

4.8 GREENHOUSE GAS EMISSIONS

This section evaluates the greenhouse gas emissions (GHG) impacts of the proposed Plan. The information presented was compiled from multiple sources, including the Energy Policy Initiatives Center (EPIC) at the University of San Diego School of Law. A related topic, the impacts of increasing GHG emissions on global climate change, is discussed in Appendix F of the EIR.

4.8.1 EXISTING CONDITIONS

California law defines GHGs as any of the following compounds: CO₂, CH₄, N₂O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) (H&SC Section 38505(g)). CO₂, followed by CH₄ and N₂O, is the most common GHG. Atmospheric concentrations of GHGs have been increasing since measurements began in the 1970s. As of 2014, globally averaged annual mean concentration of atmospheric CO₂ is approximately 397 parts per million (ppm), CH₄ is approximately 1840 parts per billion (ppb), and N₂O is approximately 327 ppb (NOAA 2015).

Global warming potential (GWP) is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas; the GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere (“atmospheric lifetime”). The GWP of each gas is measured relative to CO₂, the most abundant GHG. GHGs with lower emissions rates than CO₂ may still contribute to climate change because they are more effective at absorbing outgoing infrared radiation than CO₂. When accounting for GHGs, emissions are expressed in terms of CO₂ equivalents (CO₂e). The concept of CO₂e is used to account for the different GWP of GHGs to absorb infrared radiation. The reference gas for GWP is CO₂; therefore, CO₂ has a GWP of 1. The other main GHGs that have been attributed to human activity include CH₄, which has a GWP of 21, and N₂O, which has a GWP of 310.

Sources of CO₂ include combustion of fossil fuels (coal, oil, natural gas, gasoline, and wood). CH₄ is the main component of natural gas and also arises naturally from anaerobic decay of organic matter. Sources of N₂O include combustion of fossil fuels and industrial processes such as nylon production and production of nitric acid. Other GHGs are present in trace amounts in the atmosphere and are generated from various industrial or other uses.

4.8.1.1 EXISTING GHG EMISSIONS

Global GHG Emissions

The World Resources Institute (WRI 2014) estimated that worldwide emissions in 2011 were 43.8 billion metric tons (MT) CO₂e, of which the United States contributed the greatest percentage after China. Table 4.8-1 shows the top 10 emitters by country, which contribute 63 percent of global emissions. When accounting for GHGs, emissions are typically quantified in MT or millions of metric tons (MMT) and are shown as MMT CO₂e.

Table 4.8-1
Top 10 GHG-Emitting Countries, 2011

Country or Area	MMT CO ₂ e in 2011 ¹	Percent
China	10,552	24
United States	6,550	15
India	2,486	6
Russia	2,374	5
Japan	1,307	3
Brazil	1,131	3
Germany	883	2
Indonesia	835	2
Canada	716	2
Iran	716	2

Source: WRI 2014

California GHG Emissions

In 2012, California accounted for approximately seven percent of U.S. emissions. The State of California GHG Inventory, prepared by ARB, identified and quantified statewide GHG emissions. The inventory includes estimates for CO₂, CH₄, N₂O, SF₆, HFCs, and PFCs, and is summarized in Table 4.8-2 (ARB 2014a). The inventory is divided into eight broad categories of emissions: Agriculture, Commercial, Electricity Generation, Industrial, Residential, Transportation, Recycling and Waste, and High GWP Gases. Transportation was the sector with the largest percentage of GHG emissions (36 percent), followed by electricity generation (21 percent), and industrial sources (19 percent). The remaining sectors each accounted for less than 10 percent of overall emissions.

Table 4.8-2
State of California Greenhouse Gas Emissions by Sector - 2012

Sector	Total 2012 Emissions (MMT CO ₂ e)	Percent of Total 2012 Emissions
Agriculture and Forestry	37.86	8%
Commercial	14.20	3%
Electricity Generation	95.09	21%
Industrial	89.16	19%
Residential	28.09	6%
Transportation	167.38	36%
Recycling and Waste	8.49	2%
High GWP Gases	18.41	4%
Total	458.68	100%

Source: ARB 2014a

San Diego Region GHG Emissions

Regional GHG emissions for existing conditions (2012) are calculated based on the current GHG inventory. The inventory is based on existing sources and activity within the region. GHG emissions are divided into 16 categories. Calculations and assumptions are described in Appendix G-1 to the EIR. Total GHG emissions in the San Diego region as of 2012 are ~~over~~ about 35 MMT CO₂e as shown in Table 4.8-3.

Table 4.8-3
Total Greenhouse Gas Emissions in the San Diego Region, 2012

Sector	Annual Emissions (MMTCO ₂ e)	Percentage of Annual Emissions
On-Road Transportation Passenger Cars & Light Duty Vehicles	15.76 <u>13.14</u>	43.7 <u>37.2</u> %
Electricity	7.97	22. <u>6</u> 1%
Natural Gas	2.84	7.9 <u>8.0</u> %
Heavy Duty Trucks & Vehicles	1.89	5.4
Solid Waste	1.75	4. <u>8</u> 9%
Other Fuels	1.64	4.6%
Industrial	1.43	4. <u>1</u> 0%
Aviation	1.37	3. <u>9</u> 8%
Off-Road Equipment and Vehicles	0.92	2.6%
Wildfire	0.81	2. <u>3</u> 2%
Other – Thermal Cogeneration	0.64	1.8%
Water Supply and Conveyance	0.52	1. <u>5</u> 4%
Wastewater	0.16	0. <u>5</u> 4%
Rail	0.11	0.3%
Agriculture	0.08	0.2%
Marine Vessels (excluding pleasure craft)	0.05	0.1%
Development + Sequestration	-0.65	n/a
Total	<u>35.434.7</u>	100%

Source: Appendix G-1 to the EIR.

Note:

The revised numbers in this table reflect the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

4.8.1.2 CLIMATE CHANGE

A related topic, the impacts of increasing GHG emissions on climate change, is discussed in Appendix F to the EIR. As discussed in Appendix F, during the timeframe of the proposed Plan, climate change effects likely to exacerbate the proposed Plan's impacts on selected resource areas include, but are not limited to:

- Higher annual average temperature
- More days of extreme high temperatures
- Longer and more humid heat waves
- More intense and frequent drought
- Increased evaporation from soil, surface waters
- More frequent, severe wildfires
- Sea level rise
- Less frequent, more intense rainstorms, more frequent watershed flood events
- More frequent and severe coastal flooding
- Spreading of pests and vector-borne diseases

In general, the effects listed above would increase between 2020 and 2050.

4.8.2 REGULATORY SETTING

4.8.2.1 FEDERAL LAWS, REGULATIONS, PLANS, AND POLICIES

Energy Policy and Conservation Act of 1975 and Corporate Average Fuel Standards

The Energy Policy and Conservation Act of 1975 (42 USC Section 6201 [1975]) establishes fuel economy standards for on-road motor vehicles sold in the United States.

Compliance with federal fuel economy standards is determined through the Corporate Average Fuel Economy (CAFE) program on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States.

On April 1, 2010, USDOT and USEPA established new federal rules that set the first-ever national GHG emissions standards and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States. The standards set a requirement to meet an average fuel economy of 34.1 miles per gallon by 2016. In August 2012, the federal government adopted the second rule that increases fuel economy for the fleet of passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2017 to 2025 to average fuel economy of 54.5 miles per gallon by 2025. Because NHTSA cannot set standards beyond model year 2021 due to statutory obligations and the rules' long timeframe, a mid-term evaluation is included in the rule. Standards for model years 2022 through 2025 have not been formally adopted by NHTSA. In August 2011, NHTSA and USEPA released medium- and heavy-duty vehicle standards for model years 2014 to 2018. Tighter standards for these vehicles for model years after 2018 are expected to be developed and issued by March 2016.

Energy Policy Act of 1992

The Energy Policy Act of 1992 (40 USC Section 13201 [1992]) (EPAAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAAct requires certain government and private fleets to purchase light-duty AFVs. Federal tax deductions were created for businesses and individuals to cover the incremental cost of AFVs. EPAAct also established the Clean Cities Program. The primary goal of the Program is to cut petroleum use in the United States by 2.5 billion gallons per year by 2020 with the following three strategies:

- Replace petroleum with alternative and renewable fuels,
- Reduce petroleum consumption through smarter driving practices and fuel economy improvements, and
- Eliminate petroleum use through idle reduction and other fuel-saving technologies and practices.

As part of the federal Clean Cities Program, the San Diego Regional Clean Cities Coalition works with vehicle fleets, fuel providers, community leaders, and other stakeholders to reduce petroleum use in transportation in the San Diego region (San Diego Regional Clean Cities Coalition 2014).

Energy Policy Act of 2005

The EAct of 2005 (42 USC Section 15801 [2005]) includes several requirements that support the use of alternatively fueled vehicles, including requirements for federal fleets and expansion of compliance options under EAct 1992 by allowing fleets to choose a petroleum reduction path that achieves petroleum reductions equivalent to AFVs running on alternative fuels 100 percent of the time. The EAct of 2005 funds research programs for AFVs and provides tax incentives for purchase of AFVs. It also provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (EISA) (42 USC Section 17381 [2007]) includes provisions to increase the supply of renewable alternative fuel sources by setting a mandatory Renewable Fuel Standard, which requires transportation fuel sold in the United States to contain a minimum of 36 billion gallons of renewable fuels annually by 2022. EISA includes grant programs to encourage the development of cellulosic biofuels, plug-in hybrid electric vehicles, and other emerging electric vehicle technologies. EISA codifies into law the energy reduction goals for federal agencies put forth in Executive Order 13423 (USEPA 2007), and creates new requirements related to Corporate Average Fuel Economy Standards, the Renewable Fuel Standard, and efficiency standards for lighting and appliances. The law is projected to reduce GHG emissions by 9 percent from 2005 levels by 2030 (DOE 2014).

Clean Air Act

USEPA began regulating GHGs under the Clean Air Act (CAA) (42 USC Section 7401 et seq. [1970]) in 2011. USEPA's GHG regulations include regulations governing transportation and mobile sources, renewable fuels, carbon pollution standards for existing power plants, the GHG tailoring rule governing new and existing industrial facilities, and GHG reporting requirements. Standards for mobile sources have been established pursuant to Section 202 of the CAA, and GHGs from stationary sources are currently controlled under the authority of Part C of Title I of the act.

In 2013, USEPA issued proposed regulations to cut carbon pollution from new power plants. In 2014, USEPA proposed a plan to cut carbon pollution from existing or modified power plants. The proposed rule includes state-specific rate-based goals for CO₂ emissions from the power sector, as well as guidelines for states to follow in developing plans to achieve state-specific carbon reduction goals. Nationwide, by 2030, this rule would achieve CO₂ emission reductions from the power sector of approximately 30 percent from CO₂ emission levels in 2005 (USEPA 2014a). USEPA anticipates issuing a final rule on existing power plants and carbon pollution standards for new, modified, and reconstructed power plants by the summer of 2015 (USEPA 2015).

Federal Highway Administration/Federal Transit Administration

The Federal Transit Administration (FTA) works with public transportation providers and other key stakeholders to implement strategies that reduce GHG emissions from the transportation sector. FTA provides funding to support public transportation projects and provides technical assistance, research, and policy development on alternative fuels, high fuel efficiency vehicles, climate change mitigation and adaptation in the transportation sector. In cooperation with the FTA, the USEPA has developed information regarding clean passenger vehicles (USEPA 2014b).

The Federal Highway Administration (FHWA) has conducted climate change adaptation and resilience case studies and pilot projects throughout the country to test a climate change vulnerability assessment model. The FHWA conceptual model guided transportation agencies through the process of collecting and integrating climate and asset data in order to identify critical vulnerabilities. FHWA used the pilot projects to adopt its Climate Change & Extreme Weather Vulnerability Assessment Framework (FHWA 2015a). FHWA has also conducted a number of case studies to assess various climate adaptation strategies, including the Flood Levee System Improvements study in Washington, DC (FHWA 2015b); the Surfers Point Managed Shoreline Retreat Project in Ventura, California (FHWA 2015c); and Climate Change Adaptation Strategies for the New York State Department of Transportation (Columbia University Earth Institute 2011).

Executive Order 13514

On October 5, 2009, the President signed Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance (3 CFR 13514). The Executive Order set sustainability goals for federal agencies and focuses on making improvements in their environmental, energy, and economic performance. The Executive Order required federal agencies to submit a 2020 GHG pollution reduction target within 90 days, and to increase energy efficiency, reduce fleet petroleum consumption, conserve water, reduce waste, support sustainable communities, and leverage federal purchasing power to promote environmentally responsible products and technologies.

The Executive Order requires agencies to measure, manage, and reduce GHG emissions toward agency-defined targets. It describes a process by which agency goals will be set and reported to the President by the Chair of Council on Environmental Quality (CEQ). The Executive Order requires agencies to meet a number of energy, water, and waste reduction targets, including:

- 30 percent reduction in vehicle fleet petroleum use by 2020;
- 26 percent improvement in water efficiency by 2020;
- 50 percent recycling and waste diversion by 2015;
- 95 percent of all applicable contracts will meet sustainability requirements;
- Implementation of the 2030 net-zero-energy building requirement;
- Implementation of the stormwater provisions of the Energy Independence and Security Act of 2007, section 438; and
- Development of guidance for sustainable federal building locations in alignment with the Livability Principles put forward by the Department of Housing and Urban Development, DOT, and USEPA.

Executive Order 13693

On March 19, 2015, the President signed Executive Order 13693, Planning for Federal Sustainability in the Next Decade. The Executive Order sets a goal of reducing Federal agency GHG emissions by 40 percent over the next decade. The Executive Order sets agency GHG reduction targets and sustainability goals, including:

- Percentage reduction targets must be proposed by each Federal agency, including FHWA, FTA, and FRA, for agency-wide GHG emissions reductions by the end of fiscal year 2025 relative to a fiscal year 2008 baseline.
- Sustainability goals for each Federal agency, including:
 - Promoting building energy conservation, efficiency, and management;
 - Requiring the use of renewable and alternative energy for electric and thermal energy in Federal buildings by up to 25 percent by fiscal year 2025;
 - Requiring the use of renewable and alternative energy for total building energy consumption in Federal buildings by up to 30 percent by fiscal year 2025;
 - Improving Federal agency water efficiency and management to reduce water consumption by 36 percent by fiscal year 2025;
 - Improving Federal agency vehicle fleet efficiency and management to reduce GHG emissions by 30 percent by fiscal year 2025;
 - Promoting sustainable acquisition and procurement practices; and
 - Advancing waste prevention and pollution prevention by diverting at least 50 percent of non-hazardous solid waste.

Off-road Vehicle and Equipment Regulations

Federal regulations that govern off-road vehicles such as locomotives, heavy equipment, etc. are discussed in Section 4.3, Air Quality. These regulations would also result in reductions in GHG emissions, and are summarized below.

Locomotive Engine Emission Standards: USEPA has adopted locomotive engine exhaust emission standards (40 CFR Part 1033 et seq.) that apply to line haul and switching locomotives with total rated horsepower of 750 kilowatts (1006 horsepower [hp]) or greater. These emission standards apply to hydrocarbons, NO_x, particulate matter, and CO, and would also reduce emissions of GHG through requiring more efficient locomotive engines.

Non-Road Compression-Ignition Engine Emission Standards: USEPA has also adopted emission standards for compression-ignition engines that apply to engines with a total rated horsepower of 11 hp to engines with a rating greater than 1207 hp (40 CFR Part 89.112; Part 1039.101; Part 1039.102). These emission standards apply to hydrocarbons, NO_x, particulate matter, and CO, and would also reduce emissions of GHG through requiring more efficient non-road engines.

4.8.2.2 STATE LAWS, REGULATIONS, PLANS, AND POLICIES

Executive Order S-3-05

Executive Order S-3-05, among other things, established the following GHG emission reduction goals for California: reduction to 2000 levels by 2010; to 1990 levels by 2020; and to 80 percent below 1990 levels by 2050.

Executive Order B-16-12

Executive Order B-16-12 orders State entities under the direction of the Governor including ARB, the Energy Commission, and Public Utilities Commission to support the rapid commercialization of zero emission vehicles. It directs these entities to achieve various benchmarks related to zero emission vehicles, including:

- Infrastructure to support up to one million zero emission vehicles by 2020,
- Widespread use of zero emission vehicles for public transportation and freight transport by 2020,
- Over 1.5 million zero emission vehicles on California roads by 2025,
- Annual displacement of at least 1.5 billion gallons of petroleum fuels by 2025, and

It also sets a state GHG emissions reduction target for the transportation sector of 80 percent below 1990 levels by 2050.

Executive Order B-30-15

Executive Order B-30-15, among other things, establishes a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.

It further orders that all state agencies with jurisdiction over sources of greenhouse gas emissions to implement measures, pursuant to statutory authority, to achieve reductions of greenhouse gas emissions to meet the 2030 and 2050 greenhouse gas emissions reductions targets. It also directs ARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent (MMTCO_{2e}). Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, Safeguarding California, every three years, and to ensure that its provisions are fully implemented.

California Global Warming Solutions Act and Climate Change Scoping Plan

The California Global Warming Solutions Act of 2006, widely known as AB 32 (Assembly Bill 32, Chapter 488, Statutes of 2006), requires ARB to develop and enforce regulations for reporting, verifying, and reducing statewide GHG emissions. The heart of the legislation is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. The Legislature also intended that that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020 (Health and Safety Code Section 38551(b)). The law requires ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

AB 32 requires that ARB develop a Climate Change Scoping Plan (Scoping Plan) consisting of the main strategies California will implement to reduce statewide GHG emissions to 1990 levels by 2020. It must be updated every five years. ARB approved the initial Scoping Plan in 2008 (ARB 2008). The Scoping Plan functions as a roadmap for ARB's plans to achieve GHG reductions in California.

ARB approved the first update to the Scoping Plan in 2014 (ARB 2014b). The update defines ARB's climate change priorities for the next five years. The update describes progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities for the next several years. The update concludes that California is on track to meet the 2020 GHG limit and is well positioned to maintain and continue reductions beyond 2020. A support document for the update includes ARB's estimates for the statewide GHG reductions to be achieved by a number of measures in order reach the AB 32 emissions level by 2020, as summarized in Table 4.8-4. Of the over 55 MMTCO_{2e} in reductions needed to meet the statewide 2020 emissions target, ARB estimates that 3.0 MMTCO_{2e} (5.5 percent) of the reductions will come from statewide implementation of the SB 375 targets (the initial Scoping Plan estimated a 5 MMTCO_{2e} reduction.)

Table 4.8-4
ARB Scoping Plan Update: Meeting the Statewide 2020 Emissions Target

Category	2020 (MMTCO_{2e})
AB 32 Baseline 2020 Forecast Emissions (2020 BAU)	509
Expected Reductions from Sector-Based Measures	55.2
<i>Transportation</i>	22.9
Advanced Clean Cars	3.1
Low Carbon Fuel Standard	15.2
Regional Targets (SB 375)	3.0
Tire Pressure Program	0.6
Ship Electrification	0.2
Heavy Duty Aerodynamics	0.9
<i>Electricity and Natural Gas</i>	25.0
Energy Efficiency and Conservation	12.2
Solar Hot Water	0.1
Renewable Electricity Standard (20%-33%)	11.5
Million Solar Roofs	1.1
<i>High Global Warming Potential (GWP) Gases</i>	5.4
<i>Waste</i>	1.8
Cap-and-Trade Reductions	23.0
2020 Limit	431

Source: ARB 2014b

The update identifies eight key focus areas comprising the major areas of California's economy and recommendations for developing additional requirements to meet the 2050 goals expressed in Executive Order S-3-05. The update frames activities and issues facing the State as it develops an integrated framework for achieving both air quality and climate goals in California beyond 2020. While the update discusses setting a mid-term target between 2020 and 2050, it does not recommend any numeric post-2020 targets, nor does it recommend a specific plan or specific actions showing how the state would meet the 2050 Executive Order goal.

Cap-and-Trade Program

ARB adopted its Cap-and-Trade Regulation (17 CCR 95802 et seq.) in 2012 as one of the strategies to achieve the 2020 target established by AB 32. Under cap-and-trade, an overall limit on GHG emissions from capped sectors has been established and facilities subject to the cap are able to trade permits (allowances) to emit GHGs. The cap will decline approximately 3 percent each year beginning in 2013. The first auction of allowances occurred in 2013. ARB estimates reductions from the Cap-and-Trade regulation will amount to 23 MMT CO₂e in 2020 (ARB 2014b).

REGIONAL TRANSPORTATION PLANNING

Senate Bill 375 (Chapter 728, Statutes of 2008)

SB 375 provides for a planning process to coordinate land use planning and RTPs to help California meet the GHG reductions established in AB 32. SB 375 requires RTPs prepared by MPOs, including SANDAG, to incorporate an SCS in their RTPs that demonstrates how the region would achieve GHG emission reduction targets set by ARB.

SB 375 has three major components: (1) using the regional transportation planning process to achieve reductions in GHG emissions from passenger vehicles consistent with AB 32's goals; (2) offering incentives under CEQA to encourage projects that are consistent with a regional plan that achieves GHG emission reductions; and (3) coordinating the regional housing need allocation process with the regional transportation planning process while maintaining local authority over land use decisions.

On September 23, 2010, ARB adopted regional targets for major MPOs. SANDAG's current targets are per capita CO₂ emission reductions from passenger vehicles of 7 percent by 2020 and 13 percent by 2035 relative to 2005 levels. SANDAG adopted the 2050 RTP/SCS to comply with SB 375 in 2011. ARB reviewed the adopted RTP/SCS and determined that, if implemented, it would achieve the reduction targets for the San Diego region in compliance with the law. ARB is required to update the SB 375 GHG emissions reduction targets at least every 8 years and is currently working on updates to the targets. As of October 2014, ARB is planning to update the 2035 targets for specified agencies including SANDAG in late 2015, but make these targets effective for their SCSs starting in 2019 (ARB 2014h).

2010 California Transportation Commission RTP Guidelines

The California Transportation Commission is authorized under statute (California Government Code Section 14522) to prescribe areas for analysis and evaluation by regional transportation agencies and guidelines for the preparation of RTPs. The Commission, in consultation with Caltrans and ARB, is also required to maintain guidelines for travel demand models used in the development of RTPs by MPOs.

On April 7, 2010, the Commission adopted revisions to the RTP Guidelines (California Transportation Commission 2010). The 2010 update to the guidelines reflects revisions to address the planning requirements of SB 375 and other planning practices. In addition to addressing SB 375, the guidelines set forth a uniform transportation planning framework throughout the state that identifies state and federal requirements for the development of RTPs. The updated guidelines recognize that the reduction of GHG emissions is a key priority in the transportation planning process.

Caltrans Climate Action Program

In December 2006, the California Department of Transportation Business, Transportation, and Housing Agency issued a Climate Action Program (Caltrans 2010). The goal of the Climate Action Program is to promote clean and energy-efficient transportation, and provide guidance for mainstreaming energy and climate change issues into business operations. The Climate Action Program seeks to reduce GHG emissions from transportation through system improvements, lowered congestion, and utilization of intelligent transportation systems; and also seeks to reduce GHG emissions from land use sources by increasing efficiency of facilities, fleets, and equipment through reduction measures and technology. Caltrans has issued a report summarizing its activities to address climate change in 2013 (Caltrans 2013).

VEHICLE EFFICIENCY AND TRANSPORTATION FUELS

Executive Order S-01-07 (Low Carbon Fuel Standard)

Executive Order S-01-07 (17 CCR 95480 et seq.) requires the state to achieve a 10 percent or greater reduction by 2020 in the average fuel carbon intensity for transportation fuels in California regulated by ARB. ARB identified the Low Carbon Fuel Standard (LCFS) as a discrete early action item under AB 32, and the final ARB resolution (No. 09-31) adopting the LCFS was issued on April 23, 2009. ARB is currently considering amendments to the LCFS and plans to consider re-adoption of the LCFS in 2015.

California Advanced Clean Cars/Zero Emission Vehicle Program

Assembly Bill (AB) 1493 (Chapter 200, Statutes of 2002), also known as the Pavley regulations, required ARB to adopt regulations by January 1, 2005, that would result in the achievement of the “maximum feasible” reduction in GHG emissions from vehicles used in the state primarily for noncommercial, personal transportation.

In January 2012, ARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars (13 CCR 1962.1 and 1962.2). The Advanced Clean Cars requirements include new GHG standards for model year 2017 to 2025 vehicles. ARB anticipates that the new standards will reduce motor vehicle GHG emissions by 34 percent in 2025 (ARB 2014c).

The Advanced Clean Cars Program also includes the LEV III amendments to the LEV regulations (13 CCR 1900 et seq.), Zero Emission Vehicle Program and the Clean Fuels Outlet Regulation. The Zero Emission Vehicle Program is designed to achieve California’s long-term emission reduction goals by requiring manufacturers to offer for sale specific numbers of the very cleanest cars available. These zero-emission vehicles, which include battery electric, fuel cell, and plug-in hybrid electric vehicles, are just beginning to enter the marketplace. They are expected to be fully commercial by 2020. Most vehicle manufacturers agree that providing a selection of these technologies will be necessary to meet climate goals by 2050 (ARB 2014d). The Clean Fuels Outlet regulation ensures that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to market.

Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation

The Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation (17 CCR Sections 95300 et seq.) reduces GHG emissions by improving the fuel efficiency of heavy-duty tractors that pull 53-foot or longer box-type trailers. Fuel efficiency is improved through improvements in tractor and trailer aerodynamics and the use of low rolling resistance tires. ARB expects the regulation to reduce statewide GHG emissions by approximately 0.7 million metric tons CO₂e by 2020. The tractors and trailers subject to this regulation must use U.S. Environmental Protection Agency SmartWaySM certified tractors and trailers, or retrofit their existing fleet with SmartWay verified technologies

Tire Pressure Regulation

On September 1, 2010, the Tire Pressure Regulation (17 CCR Section 95550) took effect. The purpose of this regulation is to reduce GHG emissions from vehicles operating with under inflated tires by inflating them to the recommended tire pressure rating. The regulation applies to vehicles with a gross vehicle weight rating (GVWR) of 10,000 pounds or less.

ENERGY USE AND GENERATION

Renewable Portfolio Standard

California law (SB X1-2, Statutes of 2011) requires retail suppliers of electricity to procure at least 33 percent of annual retail sales from eligible renewable energy sources by 2020.

Title 24 Energy Standards

Energy Conservation Standards for new residential and nonresidential buildings were first adopted by the CEC in June 1977 and were most recently revised in 2013 (Title 24, Part 6 of the California Code of Regulations [Title 24]). Title 24 governs energy consumed by commercial and residential buildings in California. This includes the heating, ventilation, and air conditioning (HVAC) system; water heating; and some fixed lighting. Nonbuilding energy use, or “plug-in” energy use, is not covered by Title 24. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. California's Building Energy Efficiency Standards are updated on an approximate 3-year cycle. The most recent update was in 2013. The 2013 Title 24 standards went into effect July 1, 2014, and improve on the 2008 Title 24 standards. The CEC estimates that the 2013 Standards are 25 percent more energy-efficient than the previous standards for residential construction and 30 percent more efficient for nonresidential construction (CEC 2014a, 2014b).

Appliance Efficiency Regulations

California's 2009 Appliance Efficiency Regulations (20 CCR 1601–1608) were adopted by the CEC on December 3, 2008, and approved by the California Office of Administrative Law on July 10, 2009. The regulations include standards for both federally regulated appliances and nonfederally regulated appliances.

Green Building Standards

The 2013 California Green Building Standards Code (24 CCR Part 11 [CALGREEN]) took effect January 1, 2014. These comprehensive regulations will achieve major reductions in GHG emissions, energy consumption, and water use. CALGREEN will require that every new building constructed in California reduce water consumption by 20 percent, divert 50 percent of construction waste from landfills, and install low-pollutant-emitting materials. They also require separate water meters for nonresidential buildings' indoor and outdoor water use, with a requirement for moisture-sensing irrigation systems for larger landscape projects and mandatory inspections of energy systems (e.g., heat furnace, air conditioner, and mechanical equipment) for nonresidential buildings larger than 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies. ARB estimates that the mandatory provisions will reduce GHG emissions from buildings by approximately 3 MMT CO₂e in 2020 in comparison with GHG emissions without implementation of the Green Building Standards (ARB 2014e).

Energy Efficiency in Existing Buildings

Assembly Bill 758 (Chapter 470, Statutes of 2009) requires the CEC to develop and implement a comprehensive energy efficiency plan for all of California's existing buildings. In 2015, the CEC released the Draft Existing Buildings Energy Efficiency Action Plan, which provides a ten-year blueprint for reducing energy consumption in all existing buildings in the single-family, multi-family, commercial and public buildings sectors. The goal of the plan is to double energy savings in California's buildings, which is equivalent to a 17 percent reduction in statewide building energy use in 2030 compared to projected levels of usage. AB 758 complements the existing energy efficiency programs implemented by California's investor-owned utilities (IOUs) that target both residential and non-residential sectors.

Performance Standard for Baseload Power Generation

SB 1368 (Chapter 598, Statutes of 2006) required the California Public Utilities Commission (PUC) to establish a GHG emissions performance standard for "baseload" generation from investor-owned utilities of 1,100 lbs CO₂/MWh. The CEC established a similar standard for local publicly owned utilities. All electricity provided to California, including imported electricity, must be generated from plants that meet or exceed this standard.

Senate Bill 1 (Chapter 132, Statutes of 2006)

The California Solar Initiative (Senate Bill 1, Chapter 132, Statutes of 2006), also known as the "Million Solar Roofs" legislation, set a goal of installing 3,000 megawatts of new solar capacity by 2017.

Off-road Vehicle and Equipment Regulations

State regulations that govern off-road vehicles such as locomotives and heavy equipment are discussed in Section 4.3, Air Quality. These regulations also result in reductions in GHG emissions, and include the following standards.

Small Offroad Engine Exhaust Emission Standards: The ARB has adopted regulations (13 CCR Sections 2400 et seq.) to control emissions from small off-road engines such as lawn, garden and other maintenance utility equipment (ARB 2015b). The rules affect engines less than 25 horsepower and regulate emissions of hydrocarbons, NOx, and CO. The emission standards also reduce GHGs by requiring more efficient engines.

Offroad Compression-Ignition Diesel Engine Exhaust Emission Standards: The ARB has adopted regulations (13 CCR Sections 2400 et seq.) to control emissions from off-road compression-ignition diesel engines found in a wide variety of off-road applications such as farming, construction, and industrial. The regulations require off-road engines to meet emission standards for hydrocarbons, NOx, CO and PM in “Tiers”, which require engines to meet increasingly stringent emission levels. The regulations also reduce GHG emissions by requiring more efficient engines.

SOLID WASTE AND WATER

Solid Waste Diversion

AB 341 (Chapter 476, Statutes of 2011) set a goal that 75 percent of the solid waste generated be reduced, recycled or composted by 2020.

Landfill Methane Control Measure

The Landfill Methane Control Measure (17 CCR Sections 95460 et seq.) reduces emissions of methane from municipal solid waste (MSW) landfills. The regulation became effective June 17, 2010 and requires owners and operators of uncontrolled MSW landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner.

Water Conservation

State water conservation legislation and regulations are reviewed in Section 4.16 Water Supply.

HIGH GLOBAL WARMING POTENTIAL GASES

Refrigerant Management Program

ARB’s Refrigerant Management Program (17 CCR Sections 95380 et seq.) works to reduce the release of currently use high-global warming potential (GWP) gases. The Program requires facilities with refrigeration systems to inspect and repair leaks, maintain service records, and in some cases report refrigerant use.

Motor Vehicle Air-Conditioning

In January 2009, ARB approved the mobile air conditioning regulation (17 CCR Sections 95360 et seq.) to reduce emissions associated with the use of small container of automotive refrigerant. The regulation applies to the sale, use, and disposal of small container with a GWP greater than 150.

Consumer Products Regulation

Limiting the use of high GWP compounds in consumer products is part of ARB's larger Consumer Products Program. In 2009, ARB approved amendments to the Consumer Products Regulation to prohibit the use of compounds with GWP values greater than 150. (ARB Resolution 09-51.)

Sulfur Hexafluoride Leak Reduction and Recycling

Sulfur hexafluoride (SF₆) is a potent greenhouse gas, with a global warming potential (GWP) of 23,900, the highest identified by the Intergovernmental Panel on Climate Change. ARB approved sulfur hexafluoride reductions from non-electric and non-semiconductor applications as an early action measure. Accordingly, ARB approved the Regulation for Reducing Sulfur Hexafluoride Emissions (17 CCR Sections 95340 et seq.) in February 2009 to reduce sulfur hexafluoride emissions from other uses including magnesium die-casting, fume vent hood testing, tracer gas use, and other niche uses.

Public Resources Code Section 30253

Public Resources Code Section 30253, part 4, establishes a policy that development within the Coastal Zone shall minimize energy consumption and vehicle miles traveled.

4.8.2.3 REGIONAL AND LOCAL LAWS, REGULATIONS, PLANS, AND POLICIES

SANDAG Climate Action Strategy

In 2010, SANDAG published a Climate Action Strategy (Strategy) that was prepared under a partnership with the CEC (SANDAG 2010). The Strategy is a guidance document and not a binding plan. The Strategy serves as a guide to help policymakers address climate change as they make decisions to meet the needs of our growing population, maintain and enhance our quality of life, and promote economic stability. As stated in the Strategy introduction, the policy measures contained in the Strategy are intended to be a list of potential options (tools in the toolbox) for consideration as SANDAG and local governments update their various plans. The policy measures are not requirements for SANDAG, local governments, or any other entity.

The Strategy identifies goals, objectives, and policy measures in the areas of transportation, land use, buildings, and energy use. Also addressed are measures and resources to help local governments reduce emissions from their operations and in their communities. The policy measures contained in this document are intended to be a list of potential options to reduce GHG emissions. Because local governments have greater control over some categories of GHG emission sources, the Strategy emphasizes those areas where the greatest impact can be made at the local and regional level. These areas include land use patterns, transportation infrastructure, and related public investment; building construction and energy use; and local government operations.

Within the three areas, goals, objectives, and policy measures are included in the Strategy to further describe how GHG emissions reductions could be achieved. The goals identified in the Strategy include the following:

Transportation Sector

- Reduce total miles of vehicle travel
- Minimize GHG emissions when vehicles are used
- Support increased use of low carbon alternative fuels
- Protect transportation infrastructure from climate change impacts

Clean Energy and Efficient Buildings

- Reduce energy use in residential and commercial buildings
- Increase use of renewable energy
- Reduce water-related energy use and GHGs
- Protect energy infrastructure from climate change impacts

SANDAG and Local Government Operations

- SANDAG and local governments lead by example

SANDAG Regional Energy Strategy

SANDAG has adopted a Regional Energy Strategy (RES), which serves as the energy policy blueprint for the region through 2050 (SANDAG 2009b). The RES addresses some of the goals identified in the 2014 Scoping Plan Update. It establishes long-term goals in 11 topic areas including energy efficiency, renewable energy, distributed generation, transportation fuels, land use and transportation planning, border energy issues, and the green economy. In 2014, a technical update of the RES was completed to inform development of the proposed Plan (SANDAG 2014a). This technical update demonstrates progress toward attaining the RES goals, updates existing conditions and future projections data, and recommends priorities for the region. The RES goals include the following:

- Energy Efficiency and Conservation – Reduce per capita electricity consumption by 20 percent by 2030 in order to keep total electricity consumption flat.
- Renewable Energy – Support the development of renewable energy resources to meet a 33 percent renewable portfolio standard (RPS) by 2020 and exceed 33 percent beyond 2020.
- Distributed Generation – Increase the total amount of clean distributed generation (renewable and nonrenewable) to reduce peak demand and diversify electricity resources in the region.
- Energy and Water – Reduce water-related energy use.
- Peak Demand – Implement cost-effective steps and incentives to utilize demand response and energy efficiency measures to reduce peak demand.
- Smart Energy – Modernize the electricity grid with smart meters, smart end-use devices, and interactive communication technologies.
- Natural Gas Power Plants – Increase overall efficiency of electricity production and support replacement of inefficient power plants consistent with California’s preferred loading order.
- Transportation Fuels – Substantially increase the deployment of alternative transportation fuels and vehicles.

- Land Use and Transportation Planning – Reduce the energy demand of the built environment through changes in land use and transportation planning.
- Energy and Borders – Integrate energy considerations into existing and future collaborative border initiatives.
- Clean Energy Economy – Collaborate with workforce entities, employers, technical and vocational schools, and labor unions to identify and expand local job placement mechanisms in the Clean Energy Sector.

Regional Alternative Fuel Planning

On-road transportation represents approximately 44.5 percent of the region’s GHG emissions and, as such, the proposed Plan and RES both call for SANDAG to undertake coordinated planning for electric vehicle charging and alternative fueling infrastructure in the region.

Infrastructure needs were identified in a 2009 assessment of how to accelerate deployment of alternative fuel vehicles in and around San Diego entitled the Regional Alternative Fuels, Vehicles and Infrastructure Report (SANDAG 2009a). The report recommended public–private partnerships and collaborative approaches to infrastructure planning and increasing alternative fuels in fleets. Its findings were incorporated into the regional energy and climate strategies.

San Diego Regional Plug-In Electric Vehicle Readiness Plan

In 2012, SANDAG established the San Diego Regional Electric Vehicle Infrastructure Working Group (REVI) as part of a CEC grant to perform regional Plug-In Electric Vehicle (PEV) readiness planning. The REVI completed the San Diego Regional Plug-in Electric Vehicle Readiness Plan, which was accepted by the SANDAG Board in January 2014. As part of another CEC grant, SANDAG will build on the success of the REVI and undertake regional readiness planning for all alternative fuels in partnership with the San Diego Regional Clean Cities Coalition. A regional alternative fuels coordinating council will be established to advise on regional alternative fuel infrastructure needs, barriers, and solutions.

SANDAG Energy Roadmap Program for Local Governments

The Energy Roadmap Program is a collaboration between SANDAG and San Diego Gas & Electric (SDG&E). It is funded primarily by California utility customers under the auspices of the PUC. Transportation components of the program are funded by SANDAG. The roadmap program was developed with the help of the Energy Working Group and three pioneering cities: Carlsbad, Poway, and Solana Beach. These cities served as early pilots in energy management planning, which became the roadmap program in 2010. All cities within the San Diego region are now participating in the program.

The SANDAG Energy Roadmap Program provides free energy assessments and energy management plans, or “energy roadmaps,” to SANDAG member agencies. Each energy roadmap provides a framework for a local government to reduce energy use in municipal operations and in the community, and can result in economic savings and environmental benefits. Within the energy roadmap are eight general categories:

1. Saving Energy in City Buildings and Facilities
2. Demonstrating Emerging Energy Technologies

3. Greening the City Vehicle Fleet
4. Developing Employee Knowledge of Energy Efficiency
5. Promoting Commuter Benefits to City Employees
6. Leveraging Planning and Development Authority
7. Marketing Energy Programs to Local Residents and Businesses
8. Supporting Green Jobs and Workforce Training

Upon receiving their energy roadmap, SANDAG assists municipalities in developing projects and/or programs presented in the eight general categories.

Local Greenhouse Gas Inventories and Climate Action Plans

In the San Diego region, all 19 jurisdictions (18 cities and County of San Diego) have completed a GHG inventory covering both government operations and the community as a whole, many prepared as part of the San Diego Foundation's Climate Initiative (City of Carlsbad 2011, City of Chula Vista 2006, City of Chula Vista 2013a, City of Del Mar 2011, City of El Cajon 2011, City of Encinitas 2011b, City of Escondido 2011, City of Imperial Beach 2011, City of La Mesa 2011, City of National City 2009, City of Oceanside 2011, City of Poway 2011, City of San Marcos 2013b, City of Santee 2011, City of Solana Beach 2011, County of San Diego 2011). In addition, the Border Environment Cooperation Commission (BECC) has worked with the Center for Climate Strategies to complete GHG inventories for all six Mexican border states. Each inventory identifies emissions sources, and sets a baseline for evaluating reductions.

More than half of the local jurisdictions in the San Diego region, representing over 75 percent of the region's population, are developing or have adopted a climate action plan (CAP) ([City of Carlsbad 2015](#); City of Chula Vista 2000, 2008, 2013b; City of Encinitas 2011a; City of Escondido 2013; City of National City 2011; City of San Diego 2005; City of San Marcos 2013a; County of San Diego 2012¹; City of Vista 2012). A CAP typically includes specific measures or actions to reduce GHG emissions toward an identified target, and offers streamlining opportunities for future development projects under CEQA. Table 4.8-5 summarizes each jurisdiction's climate planning efforts. In addition to the efforts of the 18 cities and the County of San Diego, the Port of San Diego and the San Diego County Water Authority have developed GHG inventories and CAPs.

Table 4.8-5
Status of Climate Action Planning

Jurisdiction	% of 2012 Regional Population	Completed GHG Inventory	Climate Action Plan	
			Adoption year	Developing
Chula Vista	7.9	√	2008	√
Encinitas	1.9	√	2011	n/a
Escondido	4.6	√	2013	n/a
National City	1.9	√	2011	n/a
San Diego	42.0	√	2005	√
County of San Diego (unincorporated)	15.8	√	n/a ¹	√
Vista	3.0	√	2012	n/a
San Marcos	2.7	√	2013	n/a
Carlsbad	3.4	√	n/a ²	√

¹ The County of San Diego rescinded its Climate Action Plan in April 2015 and is currently preparing a new plan.

² The City of Carlsbad adopted a Climate Action Plan on September 22, 2015.

Del Mar	0.1	√	n/a	√
La Mesa	1.9	√	n/a	√
Santee	1.7	√	n/a	√
Solana Beach	0.4	√	n/a	√
Coronado	0.7	√	n/a	n/a
El Cajon	3.2	√	n/a	n/a
Imperial Beach	0.8	√	n/a	n/a
Lemon Grove	0.8	√	n/a	n/a
Oceanside	5.4	√	n/a	n/a
Poway	1.5	√	n/a	n/a

Source: ARB 2014b

4.8.3 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines and Guidelines Section 15064.4 provide criteria for evaluating the significance of a project's environmental impacts on GHGs. Unless otherwise noted, the significance criteria specifically developed for this EIR are based on the checklist questions in Appendix G and Guidelines Section 15064.4. In some cases, SANDAG has combined checklist questions, edited their wording, or changed their location in the document in an effort to develop significance criteria that reflect the programmatic level of analysis in this EIR and the unique nature of the proposed Plan.

Appendix G addresses GHGs under Greenhouse Gases (VII. (a) and (b)). The criteria below build on the Appendix G questions and Guidelines Section 15064.4 to analyze the impact of the proposed Plan in relation to the GHG targets established by AB 32, Executive Order B-30-15, Executive Order S-3-05, SB 375, and local climate action plans. For the purposes of this EIR, implementation of the proposed Plan would have a significant GHG impact if it would:

- GHG-1 Directly or indirectly result in an increase in GHG emissions compared to existing conditions (2012).
- GHG-2 Conflict with AB 32, SANDAG Climate Action Strategy, or Local Climate Action Plans.
- GHG-3 Conflict with SB 375 GHG emission reduction targets.
- GHG-4 Be inconsistent with the State's ability to achieve the Executive Order B-30-15 and S-3-05 goals of reducing California's GHG emissions to 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050.

When setting the above thresholds, SANDAG also considered the following factors listed in CEQA Guidelines Section 15064.4:

- Whether the project may increase or decrease GHG emissions compared to the existing environmental setting (Impacts GHG-1 and GHG-4)
- Whether GHG emissions exceed a threshold of significance that the lead agency determines applies to the project (Impacts GHG-1 through GHG-4)
- The extent to which the project complies with requirements adopted to implement certain specified plans for the reduction of GHG emissions (Impacts GHG-2 and GHG-3)

4.8.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

GHG-1 DIRECTLY OR INDIRECTLY RESULT IN AN INCREASE IN GHG EMISSIONS COMPARED TO EXISTING CONDITIONS (2012).

ANALYSIS METHODOLOGY

GHG emission projections are based on the proposed Plan, including forecasted regional growth and land use change and planned transportation network improvements and programs. The inventory also accounts for the Renewable Portfolio Standard that requires retail suppliers of electricity to increase renewable energy resources to 33 percent by 2020. The inventory also includes implementation programs such as Title 24 building standards, water conservation programs, solid waste diversion programs, and other regulatory requirements and programs designed to reduce GHG emissions. The GHG emissions inventory and supporting assumptions are included as EIR Appendix G-1.

It should be noted that the current GHG inventory shows lower projected GHG emissions than the inventory presented in the 2050 RTP/SCS Environmental Impact Report (SANDAG 2011) for several reasons. The original inventory was prepared in 2011 and took into account information on the regulatory environment and technology that was available at the time. The original inventory was based on “business as usual” conditions as of 2010. The current inventory is not based on business as usual emissions, but takes into account implementation of currently adopted regulations, programs, and policies that will lead to reductions in GHG emissions. As stated above, the current inventory is based on the Series 13 Regional Growth Forecast, which has slightly lower population projections than the 2050 RTP/SCS. The inventory accounts for additional certainty regarding the regulatory environment, including future projections for renewable energy, building energy efficiency, water conservation programs, and solid waste diversion. The current inventory for on-road vehicles is also based on the ARB’s EMFAC2014 model, which is the most recent update to the state’s mobile source emissions inventory tool. The model accounts for programs that will lead to further reductions from on-road vehicles, including the ARB’s Advanced Clean Cars Program.

In the Final EIR, revised numbers for on-road transportation GHG emissions reflect the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. In the Final EIR, the updated version of EMFAC2014 also was used to update the estimate of 2012 on-road GHG emissions. These numbers were slightly different from those in the Draft EIR because on-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1). On-road emissions in the Final EIR were also broken down to reflect two categories of on-road GHG emissions: (1) passenger cars and light duty vehicles and (2) heavy duty trucks and vehicles.

It should also be noted that, while the current inventory takes into account regulations, programs, and policies that are in place at this time, there is substantial uncertainty in projecting emissions for future horizon years, especially for 2050; in general, the uncertainty in future emissions increases from 2020 to 2050. The inventory projects emissions based on reasonable assumptions regarding future conditions; however, it does not account for future regulatory initiatives, technologies, or market drivers that may affect GHG emissions in the future over the next 35 years. For example, even though further reductions may be achieved through future legislation or regulations, the Renewable Portfolio Standard for renewable electricity generation does not set targets beyond 2020, and the ARB Advanced Clear Cars Program does not address passenger vehicles beyond the 2025 model year. The following analysis is therefore considered conservative and may overstate actual GHG emission trends in future years.

For the purpose of evaluating impacts under Impact GHG-1, because regional growth and land use change and the transportation network together impact overall GHG emissions, the impact assessment includes both regional growth and land use change and the transportation network improvements. Emission calculations are provided in Appendix G-1 to the EIR.

Regional Greenhouse Gas Emissions Methodology

GHG emissions from the proposed Plan are calculated based on standard approaches for estimating GHG emissions that are documented in Appendix G-1 to the EIR. To the extent possible, the inventory followed the ICLEI U.S. Community Protocol² methods for the following emissions categories:

- On-road transportation, including:
 - Passenger cars and light duty vehicles
 - Heavy duty trucks and vehicles
- Electricity and natural gas
- Water consumption
- Solid waste
- Wastewater
- Civil Aviation

The remaining categories were calculated based on California Air Resources Board methods and methods based on San Diego region data:

- Other Fuels
- Cogeneration
- Industrial
- Off-Road
- Land Use and Wildfires
- Rail
- Agriculture
- Marine Vessels

Construction emissions include emissions from off-road equipment that are part of the emission inventory under the off-road category, and vehicles that are part of the on-road transportation category. In addition, indirect GHG emissions from operation of the Trolley are included under electricity use. GHG emission reductions are also projected for development and sequestration.

GHG emissions associated with operation of planned transportation network improvements and programs are calculated using estimated total VMT under the proposed Plan, using ARB's EMFAC2014 model, which represents ARB's current understanding of motor vehicle travel activities and their associated emission levels. It represents ARB's current understanding of how vehicles travel and how much they pollute. Emissions are estimated for 2012 (baseline), 2020, 2035, and 2050. EMFAC2014 includes the latest data on California's car and truck fleets and accounts for emissions reductions due to implementation of statewide vehicular regulations, including on-road diesel fleet rules, Advanced Clean Car Standards, zero emission vehicle regulations, and the Smartway/Phase I Heavy Duty Vehicle Greenhouse Gas Regulation. The model also includes updates to truck emission factors based on the latest surveillance data (ARB 2014f).

² U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions (2013) available at <http://www.icleiusa.org/tools/ghg-protocol/community-protocol>.

During the timeframe of the proposed Plan, climate change effects that are likely to exacerbate the proposed Plan's greenhouse gas emissions impacts include but are not limited to increases in temperatures and frequency, duration, and intensity of heatwaves, and increased frequency and intensity of wildfires. In general, these climate change effects would increase between 2020 and 2050. Climate change effects are discussed in more detail in Appendix F to the EIR.

2020

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

From 2012 to 2020, the region is forecasted to increase by 292,292 people; 83,874 housing units; and 118,535 jobs. Under implementation of the proposed Plan, total GHG emissions in the San Diego region are projected to be approximately 28.18 MMT CO₂e in 2020, or about 19 percent lower than GHG emissions in 2012 (Table 4.8-6).

While population and development in the region is increasing in 2020 relative to 2012, GHG emissions are projected to decrease due to regulations and programs implemented on the state and regional levels to reduce emissions of GHGs. These programs include implementation of the RPS, Advanced Clean Cars regulations, the Low Carbon Fuel Standard, Cap-and-Trade program, energy efficiency standards for buildings, continued growth in solar photovoltaic installations, water conservation measures, solid waste diversion, refrigerant programs, and emission standards for off-road equipment. In addition, the SCS land use pattern and transportation network improvements and programs play an important role by decreasing per capita vehicle miles traveled. The decrease in per capita VMT is attributable to a number of factors considered in the proposed Plan's transportation modeling: proposed Plan investments in transit and managed lanes; TDM programs such as carpooling, vanpooling, mobility hubs, and teleworking; and demographic (e.g., aging population) and economic e.g., fuel prices factors.

Table 4.8-6
Total Greenhouse Gas Emissions in the San Diego Region, 2012 to 2020

GHG Emissions Category	2012 (Annual MMTCO₂e)	2020 (Annual MMTCO₂e)
On-Road Transportation Passenger Cars & Light Duty Vehicles	15.76 13.14	13.72 11.18
Electricity	7.97	6.41
Natural Gas	2.84	2.79
Heavy Duty Trucks & Vehicles	1.89	1.89
Solid Waste	1.75	0.84
Other Fuels	1.64	1.64
Industrial	1.43	1.45
Aviation	1.37	1.52
Off-Road Equipment and Vehicles	0.92	0.95
Wildfire	0.81	0.81
Other - Thermal Cogeneration	0.64	0.65
Water Supply and Conveyance	0.52	0.57
Wastewater	0.16	0.12
Rail	0.11	0.15
Agriculture	0.08	0.06
Marine Vessels (excluding pleasure craft)	0.05	0.05
Development + Sequestration	-0.65	-0.62
Low Carbon Fuel Standard	n/a	-1.39
Cap-and-Trade	n/a	-0.50
High GWP Gases	n/a	-0.43
Total	<u>35.434.7</u>	<u>28.828.1</u>
% Increase (Decrease) from 2012 to 2020		(18.86%)

Source: Appendix G-1 to the EIR

Note:

The revised numbers in this table reflect the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

2020 Conclusion

As shown in Table 4.8-6, implementation of the proposed Plan would result in a less than significant impact because the proposed Plan would not directly or indirectly result in an increase in GHG emissions compared to existing conditions. Therefore, this impact (GHG-1) in the year 2020 is less than significant.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

From 2012 to 2035, the region is forecasted to increase by 710,269 people, 230,220 housing units, and 319,025 jobs. Under the proposed Plan, total GHG emissions for the region in 2035 are projected to be approximately 25.5 MMT CO₂e, or ~~28.26.5~~ percent lower than GHG emissions in 2012 (Table 4.8-7).

While population in the region is increasing in 2035 relative to 2012, GHG emissions are projected to decrease due to regulations and programs implemented on the state and regional levels to reduce emissions of GHGs. These programs include implementation of the RPS, Advanced Clean Cars regulations, the Low Carbon Fuel Standard, Cap-and-Trade program, energy efficiency standards for buildings, continued growth in solar photovoltaic installations, water conservation measures, solid waste diversion, refrigerant programs, and emission standards for off-road equipment. In addition, the

SCS land use pattern and transportation network improvements and programs play an important role by decreasing per capita vehicle miles traveled. The decrease in per capita VMT is attributable to a number of factors considered in the proposed Plan's transportation modeling: proposed Plan investments in transit and managed lanes; TDM programs such as carpooling, vanpooling, mobility hubs, and teleworking; and demographic (e.g., aging population) and economic e.g., fuel prices factors.

**Table 4.8-7
Total Greenhouse Gas Emissions in the San Diego Region, 2012 to 2035**

Category	2012 (Annual MMTCO ₂ e)	2035 (Annual MMTCO ₂ e)
On-Road Transportation <u>Passenger Cars & Light Duty Vehicles</u>	15.76 <u>13.14</u>	9.68 <u>7.69</u>
Electricity	7.97	6.05
Natural Gas	2.84	2.73
<u>Heavy Duty Trucks & Vehicles</u>	<u>1.89</u>	<u>2.03</u>
Solid Waste	1.75	0.93
Other Fuels	1.64	1.66
Industrial	1.43	1.49
Aviation	1.37	1.72
Off-Road	0.92	1.47
Wildfire	0.81	0.81
Other - Thermal Cogen	0.64	0.71
Water	0.52	0.63
Wastewater	0.16	0.15
Rail	0.11	0.23
Agriculture	0.08	0.03
Marine Vessels (excluding pleasure craft)	0.05	0.05
Development + Sequestration	-0.65	-0.56
Low Carbon Fuel Standard	n/a	-1.39
Cap-and-Trade	n/a	-0.50
High GWP Gases	n/a	-0.43
Total	<u>35.434.7</u>	<u>25.5</u>
% Increase (Decrease) from 2012 to 2035		<u>(26.58-0%)</u>

Source: Appendix G-1 to the EIR

Note:

The revised numbers in this table reflect the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

2035 Conclusion

Table 4.8-7 shows the total GHG emissions in 2035 versus existing conditions. As shown in Table 4.8-7, implementation of the proposed Plan would result in a less than significant impact because the proposed Plan would not directly or indirectly result in an increase in GHG emissions compared to existing conditions. Therefore, this impact (GHG-1) in the year 2035 is less than significant.

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

From 2012 to 2050, the region is forecasted to increase by 925,330 people, 327,921 housing units, and 460,492 jobs. Total GHG emissions in 2050 are projected to be 25.926 MMT CO₂e, or 26.825.9 percent lower than GHG emissions in 2012 (Table 4.8-8).

Table 4.8-8
Total Greenhouse Gas Emissions in the San Diego Region, 2012 to 2050

Category	2012 (Annual MMTCO ₂ e)	2050 (Annual MMTCO ₂ e)
<u>On-Road Transportation</u> <u>Passenger Cars & Light Duty Vehicles</u>	<u>15.76</u> <u>13.14</u>	<u>9.64</u> <u>7.46</u>
Electricity	7.97	5.76
Natural Gas	2.84	2.69
<u>Heavy Duty Trucks & Vehicles</u>	<u>1.89</u>	<u>2.33</u>
Solid Waste	1.75	0.98
Other Fuels	1.64	1.66
Industrial	1.43	1.60
Aviation	1.37	1.82
Off-Road	0.92	1.79
Wildfire	0.81	0.81
Other - Thermal Cogen	0.64	0.77
Water	0.52	0.67
Wastewater	0.16	0.15
Rail	0.11	0.30
Agriculture	0.08	0.02
Marine Vessels (excluding pleasure craft)	0.05	0.05
Development + Sequestration	-0.65	-0.51
Low Carbon Fuel Standard	n/a	-1.39
Cap-and-Trade	n/a	-0.50
High GWP Gases	n/a	-0.43
Total	<u>35.434.7</u>	<u>25.926.0</u>
% Increase (Decrease) from 2012 to 2050	(<u>26.824.9%</u>)	

Source: Appendix G-1 to the EIR

Note:

The revised numbers in this table reflect the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

While population in the region is increasing in 2050 relative to 2012, GHG emissions are projected to decrease due to regulations and programs implemented on the state and regional levels to reduce emissions of GHGs. These programs include implementation of the RPS, Advanced Clean Cars regulations, the Low Carbon Fuel Standard, Cap-and-Trade program, energy efficiency standards for buildings, continued growth in solar photovoltaic installations, water conservation measures, solid waste diversion, refrigerant programs, and emission standards for off-road equipment.

In addition, the SCS land use pattern and transportation network improvements and programs play an important role by decreasing per capita vehicle miles traveled. The decrease in per capita VMT is attributable to a number of factors considered in the proposed Plan's transportation modeling: proposed Plan investments in transit and managed lanes; TDM programs such as carpooling, vanpooling, mobility hubs, and teleworking; and demographic (e.g., aging population) and economic e.g., fuel prices factors.

2050 Conclusion

As shown in Table 4.8-8, implementation of the proposed Plan would result in a less than significant impact because the proposed Plan would not directly or indirectly result in an increase in GHG emissions compared to existing conditions. Therefore, this impact (GHG-1) in the year 2050 is less than significant.

GHG-2 CONFLICT WITH AB 32, SANDAG CLIMATE ACTION STRATEGY, OR LOCAL CLIMATE ACTION PLANS.

ANALYSIS METHODOLOGY

The analysis evaluates any conflicts of the proposed Plan with AB 32, SANDAG’s Climate Action Strategy, and adopted local Climate Action Plans.

The AB 32 analysis evaluates whether the proposed Plan would conflict with the State’s ability to achieve the AB 32 target of reducing statewide GHG emissions to the 1990 levels by 2020. In addition to establishing a statewide emissions limit to be achieved by 2020, AB 32 also includes a provision stating the intent of the Legislature that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in GHG emissions beyond 2020 (HSC Section 38551[b]). Statewide goals for GHG emissions reductions beyond 2020 have since been expressed in Governor’s Executive Orders, including goals of 40 percent below 1990 levels by 2030 (EO-B-30-15) and goals of 80 percent below 1990 levels by 2050 (EO-S-3-05), which are evaluated in Impact GHG-4. Therefore, the AB 32 analysis in Impact GHG-2 analysis focuses on whether the region would achieve a regional reference point based on the 2020 target.

The 1990 GHG emissions in the San Diego region was 29 MMT CO₂e (see Appendix G-1 to the EIR).³ The analysis compares 2020 GHG emissions under the proposed Plan to the region’s 1990 levels. Note that there is no requirement that the SANDAG region’s emissions be reduced by the same percentage (“equal share”) as the statewide percentage in order for the State to achieve the AB 32 target. The impacts of the proposed Plan are nevertheless considered significant if the region’s total emissions in 2020 exceed the 1990 reference point of 29 MMT CO₂e.

For purposes of evaluating impacts under Impact GHG-2, because the AB 32 target includes both regional growth and land use change and the transportation network, the analysis has not been separated into two categories. The impact assessment includes both regional growth and land use change and planned transportation network improvements and programs.

Emissions calculations are provided in Appendix G-1 to the EIR. The AB 32 analysis also evaluates the proposed Plan for any conflicts with applicable recommendations for achieving GHG reductions in the ARB’s Scoping Plan Update “transportation focus area”.

The other components of Impact GHG-2 evaluate the proposed Plan for any conflicts with SANDAG’s Climate Action Strategy (Strategy) goals, objectives, and policy measures for GHG reductions, and local climate action plan policies for GHG reductions. The analysis of the Strategy and local climate actions plans is provided for 2020, 2035, and 2050. For the purpose of evaluating impacts under Impact GHG-2, because the Climate Action Strategy and local climate action plans establish goals, objectives, and policy measures for both regional growth and land use change and the transportation network improvements, the analysis of conflicts with SANDAG’s Climate Action Strategy and local climate action plans has not been separated into the two categories. The impact assessment includes both regional growth and land use change and the transportation network improvements.

³ The 1990 GHG emissions estimate of 25 MMT CO₂e in the 2050 RTP/SCS FEIR was estimated as 15 percent below 2005 levels and based on EMFAC2011 emissions data for vehicles for the region. The 1990 GHG emissions estimate has been updated to align with ARB updates to the statewide 1990 emissions inventory and to utilize the best available data for 1990~~the EMFAC2014 model, as well as other updated information.~~

During the timeframe of the proposed Plan, climate change effects that are likely to exacerbate the proposed Plan's greenhouse gas emissions impacts include but are not limited to increases in temperatures and frequency, duration, and intensity of heatwaves (which could lead to increases in GHG emissions from local fossil fuel-fired power plants to meet electricity demands); and wildfires (which release GHG emissions). In general, these climate change effects would increase between 2020 and 2050. Climate change effects are discussed in more detail in Appendix F.

2020

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

As discussed under Impact GHG-1, under implementation of the proposed Plan, total GHG emissions for the San Diego region in 2020 are projected to be approximately 28.18 MMT CO₂e. To be in line with its "equal share" of the state emissions reduction target set forth in AB 32, regional GHG emissions would need to decrease to 29 MMT CO₂e by 2020. Therefore, the proposed Plan would not conflict with the AB 32 target of reducing statewide emissions to 1990 levels by 2020.

In addition, the proposed Plan would not conflict with applicable recommendations in the ARB's Scoping Plan Update for the Transportation focus area. The 2014 Scoping Plan Update identified several recommended actions within the Transportation sector to achieve future GHG reductions, with the recommendations primarily focused on achieving major technological and regulatory changes in order to reduce GHG emissions from all types of vehicles and transportation fuels, including more efficient vehicles, low-carbon fuels like electricity and hydrogen, and supporting infrastructure. The Update also identified the following applicable recommendations for transportation:

- Caltrans and regional transportation agencies will increase investment in expanded transit and rail services, active transportation, and other VMT-reduction strategies in their next regional transportation plans.
- ARB, Caltrans, the Strategic Growth Council, and the Department of Housing and Community Development, along with other State, local and regional agencies, will coordinate planning and support to ensure that the expected GHG emission reductions from approved SCS are achieved or exceeded.

The proposed Plan would not conflict with the recommendation to increase investment in expanded transit and rail services, active transportation, and other VMT-reduction strategies in their regional transportation plans. From 2012 to 2020, the proposed Plan includes increased investment in transit and rail services, active transportation, and other VMT-reduction strategies including double-tracking along the LOSSAN rail corridor, increases in COASTER frequencies, completion of the Mid-Coast Trolley Extension from Old Town to University City, the South Bay Rapid Bus from the Otay Mesa ITC to Downtown San Diego, Rapid Bus Route 905 from Iris to the Otay Mesa POE, increases in local bus service frequencies, express bus routes to SDIA and Tijuana International Airport, a San Marcos shuttle, and construction of two transit-only lanes on SR 15 between I-805 and I-8. By 2020, the proposed Plan also includes investments in approximately 24 regional active transportation projects. Additional major transportation network improvements would include new Managed Lanes along I-5 from Manchester Avenue to SR 78 and I-805 from Carroll Canyon Road to SR 52, new toll lanes on SR 11 to the Otay Mesa POE, new general purpose lanes along a portion of SR 76, and a new freeway connector at SR 11 and SR 905. By 2020, these improvements would decrease average daily VMT per capita from 25.2 in 2012 to 24.7 in 2020. Also, the proposed Plan's SCS exceeds the regional SB 375 GHG reduction targets, as shown in Impact GHG-3.

Based on the above analysis, the proposed plan would not conflict with the AB 32 target of reducing statewide emissions to 1990 levels by 2020 or with the recommendations of the Scoping Plan Update. This impact is less than significant.

SANDAG Climate Action Strategy

The Climate Action Strategy is a guide for SANDAG on climate change policy (SANDAG 2010). The Climate Action Strategy identifies a range of potential policy measures for consideration in long-term planning documents such as the proposed Plan. The Strategy helps SANDAG identify land use, transportation, and related policy measures and investments that reduce GHG emissions from transportation and land use.

The Climate Action Strategy includes nine goals designed to address the impacts of GHG emissions and climate change in the region. The Strategy's goals include five specific goals relating to regional growth and land use change: Goals 5, 6, 7, 8, and 9. These goals have informed the development of the proposed Plan's policies relative to regional growth and land use change. Accordingly, the proposed Plan would not conflict with the Climate Action Strategy. The proposed Plan's programs and strategies are designed to be consistent with Climate Action Strategy goals and objectives, and would support their implementation. The proposed Plan therefore contributes to achieving the goals of the Strategy.

Table 4.8-9 presents the Climate Action Strategy goals and objectives that cover regional growth and land use change and transportation network improvements and programs, and an analysis of whether proposed Plan features would conflict with any of the goals and objectives.

**Table 4.8-9
Evaluation of Proposed Plan for Conflicts with the SANDAG Climate Action Strategy**

Climate Action Strategy Goals and Objectives	Conflict?
GOAL 1. REDUCE TOTAL MILES OF VEHICLE TRAVEL	
Objective 1a. Build Smart Growth Neighborhoods and Communities in which Basic Daily Needs and Public Transit Service are Safely Accessible on Foot or by Bicycle	From 2012 to 2050, the proposed Plan would increasingly locate population and employment within close proximity to public transit and bike facilities; total time engaged in transportation-related physical activity would increase; the percentage of peak period work trips via transit, walking and biking would increase. The proposed Plan land use pattern would accommodate 79 percent of all housing and 86 percent of all jobs within the Urban Area Transit Strategy (UATS). See proposed Plan Appendix N for measures documenting the proposed Plan's support for smart growth neighborhoods and communities.
Objective 1b. Expand and Develop New Systems for Low Carbon Modes of Transportation	The proposed Plan makes major investments in low carbon modes of transportation, including completion of double-tracking on the LOSSAN and SPRINTER rail corridors, five major expansions of the Trolley system, substantial investments in <i>Rapid</i> transit, major improvements in local bus service, and full build-out of the Regional Bike Network. More than half of proposed Plan revenues are for transit operations, transit capital projects, and active transportation.
Objective 1c. Reduce Demand for Single Occupancy Vehicle Travel	From 2012 to 2050, the proposed Plan would increase the percentage of peak period work trips completed by transit, walking and biking, and carpools; the percentage of drive alone trips would decrease over the same period.

GOAL 2. MINIMIZE GREENHOUSE GASES WHEN VEHICLES ARE USED	
Objective 2a. Reduce Traffic Congestion	The proposed Plan’s investments in transit, active transportation, managed lanes and general purpose lanes would reduce traffic congestion that would otherwise occur. Average travel times to work would generally remain flat over the life of the proposed Plan, and daily vehicle delay per capita would be one minute lower by 2050 relative to 2012.
Objective 2b. Promote Efficient Driving Practices	The proposed Plan would not conflict with efforts to promote efficient driving practices.
GOAL 3. PROMOTE USE OF LOW CARBON ALTERNATIVE FUELS	
n/a	The proposed Plan identifies continuing actions including building a network of electric vehicle charging stations and developing a regional alternative fuels plan, promoting the use of both zero-emission vehicles and alternative fuels.
GOAL 4. PROTECT TRANSPORTATION INFRASTRUCTURE FROM CLIMATE CHANGE IMPACTS	
Objective 4a. Protect Transportation Infrastructure from Damage Due to Extreme Heat	The proposed Plan identifies continuing actions including developing strategies to enhance the region’s ability to adapt to the consequences of climate change, including planning and design strategies to help communities cope with hazardous events such as storms, heat waves, wildfires, and ongoing drought.
Objective 4b. Protect Transportation Infrastructure from Sea Level Rise and Higher Storm Surges	
Objective 4c. Protect Transportation Infrastructure from Wildfire-Associated Mudslides	
GOAL 5. REDUCE ENERGY USE IN RESIDENTIAL AND COMMERCIAL BUILDINGS	
Objective 5a. Retrofit Existing Buildings to Reduce Energy Use	The proposed Plan identifies continuing actions including support for the efforts of local jurisdictions to implement their Energy Roadmap Programs to save energy in their own operations and in their communities. The proposed Plan identifies continuing actions including support for the efforts of local jurisdictions to implement their Energy Roadmap Programs to save energy in their own operations and in their communities.
Objective 5b. Maximize Efficiency in New Residential and Commercial Construction	
GOAL 6. INCREASE USE OF RENEWABLE ENERGY	
Objective 6a. Promote Installation of Clean, On-site Energy Systems	The proposed Plan identifies continuing actions including support for the efforts of local jurisdictions to implement their Energy Roadmap Programs to save energy in their own operations and in their communities.
Objective 6b. Promote Large-Scale Renewable Energy Projects	The proposed Plan would not conflict with development of large-scale renewable energy projects
GOAL 7. REDUCE WATER-RELATED ENERGY USE AND GREENHOUSE GASES	
Objective 7a. Integrate Measures that Save Water and Energy into Building Retrofit Programs	The proposed Plan would not conflict with programs to promote water conservation in existing buildings
Objective 7b. Use Reclaimed Water to Decrease the Amount of Greenhouse Gases Attributed to Meeting Water Needs	The proposed Plan would not conflict with the use of reclaimed water
GOAL 8. PROTECT ENERGY INFRASTRUCTURE FROM CLIMATE CHANGE IMPACTS	
Objective 8a. Support Modernization of the Electricity Grid	The proposed Plan would not conflict with modernization of the electricity grid
Objective 8b. Utilize Demand Response and Energy Efficiency Measures to Reduce Greenhouse Gases during Peak Periods	The proposed Plan would not conflict with demand response and energy efficiency measures during peak periods
Objective 8c. Study the Range of Impacts on Energy Infrastructure	The proposed Plan would not conflict with study of the range of impacts on energy infrastructure

GOAL 9. SANDAG AND LOCAL GOVERNMENTS LEAD BY EXAMPLE	
Objective 9a. Local Governments Prepare and Adopt Climate Action Plans	See below in Impact GHG-2 for analysis of the proposed Plan for conflicts with local climate action plans.
Objective 9b. Assess the Energy Use of SANDAG Operations	The proposed Plan would not conflict with programs to assess energy use of SANDAG operations
Objective 9c. Local Governments Use Cleaner Energy Supplies and Reduce Energy Use	The proposed Plan identifies continuing actions including support for the efforts of local jurisdictions to implement their Energy Roadmap Programs to save energy in their own operations and in their communities.

The Strategy's goals include four specific goals relating to transportation: Goals 1, 2, 3, and 4. These goals have informed the development of the proposed Plan's policies relative to the transportation network improvements and programs. Accordingly, the proposed Plan's transportation network improvements and programs would not conflict with the Climate Action Strategy. The proposed Plan's transportation network improvements and programs are designed to adopt Climate Action Strategy policies and would support their implementation. The proposed Plan therefore contributes to achieving the goals of the Strategy, and would not conflict with SANDAG's adopted Climate Action Strategy, and would support implementation of the Strategy.

Local Climate Action Plans

To date, there are ~~seven~~ eight cities within the region with adopted Climate Action Plans. An analysis of whether the proposed Plan would conflict with the measures and policies in adopted local Climate Action Plans is provided in Appendix G-2. As shown in Appendix G-2, the proposed Plan would not conflict with adopted local Climate Action Plans.

2020 Conclusion

Implementation of regional growth and land use change and transportation network improvements and programs under the proposed Plan would not conflict with AB 32, the SANDAG Climate Action Strategy, or adopted local Climate Action Plans. Therefore, this impact (GHG-2) in the year 2020 is less than significant.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

SANDAG Climate Action Strategy

As shown in Table 4.8-9, the proposed Plan would not conflict with SANDAG's Climate Action Strategy goals and objectives related to land use or transportation. By 2035, the proposed Plan would continue to be consistent with the Climate Action Strategy.

Local Climate Action Plans

As shown in Appendix G-2, the proposed Plan would not conflict with adopted local Climate Action Plans. By 2035 the proposed Plan would continue to support the measures and policies within adopted local Climate Action Plans.

2035 Conclusion

Implementation of regional growth and land use change and transportation network improvements and programs under the proposed Plan would not conflict with AB 32, the SANDAG Climate Action Strategy, or adopted local Climate Action Plans. Therefore, this impact (GHG-2) in the year 2035 is less than significant.

2050***Regional Growth and Land Use Change and Transportation Network Improvements and Programs*****SANDAG Climate Action Strategy**

As shown in Table 4.8-9, the proposed Plan would not conflict with SANDAG's Climate Action Strategy goals and objectives related to land use and transportation. By 2050, the proposed Plan would continue to be consistent with the Climate Action Strategy.

Local Climate Action Plans

As shown in Appendix G-2, the proposed Plan would not conflict with adopted local Climate Action Plans. While most local adopted Climate Action Plans do not set specific policies that extend to 2050, because the proposed Plan is consistent with the current plans and policies to reduce GHG emissions, the proposed Plan would continue to support the goals of local Climate Action Plans in 2050.

2050 Conclusion

Implementation of regional growth and land use change and transportation network improvements and programs under the proposed Plan would not conflict with AB 32, the SANDAG Climate Action Strategy, or adopted local Climate Action Plans. Therefore, this impact (GHG-2) in the year 2050 is less than significant.

GHG-3 CONFLICT WITH SB 375 EMISSION REDUCTION TARGETS**ANALYSIS METHODOLOGY**

The analysis evaluates whether the proposed Plan would conflict with SB 375 GHG emission reduction targets. SB 375 required ARB to develop regional GHG emission reduction targets compared to 2005 emissions, for passenger vehicles for 2020 and 2035. The targets established for SANDAG by ARB are to reduce per capita CO₂ emissions 7 percent below 2005 levels by 2020 and 13 percent below 2005 levels by 2035 (ARB 2011). ARB has not developed any post-2035 targets (ARB 2014h). The SB 375 technical methodology for estimating GHG emissions is included in Appendix G-3 to the EIR. Because SB 375 does not require 2050 GHG emissions reduction targets, the EIR does not present a 2050 analysis of conflicts with SB 375.

For the purpose of evaluating impacts under Impact GHG-3, because the SB 375 targets include both regional growth and land use change and the transportation network improvements, the analysis of conflicts with SB 375 emission reduction targets has not been separated into the two categories. The impact assessment includes both regional growth and land use change and the transportation network improvements.

2020

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

ARB requires SANDAG to reduce per capita CO₂ emissions from passenger cars and light-duty trucks 7 percent below 2005 levels by 2020. Per capita emissions from passenger cars and light-duty trucks were 26.0 lbs CO₂/person/day in 2005. Under implementation of the proposed Plan, GHG emissions would be reduced to ~~22.5~~21.4 lbs CO₂/person/day in 2020, a ~~15~~18 percent reduction from 2005 levels. The GHG emissions reductions under the proposed Plan would exceed the ARB target of a 7 percent reduction by 2020 (Table 4.8-10). Therefore, implementation of regional growth and land use change and transportation network improvements and programs would not conflict with SB 375 GHG emission reduction targets. This impact is less than significant impact.

**Table 4.8-10
SB 375 GHG Reduction Targets and GHG Emissions under the Proposed Plan, 2020**

	lbs CO ₂ per person per day, 2020
Per Capita Emissions under the proposed Plan	22.5 <u>21.4</u>
Percent Reductions under the proposed Plan	-15% <u>-18%</u>
ARB Target	-7%

Source: Appendix G-3 to the EIR

Note: Average weekday per capita CO₂ reductions for passenger cars and light-duty trucks from 2005 level of 26.0 pounds per person per day.

The revised emissions and percentages in this table have been decreased by 2% per ARB requirement that EMFAC2014 model results be revised with 2% percent adjustment factor.

2020 Conclusion

Implementation of the proposed Plan would not conflict with SB 375 emission reduction targets for 2020. Therefore, this impact (GHG-3) in the year 2020 is less than significant.

2035

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

ARB requires SANDAG to reduce per capita CO₂ emissions from passenger cars and light-duty trucks 13 percent below 2005 levels by 2035. Under implementation of the proposed Plan, GHG emissions would be reduced to ~~20.3~~19.8 lbs CO₂/person/day, a ~~18~~24 percent reduction from 2005 levels. The GHG emissions reductions under the proposed Plan would exceed the ARB target of a 13 percent reduction by 2035 (Table 4.8-11). Therefore, implementation of the regional growth and land use change and transportation network improvements and programs would not conflict with SB 375 GHG emission reduction targets. This impact is less than significant impact.

Table 4.8-11
SB 375 GHG Reduction Targets and GHG Emissions under the Proposed Plan, 2035

	lbs CO₂ per person per day, 2035
Per Capita Emissions under the proposed Plan	<u>20.319.8</u>
Percent Reductions under the proposed Plan	<u>-21%-24%</u>
ARB Target	-13%

Source: Appendix G-3 to the EIR

Note: Average weekday per capita CO₂ reductions for passenger cars and light-duty trucks from 2005 level of 26.0 pounds per person per day.

The revised emissions and percentages in this table have been decreased by 2% per ARB requirement that EMFAC2014 model results be revised with 2% percent adjustment factor.

2035 Conclusion

Implementation of the proposed Plan would not conflict with SB 375 emission reduction targets for 2035. Therefore, this impact (GHG-3) in the year 2035 is less than significant.

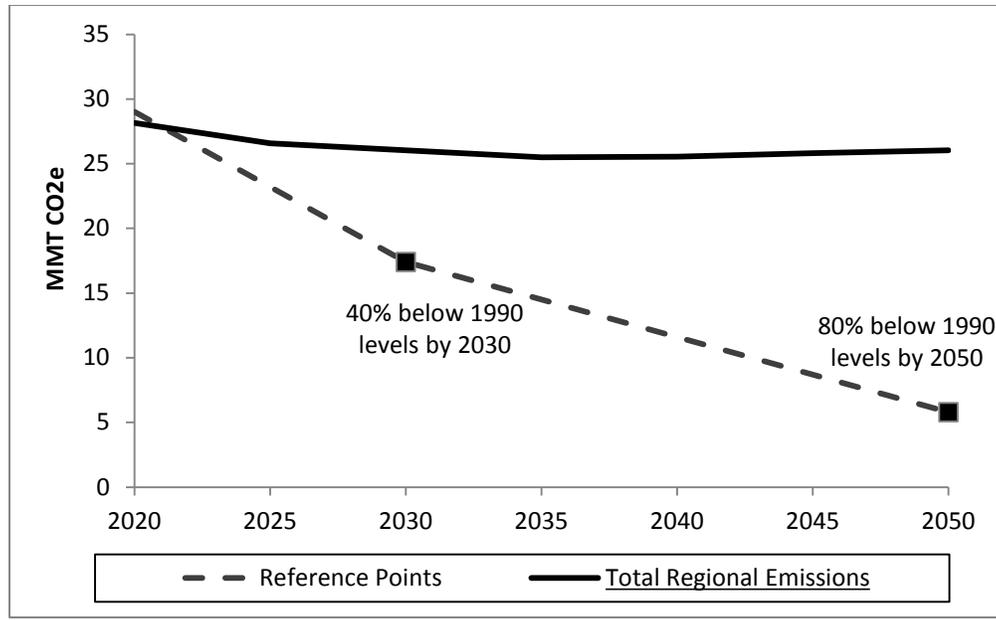
GHG-4 BE INCONSISTENT WITH THE STATE'S ABILITY TO ACHIEVE THE EXECUTIVE ORDER B-30-15 AND S-3-05 GOALS OF REDUCING CALIFORNIA'S GHG EMISSIONS TO 40 PERCENT BELOW 1990 LEVELS BY 2030 AND 80 PERCENT BELOW 1990 LEVELS BY 2050

ANALYSIS METHODOLOGY

The analysis evaluates whether the proposed Plan is inconsistent with the State's ability to achieve the Executive Order S-3-05 goal of reducing California's GHG emissions to 80 percent below 1990 levels by 2050. The analysis also evaluates whether the proposed Plan is inconsistent with the State's ability to achieve the Executive Order B-30-15 goal of reducing California's GHG emissions to 40 percent below 1990 levels by 2030.

The Executive Order S-3-05 goal of reducing California's GHG emissions to 1990 levels by 2020 was adopted in AB 32, and is evaluated in Impact GHG-2. Therefore, this analysis focuses on whether the region would achieve the 2050 goal. 2035 is also addressed in Impact GHG-4 as an interim year using the Executive Order B-30-15 goal of reducing California's GHG emissions to 40 percent below 1990 levels by 2030.

To perform this analysis, SANDAG identified estimated 2035 and 2050 emissions reduction reference points for the region. Note that there is no requirement that the SANDAG region's emissions be reduced by the same percentage ("equal share") as the statewide percentage in order for the State to achieve the Executive Order's goal. The proposed Plan's impacts nevertheless are considered significant if total emissions in the San Diego region exceed the estimated 2035 or 2050 GHG reduction reference points. A graph comparing regional emissions projected in the proposed Plan versus the Executive Order-based reference points is provided as Figure 4.8-1.



Source: Appendix G-1 to the EIR.

Note: the solid black line has been relabeled from “proposed Plan emissions” to “total regional emissions” and reflects the revised GHG emissions based on the minor modifications to the project description and the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

Figure 4.8-1. Regional GHG Reductions Required to Meet Executive Order Reference Points for 2035 and 2050 vs. ~~Proposed Plan~~ Total Regional Emissions

SANDAG identified the 2050 reference point by applying an 80 percent reduction to the San Diego region’s 1990 emissions level. The 40 percent reduction was applied to the region’s 1990 emissions level to identify a 2030 reference point, which was then used to develop a 2035 reference point by using a straight line trajectory from the 2030 goal to the 2050 goal.

As described in Impact GHG-2, the San Diego region’s 1990 GHG emissions totaled 29 MMT CO₂e (see Appendix G-1 to the EIR). By applying the methodology described above, the 2035 reference point was identified as 14.5 MMT CO₂e, and the 2050 reference point was identified as 5.8 MMT CO₂e.

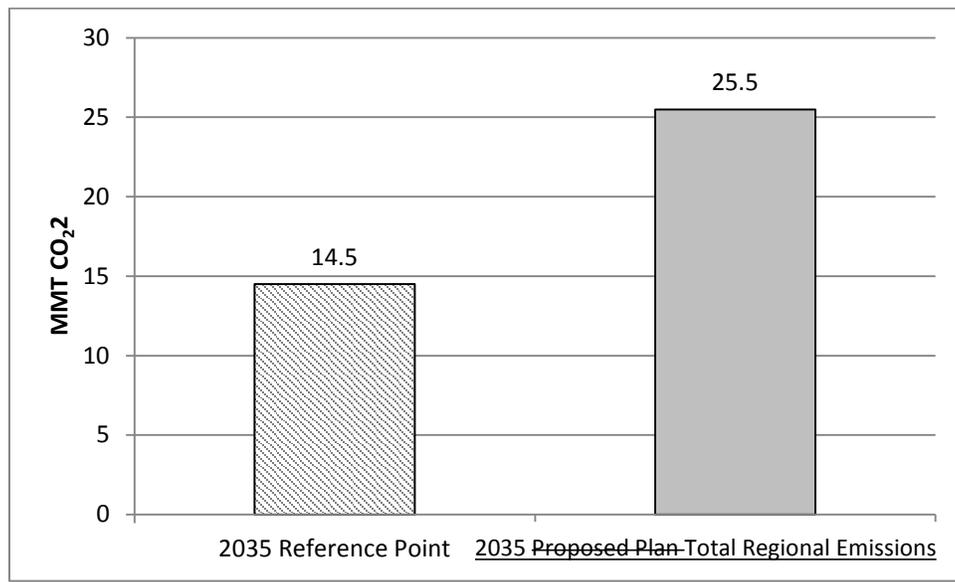
For the purpose of evaluating impacts under Impact GHG-4, because the Executive Order goals include both regional growth and land use change and the transportation network, the analysis has not been separated into the two categories. The impact assessment includes both regional growth and land use change and the transportation network. Emission calculations are provided in Appendix G-1.

During the timeframe of the proposed Plan, climate change effects that are likely to exacerbate the proposed Plan’s greenhouse gas emissions impacts include but are not limited to increases in temperatures and frequency, duration, and intensity of heatwaves (which could lead to increases in GHG emissions from local fossil fuel-fired power plants to meet electricity demands); and wildfires (which release GHG emissions of criteria pollutants). In general, these climate change effects would increase between 2020 and 2050. Climate change effects are discussed in more detail in Appendix F.

2035***Regional Growth and Land Use Change and Transportation Network Improvements and Programs***

As discussed under Impact GHG-1, under implementation of the proposed Plan, total GHG emissions for the San Diego region in 2035 are projected to be approximately 25.5 MMT CO₂e, or 28 percent lower than GHG emissions in 2012 (Table 4.8-7). To be in line with its “equal share” of the state emissions reduction goals set forth in Executive Orders S-3-05 and B-30-15, regional GHG emissions would need to decrease to 14.5 MMT CO₂e by 2035.

Figure 4.8-1 shows a projection of “equal share” reductions for the San Diego region, compared to estimated proposed Plan emissions. In addition, Figure 4.8-2 compares the Executive Order-based 2035 reference point for the region with projected GHG emission under the proposed Plan. This is a significant impact.



Source: Appendix G-1 to the EIR

Figure 4.8-2. 2035 GHG Emissions Reference Point vs. Proposed Plan Total Regional Emissions

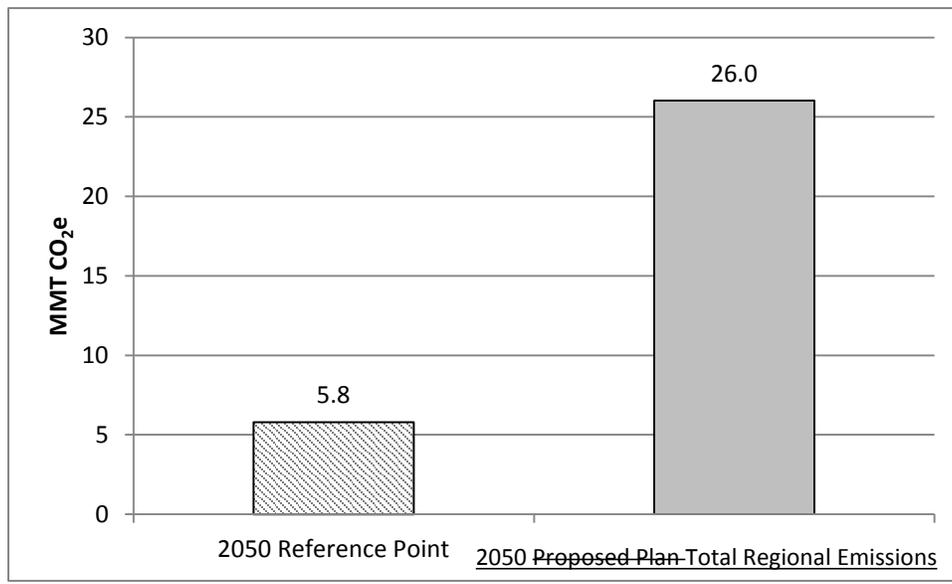
2035 Conclusion

Because the total emissions in the San Diego region of 25.5 MMT CO₂e in 2035 would exceed the regional 2035 GHG reduction reference point of 14.5 MMT CO₂e (which is based on EO-B-30-15 and EO-S-3-05), the proposed Plan’s 2035 GHG emissions would be inconsistent with state’s ability to achieve the Executive Orders’ GHG reduction goals. Therefore, this impact (GHG-4) in the year 2035 is significant.

2050

Regional Growth and Land Use Change and Transportation Network Improvements and Programs

As discussed under Impact GHG-1, under implementation of the proposed Plan, total GHG emissions for the San Diego region in 2050 are projected to be ~~25.9~~ 26.0 MMT CO₂e, or ~~26.8~~ 24.9 percent lower than GHG emissions in 2012 (Table 4.8-8). To be in line with its “equal share” of the state 2050 emissions reduction goal set forth in Executive Order S-3-05, regional GHG emissions would need to decrease to 5.8 MMT CO₂e in 2050. Figure 4.8-1 shows a projection of “equal share” reductions for the San Diego region, compared to estimated proposed Plan emissions. In addition, Figure 4.8-3 compares the Executive Order based reference point for the region for 2050 with projected GHG emission under the proposed Plan. This is a significant impact



Source: Appendix G-1 to the EIR

Figure 4.8-3. 2050 GHG Emissions Reference Point vs. ~~Proposed Plan~~ Total Regional Emissions

2050 Conclusion

Because the total emissions in the San Diego region of ~~25.9~~ 26 MMT CO₂e in 2050 would exceed the regional 2050 GHG reduction reference point of 5.8 MMT CO₂e (which is based on EO-S-3-05), the proposed Plan’s 2050 GHG emissions would be inconsistent with state’s ability to achieve the Executive Order’s GHG reduction goals. Therefore, this impact (GHG-4) in the year 2050 is significant.

MITIGATION MEASURES

GHG-4 Inconsistency with State Agency 2030 and 2050 GHG Reduction Goals

2035 and 2050

Basis for Selection of GHG Mitigation Measures

Overview. Many features currently included in the proposed Plan (e.g., the SCS, increased transit and active transportation investments) have the effect of reducing GHG emissions that might otherwise occur. Mitigation measures presented in this section are additional feasible GHG reduction measures not included in the proposed Plan that SANDAG would or other agencies could implement. Presented below are three types of feasible GHG reduction mitigation measures:

- Plan- and policy-level mitigation measures SANDAG has committed to implement;
- Mitigation measures for transportation network improvements and programs, which SANDAG has committed to implement for its projects and which other transportation project sponsors can and should implement for their projects and
- Mitigation measures for development projects implementing regional growth and land use changes, which local jurisdictions can and should implement.

While SANDAG has the authority to implement the mitigation measures it has committed to, it has no legal authority to require other transportation project sponsors or local jurisdictions to implement mitigation measures for specific projects for which they have responsibility and jurisdiction. As explained in Section 4.0, mitigation can include measures that are within the responsibility and jurisdiction of another public agency. SANDAG in its CEQA findings may find that those measures assigned to other agencies can and should be adopted by those other agencies (CEQA Guidelines Section 15091(a)(2)).

Other potential mitigation measures to reduce GHG emissions are included as components of the project alternatives in Chapter 6.0, rather than as individual mitigation measures in this section.⁴ These include still more compact land use patterns, accelerated and increased transit investments, reduced or no highway investments, and policies to reduce transit fares, increase parking prices, and establish road user fees.

Achieving the EO-S-3-05 GHG Reduction Goal. The state currently has no plan (e.g., analogous to the AB 32 Scoping Plan) for achieving the EO-B-30-15 and EO-S-3-05 GHG reduction goals. However, recent studies have shown that achieving these goals, whether statewide or within the San Diego region, would require major changes in clean technologies utilization, markets, and state and federal regulations.

For example, a recent study (Greenblatt 2015) presented an aggressive set of 49 policies intended to achieve the statewide 2050 goal, though implementing all these policies still fell short of the goal. These policies included major increases in energy efficiency, reduced GHG intensities of both fuel and electricity, and a shift away from direct fuel combustion and toward electricity, particularly in transportation. For example, the most aggressive scenario, Scenario 3, included policies such as increasing the average fleet gasoline efficiency to 54 MPG, doubled high-speed rail deployment, replacing all natural gas use in buildings with electric heat pumps by 2050, 50% residential zero net energy retrofits by 2030, adding 2.2 GW nuclear power capacity by 2050, and building 8 carbon capture and sequestration (CCS) facilities at power plants.

⁴ Alternatives and mitigation measures are two alternative means for avoiding or reducing a project's significant environmental impacts. See CEQA Guidelines Section 15002(h).

Similarly, Greenblatt and Long (2012) in an older study found that achieving the 2050 EO goal would likely require maximizing efficiency in all economic sectors, electrification of much of the transportation sector and many stationary uses of heat, a doubling of electricity production with nearly zero emissions, and development of low-carbon fuels. They concluded that achieving the EO goal would require a combination of strategies; although some are available now, they conclude others would require substantial research and development to realize. These include electricity load balancing, substantially increasing biomass fuel supply, and making CCS 100% effective and economical to implement on a large scale.

Achieving the EO B-30-15 GHG Reduction Goal. A recent study commissioned by state agencies focused on scenarios for deep reductions in GHG emissions in 2030. (Energy+Environmental Economics 2015). The study found that up to 38% reductions in GHG emissions (close to the EO B-30-15 goal of 40%) by 2030 could be achieved with “significant progress” in energy efficiency, switching to low carbon fuel sources, producing lower carbon electricity and fuels, and reducing non-energy GHGs. “Significant progress” included measures such as doubled energy efficiency in buildings by 2030, 50%-60% of electricity sales from renewable energy by 2030, and rapid penetration of near-zero and zero-emissions vehicles.

The study noted that scenarios implementing these measures would rely on existing technologies, and were consistent with a continuation of current lifestyles and economic growth. The pace of emissions reductions would, however, require that key low-carbon technologies be commercialized, produced at scale, and achieve broad market adoption in the next 10-15 years.

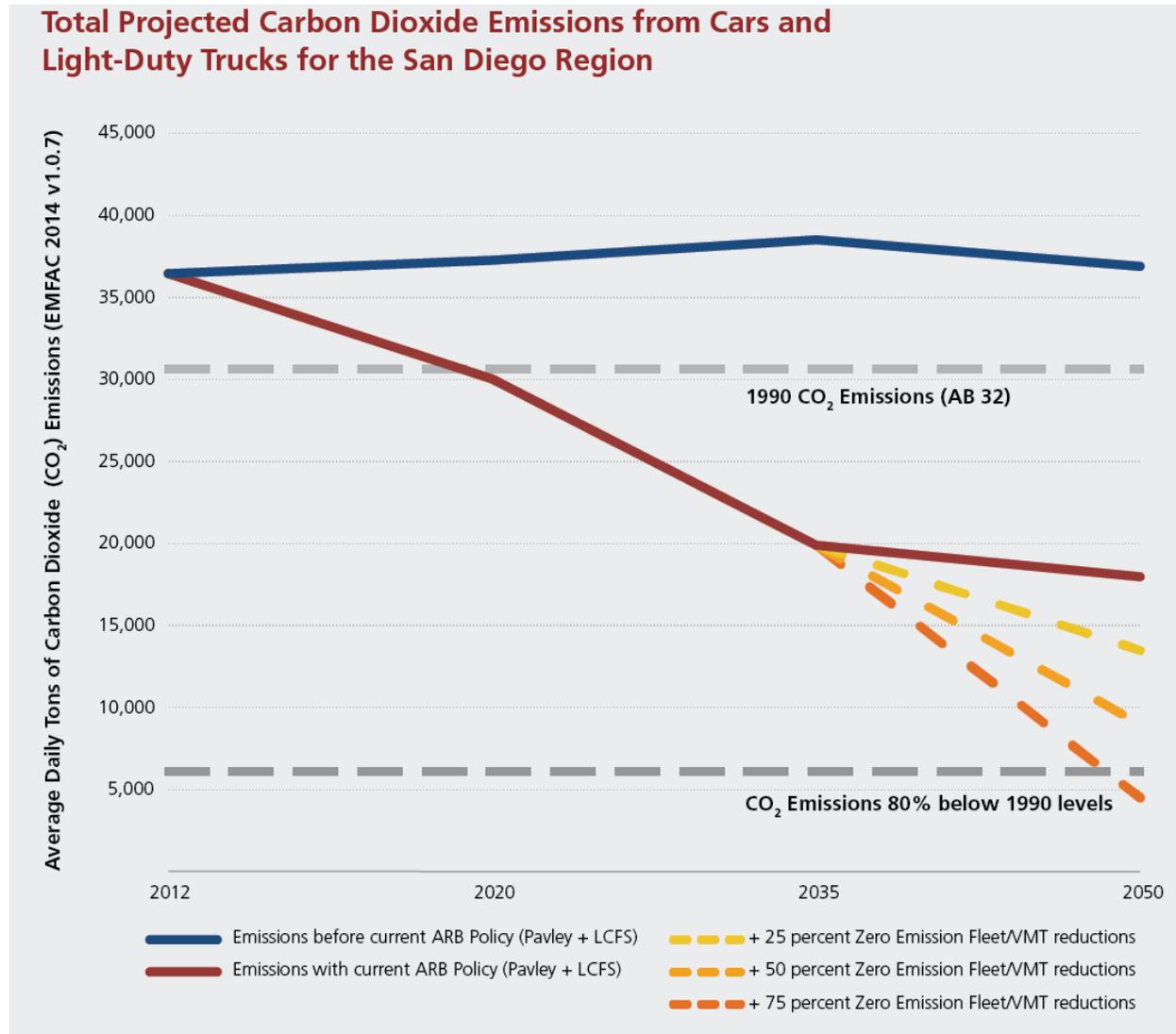
Regional Scenarios. The GHG inventory prepared for the proposed Plan (Appendix G-1) analysis is based on implementation of current regulations, policies, and programs. An alternative scenario (“Scenario 3”) for the San Diego region is presented in Appendix G-4. It assumes major changes in the technologies, markets, and state and federal regulations. For example, strategies included a move toward 100 percent renewable electricity, 100 percent zero emission vehicle passenger fleet, and 90 percent landfill waste diversion. With implementation of these measures, regional emissions would be reduced to 77% below 1990 emissions, but would still fall short of the 80% below 1990 emissions reference point based on EO-S-3-05. In this scenario, electricity and passenger vehicles contribute zero emissions; emissions remain primarily from industrial sources, natural gas, aviation, and off-road fuel use.

Focusing on the transportation sector, Chapter 2 of the proposed Plan includes scenarios for how statewide GHG emissions specifically from the transportation sector could be reduced by 80% below 1990 levels.⁵ Scenarios developed under the ARB Vision Program and the Draft California Transportation Plan (CTP) envision how this goal might be achieved statewide given an aggressive set of strategies requiring major VMT reduction, as well as improvements in vehicle and fuel technologies. For example, the Draft CTP’s VMT reduction strategies include a 75% increase in auto operating costs, and doubling of all transit services and speeds.

Using the ARB Vision and Draft CTP frameworks, Chapter 2 of the proposed Plan discusses scenarios for the SANDAG region showing how an 80% reduction in mass GHG emissions from passenger vehicles might be met by highly aggressive implementation of ZEV penetration and VMT reduction measures.

⁵ Looking Past 2035—Possible Pathways for Additional Greenhouse Gas Emissions Reductions. This section and associated appendix information are hereby incorporated by reference into the EIR.

See Figure 4.8-4. Achieving these additional emission reductions would require major changes in clean technologies utilization, markets, and state and federal policies and regulations. The proposed Plan does set forth ambitious but currently feasible TSM, electric vehicle, and other programs that can be implemented now and in the future aligned with the 2050 GHG reduction scenarios in the various studies discussed above.



Source: SANDAG 2015

Note: This figure has been updated to reflect the revised GHG emissions based on the new version of EMFAC2014 (v1.0.7) released by ARB in May 2015. On-road GHG emissions in the Draft EIR were calculated using EMFAC2014 (v1.0.1).

Figure 4.8-4. Total Projected Carbon Dioxide Emissions from Cars and Light Duty Trucks for the San Diego Region.

Conclusion. Full implementation of many of the measures that could result in a 40% reduction of GHG emissions by 2030 and an 80% reduction of GHG emissions by 2050 in the San Diego region would require major changes in clean technologies utilization, markets, and state and federal policies and regulations. The following mitigation measures would help reduce regional GHG emissions through reducing VMT, increasing use of alternative fuels, and other measures; they would reduce inconsistency of the propose Plan’s GHG emissions with the state’s ability to achieve the EO B -30-15 and EO-S-3-05 GHG reduction goals. However, full implementation of changes required to achieve the Executive Orders’ goals is beyond SANDAG’s or local agencies’ current ability to implement.

GHG-4A Allocate Competitive Grant Funding to Projects that Reduce GHG Emissions (SANDAG)

Mitigation Measure Text. SANDAG shall revise the *TransNet* Smart Growth Incentive and Active Transportation Grant Programs in the following ways to achieve GHG reductions:

- Adopt new or revised grant criteria to give greater weight to a project’s ability to directly reduce GHG emissions. Criteria include, but are not limited to, awarding points to projects that directly implement local climate action plans that reduce GHG emissions, or that directly implement parking strategies that reduce GHG emissions.
- Require locally adopted CAPs and complete streets policies as prerequisites to be eligible for grant funding. The locally adopted CAPs shall include measures to reduce GHG emissions to 1990 levels by 2020, and achieve further reductions beyond 2020 consistent with adopted regional or local GHG reduction targets.
- If a local jurisdiction does not have an adopted CAP or complete streets policy, SANDAG shall make available competitive funding through the grant programs for preparation of a CAP and/or complete streets policy.
- In addition to grant funding, SANDAG shall provide technical assistance to local jurisdictions for the preparation of CAPs as described in GHG-4E.
- These changes shall be adopted and effective for the fourth cycle of funding for both programs, which is expected to be released in December 2016.

Mitigation Measure Effectiveness. It is not possible to precisely quantify the effectiveness of this mitigation measure because SANDAG does not know the specific details of grant applications that local jurisdictions will submit in future funding cycles. However, this measure would result in GHG reductions as explained below. It requires that jurisdictions have locally adopted climate action plans in order to be eligible for grant funding. As shown below, locally adopted climate action plans in the San Diego region routinely require that GHG emissions be reduced to 1990 levels by 2020 (also expressed as 15 percent below 2005 levels) and continued reductions after 2020. Quantified estimates of metric tons of GHG reduction estimated to result from local actions in adopted climate action plans in the San Diego region also are presented below.

In the most recent cycle of funding awarded in July 2015, SANDAG awarded \$15 million to 29 projects in 14 local jurisdictions including both capital and non-capital smart growth and active transportation projects.⁶ This mitigation measure will result in GHG reductions by aligning future funding allocations under SANDAG’s smart growth incentive and active transportation grant programs with smart growth and active transportation projects that result in GHG emissions reductions within local jurisdictions that are implementing adopted climate action plans.

⁶ http://www.sandag.org/uploads/meetingid/meetingid_4082_19498.pdf

- The City of San Diego’s adopted Climate Action and Protection Plan (CPAP)⁷ establishes a 15 percent reduction goal below 1990 levels, and its July 2015 Draft Climate Action Plan establishes the following targets: 25 percent below 2010 levels by 2020, 41 percent below 2010 levels by 2030, and 50 percent below 2010 levels by 2035. The local actions identified in the City of San Diego’s draft climate action plan (Table 3.1) would achieve about 3.5 million metric tons of GHG reduction annually by 2035.⁸
- The City of Chula Vista’s adopted year 2000 climate action plan establishes a reduction goal of 20 percent below 1990 levels by 2010. In 2014, Chula Vista identified additional actions that would result in up to 166,000 metric tons of additional GHG reduction annually by 2020.⁹
- The City of Encinitas’ adopted climate action plan establishes a target to reduce city-wide GHG emissions 12 percent below 2005 levels by 2020, with local actions resulting in about 51,000 metric tons of GHG reduction annually by 2020.¹⁰
- The City of Escondido’s adopted climate action plan sets a goal to reduce emissions to 1990 levels by 2020, and continued reductions after 2020, with local actions resulting in about 36,000 metric tons of GHG reduction annually by 2020.¹¹
- The City of National City’s adopted climate action plan adopts a reduction target of 15 percent below 2005 levels by 2020, with additional reductions by 2030. Local actions would result in about 137,137 metric tons of GHG reduction annually by 2020, and 156,127 metric tons annually by 2030.¹²
- The City of Vista’s adopted climate action plan establishes a target of reducing emissions to 15 percent below 2005 levels by 2020, with local actions resulting in about 32,000 metric tons of GHG reduction annually by 2020.¹³
- The City of San Marcos’ adopted climate action plan establishes GHG reduction targets of 15 percent below 2005 levels by 2020 and 28 percent below 2005 levels by 2030. Local actions would result in about 800 metric tons of GHG reduction annually by 2020, and 1,300 metric tons annually by 2030.¹⁴
- The City of Carlsbad’s adopted climate action plan sets targets of 15 percent below 2005 levels by 2020 and 49 percent below 2005 levels by 2035. Local general plan policies and actions would result in about 9,250 metric tons of GHG reduction annually by 2020, and about 8,300 metric tons annually by 2035. Additional local CAP measures would achieve an additional 13,336 metric tons of CO₂e reduction by 2035.¹⁵
- The City of La Mesa’s May 2015 draft climate action plan is based on the target of reducing emissions to 15 percent below 2005 levels by 2020 (or 16 percent below 2010 levels by 2020), which was adopted as the City’s target as part of its General Plan Update EIR. Local actions would result in about 15,400 metric tons of GHG reduction annually by 2020.¹⁶

⁷ http://www.sandiego.gov/environmental-services/sustainable/pdf/action_plan_07_05.pdf

⁸ http://www.sandiego.gov/planning/genplan/cap/pdf/draft_cap_july_2015.pdf

⁹ <http://38.106.5.202/home/showdocument?id=7058>

¹⁰ <http://www.encinitasca.gov/modules/showdocument.aspx?documentid=1938>

¹¹ <http://www.escondido.org/Data/Sites/1/media/PDFs/Planning/ClimateActionPlan/AdoptedClimateActionPlan.pdf>

¹² <http://www.ci.national-city.ca.us/index.aspx?page=548>

¹³ <http://www.cityofvista.com/home/showdocument?id=84>

¹⁴ <http://www.ci.san-marcos.ca.us/modules/showdocument.aspx?documentid=9922>

¹⁵ <http://www.carlsbadca.gov/civicax/filebank/blobdload.aspx?BlobID=23294>

¹⁶ <http://cityoflamesa.com/DocumentCenter/View/7097>

GHG-4B Adopt a Detailed Regional Mobility Hub Strategy Implementation Plan to Reduce GHG Emissions (SANDAG)

Mitigation Measure Text. Mobility hubs are places of connectivity, where different modes of transportation—walking, biking, ridesharing, and transit—come together to connect people to their jobs, school, shopping, errands, recreation, and back home; they reduce GHG emissions through reducing VMT and increasing transit use and alternative transportation. To implement the general “Regional Mobility Hub Implementation Strategy” listed as a proposed Plan near-term action, once this general strategy is developed, mobility hub concepts outlined in the proposed Plan, SANDAG shall develop and adopt a detailed Mobility Hub Strategy implementation plan no later than 2017 that includes:

1. Identification of mobility hub features and infrastructure requirements
2. Selection of 20 mobility hub locations that align with the smart growth place types identified in the Smart Growth Concept Map. Three mobility hubs will be implemented by 2020, and 17 more will be implemented by 2035.
3. Establishment of first mile/last mile transportation networks for each candidate mobility hub site based on travel patterns, access catchment areas, and adjacent land uses
4. Development of design guidelines for each candidate mobility hub site
5. Recommendation of specific mobility hub improvements and preparation of conceptual designs and capital cost estimates for each candidate mobility hub site
6. Strategies for implementation, including the potential for public-private partnerships and a phasing strategySite-specific implementation strategies

Mitigation Measure Effectiveness. While it is not possible to precisely quantify future GHG reductions from implementation of this mitigation measure, this measure would reduce GHG emissions because the implementation of mobility hubs would promote increased trips by walking, biking, transit, and carpooling, which reduce VMT, and in turn reduce GHG emissions. For example, research shows that increasing access to transit can reduce VMT anywhere from 0.5 to 24.5 percent.¹⁷

GHG-4C Fund Electric Vehicle Charging Infrastructure (SANDAG)

Mitigation Measure Text. To implement the proposed Plan action calling for building a network of electric vehicle chargers to promote the use of electric vehicles, SANDAG shall set aside approximately \$30 million of Congestion Management and Air Quality (CMAQ) Improvement Program funds expected between 2020 and 2050 (approximately \$1 million annually) to fund the installation of publicly available electric vehicle charging infrastructure. Increasing the number of publicly available electric vehicle charging points would reduce GHG emissions by extending the electric range of plug-in hybrid electric vehicles that would replace gasoline-powered internal combustion engines. The funding that would be provided is an incentive for installation of Level 1 and Level 2 electric vehicle chargers in publicly accessible locations throughout the region. Level 1 charging (similar to a standard wall outlet) adds about 2 to 5 miles of range to an electric vehicle per hour of charging time while Level 2 (240 V circuit) adds about 10 to 20 miles of range per hour of charging time. A detailed program will be developed and presented to the SANDAG Board of Directors before the adoption of the next Plan update with funding becoming available by 2020. Available funding will be leveraged to install up to 36,000 EV chargers by 2035 and an additional 44,000 chargers by 2050.

¹⁷ <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>

Mitigation Measure Effectiveness. This expanded charging network would reduce on-road emissions by an estimated 390,000 lbs CO₂ (177 metric tons) by 2035 and 455,000 lbs CO₂ (206 metric tons) by 2050 through the extended range of plug-in hybrid electric vehicles (See Regional Plan Appendix C).

GHG-4D Adopt a Plan for Transportation Fuels that Reduce GHG Emissions (SANDAG)

Mitigation Measure Text. SANDAG shall adopt a regional readiness plan for the deployment of infrastructure for all alternative fuels by 2016. The plan will identify barriers to developing alternative fuel infrastructure, and include recommendations and resources for stakeholders to overcome these barriers. The plan will build on the regional readiness plan for plug-in electric vehicles accepted by the Board in 2014. This plan will contribute to reductions in GHGs through developing recommendations for facilitating access to alternative fuels, which will reduce emissions from vehicles.

Also, SANDAG has received a notice of proposed award from CEC for additional funding to implement the PEV Readiness Plan over 2 years. SANDAG shall provide technical assistance to local government staff, contractors, and property managers on permitting, inspection, and installation for EV charging and general PEV awareness activities. This funding is included in the Fiscal Year 16 budget.

Mitigation Measure Effectiveness. While the precise GHG reductions associated with GHG-4D cannot be quantified because SANDAG does not know the timing and future penetration rates of alternative fuels, the readiness plan and resources will build upon the efforts to date of the San Diego Regional Clean Cities Coalition. The Coalition estimates that GHG reductions from the use of alternative fuels (excluding electricity) by fleets in the San Diego region amounted to 20,051 MTCO₂ in 2013 (DOE 2013). See Mitigation Measure GHG-4C for quantification of GHG reductions from installation of charging infrastructure for electric vehicles.

GHG-4E Assist in the Preparation of Climate Action Plans and Other Measures to Reduce GHG Emissions (SANDAG)

Mitigation Measure Text. SANDAG shall assist local governments in the preparation of CAPs, and other policies/measures to reduce GHG emissions. SANDAG shall assist local governments in identifying all feasible measures to reduce GHG emission to 1990 levels by 2020, and achieve further reductions beyond 2020 consistent with adopted regional or local GHG reduction targets. Specific forms of SANDAG assistance include, but are not limited to:

- Assisting its member agencies in obtaining funding for, directly funding, updating and implementing CAPs and other climate strategies through continued implementation of the SANDAG Energy Roadmap Program.
- Providing funding and energy planning assistance to local governments to implement projects that save energy and reduce energy-related GHG emissions.
- As described in GHG-4A, for local jurisdictions that do not have an adopted CAP, SANDAG shall make available competitive funding through the grant programs for preparation of a CAP.

Mitigation Measure Effectiveness

- Implementing CAPs: The Energy Roadmap Program has assisted the following cities in obtaining funding for CAP related activities. These activities increase the GHG reduction benefits described for GHG-4A, and would continue to advance GHG reductions with continued program implementation.

- Assisted the cities of National City and Vista in obtaining funding for CAP implementation activities.
- Assisted cities of Del Mar, Encinitas, La Mesa, Santee, and Solana Beach in obtaining funding for CAP development; and
- Assisted cities of El Cajon, Lemon Grove, and Oceanside in obtaining funding for updated GHG emission inventories.
- Energy Plans and Projects: Providing funding and energy planning assistance to local governments to implement projects that save energy and reduce energy-related GHG emissions. To date, SDG&E estimates that SANDAG's energy roadmap program has resulted in up to about 3.4 million kWh of annual energy savings and about 1,200 MTCO₂e of annual GHG reduction (SDG&E 2015). Implementation of the Energy Roadmap Program has helped the following cities realize energy savings (and related GHG reductions) at their municipal facilities as reported below. These benefits would continue and increase with continued program implementation:
 - City of Carlsbad: about 49,000 kilowatt hours (kWh) and 14,000 therms of annual energy savings and about 95 MTCO₂e of annual GHG reduction
 - City of Coronado: about 130,000 kWh and 4,100 therms of annual energy savings and about 70 MTCO₂e of annual GHG reduction
 - City of El Cajon: about 406,000 kWh of annual energy savings and about 142 MTCO₂e of annual GHG reduction
 - City of Encinitas: about 70,000 kWh of annual energy savings and 24 MTCO₂e of annual GHG reduction
 - City of Escondido: about 270,000 kWh and 25,000 therms of annual energy savings and about 246 MTCO₂e of annual GHG reduction
 - City of Imperial Beach: about 2,600 kWh of annual energy savings and about 1 MTCO₂e of annual GHG reduction
 - City of National City: about 140,000 kWh of annual energy savings and 50 MTCO₂e of annual GHG reduction
 - City of Oceanside: about 317,000 kWh of annual energy savings and 112 MTCO₂e of annual GHG reduction
 - City of Poway: about 207,000 kilowatt hours (kWh) of annual energy savings and about 73 MTCO₂e of annual GHG reduction
 - City of San Marcos: about 900,000 kWh and 2,200 therms of annual energy savings and 330 MTCO₂e of annual GHG reduction
 - City of Santee: about 580,000 kilowatt hours (kWh) of annual energy savings and about 206 MTCO₂e of annual GHG reduction
 - City of Solana Beach: about 110,000 kWh of annual energy savings and 40 MTCO₂e of annual GHG reduction
 - City of Vista: about 190,000 kilowatt hours (kWh) annual energy savings and about 66 MTCO₂e of annual GHG reduction
- CAP Preparation. See Mitigation Measure GHG-4A for discussion of GHG reductions associated with local jurisdictions CAPs.

GHG-4F Implement Measures to Reduce GHG Emissions from Transportation Projects (SANDAG)

During the planning, design, project-level CEQA review, construction, and operation of transportation network improvements, SANDAG shall implement measures to reduce GHG emissions, including but not limited to, applicable transportation project measures on the Attorney General’s list of project specific measures (California Attorney General’s Office 2010), as well as the CAPCOA reference, Quantifying Greenhouse Gas Mitigation Measures (CAPCOA 2010). These include, but are not limited to, the following:

- Implement construction measures through construction bid specifications, including the following topics:
 - Use energy and fuel efficient vehicles and equipment;
 - Use alternative fuel vehicles and equipment;
 - Use lighting systems that are energy efficient, including LED technology;
 - Use lighter-colored pavement, binding agents that are less GHG-intensive than Portland cement, and less-GHG intensive asphalt pavements; and
 - Recycle construction debris.
- Install efficient lighting (including LEDs) for traffic, street, and other outdoor lighting.
- Incorporate infrastructure electrification into project design (e.g., electric vehicle charging; charging for electric bikes).
- Incorporate electric vehicle supply equipment (EVSE) into projects that include commuter parking areas.
- Design measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse.
- Design measures to reduce energy consumption and increase use of renewable energy, such as solar-powered toll booths and other facilities, including those listed in Mitigation Measures ~~EN-2A and EN-3B~~ C.
- Design measures to reduce water consumption, such as drought-resistant landscaping, smart irrigation systems, and other measures including those listed in Mitigation Measure WS-1A.
- Construct buildings to Leadership in Energy and Environmental Design (LEED) certified standards or equivalent standards.

Funding for those measures that SANDAG selects would be included in individual project budgets.

GHG-4G Implement Measures to Reduce GHG Emissions from Transportation Projects (Other Transportation Project Sponsors)

During the planning, design, project-level CEQA review, construction, and operation of transportation network improvements, other transportation project sponsors can and should implement measures to reduce GHG emissions, including, but not limited to, those described in Mitigation Measure GHG-4F.

GHG-4H Implement Measures to Reduce GHG Emissions from Development Projects (Local Governments)

During the planning, design, project-level CEQA review, construction, and operation of development projects, the County of San Diego and cities can and should implement measures to reduce GHG emissions, including but not limited to, applicable land use measures on the Attorney General's list of project specific measures (California Attorney General's Office 2010), as well as the CAPCOA reference, Quantifying Greenhouse Gas Mitigation Measures (CAPCOA 2010). These measures include, but are not limited to, the following:

- Construction measures, including those listed in Mitigation Measure GHG-4F.
- Measures that reduce VMT by increasing transit use, carpooling, bike-share and car-share programs, and active transportation, including:
 - Building or funding a major transit stop within or near development, in coordination with transit agencies;
 - Developing car-sharing and bike-sharing programs;
 - Providing transit incentives, including transit passes for MTS/NCTD buses and trolleys;
 - Consistent with the Regional Bicycle Plan, incorporating bicycle and pedestrian facilities into project designs, maintaining these facilities, and providing amenities incentivizing their use; and planning for and building local bicycle projects that connect with the regional network;
 - Implementing complete streets consistent with the SANDAG Regional Complete Streets Policy, including adopting local complete streets policies;
 - Implementing mobility hubs consistent with the Regional Mobility Hub Strategy;
 - Improving transit access to bus and trolley routes by incentives for construction of transit facilities within developments, and/or providing dedicated shuttle service to trolley and transit stations; and
 - Implementing employer trip reduction measures to reduce employee trips and VMT such as vanpool and carpool programs, providing end-of-trip facilities, and telecommuting programs.
- Measures that reduce VMT through parking strategies based on the SANDAG Regional Parking Management Toolbox, including:
 - Parking pricing strategies consistent with the Toolbox;
 - Reduced minimum parking requirements;
 - Residential parking permit programs;
 - Designate a percentage of parking spaces for ride-sharing vehicles or high-occupancy vehicles, and provide adequate passenger loading and unloading for those vehicles;
 - Provide adequate bicycle parking;
 - Other strategies in the SANDAG Regional Parking Management Toolbox

- Measures that reduce VMT through Transportation Systems Management (TSM), including measures included in proposed Plan Appendix E.
- Land use siting and design measures that reduce GHG emissions, including:
 - Developing on infill and brownfields sites;
 - Building high density and mixed use developments near transit; and
 - Retaining on-site mature trees and vegetation and planting new trees.
- Measures that increase vehicle efficiency or reduce the carbon content of fuels, including constructing electric vehicle charging stations or neighborhood electric vehicle networks or charging for electric bicycles consistent with SANDAG's regional readiness planning for alternative fuels.
- Measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse.
- Measures to reduce energy consumption and increase use of renewable energy, including those listed in Mitigation Measures EN-~~23~~A and EN-3BC.
- Measures to reduce water consumption, including those listed in Mitigation Measure WS-~~1A~~XX.

Mitigation Measures AQ-4A, AQ-4B, and AQ-4C would also reduce emissions of GHGs by reducing overall pollutant emissions from equipment and vehicles. These measures include:

- Mitigation Measure AQ-4A. Reduce Exposure to Localized Particulate and/or TAC Emissions.
- Mitigation Measure AQ-4B. Reduce diesel emissions during construction from off-road equipment.
- Mitigation Measure AQ-4C. Reduce diesel emissions during construction from on-road vehicles.

Mitigation Measures EN-3B would also reduce emissions of GHGs by reducing conventional energy use and therefore reducing emissions associated with combustion of fossil fuels used in conventional power plants.

Mitigation Measure WS-1A would increase water conservation, and thereby reduce GHG emissions associated with water supply conveyance, storage, treatment, and distribution.

SIGNIFICANCE AFTER MITIGATION

2035 and 2050

Implementation of Mitigation Measures GHG-4A through GHG-4H, as well as Mitigation Measures AQ-4A, AQ-4B, AQ-4C, EN-3B and WS-1A, would reduce GHG emissions. The effectiveness of a number of the project-specific measures in reducing GHG emissions has been quantified by CAPCOA (2010). Based on the studies cited in the introduction to the mitigation section, however, even full implementation of all identified mitigation measures would not be sufficient to reduce the proposed Plan's GHG emissions below the regional 2030 and 2050 GHG reduction reference points based on EO B- 30-15 and EO-S-3-05. Because the proposed Plan's 2035 GHG emissions would remain inconsistent with state's current ability to achieve the Executive Orders' GHG reduction goals, this impact (Impact GHG-4) remains significant and unavoidable.

This page intentionally left blank.