

3.3 Climate Change

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (GHG) emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity, including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF₆), HFC-23 (fluoroform), HFC-134a (1,1,1,2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the United States, the main source of GHG emissions is electricity generation, followed by transportation.¹ In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) are the largest contributors of GHG emissions.² The dominant GHG emitted is CO₂, mostly from fossil fuel combustion.

Two terms are typically used when discussing how we address the impacts of climate change: "greenhouse gas mitigation" and "adaptation." "Greenhouse gas mitigation" is a term for reducing GHG emissions to reduce or "mitigate" the impacts of climate change. "Adaptation" refers to planning for and responding to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).

3.3.1 Regulatory Setting

This section outlines federal and state efforts to comprehensively reduce GHG emissions from transportation sources.

3.3.1.1 Federal

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level.

The National Environmental Policy Act (NEPA) (42 United States Code [USC] Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

The Federal Highway Administration (FHWA) recognizes the threats that extreme weather, sea-level change, and other changes in environmental conditions pose to valuable transportation infrastructure and those who depend on it. FHWA therefore supports a sustainability approach that assesses vulnerability to climate risks and incorporates resilience into planning, asset management, project development and design, and operations and maintenance practices.³ This approach encourages planning for sustainable highways by addressing climate risks while

¹ <https://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014>.

² <https://www.arb.ca.gov/cc/inventory/data/data.htm>.

³ <https://www.fhwa.dot.gov/environment/sustainability/resilience/>.

balancing environmental, economic, and social values—“the triple bottom line of sustainability.”⁴ Program and project elements that foster sustainability and resilience also support economic vitality and global efficiency, increase safety and mobility, enhance the environment, promote energy conservation, and improve the quality of life. Addressing these factors up front in the planning process would assist in decision-making and improve efficiency at the program level, and would inform the analysis and stewardship needs of project-level decision-making.

Various efforts have been promulgated at the federal level to improve fuel economy and energy efficiency to address climate change and its associated effects.

The Energy Policy Act of 1992 (EPACT92, 102nd Congress H.R.776.ENR): With this act, Congress set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 consists of 27 titles detailing various measures designed to lessen the nation’s dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings. Title III of EPACT92 addresses alternative fuels. It gave the U.S. Department of Energy administrative power to regulate the minimum number of light-duty alternative fuel vehicles required in certain federal fleets beginning in fiscal year 1993. The primary goal of the Program is to cut petroleum use in the United States by 2.5 billion gallons per year by 2020.

Energy Policy Act of 2005 (109th Congress H.R.6 (2005–2006): This act sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Indian energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

Energy Policy and Conservation Act of 1975 (42 USC Section 6201) and Corporate Average Fuel Standards: This act 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.

Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, 74 Federal Register 52117 (October 8, 2009): This federal EO set sustainability goals for federal agencies and focuses on making improvements in their environmental, energy, and economic performance. It instituted as policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities.

Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, 80 Federal Register 15869 (March 2015): This EO reaffirms the policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities. It sets sustainability goals for all agencies to promote energy conservation, efficiency, and management by reducing energy consumption and GHG emissions. It builds on the adaptation and resiliency goals in previous executive orders to ensure agency operations and facilities prepare for impacts of climate change. This order revokes Executive Order 13514.

United States Environmental Protection Agency’s (U.S. EPA) authority to regulate GHG emissions stems from the United States Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that GHGs meet the definition of air pollutants under the

⁴ <https://www.sustainablehighways.dot.gov/overview.aspx>

existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, U.S. EPA finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six GHGs constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and U.S. EPA's assessment of the scientific evidence that form the basis for EPA's regulatory actions.

U.S. EPA, in conjunction with the National Highway Traffic Safety Administration (NHTSA), issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010⁵ and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States. The standards required these vehicles 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 and beyond 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. The Mid-Term Evaluation is the overarching process by which NHTSA, U.S. EPA, and the California Air Resources Board (ARB) will decide on CAFE and GHG emissions standard stringency for model years 2022–2025. NHTSA has not formally adopted standards for model years 2022 through 2025. However, the U.S. EPA finalized its mid-term review in January 2017, affirming that the target fleet average of at least 54.5 miles per gallon by 2025 was appropriate. In March 2017, President Trump ordered U.S. EPA to reopen the review and reconsider the mileage target.⁶

NHTSA and U.S. EPA issued a Final Rule for "Phase 2" for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution in October 2016. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO₂ emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018–2027 vehicles.

Presidential Executive Order 13783, *Promoting Energy Independence and Economic Growth*, of March 28, 2017, orders all federal agencies to apply cost-benefit analyses to regulations of GHG emissions and evaluations of the social cost of carbon, nitrous oxide, and methane.

3.3.1.2 State

With the passage of legislation including State Senate Bills (SBs) and Assembly Bills (ABs) and executive orders, California has been innovative and proactive in addressing GHG emissions and climate change.

Assembly Bill 1493, Pavley Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board (ARB) to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

Executive Order S-3-05 (June 1, 2005): The goal of this Executive Order is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and

⁵ <https://one.nhtsa.gov/Laws-&-Regulations/CAFE-%E2%80%93-Fuel-Economy>.

⁶ <http://www.nbcnews.com/business/autos/trump-rolls-back-obama-era-fuel-economy-standards-n734256> and <https://www.federalregister.gov/documents/2017/03/22/2017-05316/notice-of-intention-to-reconsider-the-final-determination-of-the-mid-term-evaluation-of-greenhouse>.

(3) 80 percent below year 1990 levels by 2050. This goal was further reinforced with the passage of Assembly Bill 32 in 2006 and SB 32 in 2016.

Assembly Bill 32, Chapter 488, 2006: Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals as outlined in Executive Order S-3-05, while further mandating that ARB create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.” The Legislature also intended that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs 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.

Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (Cal/EPA) and state agencies with regard to climate change.

Executive Order S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard (LCFS) for California. Under this Executive Order, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by the year 2020. ARB re-adopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor’s 2030 and 2050 GHG reduction goals.

Senate Bill 97 (SB 97), Chapter 185, 2007, Greenhouse Gas Emissions: This bill requires the Governor’s Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

Senate Bill 375 (SB 375), Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires ARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization (MPO) for each region must then develop a Sustainable Communities Strategy (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

Senate Bill 391 (SB 391), Chapter 585, 2009, California Transportation Plan: This bill requires the State’s long-range transportation plan to meet California’s climate change goals under AB 32.

Executive Order B-16-12 (March 2012) orders state entities under the direction of the Governor, including ARB, the California Energy Commission, and the 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.

Executive Order B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG 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 3 years, and to ensure that its provisions are fully implemented.

Senate Bill 32 (SB 32) Chapter 249, 2016, codifies the GHG reduction targets established in Executive Order B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

3.3.2 Environmental Setting

In 2006, the Legislature passed the California Global Warming Solutions Act of 2006 (AB 32), which created a comprehensive, multi-year program to reduce GHG emissions in California. AB 32 required ARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020. The Scoping Plan was first approved by ARB in 2008 and must be updated every five years. The second updated plan, *California's 2017 Climate Change Scoping Plan*, adopted on December 14, 2017, reflects the 2030 target established in EO B-30-15 and SB 32.

The AB 32 Scoping Plan and the subsequent updates contain the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the updated Scoping Plan, ARB released the GHG inventory for California.⁷ ARB is responsible for maintaining and updating California's GHG Inventory per H&SC Section 39607.4. The associated forecast/projection is an estimate of the emissions anticipated to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented.

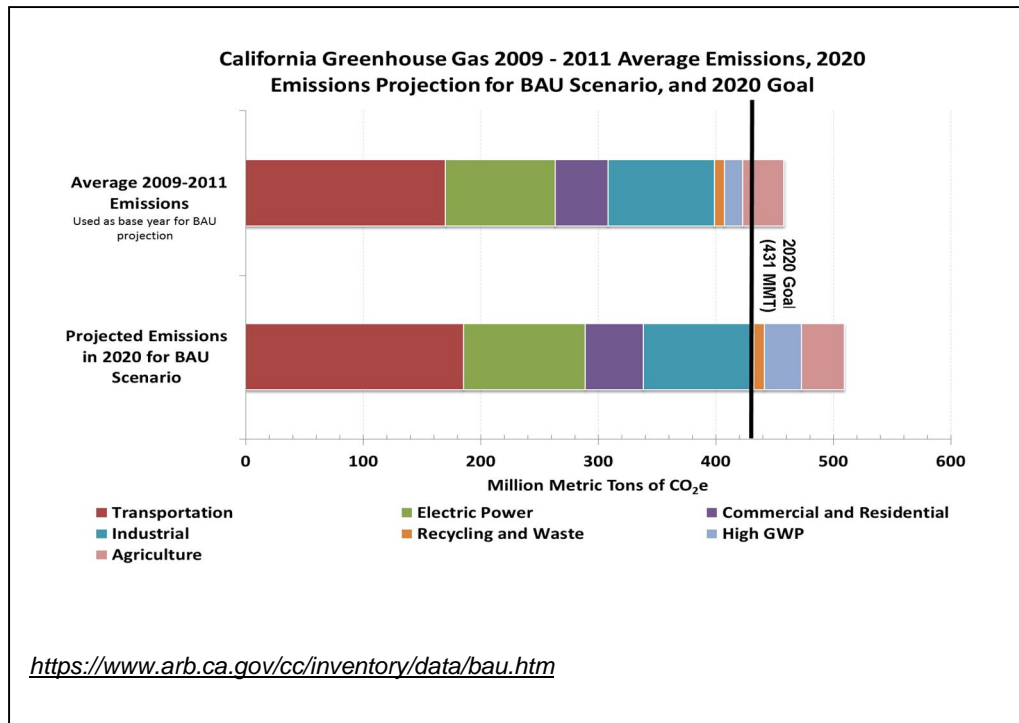
An emissions projection estimates future emissions based on current emissions, expected regulatory implementation, and other technological, social, economic, and behavioral patterns. The projected 2020 emissions provided in Figure 3.3-1, 2020 Business as Usual (BAU) Emissions Projection 2014 Edition, represent a business-as-usual (BAU) scenario assuming none of the Scoping Plan measures are implemented. The 2020 BAU emissions estimate assists ARB in demonstrating progress toward meeting the 2020 goal of 431 MMTCO_{2e}⁸. The 2017 edition of the GHG emissions inventory (released June 2017) found total California emissions of 440.4 MMTCO_{2e}, showing progress towards meeting the AB 32 goals.

The 2020 BAU emissions projection was revisited in support of the First Update to the Scoping Plan (2014). This projection accounts for updates to the economic forecasts of fuel and energy demand as well as other factors. It also accounts for the effects of the 2008 economic recession and the projected recovery. The total emissions expected in the 2020 BAU scenario include reductions anticipated from Pavley I and the Renewable Electricity Standard (30 MMTCO_{2e} total). With these reductions in the baseline, estimated 2020 statewide BAU emissions are 509 MMTCO_{2e}.

⁷ 2017 Edition of the GHG Emission Inventory Released (June 2017): <https://www.arb.ca.gov/cc/inventory/data/data.htm>.

⁸ The revised target using Global Warming Potentials (GWP) from the IPCC Fourth Assessment Report (AR4).

Figure 3.3-1: 2020 Business as Usual (BAU) Emissions Projection 2014 Edition



3.3.3 Project Analysis

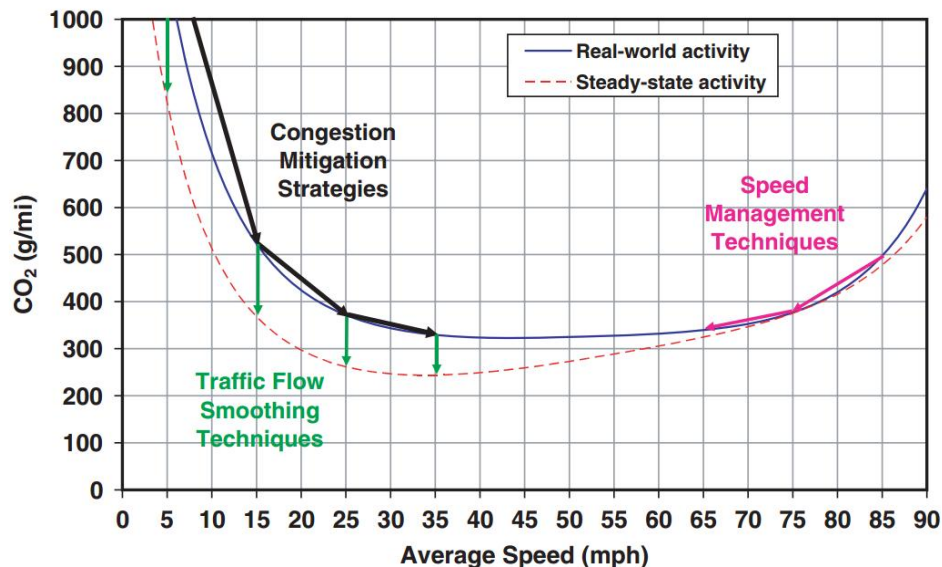
An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its incremental change in emissions when combined with the contributions of all other sources of GHG.⁹ In assessing cumulative impacts, it must be determined if a project’s incremental effect is “cumulatively considerable” (CEQA Guidelines Sections 15064(h)(1) and 15130). To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

GHG emissions for transportation projects can be divided into those produced during operations and those produced during construction. The following represents a best faith effort to describe the potential GHG emissions related to the proposed project.

⁹ This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

3.3.3.1 Operational Emissions

Figure 3.3-2: Possible Use of Traffic Operation Strategies In Reducing On-Road CO₂ Emissions



Four primary strategies can reduce GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity, (3) transitioning to lower GHG-emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued concurrently. FHWA supports these strategies to lessen climate change impacts, which correlate with efforts that the State of California is undertaking to reduce GHG emissions from the transportation sector.

The highest levels of CO₂ from mobile sources such as automobiles occur at stop-and-go speeds (0–25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from 0–25 miles per hour (see Figure 3.3-2, Possible Use of Traffic Operation Strategies in Reducing On-Road CO₂ Emissions, above). To the extent that a project relieves congestion by enhancing operations and improving travel times in high-congestion travel corridors, GHG emissions, particularly CO₂, may be reduced.

The SCAG 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) includes proposed transportation improvements to be integrated and coordinated with proposed land use changes that would lead to reduced congestion, reduced vehicle miles traveled (VMT), and increased transit, walking, and biking options. The I-605/Katella Avenue Interchange Improvements project proposes to improve interchange traffic operations and pedestrian and bicycle facilities. The project would construct bicycle lanes and sidewalks through the interchange, in an area where these facilities are current discontinuous; refer to Chapter 1, Section 1.2, Purpose and Need. As such, the project would assist the region with these goals, and is consistent with the RTP/SCS.

The RTP/SCS includes integrated transportation and land use strategies to promote active transportation opportunities, compact development, car sharing and ride sourcing, and technology in zero-emission vehicles and neighborhood electric vehicles. The Program Environmental Impact Report for the 2016 RTP/SCS determined that across the six counties in the SCAG region, the 2016 RTP/SCS would result in an approximately 24 percent decrease in

GHG emissions by 2040. The 2016 RTP/SCS also includes land use strategies that seek to balance the region's land use choices and transportation investments.

As part of the early planning phase of the project, a number of alternatives and modal choices were considered. In order to accomplish the purpose of the project (i.e., to improve interchange traffic operations and improve pedestrian and bicycle facilities), implementation of roadway improvements along Katella Avenue and the interchange ramps, in addition to the provision of bicycle and pedestrian facilities was determined necessary. Alternatives related to mass transit were explored, but were eliminated from further consideration since they would not provide the geometric improvements required to improve interchange traffic operations, and would not provide for improved pedestrian and bicycle facilities.

Although the modified cloverleaf interchange design generally provides a high level of operations for vehicles as a result of uncontrolled free right-turn movements, it is not optimal for accommodating bicycle or pedestrian movements. Right shoulders, which can serve bicycle traffic, are absent along westbound Katella Avenue through the project limits. On eastbound Katella Avenue, the right shoulder ends at the northbound exit ramp. Lane drops and additions as part of free right-turn movements at the ramps also create challenging conflict areas for bicyclists. Pedestrian crossings occur across uncontrolled high-speed free right-turn movements at all but one ramp location. Pedestrian facilities on both sides of Katella Avenue terminate at the west end of the interchange. On the westbound side, an unmarked crossing at the southbound loop on-ramp leads to a curb ramp surrounded by vegetation, with no sidewalk beyond. For pedestrians traveling west on the eastbound side of Katella Avenue, the crosswalk across the southbound direct entrance ramp leads to asphalt dike and metal guard railing at the edge of shoulder, with no sidewalk or curb ramp. From there, pedestrians must walk on the roadway shoulder to continue west to the Coyote Creek Bikeway access ramp. Beyond the interchange, there are no sidewalks on either side of Willow Street to Studebaker Road, approximately one mile away. As such, the modal choice provided under the proposed project was deemed appropriate to meet the purpose and need of the project, and enhance bicycle and pedestrian connectivity in the project area.

Based on the Air Quality Assessment, daily VMT would generally decrease (Alternative 3) or stay the same (Alternative 2) in the project area when compared to No-Build conditions, in both opening (2035) and horizon (2055) years. In addition, it should be noted that the project would improve operational deficiencies, improve travel time in the area, and accommodate future growth, and would not induce additional growth in the area.

Table 3.3-1, Annual Greenhouse Gas Emissions, depicts the existing and future emissions from vehicles traveling within the project area, calculated with the EMFAC14 model. As shown in Table 3.3-1, the existing VMT in the study area generates 67,233 metric tons per year of carbon dioxide equivalent (MTCO₂eq).¹⁰ CO₂ emissions would decrease to 44,351 MTCO₂eq per year during the 2035 No-Build and Alternative 2 scenarios, and to 42,395 MTCO₂eq per year during the 2035 Alternative 3 scenario. During the 2055 Horizon Year, emissions would be 42,386 MTCO₂eq for the No-Build and Alternative 2 scenarios, and 40,514 MTCO₂eq for Alternative 3. CO₂ emissions would generally decrease in the project area compared to existing conditions, and would be equal to (Alternative 2) or decrease (Alternative 3) under both build alternatives compared to the No-Build Alternative, in both 2035 and 2055. The overall reductions in GHG emissions would be due to the improvements in VMT and vehicle hours traveled (VHT).

¹⁰ Carbon Dioxide Equivalent (CO₂eq) – A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential. The emissions in this analysis include CO₂ and methane (CH₄).

Table 3.3-1: Annual Greenhouse Gas Emissions

Scenario	Daily VMT	CO ₂ eq (metric tons/year)
		Project Study Area ¹
Existing Conditions	454,161	67,233
Opening Year (2035) Emissions		
2035 No-Build Alternative	535,644	44,351
Alternative 2	535,644	44,351
- Net Change from No-Build to Build Alternative	0	0
- Percent Change from 2035 No-Build Alternative	0.00%	0.00%
Alternative 3	514,249	42,395
- Net Change from No-Build to Build Alternative	-21,395	-1,956
- Percent Change from 2035 No-Build Alternative	-4.16%	-4.61%
Horizon Year (2055) Emissions		
2055 No-Build Alternative	538,476	42,386
Alternatives 2	538,476	42,386
- Net Change from No-Build to Build Alternative	0	0
- Percent Change from 2055 No-Build Alternative	0.00%	0.00%
Alternative 3	516,823	40,514
- Net Change from No-Build to Build Alternative	-21,653	-1,872
- Percent Change from 2055 No-Build Alternative	-4.19%	-4.62%
Notes:		
1. CO ₂ eq = carbon dioxide equivalent: a metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.		
2. Refer to the Air Quality Assessment (August 2017) for CO ₂ emissions modeling outputs.		
3. Emissions calculated based on VMT data provided by Iteris and Fehr and Peers (May 2017) and calculated with CT-EMFAC2014.		

While EMFAC has a rigorous scientific foundation and has been vetted through multiple stakeholder reviews, its emission rates are based on tailpipe emission test data. The numbers are estimates of CO₂ emissions and not necessarily the actual CO₂ emissions. The model does not account for factors such as the rate of acceleration and the vehicles' aerodynamics, which would influence CO₂ emissions. To account for CO₂ emissions, ARB's GHG Inventory follows the IPCC guideline by assuming complete fuel combustion, while still using EMFAC data to calculate CH₄ and N₂O emissions. Though EMFAC is currently the best available tool for use in calculating GHG emissions, it is important to note that the CO₂ numbers provided are only useful for a comparison of alternatives.

3.3.3.2 Construction Emissions

Construction GHG emissions would result from material processing, on-site construction equipment, and traffic delays due to construction. These emissions would be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases.

In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

Based on the Roadway Construction Emissions Model (RCEM) (Version 8.1.0) developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD), GHG emissions associated with construction of the project would be 1,398 tons (1,268 metric tons) of CO₂eq for

the 12-month construction period under Alternative 2, and 1,687 tons (1,531 metric tons) of CO₂eq for the 18-month construction period under Alternative 3.

The proposed project would comply with any state, federal, and/or local rules and regulations developed as a result of implementing control and mitigation measures proposed as part of their respective State Implementation Plans. Certain project features under Caltrans Standard Specifications Section 14, such as properly tuning and maintaining construction vehicles, will also help reduce construction GHG emissions.

3.3.3.3 CEQA Conclusion

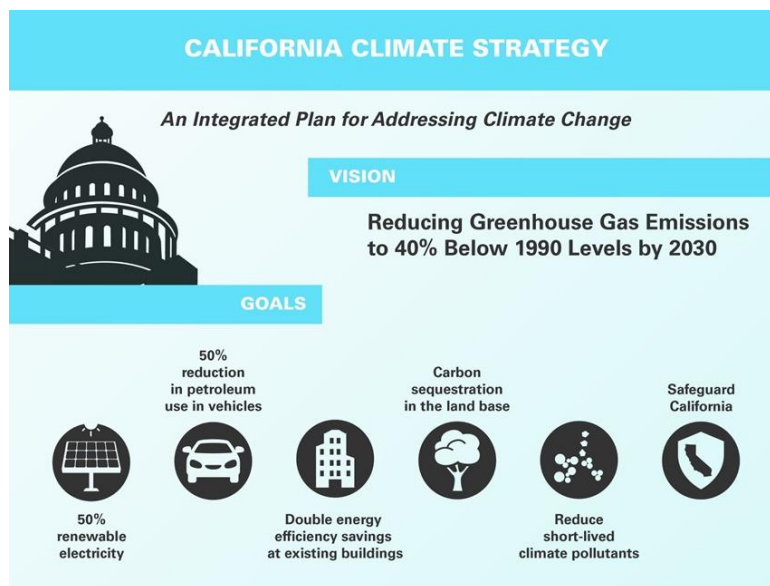
As discussed above, GHG emissions are projected to decrease in the project area as compared to existing conditions. While construction activities would result in a slight increase in GHG emissions during construction, operational emissions during the Build scenarios would decrease from the No-Build scenario. Nonetheless, there are also limitations with EMFAC and with assessing what a given CO₂ emissions increase means for climate change. Therefore, it is Caltrans' determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding significance of the project's direct impact and its contribution on the cumulative scale to climate change. However, Caltrans is firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the following section.

3.3.3.4 Greenhouse Gas Reduction Strategies

3.3.3.4.1 Statewide Efforts

In an effort to further the vision of California's GHG reduction targets outlined in AB 32 and SB 32, Governor Brown identified key climate change strategy pillars (concepts). These pillars highlight the idea that several major areas of the California economy would need to reduce emissions to meet the 2030 GHG emissions target. These pillars are (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the State's climate adaptation strategy, Safeguarding California; refer to Figure 3.3-3, The Governor's Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals.

Figure 3.3.-3: The Governor’s Climate Change Pillars: 2030 Greenhouse Gas Reduction Goals



The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that we build on our past successes in reducing criteria and toxic air pollutants from transportation and goods movement activities. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled. One of Governor Brown’s key pillars sets the ambitious goal of reducing today’s petroleum use in cars and trucks by up to 50 percent by 2030.

Governor Brown called for support to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. These lands have the ability to remove carbon dioxide from the atmosphere through biological processes, and to then sequester carbon in above- and below-ground matter.

Caltrans Activities

Caltrans continues to be involved on the Governor’s Climate Action Team as the ARB works to implement Executive Orders S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. Executive Order B-30-15, issued in April 2015, and SB 32 (2016), set a new interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

California Transportation Plan (CTP 2040)

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California’s future statewide, integrated, multimodal transportation system. It serves as an umbrella document for all of the other statewide transportation planning documents.

SB 391 (Liu 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the State's transportation needs.

While MPOs have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in Pricing, Transportation Alternatives, Mode Shift, and Operational Efficiency.

Caltrans Strategic Management Plan

The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that would help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing VMT per capita
- Reducing Caltrans' internal operational (buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several funding and technical assistance programs that have GHG reduction benefits. These include the Bicycle Transportation Program, Safe Routes to School, Transportation Enhancement Funds, and Transit Planning Grants. A more extensive description of these programs can be found in *Caltrans Activities to Address Climate Change* (2013).

Caltrans Director's Policy 30 (DP-30) Climate Change (June 22, 2012) is intended to establish a department policy that would ensure coordinated efforts to incorporate climate change into departmental decisions and activities.

Caltrans Activities to Address Climate Change (April 2013) provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

3.3.3.4.2 Project-Level GHG Reduction Strategies

The project includes improvements to bicycle and pedestrian facilities within the interchange area, improving connectivity to encourage use of these alternative modes. The following measures would also be implemented in the project to reduce GHG emissions and potential climate change impacts from the project.

CC-1 The project will implement landscaping as determined during final design in coordination with the City of Los Alamitos, the County of Orange, and the Caltrans District Landscape Architect. This landscaping will help offset any potential CO₂ emissions increase.

CC-2 The project will incorporate the use of energy efficient lighting, such as LED traffic signals, to help reduce the project's CO₂ emissions.¹¹

¹¹ Knoxville Business Journal, "LED Lights Pay for Themselves," May 19, 2008 at <http://www.knoxnews.com/news/2008/may/19/led-traffic-lights-pay-themselves/>.

CC-3 According to the Caltrans Standard Specifications, idling time for lane closure during construction will be limited to 10 minutes in each direction. In addition, the contractor will comply with all South Coast Air Quality Management District (SCAQMD) rules, ordinances, and regulations regarding air quality restrictions.

CC-4 As part of the Southern California Association of Governments (SCAG), 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), project level mitigation measures were provided to reduce impacts including those pertaining to climate change. The following project level mitigation measures would apply:

- The project will utilize energy and fuel efficient vehicles and equipment that meets and exceeds U.S. EPA/NHTSA/CARB standards relating to fuel efficiency and emission reduction.
- The project will use the minimum feasible amount of GHG-emitting construction materials.
- The project will use cement blended with the maximum feasible amount of fly ash or other materials that reduce GHG emissions from cement production.
- The project will incorporate design measures to reduce GHG emissions from solid waste management through solid waste reduction, recycling and reuse.
- The project will recycle construction debris.

3.3.3.4.3 Adaptation Strategies

“Adaptation strategies” refer to how Caltrans and others can plan for the effects of climate change on the State’s transportation infrastructure and strengthen or protect the facilities from damage—or, put another way, planning and design for resilience. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and their intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects would vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. These types of impacts to the transportation infrastructure may also have economic and strategic ramifications.

Federal Efforts

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the CEQ, the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011¹², outlining the federal government’s progress in expanding and strengthening the nation’s capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provided an update on actions in key areas of federal adaptation, including: building resilience in local communities, safeguarding critical natural resources such as fresh water, and providing accessible climate information and tools to help decision-makers manage climate risks.

The federal Department of Transportation issued U.S. DOT Policy Statement on Climate Adaptation in June 2011, committing to “integrate consideration of climate change impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that

¹² <https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/resilience>.

taxpayer resources are invested wisely and that transportation infrastructure, services and operations remain effective in current and future climate conditions.”¹³

To further the DOT Policy Statement, in December 15, 2014, FHWA issued order 5520 (Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events).¹⁴ This directive established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. The FHWA would work to integrate consideration of these risks into its planning, operations, policies, and programs in order to promote preparedness and resilience; safeguard federal investments; and ensure the safety, reliability, and sustainability of the nation’s transportation systems.

FHWA has developed guidance and tools for transportation planning that fosters resilience to climate effects and sustainability at the federal, state, and local levels.¹⁵

State Efforts

On November 14, 2008, then-Governor Arnold Schwarzenegger signed Executive Order S-13-08, which directed a number of state agencies to address California’s vulnerability to sea-level rise caused by climate change. This Executive Order set in motion several agencies and actions to address the concern of sea-level rise and directed all state agencies planning to construct projects in areas vulnerable to future sea-level rise to consider a range of sea-level rise scenarios for the years 2050 and 2100, assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea-level rise. Sea-level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, and storm surge and storm wave data.

Governor Schwarzenegger also requested the National Academy of Sciences to prepare an assessment report to recommend how California should plan for future sea-level rise. The final report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington* (Sea-Level Rise Assessment Report)¹⁶ was released in June 2012 and included relative sea-level rise projections for the three states, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; and the range of uncertainty in selected sea-level rise projections. It provided a synthesis of existing information on projected sea-level rise impacts to state infrastructure (such as roads, public facilities, and beaches), natural areas, and coastal and marine ecosystems; and a discussion of future research needs regarding sea-level rise.

In response to Executive Order S-13-08, the California Natural Resources Agency (Resources Agency), in coordination with local, regional, state, federal, and public and private entities, developed The California Climate Adaptation Strategy (December 2009),¹⁷ which summarized the best available science on climate change impacts to California, assessed California’s vulnerability to the identified impacts, and outlined solutions that can be implemented within and across state agencies to promote resiliency. The adaptation strategy was updated and

¹³ https://www.fhwa.dot.gov/environment/sustainability/resilience/policy_and_guidance/usdot.cfm.

¹⁴ <https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm>.

¹⁵ <https://www.fhwa.dot.gov/environment/sustainability/resilience/>.

¹⁶ *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

¹⁷ <http://www.climatechange.ca.gov/adaptation/strategy/index.html>.

rebranded in 2014 as Safeguarding California: Reducing Climate Risk (Safeguarding California Plan).

Governor Jerry Brown enhanced the overall adaptation planning effort by signing Executive Order B-30-15 in April 2015, requiring state agencies to factor climate change into all planning and investment decisions. In March 2016, sector-specific Implementation Action Plans that demonstrate how state agencies are implementing Executive Order B-30-15 were added to the Safeguarding California Plan. This effort represents a multi-agency, cross-sector approach to addressing adaptation to climate change-related events statewide.

Executive Order S-13-08 also gave rise to the State of California Sea-Level Rise Interim Guidance Document (SLR Guidance), produced by the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), of which Caltrans is a member. First published in 2010, the document provided “guidance for incorporating sea-level rise (SLR) projections into planning and decision making for projects in California,” specifically, “information and recommendations to enhance consistency across agencies in their development of approaches to SLR.”¹⁸

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation, and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is actively engaged in working towards identifying these risks throughout the State and would work to incorporate this information into all planning and investment decisions as directed in EO B-30-15.

The proposed project is outside the coastal zone and not in an area subject to sea-level rise. Accordingly, direct impacts to transportation facilities due to projected sea-level rise are not expected. As discussed in Section 2.2.1, Hydrology and Floodplain, the project would traverse over the Coyote Creek Channel, Los Alamitos Channel, and Katella Storm Drain Channel. Accordingly, hydrology and hydraulics analysis would be required during the Plans, Specifications, and Estimates (PS&E) phase to determine necessary improvements allowed for extension of the reinforced concrete box culverts (PF-HYD-2) to provide adequate freeboard. It is possible that future climate change conditions may affect hydrology and hydraulics conditions within the project area and associated freeboard that would be required at the affected channels. The project would be required to comply with Orange County Flood Control District (OCFCD) design parameters for channel design and freeboard. Project construction is not anticipated to occur until 2033; as such, it is expected that OCFCD design requirements would be adjusted to reflect any potential climate change-related conditions at that time.

¹⁸ <http://www.opc.ca.gov/2013/04/update-to-the-sea-level-rise-guidance-document/>.

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