions from wastewater treatment sources for 2030 and 2045.

Table 16 2019 Wastewater Treatment Greenhouse Gas Emissions Inventory and Legislative-Adjusted BAU Forecasts ($MTCO_2e$/year)

Source	2019	2030	2045
Centralized WWTPs	5,690	7,490	9,200

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

Source: Forecasts prepared by Ascent Environmental in 2022.

2.1.6 Discussion

As discussed above, the community legislative-adjusted BAU emissions would decrease by 22 percent between 2019 and 2045. This is a result of reductions that would be achieved from several regional, State, and federal legislative actions including:

- a greater renewable mix in local electricity supply (100 percent by 2030);
- improved building energy efficiency through compliance with Title 24 standards (75 percent energy reduction for residential, 53 percent for nonresidential); and
- reductions in on-road vehicle emissions factors forecasted in EMFAC2021 and off-road vehicle and equipment emissions factors forecasted in OFFROAD2021.

From 2030 to 2045, new legislative actions that would affect emissions are anticipated to be adopted by State and federal agencies; however, because information regarding these regulatory changes is currently unavailable or not final, emissions reductions from future potential legislative actions are not quantified in this memorandum. Without future legislative actions and despite growth in the city, emissions would decline from 2019 through 2045. Additional reductions could occur in the future due to State and/or federal actions requiring improvements in vehicle and equipment fuel economy and increased share of electric vehicle and equipment options, which would be reflected in future updates to the EMFAC2021 and OFFROAD2021 models. Other previous legislative actions would also continue to apply in the future and ultimately outpace growth in population and employment. Where new State regulations or programs are imminent and reasonably foreseeable, they can be incorporated as complementary actions to locally based GHG reduction measures.

3 REDUCTION TARGETS

3.1 STATEWIDE GREENHOUSE GAS REDUCTION TARGETS AND GOALS

As directed in Assembly Bill (AB) 32, SB 32, and EO B-55-18, the State aims to reduce annual GHG emissions to:

- 1990 levels by 2020;
- 40 percent below 1990 levels by 2030; and
- carbon neutrality by 2045.

Signed in 2018, EO B-55-18 established a new statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve net negative emissions thereafter. The carbon neutrality goal is separate from and complementary to existing statewide targets and goals for reducing GHG emissions. EO B-55-18 is the first California executive order or legislative action to explicitly mention the use of carbon sequestration to achieve GHG reduction targets and goals; therefore, it is distinct from other State reduction targets and goals and does not compete or conflict with existing policies.

The City aims to reduce community emissions in proportion to the State's targets and goals. Community emissions levels from 1990 are not available, which is the case for most local jurisdictions in California. Thus, community GHG reduction targets for the City's CAP were developed relative to the 2019 community emissions inventory, consistent

with guidance provided by CARB. The methodology used to calculate the City's emissions reduction targets is described below.

3.2 COMMUNITY GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Based on a review of the 2017 Scoping Plan and an understanding of activities occurring within the city, the City has direct or indirect jurisdiction over activities that generate emissions and contribute to reductions in four of the eight emissions sectors included in the 2017 Scoping Plan: residential and commercial, electric power, recycling and waste, and transportation. The City has limited influence over high GWP gases, and industrial activities in the city are limited. Lastly, while facilities regulated under Cap-and-Trade do exist within city boundaries, the State is responsible for achieving emissions reductions from these sources, and the City has limited ability to influence Cap-and-Trade facilities' GHG emissions. Therefore, by excluding these sectors under this approach, community GHG reduction targets have been established in proportion with statewide reductions for all sectors relevant to City jurisdiction to the extent feasible using available data. This target setting approach is consistent with the California Supreme Court decision in *Center for Biological Diversity v. California Department of Fish and Wildlife and Newhall Land and Farming (2015) 62 Cal.4th 204*, which determined that the approach of assessing a project's consistency with statewide emissions reduction goals must include a "reasoned explanation based on substantial evidence" that links the project's emission to the statewide GHG reduction goals.

The first step in determining community targets under this approach is to compare the State's GHG inventories for 1990 and 2019 (i.e., the City's baseline inventory year) for the four relevant sectors. According to the inventories available from CARB, statewide emissions from the relevant sectors were approximately 431 million $MTCO_2e$ ($MMTCO_2e$) in 1990 and 418 $MMTCO_2e$ in 2019 (CARB 2021) (note: sector-specific emissions totals and reductions reported in the 2017 Scoping Plan reflect rounding). Thus, 2019 statewide emissions were approximately 13 $MMTCO_2e$ (3 percent) lower than the 1990 level and the State's 2020 GHG target (i.e., reduce emissions to 1990 levels by 2020).

According to the 2017 Scoping Plan, statewide emissions from sectors relevant to the City's inventory must be reduced to 311 $MMTCO_2e$ by 2020 for the State to achieve its 2020 target. CARB's statewide inventory reports 2019 emissions levels of 278 $MMTCO_2e$ for these sectors, which demonstrates achievement of the 2020 target.

According to the 2017 Scoping Plan, statewide emissions from the sectors relevant to the City's inventory must be reduced to 179 $MMTCO_2e$ by 2030 for the State to achieve its 2030 goal. This represents an emissions reduction of approximately 99 $MMTCO_2e$, or 36 percent, by 2030, relative to 2019 levels of 278 $MMTCO_2e$. Consistent with the State's goal under EO B-55-18, the City aims to achieve carbon neutrality by 2045. Consistent with State targets and goals and considering relevant emissions sectors, the City's community GHG reduction targets are as follows:

- 2030 target: 36 percent below 2019 levels (438,283 $MTCO_2e$); and
- 2045 target: carbon neutrality (0 $MTCO_2e$).

Table 17 shows how the City's targets were derived based on adjusted statewide GHG emissions data and projections and summarizes the City's legislative-adjusted BAU forecasts and targets for 2030 and 2045.

Table 17 Rancho Cordova GHG Emissions Reduction Targets and Legislative-Adjusted BAU Summary

Source	2019	2030	2045
2017 Scoping Plan Emissions Limit ($MMTCO_2e$)	NA	259	NA
Adjusted 2017 Scoping Plan Emissions Limit[1] ($MMTCO_2e$)	NA	179	NA
Statewide Target Percent Reduction from 2019 Levels	NA	36%	100%
Baseline Emissions and Legislative-Adjusted BAU Forecast ($MTCO_2e$)	679,706	515,352	529,788
Target Percent Reduction Below Baseline (%)	NA	36%	100%
Target Annual Emissions ($MTCO_2e$)	NA	438,283	0
Reduction Needed to Meet Target ($MTCO_2e$)	NA	77,070	529,788

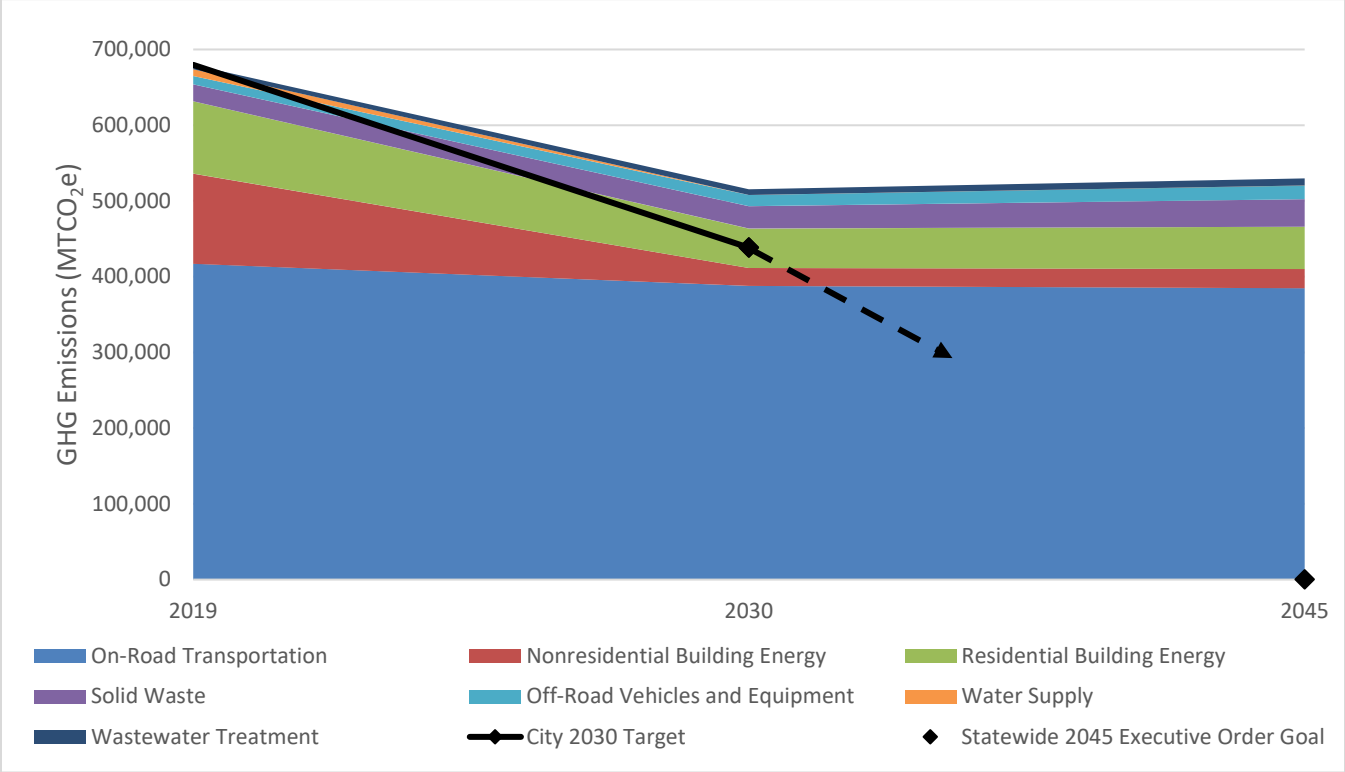
Notes: BAU = business-as-usual; GHG = greenhouse gases; $MTCO_2e$ = metric tons of carbon dioxide equivalent; $MMTCO_2e$ = million metric tons of carbon dioxide equivalent; NA = not available; 2017 Scoping Plan = California's 2017 Climate Change Scoping Plan.

[1] Excludes agriculture, high GWP, industrial, and cap-and-trade sectors because they are not relevant to the City's inventory.

Source: CARB 2017; Ascent Environmental 2022.

Figure 3 below depicts the 2019 baseline and legislative-adjusted BAU GHG emissions forecasts by sector, as distinguished by the colored wedges. The sum of the wedges represents the anticipated annual GHG emissions each year. Each wedge shows how an emissions sector is expected to contribute to the community-wide GHG inventory over time. The black line indicates the City's GHG reduction target for 2030 and 2045 relative to the City's 2019 GHG inventory, consistent with guidance provided by CARB.

The City's 2030 GHG reduction target would be 36 percent below 2019 levels (438,283 $MTCO_2e$), and carbon neutral by 2045. The space between the trajectory of the black line and the top of the colored wedges represents the "gap" in emissions that will need to be addressed through local actions for the City to meet its future GHG reduction targets. These emissions reductions are in addition to anticipated reductions provided by legislative actions at the State and federal levels. Supporting information and detailed calculation results are included in Attachment A.



Source: Ascent Environmental 2022

Figure 3 Rancho Cordova Legislative-Adjusted Business-as-Usual Forecast Emissions by Sector and 2030 Emission Reduction Target and 2045 Emission Reduction Goal

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