

4.8 Greenhouse Gas Emissions

This section analyzes the greenhouse gas (GHG) impacts that could result from implementation of the project, which consists of the 2021 General Plan Update (GPU), Housing Element Update, and Climate Action Plan (CAP). The analysis area covers the city of Moreno Valley (city) and sphere of influence (SOI), which are collectively referred to as the Planning Area. The analysis in this section is based on statewide GHG emissions reduction goals and the GHG inventory and projections conducted in preparation of the CAP.

4.8.1 Existing Conditions

4.8.1.1 Greenhouse Gases and Climate Change

There are numerous GHGs, both naturally occurring and manmade. Each GHG has variable atmospheric lifetime and global warming potential (GWP). The atmospheric lifetime of the gas is the average time a molecule stays stable in the atmosphere. Most GHGs have long atmospheric lifetimes, staying in the atmosphere hundreds or thousands of years. GWP is a measure of the potential for a gas to trap heat and warm the atmosphere. Although GWP is related to its atmospheric lifetime, many other factors including chemical reactivity of the gas also influence GWP. GWP is reported as a unitless factor representing the potential for the gas to affect global climate relative to the potential of carbon dioxide (CO₂). Because CO₂ is the reference gas for establishing GWP, by definition its GWP is 1. Although methane (CH₄) has a shorter atmospheric lifetime than CO₂, it has a 100-year GWP of 28; this means that CH₄ has 28 times more effect on global warming than CO₂ on a molecule-by-molecule basis.

GHG emissions estimates are typically represented in terms of equivalent metric tons of CO₂ (MT CO₂E). CO₂E emissions are the product of the amount of each gas by its GWP. The effects of several GHGs may be discussed in terms of MT CO₂E and can be summed to represent the total potential of these gases to warm the global climate. Table 4.8-1 summarizes some of the most common GHGs. All of the gases in Table 4.8-1 are produced by both biogenic (natural) and anthropogenic (human) sources. The GHGs of primary concern in this analysis are CO₂, CH₄, and N₂O.

Table 4.8-1 Global Warming Potentials and Atmospheric Lifetimes (years)			
Gas	Atmospheric Lifetime (years)	100-year GWP	20-year GWP
Carbon dioxide (CO ₂)	50–200	1	1
Methane (CH ₄)	12.4	28	84
Nitrous oxide (N ₂ O)	121	265	264
HFC-23	222	12,400	10,800
HFC-32	5.2	677	2,430
HFC-125	28.2	3,170	6,090
HFC-134a	13.4	1,300	3,710
HFC-143a	47.1	4,800	6,940
HFC-152a	1.5	138	506
HFC-227ea	38.9	3,350	5,360
HFC-236fa	242	8,060	6,940
HFC-43-10mee	16.1	1,650	4,310
CF ₄	50,000	6,630	4,880
C ₂ F ₆	10,000	11,100	8,210
C ₃ F ₈	2,600	8,900	6,640
C ₄ F ₁₀	2,600	9,200	6,870
c-C ₄ F ₈	3,200	9,540	7,110
C ₅ F ₁₂	4,100	8,550	6,350
C ₆ F ₁₄	3,100	7,910	5,890
SF ₆	3,200	23,500	17,500
SOURCE: Intergovernmental Panel on Climate Change (IPCC) 2007, 2014. GWP = growth warming potential			

4.8.1.2 GHG Inventories

a. State

The California Air Resources Board (CARB) performs statewide GHG inventories. The inventory is divided into the following sectors of economic activity: electricity generation, transportation, industrial, commercial, residential, agriculture and forestry. Emissions are quantified in million metric tons (MMT) of CO₂E. Table 4.8-2 shows the estimated statewide GHG emissions for the years 1990, 2010, and 2018.

Sector	1990 ¹ Emissions in MMT CO ₂ E (% total) ²	2010 ³ Emissions in MMT CO ₂ E (% total) ²	2018 ³ Emissions in MMT CO ₂ E (% total) ²
Electricity Generation	110.5 (25.7%)	90.5 (20.2%)	63.3 (14.9%)
Transportation	150.6 (35.0%)	170.2 (38.0%)	173.8 (40.9%)
Industrial	105.3 (24.4%)	101.6 (22.7%)	101.3 (23.8%)
Commercial	14.4 (3.4%)	20.1 (4.5%)	23.9 (5.6%)
Residential	29.7 (6.9%)	32.1 (7.2%)	30.5 (7.2%)
Agriculture & Forestry	18.9 (4.4%)	33.7 (7.5%)	32.6 (7.7%)
Not Specified	1.3 (0.3%)	--	--
Total⁴	430.7	448.2	425.3

SOURCE: CARB 2007 and 2020.

¹1990 data was obtained from the CARB 2007 source and are based on IPCC fourth assessment report GWPs.

²Percentages may not total 100 due to rounding.

³2010 and 2018 data was retrieved from the CARB 2020 source and are based on IPCC fourth assessment report GWPs.

⁴Totals may vary due to independent rounding.

As shown in Table 4.8-2, statewide GHG source emissions totaled about 431 MMT CO₂E in 1990, 448 MMT CO₂E in 2010, and 425 MMT CO₂E in 2018. Many factors affect year-to-year changes in GHG emissions, including economic activity, demographic influences, environmental conditions such as drought, and the impact of regulatory efforts to control GHG emissions. However, transportation-related emissions consistently contribute the most GHG emissions, followed by electricity generation and industrial emissions.

b. Regional

In September 2014, the Western Riverside Council of Governments (WRCOG) adopted the *Subregional Climate Action Plan* (WRCOG 2014). The plan inventoried existing emissions within western Riverside County and outlines measures to reduce future emissions. The communitywide GHG emissions were calculated using the International Council for Local Environmental Initiatives (ICLEI) U.S. Community Protocol. The results of the community inventory for 2010 are summarized in Table 4.8-3. Similar to the statewide emissions, transportation-related GHG emissions contributed the most countywide, followed by emissions associated with energy use.

Source	2010 Baseline Emissions	
	MT CO ₂ E	%
Transportation	3,317,387	56.9%
Commercial/Industrial Energy	1,226,479	21.0%
Residential Energy	1,167,843	20.0%
Waste	112,161	1.9%
Wastewater	10,531	0.2%
TOTAL INVENTORY	5,834,400	-
SOURCE: WCROG 2014.		

c. Local

A 2018 GHG emissions inventory was conducted in conjunction with preparation of the CAP. The inventory covers GHG emissions from ten sectors within the boundaries of the Planning Area. The results are summarized in Table 4.8-4.

Source	2018 Baseline Emissions	
	MT CO ₂ E	%
Transportation	483,063	55.8%
Industrial	19,589	2.3%
Residential	206,790	23.9%
Commercial	100,766	11.6%
Off-Road Equipment	37,784	4.4%
Solid Waste	7,737	0.9%
Wastewater	4,395	0.5%
Water Distribution	2,129	0.2%
Public Services and Lighting	2,219	0.3%
Agriculture	1,938	0.2%
Total	848,513	
SOURCE: Dyett & Bhatia 2021.		

4.8.2 Applicable Regulatory Requirements

In response to rising concern associated with increasing GHG emissions and global climate change impacts, several plans and regulations have been adopted at the international, national, and state levels with the aim of reducing GHG emissions. The following is a discussion of the federal, state, and local plans and regulations most applicable to the project.

4.8.2.1 Federal Regulations

The federal government, U.S. Environmental Protection Agency (USEPA), and other federal agencies have many federal level programs and projects to reduce GHG emissions. In June 2012, the Council on Environmental Quality (CEQ) revised the Federal Greenhouse Gas Accounting and Reporting Guidance originally issued in October 2010. The CEQ guidance

identifies ways in which federal agencies can improve consideration of GHG emissions and climate change for federal actions. The guidance states that National Environmental Policy Act documents should provide decision makers with relevant and timely information and should consider (1) GHG emissions of a Proposed Action and alternative actions and (2) the relationship of climate change effects to a Proposed Action or alternatives. Specifically, if a Proposed Action would be reasonably anticipated to cause direct emissions of 25,000 MT CO₂E GHG emissions on an annual basis, agencies should consider this as an indicator that a quantitative assessment may be meaningful to decision makers and the public (CEQ 2012).

a. U.S. Environmental Protection Agency

In 2009, the USEPA issued its science-based finding that the buildup of heat-trapping GHGs in the atmosphere endangers public health and welfare. The “Endangerment Finding” reflects the overwhelming scientific evidence on the causes and impacts of climate change. It was made after a thorough rulemaking process considering thousands of public comments, and was upheld by the federal courts.

The USEPA has many federal level programs and projects to reduce GHG emissions. The USEPA provides technical expertise and encourages voluntary reductions from the private sector. One of the voluntary programs applicable to the project is the Energy Star program. Energy Star products such as appliances, building products, heating and cooling equipment, and other energy-efficient equipment would be utilized by the project.

Energy Star is a joint program of USEPA and the U.S. Department of Energy, which promotes energy-efficient products and practices. Tools and initiatives include the Energy Star Portfolio Manager, which helps track and assess energy and water consumption across an entire portfolio of buildings, and the Energy Star Most Efficient 2020, which provides information on exceptional products which represent the leading edge in energy-efficient products in the year 2020 (USEPA 2021a).

The USEPA also collaborates with the public sector, including states, tribes, localities and resource managers, to encourage smart growth, sustainability preparation, and renewable energy and climate change preparation. These initiatives include the Clean Energy – Environment State Partnership Program, the Climate Ready Water Utilities Initiative, the Climate Ready Estuaries Program, and the Sustainable Communities Partnership (USEPA 2021b).

b. Corporate Average Fuel Economy Standards

The project would generate vehicle trips that would consume fuel and generate GHG emissions. The federal Corporate Average Fuel Economy (CAFE) standards determine the fuel efficiency of certain vehicle classes in the U.S. The first phase of the program applied to passenger cars, new light-duty trucks, and medium-duty passenger cars with model years 2012 through 2016, and required these vehicles to achieve a standard equivalent to 35.5 miles per gallon (mpg). The second phase of the program applies to model years 2017 through 2025 and increased the standards to 54.5 mpg. Separate standards were also established for medium- and heavy-duty vehicles. The first phase applied to model years 2014 through 2018

and the second phase applies to model years 2018 through 2027. With improved gas mileage, fewer gallons of transportation fuel would be combusted to travel the same distance, thereby reducing nationwide GHG emissions associated with vehicle travel.

4.8.2.2 State Regulations

a. Statewide GHG Emission Targets

S-3-05—Statewide GHG Emission Targets

This executive order (EO) establishes the following GHG emissions reduction targets for the state of California:

- by 2010, reduce GHG emissions to 2000 levels;
- by 2020, reduce GHG emissions to 1990 levels; and
- by 2050, reduce GHG emissions to 80 percent below 1990 levels.

This EO also directs the secretary of the California Environmental Protection Agency to oversee the efforts made to reach these targets, and to prepare biannual reports on the progress made toward meeting the targets and on the impacts to California related to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. With regard to impacts, the report shall also prepare and report on mitigation and adaptation plans to combat the impacts. The first Climate Action Team Assessment Report was produced in March 2006, and has since been updated every two years.

B-30-15—2030 Statewide GHG Emission Goal

This EO, issued on April 29, 2015, establishes an interim GHG emission reduction goal for the state of California by 2030 of 40 percent below 1990 levels. This EO also directed all state agencies with jurisdiction over GHG emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05. Additionally, this EO directed CARB to update its Climate Change Scoping Plan to address the 2030 goal.

b. Assembly Bill 32—California Global Warming Solutions Act of 2006

In response to EO S-3-05, the California Legislature passed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, and thereby enacted Sections 38500–38599 of the California Health and Safety Code. The heart of AB 32 is its requirement that CARB establish an emissions cap and adopt rules and regulations that would reduce GHG emissions to 1990 levels by 2020. AB 32 also required CARB to adopt a plan by January 1, 2009, indicating how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions.

c. Senate Bill 32—California Global Warming Solutions Act Update

Approved in September 2016, Senate Bill (SB) 32 updates the California Global Warming Solutions Act of 2006 and enacts EO B-30-15. Under SB 32, the state would reduce its GHG emissions to 40 percent below 1990 levels by 2030. This is equivalent to an emissions level of approximately 260 MMT CO₂E for 2030. In implementing the 40 percent reduction goal, CARB is required to prioritize emissions reductions to consider the social costs of the emissions of GHGs; where “social costs” is defined as “an estimate of the economic damages, including, but not limited to, changes in net agricultural productivity; impacts to public health; climate adaptation impacts, such as property damages from increased flood risk; and changes in energy system costs, per metric ton of greenhouse gas emission per year.”

d. Climate Change Scoping Plan

As directed by the California Global Warming Solutions Act of 2006, CARB adopted the *Climate Change Scoping Plan: A Framework for Change (Scoping Plan)* in 2008, which identifies the main strategies California will implement to achieve the GHG reductions necessary to reduce forecasted business as usual (BAU) emissions in 2020 to the state’s historic 1990 emissions level (CARB 2008). In November 2017, CARB released the 2017 Climate Change Scoping Plan Update, the Strategy for Achieving California’s 2030 Greenhouse Gas Target (2017 Scoping Plan; CARB 2017). The 2017 Scoping Plan identifies state strategies for achieving the state’s 2030 interim GHG emissions reduction target codified by SB 32. Measures under the 2017 Scoping Plan Scenario build on existing programs such as the Low Carbon Fuel Standard, Advanced Clean Cars Program, Renewables Portfolio Standard (RPS), Sustainable Communities Strategy (SCS), Short-Lived Climate Pollutant Reduction Strategy, and the Cap-and-Trade Program. Additionally, the 2017 Scoping Plan proposes new policies to address GHG emissions from natural and working lands.

e. Regional Emissions Targets – SB 375

SB 375, the 2008 Sustainable Communities and Climate Protection Act, was signed into law in September 2008 and requires CARB to set regional targets for reducing passenger vehicle GHG emissions in accordance with the Scoping Plan. The purpose of SB 375 is to align regional transportation planning efforts, regional GHG reduction targets, and fair-share housing allocations under state housing law. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt an SCS or Alternative Planning Strategy to address GHG reduction targets from cars and light-duty trucks in the context of that MPO’s Regional Transportation Plan (RTP). Southern California Association of Governments (SCAG) is the region’s MPO. In 2018, CARB set targets for the SCAG region of an 8 percent reduction in GHG emissions per capita from automobiles and light-duty trucks compared to 2005 levels by 2020 and a 19 percent reduction by 2035. These targets are periodically reviewed and updated.

f. Renewables Portfolio Standard

The RPS promotes diversification of the state's electricity supply and decreased reliance on fossil fuel energy sources. Renewable energy includes (but is not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas. Originally adopted in 2002 with a goal to achieve a 20 percent renewable energy mix by 2020 (referred to as the "Initial RPS"), the goal has been accelerated and increased by EOs S-14-08 and S-21-09 to a goal of 33 percent by 2020. In April 2011, SB 2 (1X) codified California's 33 percent RPS goal. SB 350 (2015) increased California's renewable energy mix goal to 50 percent by year 2030. SB 100 (2018) further increased the standard set by SB 350 establishing the RPS goal of 44 percent by the end of 2024, 52 percent by the end of 2027, and 60 percent by 2030.

g. California Building Standards Code (Title 24)

The California Code of Regulations (CCR), Title 24, is referred to as the California Building Code (CBC). It consists of a compilation of several distinct standards and codes related to building construction including, plumbing, electrical, interior acoustics, energy efficiency, handicap accessibility and so on. Of particular relevance to GHG emissions reductions are the CBC's energy efficiency and green building standards as outlined below.

Title 24, Part 6 – Energy Code

The California Code of Regulations, Title 24, Part 6 is the California Energy Efficiency Standards for Residential and Nonresidential Buildings (also known as the California Energy Code). This code, originally enacted in 1978, establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy consumption. The Energy Code is updated periodically to incorporate and consider new energy-efficient technologies and methodologies as they become available, and incentives in the form of rebates and tax breaks are provided on a sliding scale for buildings achieving energy efficiency above the minimum standards.

The current version of the Energy Code, known as 2019 Title 24, or the 2019 Energy Code, became effective January 1, 2020. The Energy Code provides mandatory energy-efficiency measures as well as voluntary tiers for increased energy efficiency. The California Energy Commission (CEC), in conjunction with the California Public Utilities Commission, has adopted a goal that all new residential and commercial construction achieve zero net energy by 2020 and 2030, respectively. It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

Title 24, Part 11 – California Green Building Standards Code

The California Green Building Standards Code, referred to as CALGreen, was added to Title 24 as Part 11 first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 CBC). The most recent 2019 CALGreen institutes mandatory minimum environmental performance standards for all ground-up new construction of non-residential and residential structures. It also includes voluntary tiers (I and II) with stricter environmental performance standards for these same categories of

residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory Green Building Standards and may adopt additional amendments for stricter requirements.

The mandatory standards require:

- Outdoor water use requirements as outlined in local water efficient landscaping ordinances or current Model Water Efficient Landscape Ordinance standards, whichever is more stringent;
- Requirements for water conserving plumbing fixtures and fittings;
- 65 percent construction/demolition waste diverted from landfills;
- Infrastructure requirements for electric vehicle charging stations;
- Mandatory inspections of energy systems to ensure optimal working efficiency; and
- Requirements for low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards.

Similar to the reporting procedure for demonstrating Energy Code compliance in new buildings and major renovations, compliance with the CALGreen mandatory requirements must be demonstrated through completion of compliance forms and worksheets.

4.8.2.3 Local

a. Existing 2006 General Plan

The Conservation Element of the existing 2006 General Plan discusses the City's commitment to providing a more livable, equitable, and economically vibrant community through the incorporation of sustainability features, energy efficiency, and reduction of GHG emissions. As stated in the Conservation Element, most policies intended to reduce energy use and GHG emissions were incorporated into the Energy Efficiency and Climate Action Strategy. Sustainability policies in the General Plan address transportation-related GHG emissions by promoting sustainable land use patterns and developing infrastructure to provide alternatives to single occupant vehicle travel. These policies include:

Objective 2.4: Provide commercial areas within the City that are conveniently located, efficient, attractive, and have safe and easy pedestrian and vehicular circulation in order to serve the retail and service commercial needs of Moreno Valley residents and businesses.

Objective 5.10: Encourage bicycling as an alternative to single occupant vehicle travel for the purpose of reducing fuel consumption, traffic congestion, and air pollution.

b. Energy Efficiency and Climate Action Strategy

In October 2012, the City adopted its Energy Efficiency and Climate Action Strategy (Moreno Valley 2012). The main objectives of the Strategy are to reduce the environmental and fiscal impacts of energy usage and GHG emissions in municipal facilities and within the community. The strategy adopts a comprehensive list of measures intended to reduce energy consumption, reduce water use, encourage recycling and waste diversion, promote use of alternative fuel vehicles, facilitate the use of renewable energy, or otherwise reduce GHG emissions. Policy measures support the following:

- **R2-T1:** Land Use Based Trips and VMT [Vehicle Miles Travelled] Reduction Policies. Encourage the development of Transit Priority Projects along High Quality Transit Corridors identified in the SCAG Sustainable Communities Plan, to allow a reduction in vehicle miles traveled.
- **R2-T3:** Employment-Based Trip Reductions. Require a Transportation Demand Management (TDM) program for new development to reduce automobile travel by encouraging ride-sharing, carpooling, and alternative modes of transportation.
- **R2-E1:** New Construction Residential Energy Efficiency Requirements. Require energy efficient design for all new residential buildings to be 10% beyond the current Title 24 standards. (Reach Code)
- **R2-E2:** New Construction Residential Renewable Energy. Facilitate the use of renewable energy (such as solar (photovoltaic) panels or small wind turbines) for new residential developments. Alternative approach would be the purchase of renewable energy resources offsite.
- **R2-E5:** New Construction Commercial Energy Efficiency Requirements. Require energy efficient design for all new commercial buildings to be 10% beyond the current Title 24 standards. (Reach Code)
- **R3-E1:** Energy Efficient Development, and Renewable Energy Deployment Facilitation and Streamlining. Updating of codes and zoning requirements and guidelines to further implement green building practices. This could include incentives for energy efficient projects.
- **R3-L2:** Heat Island Plan. Develop measures that address “heat islands.” Potential measures include using strategically placed shade trees, using paving materials with a Solar Reflective Index of at least 29, an open grid pavement system, or covered parking.
- **R2-W1:** Water Use Reduction Initiative. Consider adopting a per capita water use reduction goal which mandates the reduction of water use of 20 percent per capita with requirements applicable to new development and with cooperative support of the water agencies.
- **R3-W1:** Water Efficiency Training and Education. Work with EMWD [Eastern Municipal Water District] and local water companies to implement a public information and education program that promotes water conservation.

- **R2-S1:** City Diversion Program. For Solid Waste, consider a target of increasing the waste diverted from the landfill to a total of 75% by 2020.

4.8.3 Methodologies for Determining Impacts

A GHG inventory and projections were prepared in conjunction with the CAP. This includes a year 2018 baseline inventory and year 2040 projects for buildout of the project as well as buildout of the existing 2006 General Plan. ICLEI US Community Protocol assumptions were used to estimate emissions from solid waste disposal, process and fugitive emissions from wastewater treatment, and residential, commercial, industrial, and wastewater treatment natural gas use. The CARB's EMFAC2021 model was used to calculate transportation emissions, and CARB's OFFROAD model was used to calculation emissions from the off-road equipment sector. Future emissions are based on projected population, employment, and land use buildout numbers for the project and existing 2006 General Plan. The following is a discussion of the methodology used to calculate emissions from each source.

4.8.3.1 Transportation

Transportation emissions are based on vehicle miles traveled (VMT) for on-road vehicles. The SCAG model, consistent with the RTP/SCS growth projections for population, households, and jobs within Moreno Valley through 2040, was used to estimate the VMT generated by land uses in the Planning Area. To assess the VMT, the production and attraction (PA) method was used which records all home-based production and home-based-work production and attraction vehicular trips generated by land uses in the City and across the entire regional network. VMT is adjusted to halve trip VMT for trips that begin in the Planning Area but end outside the Planning Area or those that begin outside but end inside. The Planning Area generates 3,144,986 VMT in the existing condition, buildout of the existing 2006 General Plan would generate 4,566,084 VMT, and buildout of the project would generate 4,524,038 VMT (Fehr & Peers 2021). CARB's EMFAC2021 model was used to calculate transportation emissions.

4.8.3.2 Energy

Emissions from electricity consumption were calculated using electricity usage for the residential, commercial, and industrial sectors along with Southern California Edison's (SCE's) 2018 GHG per unit of electricity provided in Edison International's 2019 Corporate Responsibility Report: 0.23 MT CO₂E per megawatt-hour. SCE provided electricity usage for the commercial and residential sectors for year 2019. Agricultural and industrial electricity usage was estimated from SCE's Quarterly Customer Data Reports for 2019, which provide high level data aggregated by zip code and sector that cannot be linked to an individual customer. Moreno Valley Utility provided 2019 electricity usage for the following rate categories: residential, small commercial, large commercial, industrial (manufacturing), city accounts, pumping and agriculture, streetlights, and traffic signals.

Emissions from natural gas consumption were calculated using natural gas usage for the residential, commercial, and industrial sectors, along with emissions factors provided in

Appendix C of the ICLEI Protocol: 0.0053 MT CO₂E per therm. Southern California Gas Company provided 2019 natural gas usage for the following rate categories: commercial, industrial, single-family residential, and multi-family residential.

4.8.3.3 Off-Road Equipment

Off-road emissions in the City include lawn and garden equipment, construction equipment, and industrial equipment, in addition to other categories for which CARB's EMFAC2021 model generates emission outputs. The model generates emissions for a total of 16 categories across Riverside County. Emissions were calculated for the portion of Riverside County that lies in SCAB. These emissions were then pro-rated by the City's share of the county population within SCAB.

4.8.3.4 Solid Waste

Emissions from disposal of solid waste were calculated using the total organic commercial, residential, and other solid waste disposed of in landfills in 2019 provided by Waste Management and Riverside County Department of Waste Resources. There was a total of 92,471 tons of commercial waste, 34,706 tons of residential waste, and 30,907 tons of waste from other sources including roll-off and construction waste generated and disposed of within the City. These data were multiplied by emissions factors used in the USEPA's Waste Reduction Model. In 2019, Moreno Valley diverted 7.6 percent of commercial waste, 35.8 percent of residential waste, and 35.6 percent of roll-off waste.

4.8.3.5 Water

Emissions from supplying water were calculated using the 2019 electricity and natural gas consumption provided by Eastern Municipal Water District (EMWD) and Box Springs Mutual Water Company for potable and reclaimed water: 4,651,580 kilowatts per hour (kWh) and 199,577 therms, respectively. Box Springs does not use natural gas in water management and delivery. In 2019, EMWD supplied 11,112.47 million gallons of water and Box Springs supplied 74.104 million gallons to the city.

4.8.3.6 Water Treatment

Emissions from wastewater treatment were calculated using the 2019 electricity and natural gas consumption provided by EMWD for the management of wastewater: 9,441,777 kWh and 419,096 therms, respectively. In 2019, EMWD managed 13,793.26 million gallons of wastewater generated by the city.

Edgemont Community Services District (ECSD) also provides wastewater treatment services to Moreno Valley. However, ECSD owns and maintains an all gravity sewer collection system and therefore does not consume any electricity or natural gas in the maintenance and operation of its system. All of the effluent from the District's system runs into the City of Riverside collection system. From there, it enters the treatment plant maintained by the City of Riverside. In 2019, the ECSD managed 195.88 million gallons of wastewater generated by

the City. Given the nature of ECSD's sewer collection system, emissions associated with this source are not included in the baseline emissions analysis.

4.8.3.7 Public Lighting

Emissions from public lighting were calculated using electricity usage for street lights and traffic signals in the Planning Area. Moreno Valley Utility provided 2019 electricity consumption data: 1,206,720 kWh from street lights and 189,099 kWh from traffic signals. Additionally, SCE provided that 4,686,354 kWh was used in 2019 to power street lights.

4.8.3.8 Agriculture

Emissions from agricultural sources were calculated using electricity usage for the agricultural sector along with SCE's 2018 GHG emission factor per unit of electricity. Agricultural electricity usage was estimated from SCE's Quarterly Customer Data Reports for 2019. This was added to electricity usage data for pumping and agriculture provided by Moreno Valley Utility. SoCal Gas did not provide natural gas usage data for the agriculture sector.

4.8.4 Basis for Determining Significance

Thresholds used to evaluate impacts to GHG emissions are based on applicable criteria in the CEQA Guidelines (California Code of Regulations Sections 15000-15387), Appendix G. A significant impact would occur if the project would:

- 1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- 2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of GHGs.

GHG impacts were evaluated by determining if the project would sufficiently reduce its overall GHG emissions consistent with the state's emission reduction goals as expressed in EO B-30-15 and EO S-3-05. EO B-30-15 calls for a statewide reduction in GHG emissions to 40 percent below 1990 levels by 2030. EO S-3-05 calls for a reduction to 80 percent below 1990 levels by 2050. This EIR evaluates whether or not the project incorporates efficiency and conservation measures sufficient to contribute its portion of the overall GHG reductions necessary for the State to achieve its own mandates. If the project demonstrates that it is sufficiently reducing its overall GHG emissions, impacts can be determined not to be cumulatively considerable.

4.8.5 Impact Analysis

4.8.5.1 Topic 1: GHG Emissions

Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

The proposed CAP is designed to reinforce the City's commitment to GHG emissions, and demonstrate how the City will comply with the state of California's GHG emission reduction standards. As a Qualified GHG Reduction Strategy, the CAP will also enable streamlined environmental review of future development projects, in accordance with CEQA.

The CAP includes:

- An inventory of the City's GHG emissions;
- Forecasts of future GHG emissions;
- Measures to reduce GHG emissions consistent with State requirements; and
- Monitoring and reporting processes to ensure targets are met.

The CAP demonstrates compliance with the statewide GHG target for 2030 (40 percent below 1990 levels per EO B-30-15), as well as for the project horizon year of 2040 (derived from 80 percent below 1990 levels by 2050 per EO S-3-05). The CAP also demonstrates consistency with the 2017 CARB Scoping Plan, which provides guidance for local communities to meet AB 32 and EO S-3-05 targets.

Per CARB, local actions—such as general plans and climate action plans—are essential tools for the state to meet its GHG emission reduction goals. The 2017 Scoping Plan provides guidance for local communities to meet AB 32 and EO S-3-05 targets; therefore, the CAP must demonstrate consistency with Scoping Plan targets. According to the Scoping Plan, local agencies should target total emissions of no more than 6 MT CO₂E per capita per year by 2030 and no more than 2 MT CO₂E per capita by 2050 to be consistent with the 2017 Scoping Plan and the state's long-term goals. The GHG emission targets established in the proposed CAP are based on the goals established by EO S-3-15 and SB 32, consistent with the CAP guidelines established in the 2017 Scoping Plan. The horizon year for analysis in the proposed CAP is 2040, corresponding with the horizon year established in the 2021 GPU. Thus, the CAP includes targets of 6 MT CO₂E per capita per year by 2030 and 4 MT CO₂E per capita per year by 2040 (derived from the Scoping Plan target of 2 MT CO₂E per capita per year in 2050). The proposed 2040 target of 4 MT CO₂E per capita per year is determined using a linear trajectory in emissions reduction between 2030 and 2050.

The 2018 inventory and 2040 forecast cover GHG emissions from ten sectors within the Planning Area. Emissions were calculated using the methodology summarized in Section 4.8.3. Buildout under the existing 2006 General Plan and 2021 GPU scenarios would result in different patterns of growth and would be comprised of a different mix of land uses. Therefore, different levels of emissions would result. Table 4.8-5 summarizes the baseline and forecast year emissions.

**Table 4.8-5
Moreno Valley GHG Emissions Inventory, 2018 and 2050 (MT CO₂E)**

Sector	2018 Baseline	Existing 2006 General Plan (2040)	2021 GPU (2040)
Residential	206,790	257,663	264,683
Commercial	100,766	183,539	159,749
Industrial	19,589	383,075	320,135
Transportation	483,063	514,051	509,317
Solid Waste	7,737	11,754	10,880
Water	2,129	2,602	2,582
Wastewater	4,395	5,372	5,330
Agriculture	1,938	1,938	1,938
Off-Road Equipment	37,784	50,143	49,279
Public Services and Lighting	2,219	1,208	1,208
Total	866,410	1,411,346	1,325,101
<i>Population</i>	<i>207,946</i>	<i>256,600</i>	<i>252,179</i>
MT CO₂E Per Capita without CAP GHG Reduction Measures	4.17	5.50	5.25

SOURCE: Dyett & Bhatia 2021.

As shown in Table 4.8-5, without implementation of GHG reduction measures identified in the CAP, buildout of the 2021 GPU is projected to exceed the 2040 emission target of 4 MT CO₂E per capita. Although buildout of the 2021 GPU would result in fewer GHG emissions compared to buildout of the existing 2006 General Plan, it would still exceed standards established in CARB's 2017 Scoping Plan based solely on the goals, policies, and actions proposed in the 2021 GPU. The City would need to reduce emissions by 316,385 MT CO₂E in order to achieve the 2040 emissions target and be consistent with the 2017 Scoping Plan and Statewide goals.

Therefore, the proposed CAP developed a Qualified GHG Reduction Strategy that would reduce GHG emissions below the standards established in CARB's 2017 Scoping Plan. These strategies would serve to reduce GHG emissions associated with transportation, industrial, residential, commercial, water, public services and public lighting, and off-road equipment uses. Each measure includes a range of effectiveness estimated from the CAPCOA's Quantifying Greenhouse Gas Mitigation Measures (CAPCOA 2010) and academic literature. Table 4.8-6 summarizes the CAP GHG reduction measures along with the estimated effectiveness.

Table 4.8-6 CAP GHG Reduction Measures			
Strategy	Range of Effectiveness	Assumed Effectiveness	Estimated GHG Emission Reductions (MT CO ₂ E per year)
TRANSPORTATION			
TR-1: Partner with Moreno Valley Unified School District, Val Verde Unified School District and Moreno Valley College to establish an online system like 511.org that links employees and guardians of students to provide carpool matching.	7.2-15.8%	7.2%	36,671
TR-2: Continue to implement a Safer Routes to School program for increased bicycle and pedestrian safety to and from schools.	7.2-15.8%	7.2%	36,671
TR-3: Encourage businesses with over 50 employees to implement Transportation Demand Management strategies and programs identified in Connect SoCal, the Southern California Association of Governments' Regional Transportation Plan/Sustainable Communities Strategy, including but not limited to: implementing commuter benefit programs, promoting telecommuting and alternative work schedule options, and other financial incentives. Establish a goal of achieving a 10 percent increase in alternative mode use by workers in Moreno Valley.	5.0-30.0%	10.0%	50,932
TR-4: Create a Transportation Demand Management program for City staff to promote alternative transportation modes and carpooling to the greatest extent possible.	5.0-10.0%	5.0%	25,466
TR-5: Implement trip reduction programs in new residential, commercial, and mixed-use developments.	5.0-10.0%	5.0%	25,466
TR-6: Advocate for transit service improvements by area transit providers with an emphasis on coordinating public transit schedules and connections and for subsidies for a higher level of transit service and/or more transit passes for residents and/or employees.	0.3-20.0%	1.0%	5,093
TR-7: Secure funding to install electric vehicle recharging stations or other alternative fuel vehicle support infrastructure in existing public and private parking lots.	0.5-12.7%	12.7%	64,683
TR-8: Increase the number of efficient or alternatively fueled vehicles in the City fleet as vehicles are turned over.	0.4-20.3%	1.0%	5,093

Table 4.8-6 CAP GHG Reduction Measures			
Strategy	Range of Effectiveness	Assumed Effectiveness	Estimated GHG Emission Reductions (MT CO ₂ E per year)
TR-9: Consider requiring new multi-family residential and mixed use development to reduce the need for external trips by providing useful services/facilities on-site such as an ATM, vehicle refueling, electric vehicle infrastructure, and shopping.	Supportive	--	--
TR-10: Create at least one day a year when a portion of streets and plazas is designated for pedestrian and/or bicycle access only.	Supportive	--	--
Total Transportation Emissions Reduction:			250,075
INDUSTRIAL			
I-1: Actively promote the use of energy-efficient building operations systems in existing and new industrial facilities with the goal of achieving a 40 percent energy reduction in 30 percent of industrial square footage citywide by 2040. Effectiveness should be confirmed through commissioning of new systems.	12.0-16.0%	12.0%	38,416
I-2: Promote and incentivize solar installations on new and existing industrial and warehousing facilities through partnerships with energy providers (e.g. Moreno Valley Utility [MVU], Southern California Edison [SCE]) and other private sector funding sources, with the goal of providing 25 percent of energy needs with solar in 30 percent of industrial and warehouse square footage by 2040. Examples of incentives include reduced permit fees or streamlined permit approval processes.	7.0%	7.0%	22,409
I-3: Work with electricity providers (e.g. MVU, SCE) to encourage large commercial and industrial facilities to participate in energy efficient upgrade programs including installation of solar PV systems and EV chargers and to establish annual targets.	0.5%	0.5%	1,601
I-4: Develop and implement Technology Advancement Program, working with industrial, warehousing, and distribution facilities to encourage innovation, development of new emissions reduction technologies, and energy efficient/alternative fueled equipment upgrades. Provide incentives through partnerships with regional, statewide, and federal programs.	0.4-20.3%	1.0%	3,201
Total Industrial Emissions Reduction:			65,628

Table 4.8-6 CAP GHG Reduction Measures			
Strategy	Range of Effectiveness	Assumed Effectiveness	Estimated GHG Emission Reductions (MT CO ₂ E per year)
RESIDENTIAL			
R-1: Provide incentives such as streamlined permitting or bonus density for new multi-family buildings and re-roofing projects to install “cool” roofs consistent with the current California Green Building Code (CALGreen) standards for commercial and industrial buildings.	25.0%	25.0%	13,549
R-2: Require new construction and major remodels to install interior real-time energy smart meters in line with current utility provider (e.g. MVU, SCE) efforts.	25.0%	25.0%	18,858
R-3: Develop and implement program to incentivize single-family residential efficiency retrofits and participation in MVU direct install program with the goal of a 50 percent energy reduction compared to baseline in 30 percent of the total single-family homes citywide by 2040.	6.9%	6.9%	1,465
R-4: Prioritize cap and trade funds to assist low-income homeowners achieve energy-efficient improvements and fund weatherization programs.	3.7-7.5%	3.7%	9,793
R-5: Apply for and prioritize Community Block Development Grant funds to assist low-income homeowners achieve energy-efficient improvements.	3.7-7.5%	3.7%	9,793
R-6: Develop program and funding strategy to incentivize conversion of natural gas heated homes and nonresidential buildings to electricity.	2.0-3.0%	2.0%	4,185
R-7: Develop and implement program to incentivize multi-family residential efficiency audits and participation in MVU direct install program with the goal of a 50 percent energy reduction in 30 percent of the projected amount of multi-family homes citywide by 2035	0.0-15.0%	15.0%	12,955
R-8: Provide a toolkit of resources, including web-based efficiency calculators, for residents and businesses to analyze their greenhouse gas emissions in comparison to their neighborhood, the city, and the region.	Supportive	--	--
R-9: Develop and implement a competitive greenhouse gas reduction program with an award component between groups of citizens in the city.	Supportive	--	--
Total Residential Emissions Reduction:			70,599

Table 4.8-6 CAP GHG Reduction Measures			
Strategy	Range of Effectiveness	Assumed Effectiveness	Estimated GHG Emission Reductions (MT CO ₂ E per year)
COMMERCIAL			
C-1: Expand efforts to install energy-efficient lighting technologies in new and existing private parking lots.	0.0-68%	20.0%	21,999
C-2: Facilitate energy efficiency improvements in nonresidential buildings through incentives and regulations that may include energy performance reports, time of sale upgrades, and/or innovative partnerships such as expansion of utility provider (e.g. MVU, SCE, SoCal Gas) programs to reduce energy use.	5.2-15.0%	5.2%	8,307
C-3: Promote energy efficiency financing programs to medium to large sized commercial facilities.	0.4%	0.4%	479
C-4: Promote MVU and SCE direct install energy efficiency programs to help small businesses identify opportunities to save electricity.	0.4%	0.4%	158
C-5: Actively engage with Moreno Valley businesses to identify areas for GHG reduction and financial savings.	Supportive	--	--
Total Commercial Emissions Reduction:			30,945
OFF-ROAD EQUIPMENT			
OR-1: Encourage residents and businesses to use efficient lawn and garden maintenance equipment or to reduce the need for landscape maintenance through native planting. <ul style="list-style-type: none"> • Partner with the SCAQMD to establish a voluntary exchange program for residential electric lawnmowers and backpack-style leaf blowers. • Require new buildings to provide electrical outlets in an accessible location to facilitate use of electric-powered lawn and garden equipment • In project review, encourage the replacement of high-maintenance landscapes (like grass turf) with native vegetation to reduce the need for gas-powered lawn and garden equipment. 	0.0-49.5%	10.0%	4,928

Table 4.8-6 CAP GHG Reduction Measures			
Strategy	Range of Effectiveness	Assumed Effectiveness	Estimated GHG Emission Reductions (MT CO ₂ E per year)
<p>OR-2: Reduce emissions from heavy-duty construction equipment by limiting idling based on South Coast Air Quality Management District (SCAQMD) requirements and utilizing cleaner fuels, equipment, and vehicles.</p> <ul style="list-style-type: none"> • Require provision of clear signage reminding construction workers to limit idling • Require project applicants to limit GHG emissions through one or more of the following measures: substitute electrified or hybrid equipment for diesel/gas powered, use alternative-fueled equipment on site, avoid use of on-site generators. 	2.5-22.0%	2.5%	1,232
Total Off-Road Equipment Emissions Reduction:			6,160
PUBLIC SERVICES AND PUBLIC LIGHTING			
PS-1: Participate in Savings by Design program to identify ways to improve the energy efficiency for all new municipal buildings and facilities. As part of the Savings By Design program, new municipal buildings and facilities shall have a goal to exceed Title 24 Building Standards by 10%.	0.2-5.5% (electricity) 0.7-10% (natural gas)	5.5%	66
PS-2: Expand City of Moreno Valley's Environmental Procurement Administrative Procedure to address energy efficient equipment.	5.0-10.0%	10.0%	121
PS-3: Support Moreno Valley Utility and Southern California's efforts to conduct an annual municipal energy audit to determine if energy efficient retrofits are effective in reducing emissions from City operations.	Supportive	--	--
PS-4: Utilize Energy Management tools to monitor long-term impacts of municipal efficiency projects.	Supportive	--	--
Total Public Services and Public Lighting Emissions Reduction:			187
NATURAL RESOURCES			
NC-1: Require new landscaping to be climate appropriate.	Supportive	--	--
NC-2: Encourage residents and businesses to use efficient lawn and garden maintenance equipment or to reduce the need for landscape maintenance through native planting.	Supportive	--	--
NC-3: Increase and maintain urban greening in the community by maintaining Tree City USA status and promoting tree planting and urban gardening programs.	Supportive	--	--
Total Natural Resources Emissions Reduction:			0
TOTAL CAP STRATEGIES EMISSIONS REDUCTION:			398,128
SOURCE: Dyett & Bhatia 2021.			

As a whole, the CAP GHG reduction strategies were designed to the City to achieve its GHG reduction target in the year 2040. The combined GHG reductions from these measures is 423,594 MT CO₂E in 2040, which cover the emissions “gap” identified in Table 4.8-5. Table 4-8-7 adds the effect of the CAP GHG reduction measures to the 2021 GPU forecast, and compares the resulting forecast with CAP GHG reduction strategies to the BAU forecast and 2021 GPU forecast (without CAP strategies). As shown, implementation of the CAP would enable the City to meet the emissions target for 2040 and be consistent with Statewide reduction goals.

**Table 4.8-7
2040 GHG Emissions Forecast with CAP Strategies (MT CO₂E)**

Sector	BAU Emissions (2040)	2021 GPU Emissions (2040)	Emissions Reduction from CAP Strategies (2040)	2021 GPU Emissions with CAP Strategies (2040)
Residential	257,663	264,683	70,599	194,084
Commercial	183,539	159,749	30,945	128,804
Industrial	383,075	320,135	65,628	254,507
Transportation	514,051	509,317	250,075	259,242
Solid Waste	11,754	10,880	0	10,880
Water	2,602	2,582	0	2,582
Wastewater	5,372	5,330	0	5,330
Agriculture	1,938	1,938	0	1,938
Off-Road Equipment	50,143	49,279	6,160	43,119
Public Services and Lighting	1,208	1,208	187	1,021
TOTAL	1,411,346	1,325,101	423,594	901,508
<i>Population</i>	<i>256,600</i>	<i>252,179</i>		<i>252,179</i>
MT CO₂E Per Capita without CAP GHG Reduction Measures	5.50	5.25	1.68	3.57

SOURCE: Dyett & Bhatia 2021.

Implementation and monitoring are key components of the CAP to ensure that the City is successful in reaching these identified reduction targets. The City will annually monitor and report on CAP implementation activities. The annual monitoring report will include implementation status of each action and progress towards achieving the performance targets of the corresponding emissions reduction measure. The annual monitoring report will also include information on the status of the federal, state, regional, and local level emissions reduction strategies, as well as any new efforts that may emerge in the reporting year. The City will also update the GHG inventory every five years. If an updated inventory reveals that the CAP is not making adequate progress toward meeting the GHG target, or that new technologies and programs emerge that warrant inclusion in the CAP, the City will adjust the CAP by modifying, adding, and/or replacing measures as necessary. New opportunities for GHG reductions, including new funding sources and the ability to link city reduction actions to the City’s Capital Improvement Plan, Infrastructure Replacement and Fleet Vehicle Replacement schedules, and other programs can also be incorporated into future updates of the CAP.

Implementation of the GHG reduction and adaptation measures identified in the CAP would reduce the City's emissions consistent with statewide GHG emission reduction goals. Therefore, the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Impacts would be less than significant.

4.8.5.2 Topic 2: GHG Plans

Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of GHGs?

Applicable plans, policies, or regulations include statewide GHG emission targets established by AB 32 and SB 32; a longer-term statewide policy goals established by EO S-3-05; the 2017 Scoping Plan (which establishes a specific statewide plan to achieve the 2030 target); SCAG's RTP/SCS; regulations regarding increased use renewables for electricity production (RPS); and the California Energy Code. As discussed in Section 4.8.5.1, the CAP would be consistent with the 2017 Scoping Plan GHG emission reduction targets. The GHG emission targets established in the proposed CAP are based on the goals established by EO S-3-15 and SB 32, consistent with the CAP guidelines established in the 2017 Scoping Plan. The CAP would achieve additional longer-term GHG reductions that would contribute towards achievement of the State's long-term 2050 goal. It is not currently possible for the CAP to demonstrate how a local 2050 goal can be achieved because the City does not have jurisdictional control over all activities or emissions sources over all post-2040 activities or sources of emissions. However, the CAP includes specific implementation and monitoring procedures that require the City to achieve increasingly-effective long-term reductions over time and demonstrate substantial progress on the pathway towards the long-term 2050 goal. As discussed in the Implementation, Monitoring, and Reporting chapter of the CAP, the City would identify new or modified local measures to complement future State actions needed to achieve the state's 2050 goal through future CAP updates. Moreover, the City would update the CAP following specific State actions, such as future updates to the Scoping Plan or new interim post-2030 targets, which would be needed to demonstrate how achievement of the State's longer-term 2050 goal would be feasible and, in turn, the role of local government agencies in complementing the State's regulatory actions. Therefore, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. This impact would be less than significant.

4.8.6 Cumulative Analysis

The issue of global climate change is inherently a cumulative issue, as GHG emissions of individual projects cannot be shown to have a material effect on global climate change. Impacts would be cumulative in nature if they lead to a substantial increase in GHG emissions, when combined with other development. As discussed, the framework for assessing GHG emissions in the state has been created through AB 32, SB 32, EO S-3-05, and the 2017 Scoping Plan. If a project demonstrates that it is sufficiently reducing its overall GHG emissions consistent with statewide goals, the project's impact can be determined not to be cumulatively considerable as it would contribute to the State's GHG emission reduction targets. As discussed in Section 4.8.5.1 above, with implementation of the CAP, the City

would reduce its GHG emissions consistent with the 2017 Scoping Plan GHG emission reduction targets. The City would update GHG inventories, evaluate the performance of individual strategies, evaluate progress toward the City's reduction targets, and make revisions to strategies, as necessary, to ensure that the City will achieve its targets. Therefore, implementation of the CAP would ensure that the project would not contribute to a cumulative impact related to GHG.

4.8.7 Significance of Impacts before Mitigation

The proposed CAP identifies strategies, measures, and actions that would be implemented to reduce GHG emissions consistent with State legislative requirements. Therefore, with the adoption and implementation of the proposed CAP, GHG emissions generated by the 2021 GPU would be reduced to meet State GHG reduction targets. Therefore, the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of GHGs, and impacts would be less than significant.

4.8.8 Mitigation

Impacts would be less than significant. No mitigation is required.

4.8.9 Significance of Impacts after Mitigation

Impacts would be less than significant. No mitigation is required.