# 3.5 Global Climate Change

## 3.5.1 Introduction

This section addresses the potential impacts of operation of the proposed Expo Phase 2 project on greenhouse gas emissions and the potential for emissions to cumulatively contribute to climate change, as required by the *California Global Warming Solutions Act of 2006* (AB 32).

Greater detail on Global Climate Change is contained in the *Global Climate Change Technical Background Report.* Full bibliographic references can be found in Appendix B (Bibliography).

## 3.5.2 Existing Conditions

The term "climate change" refers to long-term global and regional variations in wind patterns, storm intensity, precipitation, and temperature. It is widely accepted by the scientific community, and is recognized by the State of California, that (1) emissions of greenhouse gases and aerosols, and changes in land cover associated with development are accelerating global climate change and that (2) adverse environmental impacts will result from climate change in the future.

**Greenhouse Gas Emissions**

Gases that trap heat in the atmosphere are called greenhouse gases, analogous to the way a greenhouse retains heat.

Generally, greenhouse gases generated by electrical-powered light-rail vehicles and other transit sources (including those fueled by petroleum or natural gas) include carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$), hydrofluorocarbons (HFCs), sulfur hexafluoride ($SF_6$), and aerosols.

Other gases that contribute to the greenhouse effect include ozone,[56] chlorofluorocarbons (CFCs), and perfluorocarbons (PFCs), but these gases are generally associated with residential and/or industrial uses. Transportation infrastructure projects do not generate substantial levels of these gases.

### Sources of Greenhouse Gases Associated with Transportation Sector

California's transportation sector is heavily dependent upon oil, with petroleum-based fuels currently supplying 96 percent of California's transportation energy needs (California Energy Commission [CEC] 2003). By percentage, the transportation sector (including highways, rail systems, airports, and ports) is the largest contributor to greenhouse gas emissions in California, and contributed 38 percent of California' greenhouse gas emissions between 2002 and 2004 (California Air Resources Board [California ARB] 2008).

[56] Ozone is a greenhouse gas; however, unlike other greenhouse gases, ozone in the troposphere, which is the lowest portion of the earth's atmosphere, is relatively short-lived. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change (~~Cal EPA 2004~~Pavley 2002).

Public transit is demonstrably more energy efficient than multiple automobile trips and has been shown to result in lower greenhouse gas emissions (Poudenx and Merida 2007). The California Attorney General's Office (AGO) suggests that land development projects should be required to create an interconnected transportation system that allows a shift in travel from private passenger vehicles to alternative modes, including public transit, ride sharing, bicycling and walking as a form of reducing and mitigating greenhouse gas emissions (AGO 2007). Generally, the Association of Environmental Professionals (AEP), California Air Pollution Control Officers Association (CAPCOA), California Climate Action Team (CAT), United States Environmental Protection Agency (U.S. EPA), and other climate change policy makers consider the provision of public transit access that serves to reduce vehicle miles traveled (VMT) as mitigation for climate change impacts.

### 3.5.3 Regulatory Setting

**Federal Policies**

**Climate Change Action Plan**

In October 1993, President Clinton announced his "Climate Change Action Plan," with the goal of returning greenhouse gas emissions to 1990 levels by the year 2000. This was to be accomplished through fifty initiatives, relying on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in greenhouse gas emissions. As of May 2008, thirty states, including California, have completed comprehensive Climate Action Plans that detail the steps that each state can take to reduce their contribution to climate change.

**Clean Air Act**

The U.S. EPA currently does not regulate greenhouse gas emissions from motor vehicles.

**State Policies**

**Executive Order S-3-05**

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's greenhouse gas emissions to (1) 2000 levels by 2010, (2) 1990 levels by the 2020, and (3) 80 percent below the 1990 levels by the year 2050.

**Assembly Bill 32**

In 2006, the Governor's goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the *Global Warming Solutions Act of 2006*. AB 32 sets the same overall greenhouse gas emissions reduction goals while further mandating that the California ARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's CAT. The AB 32 Scoping Plan does not recommend specific actions with respect to local or regional transit. However, the proposed project will help to achieve the overall California ARB Scoping Plan reductions by reducing the amount of overall vehicle miles traveled within the region.

**Executive Order S-01-07**

In January~~,~~ 2007, w~~W~~ith Executive Order S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this executive order, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

**Senate Bill 97**

The provisions of Senate Bill (SB) 97, which was enacted in August 2007 as part of the State Budget negotiations, directed the Office of Planning and Research (OPR) to propose *California Environmental Quality Act* (CEQA) Guidelines advising lead agencies on how to mitigate the impacts of greenhouse gas emissions. OPR ~~has been directed to promulgate such~~drafted a proposed set of guidelines ~~by July~~addressing greenhouse gas emissions and released them for informal public review and comment in December 2008. OPR made minor revisions to the guidelines based upon public comments and in April 2009~~, and~~ handed over the proposed guidelines to the Resources Agency for adoption. The Resources Agency is providing a formal public review process and has been directed to adopt such guidelines into law by January 2010~~. Draft guidelines were released in December 2008 and were used for the analysis in this section~~.

**Senate Bill 1078**

SB 1078, enacted in 2002, established a renewable portfolio standard (RPS) for electricity supply. The RPS requires that retail sellers of electricity provide 20 percent of their supply from renewable sources by 2010. In addition, electricity providers subject to the RPS must increase the percentage of their energy portfolio supplied through renewable sources by at least 1 percent each year. As of July 2008, Southern California Edison has achieved 15.7 percent of its total electrical sales from renewable resources (California Public Utilities Commission [CPUC] 2008). The Los Angeles Department of Water and Power (LADWP) reported that in 2008, 10 percent of its electricity was generated from renewable sources.[57]

**Senate Bill 375**

SB 375 was signed into law in September 2008, and requires the California ARB to develop regional greenhouse gas emission reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. The eighteen metropolitan planning organizations (MPOs) in California will prepare a "sustainable communities strategy" (SCS), as part of their Regional Transportation Plans, to reduce the amount of VMT in their respective regions and demonstrate the ability for the region to attain the California ARB's targets. Starting in the year 2012, transit-oriented development that is consistent with the SCS would then be eligible for regional funding; and in order to incentivize smart growth, these funds would not be available for non-compliant projects.

Cities and counties, when pursuing developments that comply with the SCS that has been prepared for their region, would be incentivized to focus on constructing "transit priority projects" (TPPs) that are sufficiently dense and close to transit. If a TPP is consistent with a region's SCS, and if it satisfies other necessary conditions (such as no interference with wetlands or the habitat of an endangered species), then a TPP may be approved with less rigorous environmental review than CEQA currently requires. In addition, Cities would get extra time—eight years instead of five—to update housing plans required by the state. The main goal

[57] LADWP. *2008 Green Power Annual Report.*

underlying these amendments is to coordinate transportation and housing planning—in particular, to allocate housing in a way that is consistent with the growth blueprint that each MPO lays out in its Regional Transportation Plan (RTP)-SCS.

**Regional**

**Metro Energy and Sustainability Policy**

As a provider of public transportation, Metro is a large user of energy, both fossil fuels and electricity. The Metro Energy and Sustainability Policy, adopted in June 2007, examines ways to reduce energy consumption and consequently improve sustainability. Metro is in the process of completing numerous energy efficiency projects, such as lighting upgrades, escalator power controllers, HVAC replacements, and solar projects. The Metro Energy and Sustainability Policy codified an agency commitment to responsible energy management, renewable energy sources, energy efficiency, and general sustainability in Metro's operations.

The immediate goals of the policy are to gain more control over Metro's energy consumption and reduce costs by aggressively pursuing renewable energy sources and energy conservation projects, and to construct all new facilities using energy efficiency and conservation strategies.

### 3.5.4 Analytic Methodology

Data used to prepare this section were taken from various sources, including the following professional white papers: *Mitigation Measures and Global Warming Resources* (AGO 2007); *Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents* (AEP 2007); *CEQA and Climate Change* (CAPCOA 2008); *Climate Action Team Proposed Early Actions to Mitigate Climate Change in California* (CAT 2007); and *Climate Change 2007: Fourth Assessment Report* (IPCC 2007). Significance criteria are derived from the CAPCOA report, while the description of predicted climate change impacts is drawn from the United Nations Intergovernmental Panel on Climate Change (IPCC) report and from U.S. EPA predictions. The discussion of emissions reductions strategies is drawn from the California AGO and CAT reports.

In June 2008, the OPR published a technical advisory with recommendations for the preparation of greenhouse gas analyses under CEQA. OPR recommends preparation of a quantitative emissions inventory for a proposed project, followed by a discussion of the significance of the project according to climate change thresholds defined by a local agency. The December 2008 Draft CEQA Guideline amendments, prepared pursuant to SB 97, are consistent with the technical advisory.

In January 2009, OPR released preliminary draft revisions to the CEQA Guidelines with regard to evaluating, measuring, and mitigating the potential greenhouse gas emissions of a project. These preliminary draft guidelines allow a lead agency to consider a number of factors in determining the significance of a project's potential greenhouse gas emissions including the extent to which the project would help or hinder attainment of emissions reduction goals set by AB 32. The lead agency is allowed to either "use a model or methodology to quantify" the greenhouse gas emissions, or "rely on qualitative or other performance based standards" to estimate the significance of a project's potential greenhouse gas emissions. Further, the lead agency may consider thresholds of significance adopted by other public agencies.

This section uses data from Section 3.2 (Transportation/Traffic) for the Light-Rail Transit (LRT) Alternatives. The greenhouse gas emissions estimate for the No-Build Alternative was used as a baseline to compare with the TSM Alternative and the four LRT Alternatives to determine the reduction in passenger vehicle-related greenhouse gas emissions that would occur with implementation of the proposed project. In addition, the increased use of electricity from the implementation of the LRT Alternatives were determined and included in comparison to the No-Build and TSM Alternatives. Emissions of $CO_2$ from buses and passenger vehicles were obtained from the URBEMIS 2007 model. Emissions of $CH_4$ and $N_2O$ from busses and passenger vehicles were determined from vehicle miles traveled. $CO_2$, $CH_4$, and $N_2O$ emissions were also determined for electrical generation with respect to the operation of the LRT Alternatives, stations, and Maintenance Facility.

The Expo Authority has identified the following CEQA criteria, taken from the preliminary draft revisions to Appendix G of the CEQA Guidelines, as appropriate for this project. The project would have significant impacts on global climate change if the project would result in either of the following:

- Create greenhouse gas emissions that would directly or indirectly have a significant impact, based on any threshold of significance
- Conflict with any existing applicable agency plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions

In response to the first significance determination criteria, the California Air Pollution Control Officers Association (CAPCOA) prepared a white paper outlining programmatic approaches for determining the significance of greenhouse gas emissions. For the purposes of this analysis, the CAPCOA's "Non-Zero GHG Threshold" was chosen. Significance determination in this analysis also uses methods of analysis found in the South Coast Air Quality Management District (SCAQMD) "Draft Guidance Document—Interim CEQA Greenhouse Gas Significance Thresholds (October 2008)." Under this threshold and using the SCAQMD methodology, if a project with the inclusion of construction emissions amortized over thirty years, emits less than 10,000 metric tons per year of $CO_2e$ ($MTCO_2e$) then the Project's incremental contribution of greenhouse gases is considered less than significant.

Based on the CAPCOA and SCAQMD methodology and guidance, the temporal changes of greenhouse gas emissions year to year on the ground are not important. What is important in the analysis of greenhouse gas emissions is the atmospheric lifetime of greenhouse gases in the upper atmosphere. Therefore, the analysis needs to depict the total annual average emissions generated by the Project. Specific to temporary construction emissions, in comparing these emissions to the Tier 3 brightline screening threshold proposed by SCAQMD, construction emissions need to be annualized over the economic life of the Project and added to the total operational emissions in order to predict the average annual emissions that can be expected to occur in the upper atmosphere. The SCAQMD methodology assumes the economic life of a Project is 30-years.

The mix of energy supplied to SCE and LADWP was assumed to remain as it is with no addition of renewable energy resources and there was no increase in energy efficiency taken into account. These conservative assumptions were maintained for all alternatives. However, rules and regulations are being developed that will increase energy efficiency and renewable energy sources that would result in emissions reductions in each of the alternatives. Because the

analysis was conservative and does not take into account future rules and regulations that may reduce emissions, the emissions shown in this analysis are considered a worst-case scenario.

### 3.5.5 Criteria, Impact Evaluation, and Mitigation Measures

| | |
|---|---|
| **Criteria** | **Would the project ~~contribute to a regional increase in~~create greenhouse gas emissions that would directly or indirectly have a significant impact based on any threshold of significance?** |

**No-Build Alternative**

Regional VMT, and corresponding mobile source emissions, are expected to increase by 2030 in response to increased population and economic activity (refer to Table 3.5-1 [Annual ~~Countywide Reductions in $CO_2$ Associated with Reduced Vehicle Single-Occupancy Miles Traveled]).~~$MTCO_2e$ Emissions]). Under the No-Build Alternative, greenhouse gas emissions would increase as a result of the increased VMT. The minor improvements in bus service on existing routes that would be implemented under the No-Build Alternative would have a small but positive impact on future greenhouse gas emissions. However, the vast majority of other projects assumed in the Air Quality Management Plan (AQMP) would proceed. Therefore, ~~the impact is~~a ***less~~-~~than~~-~~significant*** impact would result.

**Transportation Systems Management (TSM) Alternative**

~~The TSM Alternative would include all of the improvements under the No-Build Alternative and new on-street bus services to directly serve the Expo Phase 2 community transit needs. Those additional improvements would include minor physical modifications such as upgraded bus stops and additional buses.~~ The TSM Alternative would increase Metro, local and Rapid Bus services along city streets. By providing expanded bus service, it is anticipated that the TSM Alternative would result in a slight decrease in countywide VMT (refer to Table 3.5-1 [Annual ~~Countywide Reductions in $CO_2$ Associated with Reduced Vehicle Single-Occupancy Miles Traveled]).~~$MTCO_2e$ Emissions]). The TSM Alternative would result in a net decrease in regional emissions and would have a ***beneficial*** ~~impact~~effect on regional greenhouse gas emissions with respect to the No-Build Alternative.

**LRT Alternatives**

The proposed project would ~~use electrical power, presumably~~ consume electricity and natural gas supplied by Southern California Edison (SCE) and the Los Angeles Department of Water and Power (LADWP). ~~Although operation of the LRT Alternatives would indirectly increase greenhouse gas emissions through the generation of electricity required to operate the light-rail vehicles (LRVs), these emissions would not be substantial when considered in the context of the project's contributions to regional emission reductions, discussed below.~~ Electric consumption is attributed to the operation of the light rail vehicles (LRVs), stations, and Maintenance Facility. Consumption of natural gas is attributed only to the operation of the Maintenance Facility.

**Table 3.5-1 Annual ~~Countywide Reductions in $CO_2$ Associated with Reduced Vehicle Single-Occupancy Miles Traveled~~MT$CO_2$e Emissions**

| Measure | No-Build Alternative (~~b~~Baseline) | TSM Alternative | LRT 1: Expo ROW–Olympic Alternative | LRT 2: Expo ROW–Colorado Alternative | LRT 3: Venice/Sepulveda–Olympic Alternative | LRT 4: Venice/Sepulveda–Colorado Alternative |
|---|---|---|---|---|---|---|
| VMT, LA County | 223,164,138 | 223,163,833 | 223,073,743 | 223,120,245 | 223,147,690 | 223,152,265 |
| Miles of Track | 0 | 0 | 6.6 | 6.6 | 7.5 | 7.5 |
| **Countywide Emissions (Annual—Metric Tons per Year)** | | | | | | |
| Total $CO_2$e Associated with VMT | ~~40,496,032~~ 36,738,657 | ~~40,495,979~~ 36,738,609 | ~~40,479,626~~ 36,723,773 | ~~40,488,064~~ 36,731,429 | ~~40,493,055~~ 36,736,014 | ~~40,493,891~~ 36,736,715 |
| Total $CO_2$e Associated with Track Usage | 0 | 0 | 6,241 | 6,241 | 7,092 | 7,768 |
| Total $CO_2$e Associated with Stations & Maintenance Facility Operations | 0 | 0 | 721 | 723 | 727 | 729 |
| 30-Year Amortization of Construction Impacts | 0 | 0 | 609 | 609 | 609 | 609 |
| Total $CO_2$e | 36,738,657 | 36,738,609 | 36,731,346 | 36,739,003 | 36,744,442 | 36,745,822 |
| **Change from No-Build Alternative** | | | | | | |
| Net ~~$CO_2$ (Tons per Year)~~$CO_2$e | — | ~~-53~~48 | ~~-16,406~~7,312 | ~~-7,968~~+345 | ~~-2,977~~+5,785 | ~~-2,141~~+7,164 |
| Percent Change | — | -0.00013 | -0.0~~4051~~01990 | -±0.0~~1968~~00094 | -±0.00~~15~~735 | ~~-0.00529~~+0.01950 |
| **Changes from TSM Alternative** | | | | | | |
| Net ~~$CO_2$ (Tons per Year)~~$CO_2$e | — | — | ~~-16,353~~7,264 | ~~-7,915~~+393 | ~~-2,924~~+5,833 | ~~-2,088~~+7,212 |
| Percent Change | — | — | -0.0~~4038~~01977 | -±0.0~~1955~~00107 | -±0.00~~72~~01588 | -±0.00~~5~~1963 |

SOURCE: Data from URBEMIS2007; based on VMT in the *Transportation/Traffic Technical Background Report*; PBS&J 2009.

**Regional Operational Emissions ~~Reductions~~**

Implementation of the LRT Alternatives would result in increased transit ridership in Los Angeles County because of new connectivity. It is expected that over 10,000 new transit riders would choose to ride the LRT Alternatives in 2030~~, if implemented~~. All of t~~T~~he LRT Alternatives would reduce annual VMT associated with single-occupancy automotive traffic as compared to both the No-Build and ~~the~~ TSM Alternatives. ~~A regional reduction in VMT would be expected to contribute to a corresponding regional reduction in greenhouse gas emissions producing anywhere from 2,141 to 16,406 tons of $CO_2$ less than the No-Build Alternative, and from 2,088 to 16,353 tons of $CO_2$ less than the TSM Alternative. In addition, implementation of the LRT Alternatives would result in improvements in intersection level of service (LOS), contributing to reductions in greenhouse gas emissions by increasing the efficiency of the regional transportation system (refer to Section 3.2 [Transportation/Traffic]). This would be considered a beneficial impact with regards to compliance with the emissions-reduction targets set forth in AB 32 and Executive Order S-3-05.~~

The proposed project would consume electricity and natural gas supplied by SCE and LADWP. Electric consumption is attributed to the operation of the LRVs, stations, and maintenance facility. Consumption of natural gas is attributed only to the operation of the maintenance facility. Water consumption would be associated with irrigation and washing trains at the maintenance yard and is analyzed for greenhouse gas emissions from the electricity infrastructure needed to pump water to the facility and to treat the wastewater from the maintenance yard. As shown in Table 3.5-1 (Annual $MTCO_2e$ Emissions), LRT 1 Alternative would result in a reduction of greenhouse gas emissions over the No-Build and TSM Alternatives. LRT 2, LRT 3, and LRT 4 Alternatives would result in an increase of less than 7,300 $MTCO_2e$ over the No-Build and TSM Alternatives. Based on the CAPCOA Significance Threshold, a project is considered less than significant if greenhouse gas emissions, including construction impacts amortized over 30 years, show an incremental increase below 10,000 $MTCO_2e$/year. The LRT Alternatives would therefore have a ***beneficial*** ~~impact~~ effect on greenhouse gas emissions with respect to LRT Alternative 1 (Expo ROW–Olympic), and a ***less-than-significant*** effect on greenhouse gas emissions with respect to LRT Alternative 2 (Expo ROW–Colorado), LRT Alternative 3 (Venice/Sepulveda–Olympic), and LRT Alternative 4 (Venice/Sepulveda–Colorado).

**FEIR Design Options**

Implementation of the Colorado Parking Retention, Sepulveda Grade Separation, Colorado/4th Parallel Platform and South Side Parking, Maintenance Facility Buffer, or Expo/Westwood Station No Parking design options would involve minor redesign of certain elements of the proposed alignment. However, the proposed design options would not be anticipated to affect the daily operations of the LRT Alternatives, nor increase/decrease traffic volumes. Thus, no change in the level of operational greenhouse gas emissions discussed above for the LRT Alternatives is anticipated. Impacts on greenhouse gas emissions would remain ***beneficial*** with LRT Alternative 1 and ***less than significant*** for LRT Alternatives 2, 3 and 4.

**Criterion Would the project conflict with any existing applicable agency plan, policy, or regulation adopted for the purpose of reducing greenhouse gas emissions?**

**No-Build Alternative**

Metro has authority over the improvements and operation of the No-Build Alternative, within their jurisdiction. As such, the No-Build Alternative would be subjected to the Sustainability Implementation Plan as unfolded by Metro. The *Sustainability Implementation Plan* of Metro furthers the reduction of greenhouse gas emissions and thereby complies with the federal and state plans to reduce overall greenhouse gas emissions. Therefore, a ***less-than-significant*** impact is anticipated from the implementation of the No-Build Alternative.

**Transportation Systems Management (TSM) Alternative**

Metro has authority over the improvements and operation of the TSM Alternative, within their jurisdiction. As such, the TSM Alternative would be subjected to the Sustainability Implementation Plan as unfolded by Metro. The *Sustainability Implementation Plan* of Metro furthers the reduction of greenhouse gas emissions and thereby complies with the federal and state plans to reduce overall greenhouse gas emissions. Therefore, a ***less-than-significant*** impact is anticipated from the implementation of the TSM Alternative.

**LRT Alternatives**

Metro introduced and adopted a *Sustainability Implementation Plan* in 2008 that commits to a number of initiatives, programs, and projects that will further reduce the use of electricity and thereby further reduce greenhouse gas emissions. Although these initiatives and programs are not detailed enough to provide quantitative reductions, as they are implemented, the emissions of greenhouse gases from electricity use will decrease and result in a greater beneficial effect for the LRT 1 Alternative, and have the potential to become a beneficial effect for the LRT 2, LRT 3, and LRT 4 Alternatives.

In addition, the development of the LRT Alternatives support the Attorney General's suggestion that land development projects create an interconnected transportation system and fosters the shift in travel from private-passenger vehicles to alternative modes. By instituting any of the LRT Alternatives, the proposed project will assist in the reduction of vehicle miles traveled and therefore, can in itself be considered a form of mitigation according to the USEPA, CAPCOA, CAT, and other climate change policymakers. Thus, a ***less-than-significant*** impact is anticipated from the implementation of the LRT Alternatives.

**FEIR Design Options**

Implementation of the Colorado Parking Retention, Sepulveda Grade Separation, Colorado/4$^{th}$ Parallel Platform and South Side Parking, Maintenance Facility Buffer, or Expo/Westwood Station No Parking design options would involve minor redesign of certain elements of the proposed alignment. However, the proposed design options would not be anticipated to affect the daily operations of the proposed alignment, nor increase/decrease traffic volumes. Thus, no change in the level of operational greenhouse gas emissions discussed above is anticipated. Impacts would remain ***less than significant*** relative to potential conflicts with plans, policies or regulations.

Global climate change by its nature is a cumulative impact. The amount of greenhouse gas emissions generated by this or any other single project on its own is not sufficient to create global climate change impacts. Rather it is this project's incremental contribution to greenhouse gas emissions when combined with all other anthropogenic sources of greenhouse gas emissions that influences global climate change. Given that project impacts of global climate change can only be analyzed from a cumulative context, the analysis provided above is an assessment of cumulative impacts.