3.5 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

3.5.1 INTRODUCTION

Greenhouse gas (GHG) emissions have the potential to adversely affect the environment because they contribute, on a cumulative basis, to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; to affect rain and snow fall, leading to changes in alpine hydrology and water supply; to affect habitat, leading to adverse effects on biological and other resources; and to change the frequency and duration of droughts, which can affect wildfire hazards and forest health. In this section, TRPA, federal, state, and local regulations related to GHG emissions and climate change are summarized. Potential impacts of the proposed alternatives are analyzed, and mitigation measures are provided for those impacts determined to be significant. Because the nature of this issue is inherently cumulative, this section serves as the cumulative impact analysis related to GHGs and climate change.

3.5.2 REGULATORY BACKGROUND

TAHOE REGIONAL PLANNING AGENCY

The Tahoe Regional Planning Agency (TRPA) has not specifically identified any goals, policies, or Environmental Threshold Carrying Capacities (environmental threshold standards) related to GHG emissions or climate change at this time. TRPA is currently participating in efforts to prepare a sustainability plan for the Region, which includes a GHG emissions target and reduction strategies (see below at Tahoe Metropolitan Planning Organization).

FEDERAL

SUPREME COURT RULING

The U.S. Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA). The Supreme Court of the United States ruled on April 2, 2007, that carbon dioxide (CO_2) is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. The ruling in this case resulted in EPA taking steps to regulate GHG emissions and lent support for state and local agencies' efforts to reduce GHG emissions.

EPA ACTIONS

In response to the mounting issue of climate change, EPA has taken actions to regulate, monitor, and potentially reduce GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons (MT) or more of CO_2 per year. This publicly available data will allow the reporters to track their own emissions, compare them to other similar facilities, and aid in identifying cost-effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

National Program to Reduce Greenhouse Gas Emissions and Improve Fuel Economy for Cars and Trucks

On September 15, 2009, EPA and the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) proposed a new national program that would reduce GHG emissions and improve fuel economy for all new cars and trucks sold in the United States. EPA proposed the first-ever national GHG emissions standards under the CAA, and NHTSA proposed Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act (EPCA). This proposed national program would allow automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both federal programs and the standards of California and other states. The President requested that EPA and NHTSA, on behalf of the U.S. Department of Transportation, develop, through notice and comment rulemaking, a coordinated National Program under the CAA and the EPCA, as amended by the Energy Independence and Security Act (EISA), to reduce fuel consumption by and GHG emissions of light-duty vehicles for model years 2017-2025.

The EPA and NHTSA are developing the proposal based on extensive technical analyses, an examination of the factors required under the respective statutes, and discussions with individual motor vehicle manufacturers and other stakeholders. The National Program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles (light-duty vehicles) built in model years 2017-2025 (76 FR 48758).

Endangerment and Cause or Contribute Findings

On December 7, 2009, EPA adopted its Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases under the CAA (Endangerment Finding). The Endangerment Finding is based on Section 202(a) of the CAA, which states that the Administrator (of EPA) should regulate and develop standards for "emission[s] of air pollution from any class or classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." The rule addresses Section 202(a) in two distinct findings. The first addresses whether or not the concentrations of the six key GHGs (i.e., CO_2, methane [CH_4], nitrous oxide [N_2O], hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF_6]) in the atmosphere threaten the public health and welfare of current and future generations. The second addresses whether or not the combined emissions of GHGs from new motor vehicles and motor vehicle engines contribute to atmospheric concentrations of GHGs and therefore the threat of climate change.

The Administrator found that atmospheric concentrations of GHGs endanger the public health and welfare within the meaning of Section 202(a) of the CAA. The evidence supporting this finding consists of human activity resulting in "high atmospheric levels" of GHG emissions, which are very likely responsible for increases in average temperatures and other climatic changes. Furthermore, the observed and projected results of climate change (e.g., higher likelihood of heat waves, wildfires, droughts, sea level rise, higher intensity storms) are a threat to the public health and welfare. Therefore, GHGs were found to endanger the public health and welfare of current and future generations.

The Administrator also found that GHG emissions from new motor vehicles and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHGs fit within the CAA definition of air pollutants. The findings do not, in and of themselves, impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed earlier in 2009 for new light-duty vehicles as part of the joint rulemaking with the U.S. Department of Transportation.

CLIMATE CHANGE ADAPTATION

Activities are already underway across the federal government to build adaptive capacity and increase resilience to climate change. These activities include efforts to improve understanding of climate science and impacts, incorporate climate change considerations into policies and practices, and strengthen technical support and capacity for adaptation decision making. Some efforts are large collaborative undertakings involving federal and non-federal partners while others are smaller and taking place at the program level. The Climate Change Adaptation Task Force, co-chaired by the White House Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), makes recommendations to the President on how federal agency policies and programs can better prepare the United States to respond to the impacts of climate change (CEQ 2011).

STATE

CALIFORNIA

The California Air Resources Board (ARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), which was adopted in 1988. Various statewide and local initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is under way, and there is a real potential for severe adverse environmental, social, and economic effects in the long term. Because every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Arnold Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra Nevada snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing progress made toward reaching the emission targets, impacts of global warming on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of CalEPA created the California Climate Action Team (CCAT), made up of members from various state agencies and commissions. CCAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, and state incentive and regulatory programs.

Assembly Bill 32, the California Global Warming Solutions Act of 2006

In September 2006, Governor Schwarzenegger signed the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

AB 32 Climate Change Scoping Plan

In December 2008, ARB adopted its *Climate Change Scoping Plan*, which contains the main strategies California will implement to achieve reduction of approximately 118 million metric tons (MMT) of CO_2-equivalent emissions (CO_2e, discussed further below), or approximately 22 percent from the state's projected 2020 emission level of 545 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 47 MMT CO_2e, or almost 10 percent, from 2008 emissions). ARB's original 2020 projection was 596 MMT CO_2e, but this revised 2020 projection takes into account the economic downturn that occurred in 2008 (ARB 2011a). The Scoping Plan reapproved by ARB in August 2011 includes the Final Supplement to the Scoping Plan Functional Equivalent Document (FED), which further examined various alternatives to Scoping Plan measures. The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. ARB estimates the largest reductions in GHG emissions to be achieved by implementing the following measures and standards (ARB 2011a):

- improved emissions standards for light-duty vehicles (estimated reductions of 26.1 MMT CO_2e),
- the Low-Carbon Fuel Standard (LCFS) (15.0 MMT CO_2e),
- energy efficiency measures in buildings and appliances (11.9 MMT CO_2e), and
- a renewable portfolio and electricity standards for electricity production (23.4 MMT CO_2e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions. (Meanwhile, ARB is also developing an additional protocol for community emissions.) ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is yet to be determined (ARB 2008). With regard to land use planning, the Scoping Plan expects that reductions of approximately 3.0 MMT CO_2e will be achieved through implementation of Senate Bill (SB) 375, which is discussed further below (ARB 2011a).

Senate Bill 97

As directed by SB 97, the California Resources Agency adopted Amendments to the California Environmental Quality Act (CEQA) Guidelines, including GHG analysis in the requirements for environmental review under CEQA, on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

Senate Bill 375

SB 375, signed in September 2008, aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a Sustainable Communities Strategy (SCS) as part of the MPO's Regional Transportation Plan (RTP) that prescribes land use allocation and transportation investments necessary to meet GHG emission reduction targets for the region. If the SCS cannot meet GHG reduction targets, the MPO must prepare an Alternative Planning Strategy

(APS) that identifies the additional regional land uses and transportation investments needed to attain the targets. The proposed RTP includes a land use pattern and transportation strategies that would serve as the SCS.

As described in Chapter 1, Introduction, preparation of the RTP and SCS are underway concurrently with the Regional Plan Update. The RTP Draft EIR/EIS, incorporated by reference, evaluates the transportation policies and projects that correspond with each Regional Plan Update alternative. With the assistance of the Regional Targets Advisory Committee (RTAC) and in consultation with the MPOs, ARB provided each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for 2020 and 2035. These reduction targets will be updated every 8 years but can be updated every 4 years if advancements in emissions technologies affect the reduction strategies to achieve the targets. ARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects would not be eligible for funding programmed after January 1, 2012. The ARB-issued targets for the California portion of the Tahoe Region are a 7-percent reduction in GHG emissions per capita by 2020 relative to 2005 per capita GHG emissions and a 5-percent reduction by 2035 (ARB 2011b).

California Strategic Growth Council-Funded Sustainability Planning

In 2011, the California Strategic Growth Council (SGC) funded a Lake Tahoe regional collaboration to develop sustainability tools for regional and local agencies, nonprofit organizations, the business community, and local residents to use in promoting GHG reduction, among other sustainability goals. The grant and planning effort is administered by the Tahoe Metropolitan Planning Organization (TMPO) and is being carried out by the Lake Tahoe Sustainability Collaborative, which is a public-private partnership, established to lead the development of sustainability tools and drive coordinated sustainability efforts. The sustainability tools are intended to support development of economic incentives, GHG reduction strategies, and climate change adaptation strategies. The development of the Tahoe Regional Sustainability Plan is underway and is scheduled for completion by December 2013.

NEVADA

The Nevada Climate Change Advisory Committee (NCCAC) was created through an Executive Order signed in April 2007. The Executive Order directed the committee to propose recommendations for reducing GHG emissions in Nevada. The committee's final report included 28 recommendations related to reducing GHG emissions from the energy, transportation, waste, agriculture, and other sectors. One of the committee's priority recommendations is to develop a State Climate Action Plan (NCCAC 2008:7-9). At this time, the Nevada Division of Environmental Protection (NDEP) has not adopted GHG reduction goals or climate change-related policies or regulations that would pertain to the Regional Plan Update.

LOCAL

Currently, no locally adopted climate change or GHG-related programs or plans are applicable to the Regional Plan Update. The City of South Lake Tahoe adopted a policy (NCR-6.2) in its 2011 General Plan update to develop a comprehensive strategy to reduce GHG emissions and climate impacts. TRPA, TMPO, and several other agencies, organizations, and stakeholders formed the Lake Tahoe Sustainability Collaborative, which is currently developing the Tahoe Regional Sustainability Plan (described above).

3.5.3 AFFECTED ENVIRONMENT

EXISTING CLIMATE

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). Lake Tahoe lies in a

depression between the crests of the Sierra Nevada and Carson ranges on the California-Nevada border at a surface elevation of approximately 6,260 feet above sea level. The Lake Tahoe Air Basin (LTAB) is defined by the 7,000-foot contour, which is continuous around the lake, except near Tahoe City. The mountains surrounding the Lake are approximately 8,000–9,000 feet in height on average, with some reaching 10,000 feet.

The constant water temperature of Lake Tahoe at 600 feet below the surface is approximately 39 degrees Fahrenheit (ºF). This characteristic and the Lake's topographic location combine to define one of the LTAB's most important atmospheric regimes: in the absence of strong synoptic weather systems (large-scale system, 620 miles or more), the LTAB develops shallow subsidence and radiation inversions throughout the year (air temperature variations unique to the Basin relative to surrounding areas). In addition, rapid radiation cooling at night regularly generates gentle downslope nocturnal winds that blow from the mountain ridges down to the shore, then fan across the lake (Cahill and Cliff 2000:1).

ATTRIBUTING CLIMATE CHANGE—THE PHYSICAL SCIENTIFIC BASIS

Certain gases in the earth's atmosphere, collectively classified as GHGs, play a critical role in determining the Earth's surface temperature. Solar radiation enters the Earth's atmosphere from space. A portion of the radiation is absorbed by the Earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the Earth as low-frequency infrared radiation.
The frequencies at which bodies emit radiation are proportional to temperature. The Earth has a much lower temperature than the sun; therefore, the Earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the Earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years, depending on the gas). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, uptake by forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs required to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GAS EMISSION SOURCES

CALIFORNIA

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the transportation, industrial/manufacturing, utility, residential, commercial, and agricultural sectors (ARB 2010). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (ARB 2010). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices and landfills. N_2O is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, respectively, two of the most common processes that remove CO_2 from the atmosphere.

California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 478 gross MMT of CO_2e (before sequestration effects are accounted for) in 2008 (ARB 2010). CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (CCAR 2009), 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Combustion of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2008, accounting for 37 percent of total GHG emissions in the state (ARB 2010). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (24 percent) and the industrial sector (19 percent) (ARB 2010). California GHG emissions inventory and projections are summarized in Table 3.5-1.

Table 3.5-1. California Greenhouse Gas Emissions Inventory and Projections

Emissions Sector	MMT CO_2e/yr				
	1990	**2000**	**2005**	**2008**	**2020**
Electrical Generation[1]	110.6	103.9	111.0	116.4	110.4
Residential/Commercial	44.1	42.9	40.8	43.1	45.3
Transportation	150.7	171.1	184.3	175.0	183.9
Industrial	103.0	97.3	90.7	92.7	91.5
High GWP Processes	-[2]	11.0	14.2	15.7	37.9
Agriculture	23.4	25.4	29.0	28.1	29.1
Waste Management	-[2]	6.2	6.5	6.7	8.5
Forestry	0.2	0.2	0.2	0.2	0.2
Gross Total Emissions[3]	**433**	**458.0**	**476.7**	**477.7**	**506.8**
Carbon Sequestration	-6.7	-4.7	-4.2	-4.0	0.0
Net Emissions[3]	**427**	**453.3**	**472.6**	**473.8**	**506.8**

Notes: GWP = global warming potential; MMT CO_2e/yr = million metric tons of carbon dioxide equivalent per year.
[1] Includes in-state-generated and imported electricity production.
[2] Contained within Industrial Sector emissions.
[3] Totals may not sum exactly due to rounding.
Sources: ARB 2010, 2007:6, 2011c.

NEVADA

In Nevada, the electrical generation sector is the largest emitter of GHGs, followed by transportation (NDEP 2008:12). Nevada produced 56 gross MMT CO_2e in 2005 (NDEP 2008:12). Nevada's GHG emissions inventory and projections are summarized in Table 3.5-2.

Table 3.5-2. Nevada Greenhouse Gas Emissions Inventory and Projections

Emissions Sector	MMT CO_2e/yr				
	1990	2000	2005	2010	2020
Electrical Generation[1]	16.9	24.8	26.2	22.5	36.0
Residential/Commercial/Industrial	4.4	6.0	6.8	6.9	6.9
Transportation	9.7	14.9	16.9	19.3	26.0
Industrial Process	0.2	2.1	2.5	3.1	4.6
Fossil Fuel Industry	0.4	0.6	0.8	0.9	0.9
Agriculture	1.6	1.8	1.6	1.7	1.8
Waste Management	0.8	1.4	1.4	1.5	2.2
Gross Total Emissions[2]	**34.1**	**51.5**	**56.3**	**55.8**	**78.4**
Carbon Sequestration	-5.0	-5.0	-5.0	-5.0	-5.0
Net Emissions[2]	**29.1**	**46.5**	**51.3**	**50.8**	**73.4**

Notes: MMT CO_2e/yr = million metric tons of carbon dioxide equivalent per year.
[1] Includes in-state-generated electricity production.
[2] Totals may not sum exactly due to rounding.
Source: NDEP 2008:12.

LOCAL GREENHOUSE GAS EMISSIONS SOURCES

Mobile Sources

As discussed above under "Regulatory Setting" regarding SB 375, ARB issued TMPO per-capita mobile-source GHG reduction targets of 7 percent by 2020 and 5 percent by 2035 (from 2005 levels). These targets apply to California-generated GHG and to the portion of the vehicle fleet comprised of automobiles and light-duty trucks. The SB 375 RTAC developed guidance for how interregional vehicle miles traveled (VMT) should be attributed between MPOs. According to the RTAC, 50 percent of internal-external and external-internal VMT and trips (i.e., trips that originate or terminate in the applicable MPO), 100 percent of internal-internal VMT and trips (i.e., trips that originate and terminate in the applicable MPO), and 0 percent of external-external VMT and trips (i.e., pass-through) should be attributed to the MPO (RTAC 2009:26). This method was applied to calculate VMT for the California portion of the Basin. Existing GHG emissions from mobile sources were estimated using VMT obtained from the transportation analysis prepared for the Regional Plan update per the RTAC method (see Section 3.3, Transportation, and Appendix E) and the mobile-source emission factor model available from ARB, EMFAC 2011 (ARB 2012a). In 2005, the California side of the Region generated 949,750 daily VMT and 139,996 trips (see Appendix E).

In 2010, the Region-wide daily VMT was 1,459,299 miles and 198,340 trips (Appendix E). The results of baseline GHG emissions modeling conducted for the RTP/SCS EIR/EIS (for mobile-source emissions) are summarized in Table 3.5-3. Baseline emissions for 2005 are for California only, as that is the baseline used by ARB to set SB 375 GHG targets. Baseline emissions for 2010 are Region-wide, as that is the baseline used by this EIS for all other impacts, unless otherwise specified.

Local Greenhouse Gas Emissions Inventory

A local, Region-wide GHG emissions inventory is being prepared as part of the Tahoe Regional Sustainability Plan. The GHG inventory will include emissions and projections for sources such as transportation, energy

consumption, solid waste, water consumption, and forestry. The GHG inventory associated with the Tahoe Regional Sustainability Plan will inform the GHG reduction strategies and will be the baseline against which emissions reduction targets are established and against which GHG emissions reductions are measured.

Table 3.5-3 TMPO Mobile-Source Activity Data and Greenhouse Gas Emissions

2005		2010	
California Portion of Basin[1]		Entire Tahoe Basin[1]	
Daily VMT	949,750	Daily VMT	1,459,299
Daily Vehicle Trips	139,996	Daily Vehicle Trips	198,340
Population	41,213	Population	54,473
GHG Emissions (tons/day)	460	GHG Emissions (tons/day)	918
GHG Emissions (MT/year)	152,281	GHG Emissions (MT/year)	303,877
GHG Emissions per Capita (MT/person/year)	3.69	GHG Emissions per Capita (MT/person/year)	5.58
GHG Emissions per Capita (pounds/person/day)	22.32	GHG Emissions per Capita (pounds/person/day)	33.70

Notes: GHG = greenhouse gas; MT = metric tons; TMPO = Tahoe Metropolitan Planning Organization; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
Please see Appendix F for detailed model output.

ADAPTATION TO CLIMATE CHANGE

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7°F by the end of the 21st century, depending on future GHG emission scenarios (IPCC 2007). Resource areas other than air quality and global average temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state (including the Tahoe Region). According to the California Energy Commission (CEC) (CEC 2006b), the snowpack portion of the water supply could potentially decline by 30–90 percent by the end of the 21st century. A report by the California Department of Water Resources (DWR) cites projections that approximately 50 percent of the statewide snowpack will be lost by the end of the century (Knowles and Cayan 2002). Although current forecasts are uncertain, it is evident that this phenomenon could lead to significant challenges in securing an adequate water supply for a growing population. An increase in precipitation falling as rain rather than snow could also lead to increased potential for flooding because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system (DWR 2006).

A recent report compiled the latest research of the effects of climate change on Lake Tahoe (Reuter et al. 2010). The report uses downscaled climate model data to predict that the average snowpack in the northern Sierra Nevada would decline by 40-60 percent under the most optimistic projections, as warming temperatures could result in precipitation falling as rain instead of snow toward the end of the 21st century. Warmer temperatures could also result in accelerated runoff, erosion, and further impaired lake clarity. Finally, disruptions to normal precipitation patterns could result in drought and increased risk of wildfire in the Basin (Reuter et al. 2010).

According to Cal-Adapt, a climate change scenario planning tool developed by CEC, temperatures in the Lake Tahoe Region on average are projected to rise 4-7°F by 2100, with the range based on low and high emissions scenarios (Cal-Adapt 2011). Cal-Adapt downscales global climate model data to local and regional resolution under two emissions scenarios; the A-2 scenario represents a business-as-usual future emissions scenario, and the B-1 scenario represents a lower GHG emissions future. Exhibits 3.5-1 and 3.5-2 depict graphical output of future snowpack and wildfire risk in the Tahoe Region under both emissions scenarios (Cal-Adapt 2011). In either scenario, snowpack is projected to be reduced and wildfire risk is projected to increase by the end of the century.

3.5.4 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

METHODS AND ASSUMPTIONS

No recommended or adopted methodology is available from the local air districts, state agencies, or TRPA for evaluating GHG emissions from new development. In the case of the Regional Plan Update, mobile-source CO_2 emissions associated with implementation of the five alternatives were modeled using EMFAC 2011, a model widely-used in regional air quality analysis and recommended by ARB and EPA for emissions estimation and regulatory purposes (ARB 2012a). Mobile-source emissions were modeled for the RTP/SCS EIR/EIS and are also used in this EIS due to the relationship of the two planning efforts. Area-source and indirect GHG emissions from new development that could be accommodated under the Regional Plan Update were modeled using the California Emissions Estimator Model (CalEEMod). CalEEMod contains emission factors associated with activities such as snow removal and landscaping equipment, electricity consumption, and natural gas consumption in residential and non-residential land uses, and is recommended for environmental review purposes under CEQA and the National Environmental Policy Act (NEPA) (South Coast Air Quality Management District 2012). Emissions associated with fireplaces and woodstoves were also estimated using CalEEMod with inputs derived from the Washoe County Residential Wood Use Survey (Washoe County 2010) and TRPA staff. Emissions associated with waterborne transit vehicles were estimated using ARB's California Commercial Harbor Craft Emissions Inventory database tool (ARB 2012b). Detailed modeling inputs and assumptions are provided in Appendix F.

The methodology used in this EIS to analyze the potential effects of the Regional Plan Update on climate change includes an inventory of mobile-, area-, and indirect-source GHG emissions and an evaluation of consistency with relevant climate change planning legislation and associated GHG reduction targets.

SIGNIFICANCE CRITERIA

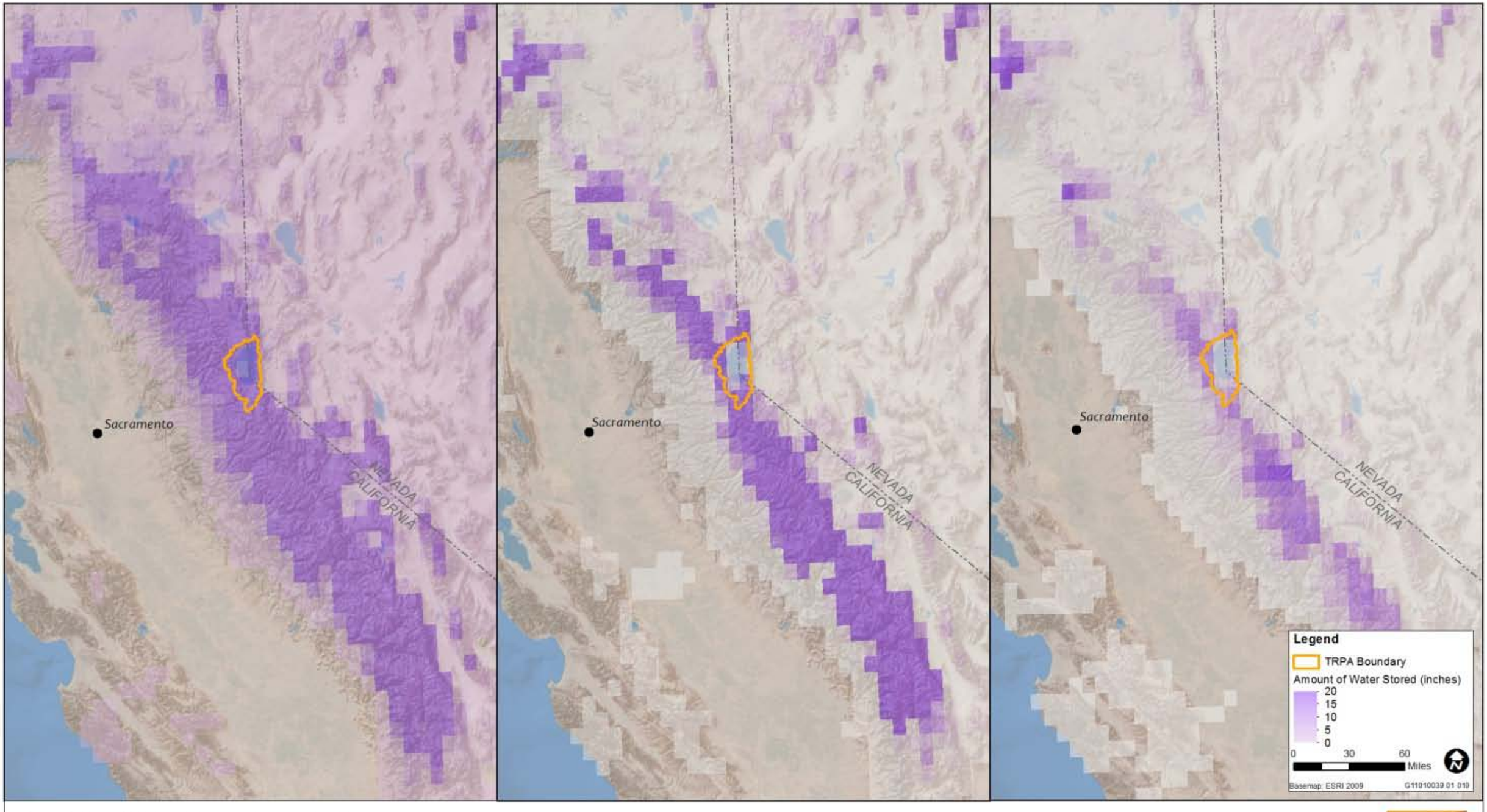
Neither TRPA, NDEP, the Placer County Air Pollution Control District (PCAPCD), nor the El Dorado County Air Quality Management District (EDCAQMD) has identified a significance threshold standard for analyzing GHG emissions generated by a proposed project, or a methodology for analyzing impacts related to GHG emissions or global climate change. With adoption of AB 32, however, California has identified GHG reduction goals and affirmed that the effect of GHG emissions as they relate to global climate change is inherently an adverse environmental impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

To meet AB 32 goals, California would need to generate less GHG emissions than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall GHG emission levels.

2010

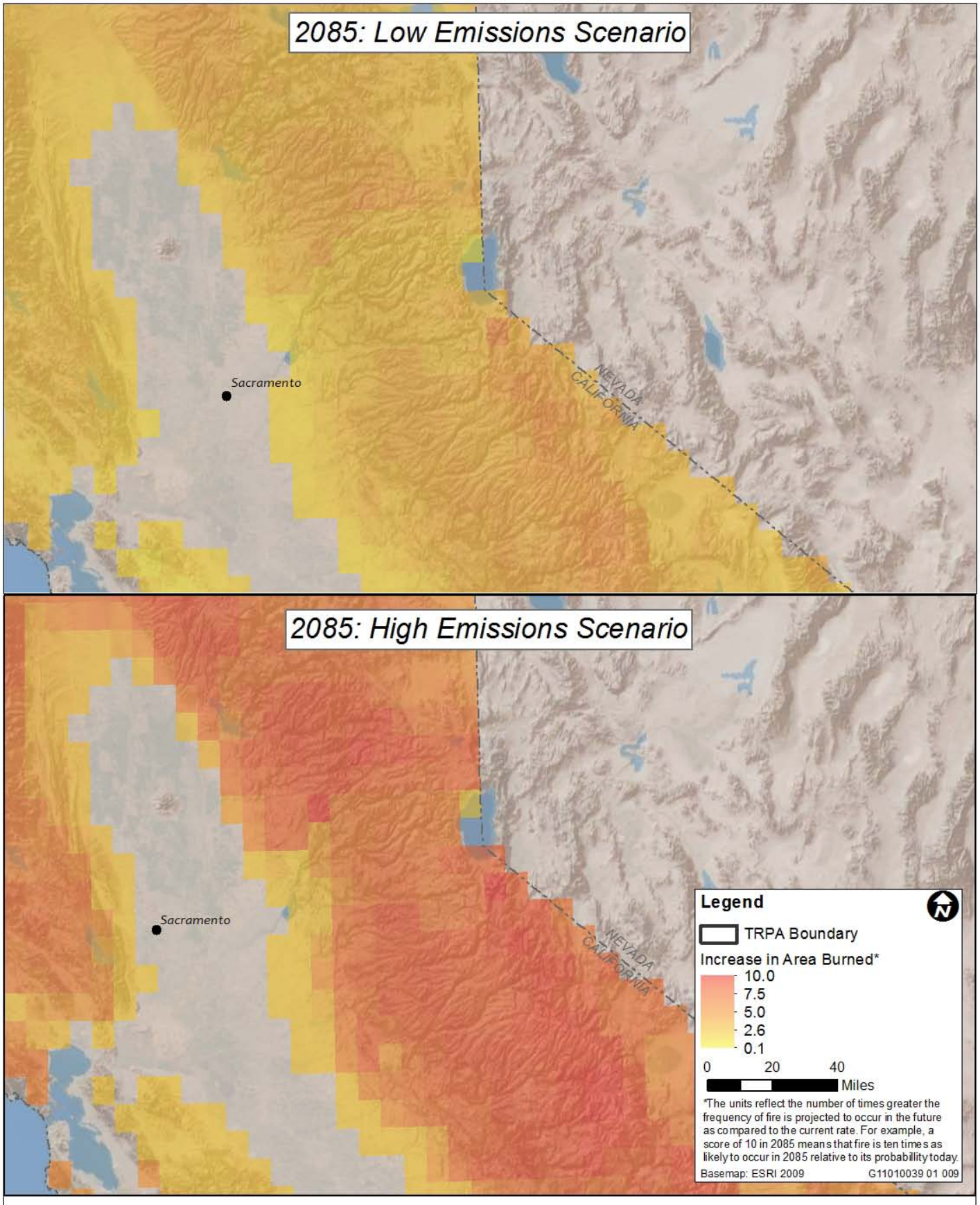
2090: Low Emissions Scenario

2090: High Emissions Scenario



Source: Cal-Adapt. 2011. http://cal-adapt.org/snowpack/decadal/

Exhibit 3.5-1. **Average Snowpack under Cal-Adapt Low and High Emissions Scenarios**



Source: Cal-Adapt 2011. http://cal-adapt.org/fire/

Exhibit 3.5-2. Increased Wildfire Risk under Cal-Adapt Low and High Emissions Scenarios

AB 32 demonstrates California's commitment to reducing the rate of GHG emissions and the state's associated contribution to climate change, without the intent to limit population or economic growth within the state. Thus, to achieve the goals of AB 32, which are tied to GHG emission rates of specific benchmark years (e.g., 1990), California would need to achieve a lower rate of emissions per unit of population than it has now. Further, to accommodate future population and economic growth, the state would need to achieve an even lower rate of emissions per unit than was achieved in 1990. (The goal to achieve 1990 quantities of GHG emissions by 2020 means that this will need to be accomplished with 30 years of population and economic growth beyond 1990 already in place.) Thus, future planning efforts that fail to encourage reductions in GHG emissions would conflict with the policy decisions contained in the spirit of AB 32, thus impeding California's ability to comply with the mandate.

The Governor's Office of Planning and Research (OPR) has provided amendments to the State CEQA Guidelines, including Appendix G, to address impacts of GHG emissions, as directed by Senate Bill 97 (2007). These proposed amendments were approved by the Resources Agency on December 30, 2009, and became effective on March 18, 2010 (California Resources Agency 2009).The amendments include the following significance threshold standards for GHG emissions.

An impact related to global climate change is considered significant if the proposed project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases; or
- Fail to achieve the SB 375 GHG reduction targets of 7 percent and 5 percent per capita in 2020 and 2035, respectively.

A substantial portion of the plan area is located in Nevada, which is outside the purview of CEQA and AB 32. However, the U.S. Supreme Court and CEQ have provided direction that GHG emissions and climate change warrant consideration as environmental impacts.

CEQ has provided draft guidance for federal lead agencies to address impacts of GHG emissions. The draft guidelines state:

> if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2 equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_2 equivalent, CEQ encourages Federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold standard of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010:1-2).

For the purposes of this EIS, total operational GHG emissions from the Regional Plan Update alternatives are quantified to determine whether the net increase in GHG emissions compared to existing conditions would be substantial (Impact 3.5-1). In the RTP/SCS EIR/EIS, mobile-source GHG emissions associated with VMT attributable to the California portion of the Basin were quantified for each alternative to assess the ability of each alternative to meet the applicable SB 375 per-capita GHG reduction targets (Impact 3.5-2). These results are included herein because the Regional Plan Update is the land use plan that would influence VMT and GHG as they relate to the RTP/SCS.

IMPACT ANALYSIS AND MITIGATION MEASURES

Impact 3.5-1	**Increase in GHG Emissions.** Implementation of any of the Regional Plan Update alternatives would result in some level of development and population growth anticipated during the plan horizon. Although many of the sustainability- and conservation-oriented land use and transportation policies and strategies of the five plan alternatives would reduce VMT, increase transit and non-motor vehicle travel, and allow or encourage redevelopment that would improve energy efficiency, the combined influence of development and population growth occurring during the planning horizon of the Regional Plan Update would result in a substantial increase in overall GHG emissions (in contrast to GHG per capita) that would make a **cumulatively considerable contribution** to global climate change. Among the Regional Plan Update alternatives, Alternative 5 would result in the largest increase in overall GHG emissions, followed by Alternatives 4, 2, 3, and 1. Alternative 3 would result in the most GHG-efficient land use and transportation system combination; however, this **significant** impact from increased GHG emissions would apply to all five Regional Plan Update alternatives.

Implementation of Regional Plan Update Alternatives 1 through 5 would result in some level of population growth, and development/redevelopment that would result in construction- and operational-related GHG emissions. Construction-related emissions would primarily be associated with heavy-duty construction equipment and truck and vehicle exhaust associated with project development. Long-term operational sources of GHG emissions associated with the Regional Plan Update would include area sources (e.g., landscaping equipment, snow removal equipment, wood-burning appliances), mobile sources (e.g., vehicle exhaust), energy consumption (e.g., electricity and natural gas), solid waste (e.g., emissions that would occur at a landfill associated with solid waste decomposition), and water consumption (e.g., electricity used to deliver and treat water to serve the Region). Operational GHG emissions from area, energy, solid waste, and water-related sources were estimated for each alternative using CalEEMod. Mobile-source GHG emissions were estimated using EMFAC 2011, with Basin-wide VMT activity data obtained from the TRPA travel demand model as input (see Section 3.3, Transportation, and Appendix E). VMT was estimated using the RTAC method (discussed in Section 3.5.3 above) for this impact. Emissions associated with waterborne transit vehicles were estimated using ARB's California Commercial Harbor Craft Emissions Inventory database tool. It was assumed that three additional ferries per day would be operational under Alternatives 1, 3, 4, and 5. Although waterborne transit is a specific transportation program identified in the RTP, associated emissions are reported within this analysis of the Regional Plan Update for completeness.

The net increase in GHG emissions associated with operation of each alternative was estimated for build-out (2035) and compared with existing conditions (2010), and significance conclusions are based on these data. For informational purposes, the net increases in GHG emissions associated with operation of each alternative in 2035 were also compared with operation of Alternative 1, No Project. This comparison is intended to provide additional information about the level of GHG emissions associated with individual alternatives, above and beyond what would happen under the no-project alternative.

No AB 32 Scoping Plan measures were incorporated into the GHG emissions modeling presented in this analysis. For example, Pavley fuel economy standards and the LCFS would be anticipated to reduce mobile-source emissions. However, even if additional future GHG reductions were considered, the net increase in mobile-source GHG emissions associated with any of the alternatives would still be substantial.

ALTERNATIVE 1: NO PROJECT

Under Alternative 1, there would be no changes to the 1987 Regional Plan, except minor edits to extend the plan for an additional 20 years. RTP/SCS Transportation Strategy Package A would be implemented for

Alternative 1, consisting of basic maintenance of the existing transportation infrastructure in the Basin and construction of projects that are already approved and/or substantially underway. Alternative 1 would retain the existing Goals and Policies, land use classifications, land use maps, Plan Area Statements (PASs), and Community Plans. Alternative 1 would include only development rights remaining from the 1987 Regional Plan and retain existing regulations pertaining to coverage and transfer of development rights.

Construction Emissions

Because Alternative 1 would not involve any additional development allocations beyond what was allowed under the 1987 Regional Plan, construction-related GHG emissions would remain similar to current levels or would diminish over the 20-year planning period.

Operational Emissions

As described above, the Tahoe Regional Sustainability Plan will develop a framework of climate change mitigation and adaptation strategies. The mitigation strategies will aim to reduce operational emissions of activities within the Basin from emission sources such as transportation, energy consumption, solid waste, and water consumption. Strategies will be selected for each jurisdiction as applicable and feasible. Mitigation strategies are still under development, and details regarding their effectiveness are not available at this time.

According to the transportation analysis prepared for the Regional Plan Update, VMT in the Region under Alternative 1 would increase by approximately 111,000 VMT per day by 2035 compared to 2010 conditions. VMT per capita would increase by approximately 5 percent by 2035 compared to 2010 conditions. (As described above, SB 375 required ARB to set regional targets for 2020 and 2035 for reduction of GHGs from passenger vehicles. Because the planning period of the Regional Plan is approximately 20 years and adoption is anticipated in December 2012, 2035 represents a reasonable surrogate for the planning horizon of this Regional Plan Update.)

Total Region-wide mobile-source GHG emissions associated with Alternative 1 were modeled using EMFAC 2011. Mobile-source GHG emissions modeling results are summarized in Table 3.5-4 and represent the entire Region-wide vehicle fleet. Mobile-source operational emissions, as well as emissions per capita, associated with Alternative 1 would increase compared with existing conditions.

Table 3.5-4. Alternative 1 Mobile-Source Greenhouse Gas Emissions (Entire Tahoe Basin)[1]

2010		2035		% Change from 2010
Daily VMT	1,459,299	Daily VMT	1,570,454	7.6%
Population	54,473	Population	55,687	2.2%
VMT per capita per day	26.79	VMT per capita per day	28.20	5.3%
GHG Emissions (tons/day)	918	GHG Emissions (tons/day)	1,010	10.0%
GHG Emissions (MT/year)	303,877	GHG Emissions (MT/year)	334,320	
GHG Emissions per Capita (MT/person/year)	5.58	GHG Emissions per Capita (MT/person/year)[2]	6.00	7.6%

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Total estimated operational GHG emissions associated with Alternative 1 are summarized in Table 3.5-5. These values represent the net change in operational emissions in 2035 from existing conditions (2010) associated with the remaining development allowed under the 1987 Regional Plan.

Table 3.5-5. Alternative 1 Net Increase in Greenhouse Gas Emissions (Entire Tahoe Basin)

Emissions by Source	Net Increase in GHG Emissions in 2035 Compared to Existing Conditions (MT CO_2e/year)
Area-Source Emissions	644
Mobile-Source Emissions	30,443
Waterborne Transit Emissions	3,168
Energy-Related Emissions	11,927
Solid Waste-Related Emissions	416
Water Consumption-Related Emissions	774
Total Net Increase in GHG Emissions[1]	**47,373**
GHG Emissions per Capita (MT/person/year)	39.02[2]

Notes: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons.
[1] Totals may not sum exactly due to rounding.
[2] Represents total GHG per capita associated with the remaining development allowed under the 1987 Regional Plan.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Based on the results of the GHG emissions modeling presented in Table 3.5-5, overall GHG emissions in the Region would increase by approximately 47,373 MT CO_2e/year in 2035, and GHG emissions per capita would increase by 7.6 percent under Alternative 1. Based on CEQ's guidance, the net increase in project-generated emissions associated with Alternative 1 would be considered substantial. Policy direction in California and mandates in AB 32 will require that statewide GHG emissions per capita be reduced compared with existing conditions. Because Alternative 1 would result in a substantial long-term increase in GHG emissions, this impact is considered cumulatively considerable. Alternative 1 would result in a **significant** impact on GHG emissions and climate change.

Alternative 2: Low Development, Increased Regulation

Alternative 2 would substantially reduce the amount of development compared to the 1987 Regional Plan. Alternative 2 would include allocations remaining from the 1987 Regional Plan plus an additional 200,000 square feet of new CFA and 2,600 new residential allocations. Alternative 2 would include the group of projects identified for RTP/SCS Transportation Strategy Package B, which includes the projects listed in the constrained and unconstrained project lists but does not include waterborne transit.

Construction Emissions

Alternative 2 would result in construction-related GHG emissions associated with limited new development allocations. Detailed construction information for individual projects is unknown at this time but would typically involve use of heavy-duty equipment, construction worker commute trips, material deliveries, and vendor trips. These activities would result in GHG emissions that would be limited in duration for any given project but, when taken together over the implementation period of the Regional Plan Update, could be considered substantial.

Operational Emissions

According to the transportation analysis prepared for the Regional Plan Update, VMT in the Region under Alternative 2 would increase by approximately 93,000 VMT per day by 2035 compared to 2010 conditions. VMT per capita would increase by approximately 2.5 percent by 2035 compared to 2010 conditions.

Mobile-source GHG emissions modeling results are summarized in Table 3.5-6 and represent the entire Region-wide vehicle fleet. Mobile-source operational emissions, as well as emissions per capita, associated with Alternative 2 would increase compared with existing conditions.

Table 3.5-6. Alternative 2 Mobile-Source Greenhouse Gas Emissions (Entire Tahoe Basin)[1]

2010		2035		% Change from 2010
		New Residential Allocations	2,600	
		New CFA Allocations (sq ft)	200,000	
Daily VMT	1,459,299	Daily VMT	1,552,670	8.2%
Population	54,473	Population	57,813	6.1%
VMT per capita per day	26.79	VMT per capita per day	28.86	0.25%
GHG Emissions (tons/day)	918	GHG Emissions (tons/day)	998	8.8%
GHG Emissions (MT/year)	303,877	GHG Emissions (MT/year)	330,533	
GHG Emissions per Capita (MT/person/year)	5.58	GHG Emissions per Capita (MT/person/year)[2]	5.72	2.5%

Notes: CFA = commercial floor area; GHG = greenhouse gas; MT = metric tons; sq ft = square feet; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Total estimated operational GHG emissions associated with Alternative 2 are summarized in Table 3.5-7. These values represent the net change in operational emissions in 2035 from existing conditions (2010) associated with the remaining development allowed under the 1987 Regional Plan and the additional development that would be allowed under Alternative 2.

Table 3.5-7. Alternative 2 Net Change in Greenhouse Gas Emissions (Entire Tahoe Basin)

Emissions by Source	Net Change in GHG Emissions in 2035 Compared to Existing Conditions (MT CO_2e/year)	Net Change in GHG Emissions in 2035 Compared to Alternative 1 (MT CO_2e/year)
Area-Source Emissions	2,558	1,914
Mobile-Source Emissions	26,656	-3,787
Waterborne Transit	0	-3,168
Energy-Related Emissions	28,951	17,024
Solid Waste-Related Emissions	796	380
Water Consumption-Related Emissions	1,979	1,205
Total GHG Emissions[1]	**60,940**	**13,567**
GHG Emissions per Capita (MT/person/year)[2]	18.25	-20.78

Notes: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons.
[1] Totals may not sum exactly due to rounding.
[2] Represents total GHG per capita associated with remaining development under the 1987 Regional Plan plus new development allocated under Alternative 2.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Based on the results of the GHG emissions modeling presented in Table 3.5-7, GHG emissions in the Region would increase by approximately 60,940 MT CO_2e/year in 2035 under Alternative 2 compared with existing conditions. GHG emissions would increase by approximately 13,567 MT CO_2e/year above what would occur under Alternative 1 (the no project alternative). GHG emissions per capita would decrease compared to Alternative 1; however, they would increase compared to the existing, 2010 condition. Based on CEQ's guidance, the net increase in project-generated emissions associated with Alternative 2 would be considered substantial. Policy direction in California and mandates in AB 32 will require that statewide GHG emissions per capita be reduced compared with existing conditions. Because Alternative 2 would result in a substantial long-term increase in GHG emissions, this impact is considered cumulatively considerable. Alternative 2 would result in a **significant** impact on GHG emissions and climate change.

ALTERNATIVE 3: LOW DEVELOPMENT, HIGHLY INCENTIVIZED REDEVELOPMENT

Alternative 3 would include remaining allocations from the 1987 Regional Plan plus 2,600 new residential allocations, 600 new residential bonus units, and 200,000 new square feet of CFA. Alternative 3 would include the group of projects identified for RTP/SCS Transportation Strategy Package C, which includes the constrained project list. Alternative 3 would also promote public transit and pedestrian and bicycle transit systems.

Construction Emissions

Alternative 3 would result in construction-related GHG emissions associated with several transportation infrastructure projects. Detailed construction information for these transportation projects is unknown at this time but would likely involve use of heavy-duty equipment, construction worker commute trips, material deliveries, and vendor trips. These activities would result in GHG emissions that would be finite in duration but, when taken together over the implementation period of the RTP, could be considered substantial.

Operational Emissions

According to the transportation analysis prepared for the Regional Plan update, VMT in the Basin under Alternative 3 would increase by approximately 126,000 VMT per day by 2035 compared to 2010 conditions. VMT per capita per day would decrease by approximately 2 percent by 2035 compared to 2010 conditions.

Mobile-source GHG emissions modeling results are summarized in Table 3.5-8 and represent the entire Basin-wide vehicle fleet. Mobile-source operational emissions associated with Alternative 3 would experience a net increase compared with existing conditions but would be more efficient than under any of the other alternatives and more efficient that existing conditions, as reflected in the projected decrease of the rate of GHG emissions on a per-capita basis.

Total estimated operational GHG emissions associated with Alternative 3 are summarized in Table 3.5-9. These values represent the net change in operational emissions in 2035 from existing conditions (2010) associated with the remaining development allowed under the 1987 Regional Plan and the limited additional development that would be allowed under Alternative 3.

Based on the results of the GHG emissions modeling presented in Table 3.5-9, overall GHG emissions in the Basin would increase by approximately 75,593 MT CO_2e/year in 2035 under Alternative 3 compared with existing conditions. GHG emissions would increase by approximately 28,220 MT CO_2e/year above what would occur under Alternative 1 (the no-project alternative). Mobile-source GHG emissions would be reduced by approximately 10,800 MT CO_2e/year compared with Alternative 1. GHG emissions per capita would also decrease compared with Alternative 1. Based on CEQ's guidance, which focuses on overall GHG, the net increase in project-generated emissions associated with Alternative 3 would be considered substantial. Because Alternative 3 would result in a substantial long-term increase in GHG emissions, this impact is considered

cumulatively considerable. Alternative 3 would result in a **significant** impact on GHG emissions and climate change.

Table 3.5-8. Alternative 3 Mobile-Source Greenhouse Gas Emissions (Entire Tahoe Basin)[1]

2010		2035		% Change from 2010
		New Residential Allocations	2,600	
		New Residential Bonus Units	600	
		New CFA Allocations (sq ft)	200,000	
Daily VMT	1,459,299	Daily VMT	1,585,335	8.6%
Population	54,473	Population	60,365	10.8%
VMT per capita per day	26.79	VMT per capita per day	26.26	-2.0%
GHG Emissions (tons/day)	918	GHG Emissions (tons/day)	1,019	11.1%
GHG Emissions (MT/year)	303,877	GHG Emissions (MT/year)	337,487	
GHG Emissions per Capita (MT/person/year)	5.58	GHG Emissions per Capita (MT/person/year)[2]	5.59	0.2%

Notes: CFA = commercial floor area; GHG = greenhouse gas; MT = metric tons; sq ft = square feet; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Table 3.5-9. Alternative 3 Net Change in Greenhouse Gas Emissions (Entire Tahoe Basin)

Emissions by Source	Net Change in GHG Emissions in 2035 Compared to Existing Conditions (MT CO_2e/year)	Net Change in GHG Emissions in 2035 Compared to Alternative 1 (MT CO_2e/year)
Area-Source Emissions	3,000	2,357
Mobile-Source Emissions	33,610	3,167
Waterborne Transit	3,168	0
Energy-Related Emissions	32,455	20,528
Solid Waste-Related Emissions	1,150	734
Water Consumption-Related Emissions	2,209	1,435
Total GHG Emissions[1]	**75,593**	**28,220**
GHG Emissions per Capita (MT/person/year)	12,83[2]	-26.19

Notes: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons.
[1] Totals may not sum exactly due to rounding.
[2] Represents total GHG per capita associated with remaining development under the 1987 Regional Plan plus new development allocated under Alternative 3.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

ALTERNATIVE 4: REDUCED DEVELOPMENT, INCENTIVIZED REDEVELOPMENT

Alternative 4 would involve a similar transportation policy approach as under Alternative 3 but would increase the amount of development compared to Alternatives 1, 2, and 3. Alternative 4 would allow the remaining allocations from the 1987 Regional Plan, but would also include 4,000 new residential allocations, 400,000 new square feet of CFA, and 200 new TAUs. Alternative 4 would include the group of projects identified for RTP/SCS Transportation Strategy Package C, which includes the constrained project list.

Construction Emissions

Alternative 4 would result in construction-related GHG emissions associated with several transportation infrastructure projects. Detailed construction information for these transportation projects is unknown at this time but would typically involve use of heavy-duty equipment, construction worker commute trips, material deliveries, and vendor trips. These activities would result in GHG emissions that would be finite in duration but, when taken together over the implementation period of the RTP, could be considered substantial.

Operational Emissions

According to the transportation analysis prepared for the Regional Plan Update, VMT in the Basin under Alternative 4 would increase by approximately 191,000 VMT per day by 2035 compared to 2010 conditions. VMT per capita would increase by approximately 3 percent by 2035 compared to 2010 conditions.

Mobile-source GHG emissions modeling results are summarized in Table 3.5-10 and represent the entire Basin-wide vehicle fleet. Mobile-source operational emissions and per-capita emissions associated with Alternative 4 would increase compared with existing conditions.

Table 3.5-10. Alternative 4 Mobile-Source Greenhouse Gas Emissions (Entire Tahoe Basin)[1]

2010		2035		% Change from 2010
		New Residential Allocations	4,000	
		New CFA Allocation (sq ft)	400,000	
		New TAU Allocations	200	
Daily VMT	1,459,299	Daily VMT	1,650,574	13.1%
Population	54,473	Population	59,773	9.7%
VMT per capita per day	26.79	VMT per capita per day	27.61	3.1%
GHG Emissions (tons/day)	918	GHG Emissions (tons/day)	1,061	15.6%
GHG Emissions (MT/year)	303,877	GHG Emissions (MT/year)	351,375	
GHG Emissions per Capita (MT/person/year)	5.58	GHG Emissions per Capita (MT/person/year)[2]	5.88	5.4%

Notes: CFA = commercial floor area; GHG = greenhouse gas; MT = metric tons; sq ft = square feet; TAU = tourist accommodation unit; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Total estimated operational GHG emissions associated with Alternative 4 are summarized in Table 3.5-11. These values represent the net change in operational emissions in 2035 from existing conditions (2010) associated with the remaining development allowed under the 1987 Regional Plan and the additional development that would be allowed under Alternative 4.

Table 3.5-11. Alternative 4 Net Change in Greenhouse Gas Emissions (Entire Tahoe Basin)		
Emissions by Source	Net Change in GHG Emissions in 2035 Compared to Existing Conditions (MT CO_2e/year)	Net Change in GHG Emissions in 2035 Compared to Alternative 1 (MT CO_2e/year)
Area-Source Emissions	3,590	2,946
Mobile-Source Emissions	47,498	17,055
Waterborne Transit	3,168	0
Energy-Related Emissions	40,893	28,966
Solid Waste-Related Emissions	1,202	786
Water Consumption-Related Emissions	2,748	1,973
Total GHG Emissions[1]	**99,098**	**51,726**
GHG Emissions per Capita (MT/person/year)	18.70[2]	-20.32

Notes: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons.
[1] Totals may not sum exactly due to rounding.
[2] Represents total GHG per capita associated with remaining development under the 1987 Regional Plan plus new development allocated under Alternative 4.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Based on the results of the GHG emissions modeling presented in Table 3.5-11, overall GHG emissions in the Basin would increase by approximately 99,098 MT CO_2e/year in 2035 under Alternative 4 compared with existing conditions. GHG emissions would increase by approximately 51,726 MT CO_2e/year above what would occur under Alternative 1 (the no-project alternative). GHG emissions per capita would decrease compared with Alternative 1, but would increase compared with existing levels under Alternative 4. Based on CEQ's guidance, the net increase in project-generated emissions associated with Alternative 4 would be considered substantial. Because Alternative 4 would result in a substantial long-term increase in GHG emissions, this impact is considered cumulatively considerable. Alternative 4 would result in a **significant** impact on GHG emissions and climate change.

Alternative 5: Similar Rate of Development and Regulatory Structure to the 1987 Regional Plan

Alternative 5 would represent a continuation of the amount of development experienced under the 1987 Regional Plan. Alternative 5 would also result in the addition of 600,000 square feet CFA, 5,200 new residential allocations (limited by 4,091 remaining development rights), and 400 new TAU allocations in addition to the remaining allocations allowed under the 1987 Regional Plan. Alternative 5 would include the group of projects identified for RTP/SCS Transportation Strategy Package A, which includes completion of already proposed and approved projects in the Basin. The package also includes operation and maintenance of the existing transportation system and the construction of projects on the constrained project list already substantially in progress.

Construction Emissions

Alternative 5 would result in construction-related GHG emissions associated with several transportation infrastructure projects that would accommodate additional growth in the Basin. Detailed construction information for these transportation projects is unknown at this time but would typically involve use of heavy-duty equipment, construction worker commute trips, material deliveries, and vendor trips. These activities would result in GHG emissions that would be finite in duration but, when taken together over the implementation period of the RTP, could be considered substantial.

Operational Emissions

According to the transportation analysis prepared for the Regional Plan Update, VMT in the Basin under Alternative 5 would increase by approximately 241,000 VMT per day by 2035 compared to 2010 conditions. VMT per capita would increase by approximately 6 percent by 2035 compared to 2010 conditions.

Mobile-source GHG emissions modeling results are summarized in Table 3.5-12 and represent the entire Basin-wide vehicle fleet. Mobile-source operational emissions and per-capita emissions associated with Alternative 5 would increase compared with existing conditions.

Table 3.5-12. Alternative 5 Mobile-Source Greenhouse Gas Emissions (Entire Tahoe Basin)[1]

2010		2035		% Change from 2010
		New Residential Allocations	4,091	
		New CFA Allocation (sq ft)	600,000	
		New TAU Allocations	400	
Daily VMT	1,459,299	Daily VMT	1,700,389	16.5%
Population	54,473	Population	59,952	10.1%
VMT per capita per day	26.79	VMT per capita per day	28.36	5.9%
GHG Emissions (tons/day)	918	GHG Emissions (tons/day)	1,093	19.1%
GHG Emissions (MT/year)	303,877	GHG Emissions (MT/year)	361,980	
GHG Emissions per Capita (MT/person/year)	5.58	GHG Emissions per Capita (MT/person/year)[2]	6.04	8.2%

Notes: CFA = commercial floor area; GHG = greenhouse gas; MT = metric tons; sq ft = square feet; TAU = tourist accommodation unit; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

Total estimated operational GHG emissions associated with Alternative 5 are summarized in Table 3.5-13. These values represent the net change in operational emissions in 2035 from existing conditions (2010) associated with the remaining development allowed under the 1987 Regional Plan and the additional development that would be allowed under Alternative 5.

Based on the results of the GHG emissions modeling presented in Table 3.5-13, GHG emissions in the Basin would increase by approximately 130,439 MT CO_2e/year in 2035 under Alternative 5 compared with existing conditions. GHG emissions would increase by approximately 83,066 MT CO_2e/year above what would occur under Alternative 1 (the no-project alternative). GHG emissions per capita would decrease compared with Alternative 1, but would increase compared with the existing, 2010 condition. Based on CEQ's guidance, the net increase in project-generated emissions associated with Alternative 5 would be considered substantial. Because Alternative 5 would result in a substantial long-term increase in GHG emissions, this impact is considered cumulatively considerable. Alternative 5 would result in a **significant** impact on GHG emissions and climate change.

Table 3.5-13. Alternative 5 Net Change in Greenhouse Gas Emissions (Entire Tahoe Basin)		
Emissions by Source	Net Change in GHG Emissions in 2035 Compared to Existing Conditions (MT CO_2e/year)	Net Change in GHG Emissions Compared to Alternative 1 (MT CO_2e/year)
Area-Source Emissions	3,656	3,013
Mobile-Source Emissions	58,103	27,660
Waterborne Transit	3,168	0
Energy-Related Emissions	61,160	49,234
Solid Waste-Related Emissions	1,336	920
Water Consumption-Related Emissions	3,014	2,240
Total GHG Emissions[1]	**130,439**	**77,740**
GHG Emissions per Capita (MT/person/year)	24.61[2]	-14.41

Notes: CO_2e = carbon dioxide equivalent; GHG = greenhouse gas; MT = metric tons.
[1] Totals may not sum exactly due to rounding.
[2] Represents total GHG per capita associated with remaining development under the 1987 Regional Plan plus new development allocated under Alternative 5.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed modeling results.

MITIGATION MEASURES

The following mitigation measure is required for Alternatives 1, 2, 3, 4, and 5.

Mitigation Measure 3.5-1: Implement Sustainability Measures with Performance Standard

Within twelve months of adoption of an updated Regional Plan, TRPA will coordinate implementation of a GHG Emission Reduction Policy through TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments addressing Best Construction Practices and ongoing operational efficiency. Until that time, TRPA will continue existing practice to require measures developed on a project-specific basis. The policy will require implementation of measures for the reduction of GHG emissions generated by demolition and construction activity in the Region and by ongoing building and property operations. Where local ordinances already require GHG Emission Reductions consistent with the Policy, no further action is necessary. Where local government ordinances do not adequately address GHG reduction practices, those practices will be implemented through local government and/or TRPA permitting activities. Such measures may include, but are not limited to, the following:

Minimize Construction-Related GHG Emissions

- *Limit equipment idling time to a maximum of five (5) minutes.*
- *Recycle or reuse construction waste and demolition material to the maximum extent feasible.*
- *Use electrified or alternative-fueled construction equipment to the maximum extent feasible.*
- *Use local and sustainable building materials to the extent possible.*

Minimize Operation-Related GHG Emissions

- *Use on-site renewable energy, such as photovoltaic systems.*
- *Exceed building code standards for energy efficiency.*
- *Install energy efficient appliances and equipment in new buildings.*
- *Retrofit existing buildings to exceed energy efficiency building code standards.*

- *Construct new development to allow for electric lawn maintenance and snow removal equipment compatibility.*
- *Require minimum passive solar design standards in new buildings.*
- *Expand recycling opportunities and increase recycling infrastructure, including food waste diversion into a composting process.*
- *Implement water conservation standards in new development.*

TRPA will require through TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments that GHG emissions from project-specific construction and operational activities permitted pursuant to and in accordance with the Regional Plan are reduced to the maximum extent feasible. As described in the RTP/SCS EIR/EIS, all feasible mitigation measures pertaining to mobile-source GHG emissions have been considered within the range of transportation strategies already included in the three RTP/SCS Transportation Strategy Packages. Through the grant awarded to the Lake Tahoe Region from the California Strategic Growth Council, a partnership of agencies and organizations are working on a Region-wide Sustainability Plan, which will address other primary sources of GHG emissions (i.e., energy use and efficiency, water supply and conservation, and solid waste). At such time a Sustainability Plan is completed for the Tahoe Region, TRPA will coordinate implementation measures through TRPA-approved plans, project permitting, or projects/programs developed in coordination with local or other governments recommended in that plan along with other appropriate measures, as feasible.

Significance After Mitigation

Among the Regional Plan Update alternatives, Alternative 3 provides the most GHG-efficient combination of land use and transportation strategies, so its adoption would provide the maximum feasible extent of GHG emission reduction for the Region's transportation sector. Thus, no additional feasible mobile-source GHG mitigation is available, making this a considerable contribution to the cumulative impact of greenhouse gas emissions and climate change **significant and unavoidable** for all of the Regional Plan Update alternatives.

Impact 3.5-2	**Consistency with SB 375 Targets and AB 32 Goals.** Regional Plan Update Alternatives 1, 4, and 5 would meet TMPO's ARB-issued SB 375 GHG reduction target for 2020, but not for 2035. Alternatives 2 and 3 would meet both 2020 and 2035 targets and would be the only Regional Plan Update Alternatives that would meet the requirements of an SCS and comply with SB 375 requirements. Alternatives 1, 4, and 5 would not comply with SB 375 requirements and would not be consistent with legislation adopted for the purposes of reducing GHG emissions. Therefore, Alternatives 1, 4, and 5 would result in a substantial cumulative contribution to climate change impacts. This impact would be **significant** for Alternatives 1, 4, and 5, and **less than significant** for Alternatives 2 and 3.

ARB issued to TMPO regional GHG reduction targets pursuant to SB 375. These reduction targets are a 7-percent reduction in GHG per capita by 2020 and a 5-percent reduction in GHG per capita by 2035 compared with 2005 levels. The targets apply to mobile-source emissions from automobiles, light-duty trucks, and medium-duty trucks traveling in the California portion of the Tahoe Basin. To qualify as an SCS, the RTP must demonstrate how these targets would be met through land use changes and transportation improvements that would reduce regional VMT. The RTP is being prepared in a parallel process with the Regional Plan Update and relies on the Regional Plan Update land use assumptions under each alternative.

As part of the RTP preparation process, VMT and vehicle trips for the California-portion of the Basin under each alternative were obtained from the TRPA travel demand model (see Section 3.3, Transportation, and Appendix E) and were estimated using the RTAC method (discussed in Section 3.5.3 above). Mobile-source emissions

associated with VMT from automobiles, light-duty trucks, and medium-duty trucks were estimated using the EMFAC 2011 model. No AB 32 Scoping Plan measures were incorporated into this mobile-source emissions modeling. These results from the RTP EIR/EIS have been reproduced in this section for reference, as they relate to the Regional Plan Update alternatives.

ALTERNATIVE 1: NO PROJECT

Results of mobile-source GHG emissions modeling associated with Alternative 1 are summarized in Table 3.5-14.

Alternative 1 would result in a net reduction in total mobile-source GHG emissions associated with light-duty vehicles in the California portion of the Basin in both 2020 and 2035 compared to 2005 levels, despite a slight increase in population. Alternative 1 would meet the GHG per capita reduction target of 7 percent below 2005 levels by 2020, but would not meet the 2035 target of 5 percent below 2005 levels required by SB 375. Because Alternative 1 would not meet both of the applicable SB 375 targets, Alternative 1 of the RTP would not qualify as an SCS. However, because SB 375 is a component of the AB 32 Scoping Plan (the State's plan to achieve AB 32-mandated emission reductions by 2020) and Alternative 1 would meet the 2020 SB 375 GHG reduction target, Alternative 1 would fulfill the 2020 component of the AB 32 Scoping Plan as it relates to local government and land use planning (ARB 2011a).

Table 3.5-14. Alternative 1 Mobile-Source Greenhouse Gas Emissions for California Portion of Basin[1]

2005		2020		2035	
Daily VMT	949,750	Daily VMT	928,908	Daily VMT	989,899
Population	41,213	Population	41,709	Population	42,005
VMT per capita per day	23.04	VMT per capita per day	22.27	VMT per capita per day	23.57
GHG Emissions (tons/day)[2]	460	GHG Emissions (tons/day)[2]	433	GHG Emissions (tons/day)[2]	458
GHG Emissions per Capita (pounds/person/day)[2]	22.32	GHG Emissions per Capita (pounds/person/day)[2]	20.75	GHG Emissions per Capita (pounds/person/day)[2]	21.80
		% change GHG per capita from 2005	-7.05%	% Reduction GHG per capita from 2005	-2.34%
		SB 375 Target	-7%	SB 375 Target[3]	-5%
		SB 375 Target Met?	Yes	SB 375 Target Met?	No

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] GHG emissions were estimated for the portion of the vehicle fleet comprised of automobiles, light-duty vehicles, and medium-duty vehicles.
[3] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed model output.

Alternative 1 would not fulfill the requirements of SB 375, due to inconsistency with the 2035 GHG reduction target. However, it is notable that Alternative 1 would result in a net reduction in mobile-source GHG emissions from light-duty vehicles in California and in GHG emissions per capita compared to existing conditions. In addition, Alternative 1 would not substantially impair the State's ability to meet its 2020 emission reduction mandates. However, because Alternative 1 would not comply with SB 375 requirements, Alternative 1 does not comply with applicable legislation adopted for the purpose of reducing GHG emissions. This would be considered a cumulatively considerable and, thereby, a **significant** impact.

ALTERNATIVE 2: LOW DEVELOPMENT, INCREASED REGULATION

Results of mobile-source GHG emissions modeling associated with Alternative 2 are summarized in Table 3.5-15.

Table 3.5-15. Alternative 2 Mobile-Source Greenhouse Gas Emissions for California Portion of Basin[1]

2005		2020		2035	
Daily VMT	949,750	Daily VMT	944,010	Daily VMT	1,004,890
Population	41,213	Population	42,735	Population	44,102
VMT per capita per day	23.04	VMT per capita per day	22.09	VMT per capita per day	22.79
GHG Emissions (tons/day)[2]	460	GHG Emissions (tons/day)[2]	440	GHG Emissions (tons/day)[2]	465
GHG Emissions per Capita (pounds/person/day)[2]	22.32	GHG Emissions per Capita (pounds/person/day)[2]	20.58	GHG Emissions per Capita (pounds/person/day)[2]	21.08
		% change GHG per capita from 2005	--7.81%	% Reduction GHG per capita from 2005	-5.58%
		SB 375 Target	-7%	SB 375 Target[3]	-5%
		SB 375 Target Met?	Yes	SB 375 Target Met?	Yes

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] GHG emissions were estimated for the portion of the vehicle fleet comprised of automobiles, light-duty vehicles, and medium-duty vehicles.
[3] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed model output.

Alternative 2 would result in a net reduction in total mobile-source GHG emissions associated with light-duty vehicles in the California-portion of the Basin in both 2020 and 2035 compared to 2005 levels, despite an increase in population. Alternative 2 would meet the GHG per capita reduction targets of 7 percent below 2005 levels by 2020 and 5 percent below 2005 levels by 2035 required by SB 375. Because Alternative 2 would meet both of the applicable SB 375 targets, Alternative 2 of the RTP would qualify as a SCS. In addition, Alternative 2 would fulfill the 2020 component of the AB 32 Scoping Plan as it relates to local government and land use planning (ARB 2011a).

Alternative 2 would fulfill the requirements of SB 375. Alternative 2 would comply with applicable legislation (e.g., AB 32 and SB 375) adopted for the purpose of reducing GHG emissions. This would be considered a less-than-cumulatively considerable and, thereby, a **less-than-significant** impact.

ALTERNATIVE 3: LOW DEVELOPMENT, HIGHLY INCENTIVIZED REDEVELOPMENT

Results of mobile-source GHG emissions modeling associated with Alternative 3 are summarized in Table 3.5-16.

Alternative 3 would result in a net reduction in total mobile-source GHG emissions associated with light-duty vehicles in the California-portion of the Basin in both 2020 and 2035 compared to 2005 levels, despite an increase in population. Alternative 3 would meet and exceed the GHG per capita reduction targets of 7 percent below 2005 levels by 2020 and 5 percent below 2005 levels by 2035 required by SB 375. Because Alternative 3 would exceed both of the applicable SB 375 targets, Alternative 3 of the RTP would qualify as a SCS. Alternative 3 would result in the greatest reduction in GHG per capita of the five alternatives considered and would result in stronger promotion of SB 375 goals than Alternative 2. In addition, Alternative 3 would fulfill the 2020 component of the AB 32 Scoping Plan as it relates to local government and land use planning (ARB 2011a).

Table 3.5-16. Alternative 3 Mobile-Source Greenhouse Gas Emissions for California Portion of Basin[1]					
2005		2020		2035	
Daily VMT	949,750	Daily VMT	925,150	Daily VMT	1,017,955
Population	41,213	Population	43,934	Population	45,468
VMT per capita per day	23.04	VMT per capita per day	21.06	VMT per capita per day	22.39
GHG Emissions (tons/day)[2]	460	GHG Emissions (tons/day)[2]	431	GHG Emissions (tons/day)[2]	471
GHG Emissions per Capita (pounds/person/day)[2]	22.32	GHG Emissions per Capita (pounds/person/day)[2]	19.62	GHG Emissions per Capita (pounds/person/day)[2]	20.71
		% change GHG per capita from 2005	-12.12%	% Reduction GHG per capita from 2005	-7.22%
		SB 375 Target	-7%	SB 375 Target[3]	-5%
		SB 375 Target Met?	Yes	SB 375 Target Met?	Yes

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] GHG emissions were estimated for the portion of the vehicle fleet comprised of automobiles, light-duty vehicles, and medium-duty vehicles.
[3] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed model output.

Alternative 3 would fulfill the requirements of SB 375. Alternative 3 would comply with applicable legislation (e.g., AB 32 and SB 375) adopted for the purpose of reducing GHG emissions. This would be considered a less-than-cumulatively considerable and, thereby, a **less-than-significant** impact.

ALTERNATIVE 4: REDUCED DEVELOPMENT, INCENTIVIZED REDEVELOPMENT

Results of mobile-source GHG emissions modeling associated with Alternative 4 are summarized in Table 3.5-17.

Table 3.5-17. Alternative 4 Mobile-Source Greenhouse Gas Emissions for California Portion of Basin[1]					
2005		2020		2035	
Daily VMT	949,750	Daily VMT	963,786	Daily VMT	1,068,686
Population	41,213	Population	43,737	Population	45,950
VMT per capita per day	23.04	VMT per capita per day	22.04	VMT per capita per day	23.26
GHG Emissions (tons/day)[2]	460	GHG Emissions (tons/day)[2]	449	GHG Emissions (tons/day)[2]	494
GHG Emissions per Capita (pounds/person/day)[2]	22.32	GHG Emissions per Capita (pounds/person/day)[2]	20.53	GHG Emissions per Capita (pounds/person/day)[2]	21.51
		% change GHG per capita from 2005	-8.04%	% Reduction GHG per capita from 2005	-3.62%
		SB 375 Target	-7%	SB 375 Target[3]	-5%
		SB 375 Target Met?	Yes	SB 375 Target Met?	No

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] GHG emissions were estimated for the portion of the vehicle fleet comprised of automobiles, light-duty vehicles, and medium-duty vehicles.
[3] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed model output.

Alternative 4 would result in a net reduction in total mobile-source GHG emissions associated with light-duty vehicles in the California-portion of the Basin in 2020 compared to 2005 levels, despite an increase in population. Alternative 4 would meet the GHG per capita reduction target of 7 percent below 2005 levels by 2020 but would not meet the 2035 target of 5 percent below 2005 levels required by SB 375. Because Alternative 4 would not meet both of the applicable SB 375 targets, Alternative 4 of the RTP would not qualify as a SCS. However, because SB 375 is a component of the AB 32 Scoping Plan (the State's plan to achieve AB 32-mandated emission reductions by 2020) and Alternative 4 would meet the 2020 SB 375 GHG reduction target, Alternative 4 would fulfill the 2020 component of the AB 32 Scoping Plan as it relates to local government and land use planning (ARB 2011a).

Alternative 4 would not fulfill the requirements of SB 375, due to inconsistency with the 2035 GHG reduction target. However, it is notable that Alternative 4 would result in a net reduction in mobile-source GHG emissions from light-duty vehicles in California in 2020 and in GHG emissions per capita compared to existing conditions. In addition, Alternative 4 would not substantially impair the State's ability to meet its 2020 emission reduction mandates. However, because Alternative 4 would not comply with SB 375 requirements, Alternative 4 does not comply with applicable legislation adopted for the purpose of reducing GHG emissions. This would be considered a cumulatively considerable and, thereby, **significant** impact.

Alternative 5: Similar Rate of Development and Regulatory Structure to the 1987 Regional Plan

Results of mobile-source GHG emissions modeling associated with Alternative 5 are summarized in Table 3.5-18.

Table 3.5-18. Alternative 5 Mobile-Source Greenhouse Gas Emissions for California Portion of Basin[1]

2005		2020		2035	
Daily VMT	949,750	Daily VMT	981,457	Daily VMT	1,095,393
Population	41,213	Population	44,277	Population	46,129
VMT per capita per day	23.04	VMT per capita per day	22.17	VMT per capita per day	23.75
GHG Emissions (tons/day)[2]	460	GHG Emissions (tons/day)[2]	457	GHG Emissions (tons/day)[2]	507
GHG Emissions per Capita (pounds/person/day)[2]	22.32	GHG Emissions per Capita (pounds/person/day)[2]	20.65	GHG Emissions per Capita (pounds/person/day)[2]	21.97
		% change GHG per capita from 2005	-7.49%	% Reduction GHG per capita from 2005	-1.60%
		SB 375 Target	-7%	SB 375 Target[3]	-5%
		SB 375 Target Met?	Yes	SB 375 Target Met?	No

Notes: GHG = greenhouse gas; MT = metric tons; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the RTAC method, which excludes through-trips. The method for determining VMT Threshold Standard attainment includes all in-Basin VMT, as described in Section 3.3, Transportation.
[2] GHG emissions were estimated for the portion of the vehicle fleet comprised of automobiles, light-duty vehicles, and medium-duty vehicles.
[3] Vehicle-related GHG emissions were estimated for the entire on-road vehicle fleet in the Basin, including autos, buses, light-, medium-, and heavy-duty vehicles and trucks. However, GHG emission estimates for purposes of meeting SB 375 targets include only autos and light- and medium duty-trucks. The EMFAC model assumes changes in vehicle fleet composition, fuel economy, and emissions control technology factors over the period between 2010 and 2035. These factors, and the fact that GHG emissions were attributed to the Basin-wide population, contribute to the non-linear results between the percent change in VMT per capita per day and GHG emissions per capita per year from 2010 to 2035.
Source: Data provided by Fehr & Peers in 2012; see Appendix E.
See Appendix F for detailed model output.

Alternative 5 would result in a net reduction in total mobile-source GHG emissions associated with light-duty vehicles in the California-portion of the Basin in 2020 compared to 2005 levels, despite an increase in population. Alternative 5 would meet the GHG per capita reduction target of 7 percent below 2005 levels by 2020, but would not meet the 2035 target of 5 percent below 2005 levels required by SB 375. Because Alternative 5 would not meet both of the applicable SB 375 targets, Alternative 5 of the RTP would not qualify as

a SCS. However, because SB 375 is a component of the AB 32 Scoping Plan (the State's plan to achieve AB 32-mandated emission reductions by 2020) and Alternative 5 would meet the 2020 SB 375 GHG reduction target, Alternative 5 would fulfill the 2020 component of the AB 32 Scoping Plan as it relates to local government and land use planning (ARB 2011a).

Alternative 5 would not fulfill the requirements of SB 375, due to inconsistency with the 2035 GHG reduction target. However, it is notable that Alternative 5 would result in a net reduction in mobile-source GHG emissions from light-duty vehicles in California in 2020 and in GHG emissions per capita compared to existing conditions. In addition, Alternative 5 would not substantially impair the State's ability to meet its 2020 emission reduction mandates. However, because Alternative 5 would not comply with SB 375 requirements, Alternative 5 does not comply with applicable legislation adopted for the purpose of reducing GHG emissions. This would be considered a cumulatively considerable and, thereby, a **significant** impact.

Mitigation Measures

No mitigation is required for Alternatives 2 or 3. The following mitigation is required for Alternatives 1, 4, and 5.

Mitigation Measure 3.5-2: Prepare Alternative Planning Strategy

For Alternatives 1, 4, and 5, TMPO shall prepare an Alternative Planning Strategy (APS) that demonstrates how the regional SB 375 GHG-reduction targets for the California portion of the Region would be achieved, in accordance with California SB 375. The APS would need to include strategies for bringing the alternative into compliance, such as additional transportation projects, development right transfer incentives, a compact land use pattern, reduced allocations, and energy efficiency measures that would result in achievement of SB 375 targets.

Significance After Mitigation

Because Alternatives 2 and 3 demonstrate that achieving both the AB 32 and SB 375 reduction goals is feasible, adoption of a qualifying APS for Alternatives 1, 4, and 5 would feasibly reduce this impact to a **less-than-significant** level.