

4.17 GREENHOUSE GAS EMISSIONS

This section addresses greenhouse gas (GHG) emissions anticipated from future development in the City and their relationship to global warming. Information in this section is derived from the *Air Quality Evaluation* prepared by Urban Crossroads in June 2010. The *Air Quality Evaluation* is included in its entirety in Appendix E of this EIR. Emissions of criteria air pollutants and toxic air contaminants (TACs) from future developments in the City are addressed in Section 4.3, Air Quality, of this EIR. Unless noted otherwise, the information in this section has been obtained from the above-referenced report.

4.17.1 METHODOLOGY

Construction Greenhouse Gas Emissions

During construction, GHG emissions will likely result from the burning of fossil fuel in construction equipment. Because details are unknown at this time regarding specific project construction activity for the General Plan Update, emissions of GHGs during construction activity have not been analyzed in this evaluation. Construction-related GHG emissions will instead be analyzed in future air quality analyses to be conducted for individual projects.

Mobile Source Greenhouse Gas Emissions

The Urban Emissions (URBEMIS) 2007 model was used to estimate carbon dioxide (CO₂) emissions from mobile source activity. Trip generation rates were obtained from the traffic study prepared for the City of Arcadia General Plan Update. Additional trip characteristics and fleet percentages were generated based on the conservative URBEMIS 2007 model defaults for Los Angeles County. Trip lengths for 2010 and 2035 were estimated using URBEMIS 2007 defaults. The URBEMIS 2007 model does not quantify methane (CH₄) and nitrous oxide (N₂O) emissions. However, these two GHGs are known to be emitted from mobile sources; therefore, the Climate Registry Protocol was utilized. Specifically, the grams/mile emission factors for CH₄ and N₂O available in Table C.4 of The Climate Registry General Reporting Protocol by vehicle class, model year, and fuel type were utilized. A composite emission factor was generated based on the vehicle fleet mix programmed into the URBEMIS 2007 model. Detailed calculations are presented in Attachment A of the *Air Quality Analysis* (Appendix E of this EIR).

The limitations of URBEMIS should be noted. While the best information available was utilized, several assumptions were made relating to the number of trips and trip length. In addition, trip lengths were obtained utilizing assumptions in the URBEMIS 2007 model, which conservatively assumes that trips lengths will remain the same for both the baseline (2010) and the General Plan Update buildout (2035) years. It is also difficult to calculate emissions resulting from the number trips that occur as a result of land uses located outside the City as well as vehicles passing through the City from surrounding areas because no data exists. Therefore, the effects of surrounding land uses as well as vehicles traveling through the City have not been analyzed.

Area Source Greenhouse Gas Emissions

GHG emissions resulting from existing and future City of Arcadia energy use were calculated based on average annual energy usage rates. For residential land uses, average annual energy consumption estimates were obtained from the California Energy Commission report *Impacts of Climate Change on Residential Electricity Consumption: Evidence from Billing Data* (March 2009) for Climate Zone 16, which is representative of the City of Arcadia. Energy

consumption estimates for commercial, office, and light industrial uses were obtained from the California Climate Action Registry General Reporting Protocol, Table III.6.1.

The URBEMIS 2007 model was used to estimate CO₂ emissions associated with natural gas use. In order to forecast the GHG emissions resulting from natural gas combustion for emissions of CH₄ and N₂O, usage estimates were obtained from the SCAQMD's *CEQA Air Quality Handbook 1993*. GHG emissions from natural gas usage were calculated based on U.S. Environmental Protection Agency (USEPA) emission factors.

Water use and energy consumption are closely linked, especially in Southern California, where water supplies are limited and a significant portion of the water supply must be imported. Large amounts of energy are required for the conveyance, treatment, distribution, and end use of water, as well as for wastewater treatment. Water usage rates were obtained from data provided by the American Water Works Administration.

GHG emissions will also occur as a result of municipal solid waste generated by uses within the City. Solid waste generated by future development pursuant to the General Plan Update has the potential to be disposed of in a landfill, where it will emit methane gas as it decomposes. Solid waste generation rates were estimated utilizing data provided by the California Integrated Waste Management Board, and emissions of methane gas resulting from project-generated solid waste were estimated utilizing data provided in *Solid Waste Management and Greenhouse Gases*.

4.17.2 RELEVANT POLICIES AND REGULATIONS

Federal

The federal government began studying the phenomenon of global warming as early as 1978 with the National Climate Protection Act (92 Stat. 601), which required the President to establish a program to “assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications.” The 1987 Global Climate Protection Act (Title XI of Pub. L. 100-204), directed the U.S. Environmental Protection Agency (USEPA) to propose a “coordinated national policy on global climate change”, and ordered the Secretary of State to work “through the channels of multilateral diplomacy” to coordinate efforts to address global warming. Further, in 1992, the United States ratified a nonbinding agreement among 154 nations to reduce atmospheric GHGs.

More recently, in *Massachusetts v. EPA* (April 2, 2007), the U.S. Supreme Court held that GHGs fall within the Clean Air Act's (CAA's) definition of an “air pollutant”, and directed the USEPA to consider whether GHGs are causing global warming. If so, the USEPA must regulate GHG emissions from automobiles under the CAA. On December 7, 2009, the Administrator signed two distinct findings regarding GHG emissions under section 202(a) of the Clean Air Act. The rule (1) declares that GHGs endanger human health and (2) represents the first step to regulation through the federal CAA. The USEPA defines air pollution to include the six key GHGs (CO₂, CH₄, N₂O, hydrofluorocarbons [HFCs], perfluorocarbons [PFCs], and sulfur hexafluoride [SF₆]). The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare. These findings do not impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the USEPA's Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles, which were jointly proposed by the USEPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) on September 15, 2009.

In addition, Congress has increased the corporate average fuel economy (CAFE) of the U.S. automotive fleet. In December 2007, former President Bush signed a bill raising the minimum average miles per gallon for cars, sport utility vehicles, and light trucks to 35 miles per gallon by 2020. This modification of the CAFE standard will create a substantial reduction in GHG emissions from automobiles, which is the largest single emitting GHG sector in California.

Multi-State

Western Regional Climate Action Initiative

The Western Regional Climate Action Initiative (2007) includes Arizona, California, New Mexico, Oregon, Utah, and Washington. Acknowledging that the western states already experience a hotter, drier climate, the Governors of the foregoing states have committed to three time-sensitive actions: (1) to set a regional goal to reduce emissions from the states collectively, consistent with state-by-state goals, by August 26, 2007; (2) to develop “a design for a regional market-based multi-sector mechanism, such as a load-based cap and trade program, to achieve the regional GHG reduction goal” by August 26, 2008; and (3) to participate in a multi-state GHG registry “to enable tracking, management, and crediting for entities that reduce GHG emissions, consistent with state GHG reporting mechanisms and requirements”.

Western Climate Initiative

The Western Climate Initiative (WCI), a regional collaboration between the Governors of Arizona, California, New Mexico, Oregon and Washington and the Canadian provinces of British Columbia and Manitoba (joined in April 2007), has established a regional goal to reduce GHG emissions in the west to 15 percent below 2005 levels by 2020. The regional goal does not replace the individual States’ goals regarding GHG emissions, but rather the WCI members will use the regional goal in the design of the multi-sector, market-based mechanism.

State of California

The California Air Resources Board (CARB), a part of the California Environmental Protection Agency (CalEPA), is responsible for the coordination and administration of both federal and State air pollution control programs in California. There are numerous State plans, policies, regulations, and laws related to GHGs and global warming. Following is a brief discussion of the plans, policies, and regulations most relevant to the proposed General Plan Update and future development in the City (presented in approximate chronological order).

Assembly Bill 1493

In 2002, Assembly Bill (AB) 1493 required CARB to develop and adopt, by January 1, 2005, regulations that achieve “the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty truck and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the state”. To meet the requirements of AB 1493, CARB approved amendments to the *California Code of Regulations*. Amendments include (1) the addition of GHG emission standards to California’s existing motor vehicle emission standards and (2) the requirement that automobile manufacturers meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. Emission limits are further reduced each model year through 2016. In order to enact State standards for vehicle emissions, a waiver was required from the USEPA.

Subsequent to prolonged litigation, the USEPA denied California's waiver request. California filed a petition with the Ninth Circuit Court of Appeals challenging the USEPA's denial on January 2, 2008. The Obama administration subsequently directed the USEPA to re-examine their decision. On May 19, 2009, challenging parties, automakers, the State of California, and the federal government reached an agreement on a series of actions that would resolve these current and potential future disputes over the standards through model year 2016. In summary, the USEPA and the U.S. Department of Transportation agreed to adopt a federal program to reduce GHGs and improve fuel economy, respectively, from passenger vehicles in order to achieve equivalent or greater greenhouse gas benefits as the AB 1493 regulations for the 2012–2016 model years. Manufacturers agreed to ultimately drop current and forego similar future legal challenges, including challenging a waiver grant, which occurred on June 30, 2009. The State of California committed to (1) revise its standards to allow manufacturers to demonstrate compliance with the fleet-average GHG emission standard by "pooling" California and specified State vehicle sales; (2) revise its standards for 2012–2016 model year vehicles so that compliance with USEPA-adopted GHG standards would also meet California's standards; and (3) revise its standards, as necessary, to allow manufacturers to use emissions data from the federal CAFE program to demonstrate compliance with the AB 1493 regulations (CARB 2009). As described above, the USEPA/NHTSA rule to implement the GHG reduction standards was issued on April 1, 2010.

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which proclaims that California is vulnerable to the impacts of global warming. It declares that increased temperatures could reduce snow pack in the Sierra Nevada Mountains, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. In an effort to avoid or reduce the impacts of global warming, Executive Order S-3-05 calls for a reduction in GHG emissions to the year 2000 level by 2010, to year 1990 levels by 2020, and to 80 percent below 1990 levels by 2050.

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

The California Legislature adopted the public policy position that global warming is "a serious threat to the economic well-being, public health, natural resources, and the environment of California" (*California Health and Safety Code* §38501). Furthermore, the State Legislature has determined that "the potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra Nevada snow pack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious disease, asthma, and other human health-related problems", and that "Global warming will have detrimental effects on some of California's largest industries, including agriculture, wine, tourism, skiing, recreational and commercial fishing, and forestry. It will also increase the strain on electricity supplies necessary to meet the demand for summer air-conditioning in the hottest parts of the State" (*California Health and Safety Code* §38501). These public policy statements became law with the enactment of AB 32, the California Global Warming Solutions Act of 2006, signed by Governor Arnold Schwarzenegger in September 2006. AB 32 is now codified as *California Health and Safety Code*, Sections 38500–38599.

AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020, consistent with Executive Order S-3-05. This reduction is to be accomplished through an enforceable statewide cap on GHG emissions to be phased in starting in 2012. AB 32 directs CARB to

establish this statewide cap based on 1990 GHG emissions levels; disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms. Emissions reductions under AB 32 are to include carbon sequestration projects and best management practices that are technologically feasible and cost-effective.

Senate Bill 1368

Senate Bill (SB) 1368 (2006) (*Public Utilities Code* §§8340-41) requires the California Public Utilities Commission (CPUC) to establish a “GHG emission performance standard” by February 1, 2007, for all electricity providers under its jurisdiction, including the State’s three largest privately owned utilities. These utilities provide approximately 30 percent of the State’s electric power. After the CPUC acted, the California Energy Commission (CEC) adopted a performance standard “consistent with” the CPUC performance standard and applied it to local publicly owned utilities on May 23, 2007 (over one month ahead of its June 30, 2007 deadline). However, the California Office of Administrative Law (OAL) found four alleged flaws in the CEC’s rulemaking. The CEC overcame these alleged flaws and adopted reformulated regulations in August 2007.

Senate Bill 107

SB 107 (2006) requires investor-owned utilities such as Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric to ensure 20 percent of their electricity is generated from renewable sources by 2010. Previously, State law required that this target be achieved by 2017. Based on pending and approved contracts, the investor-owned utilities are expected to achieve the 20 percent target in the 2013 to 2014 timeframe.

Executive Order S-01-07

Executive Order S-01-07 (2007) calls for a reduction in the carbon intensity of California’s transportation fuels by at least 10 percent by 2020. As noted above, the low-carbon fuel standard (LCFS) was adopted by CARB as one of its three “early action measures” on June 21, 2007.

Executive Order S-13-08

In November 2008, Governor Schwarzenegger issued Executive Order S-13-08, which directs State agencies to plan for sea level rise and other global warming impacts. There are four key actions in the Executive Order: (1) initiation of an adaptation strategy to assess the State’s expected global warming impacts where the State is most vulnerable, with recommendations by early 2009; (2) an expert panel on sea level rise to inform State planning and development efforts; (3) interim guidance to State agencies on planning for sea level rise in coastal and floodplain areas for new projects; and (4) initiation of a report on critical existing and planned infrastructure projects vulnerable to sea level rise.

Senate Bill 97 and Amendments to CEQA Guidelines

Senate Bill (SB) 97 directs the California Natural Resources Agency (CNRA) to adopt amendments to the CEQA Guidelines that require evaluation of GHG emissions or the effects of GHG emissions by January 1, 2010. The CNRA has done so, and the amendments to the CEQA Guidelines, in a new Section 15064.4, titled Determining the Significance of Impacts from Greenhouse Gas Emissions, provide that:

- (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:
 - (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or
 - (2) Rely on a qualitative analysis or performance based standards.
- (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
 - (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
 - (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
 - (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

The amendments add a new Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions. This new section includes the following:

“....Lead agencies shall consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of greenhouse gas emissions. Measures to mitigate the significant effects of greenhouse gas emissions may include, among others:

- (1) Measures in an existing plan or mitigation program for the reduction of emissions that are required as part of the lead agency's decision;
- (2) Reductions in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F;
- (3) Off-site measures, including offsets that are not otherwise required, to mitigate a project's emissions;
- (4) Measures that sequester greenhouse gases;

- (5) In the case of the adoption of a plan, such as a general plan, long range development plan, or plans for the reduction of greenhouse gas emissions, mitigation may include the identification of specific measures that may be implemented on a project-by-project basis. Mitigation may also include the incorporation of specific measures or policies found in an adopted ordinance or regulation that reduces the cumulative effect of emissions.”

Appendix F, Energy Conservation, in Section II, EIR Contents, includes the following:

“(D) Mitigation Measures may include:

- (1) Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. The discussion should explain why certain measures were incorporated in the Project and why other measures were dismissed.
- (2) The potential of siting, orientation, and design to minimize energy consumption, including transportation energy, increase water conservation and reduce solid-waste.
- (3) The potential for reducing peak energy demand.
- (4) Alternate fuels (particularly renewable ones) or energy systems.
- (5) Energy conservation which could result from recycling efforts.”

Governor’s Office of Planning and Research Technical Advisory

On June 19, 2008, the OPR issued a Technical Advisory on addressing global warming impacts of a proposed project under CEQA (OPR Climate Change Advisory) (OPR 2008). The OPR Climate Change Advisory recommends that lead agencies quantify, determine the significance of, and (as needed) mitigate the cumulative global warming impacts of a proposed project. The OPR Climate Change Advisory identifies that each lead agency is required, under CEQA, to exercise its own discretion in choosing how to determine significance in the absence of adopted thresholds or significance guidelines from the State, CARB, or the applicable local air district.

CARB Scoping Plan

In December 2007, CARB published California’s GHG inventory, which compiled statewide anthropogenic GHG emissions and sinks¹ for the years 1990 through 2004. The total statewide GHG emissions level in 1990, and therefore the 2020 emissions target, is 427 million metric tons of carbon dioxide equivalent (MMTCO₂e).² Achieving this target requires a reduction of 169 MMTCO₂e (approximately 30 percent) from the State’s projected 2020 emissions of 596 MMTCO₂e (business-as-usual), and a reduction of 42 MMTCO₂e (almost 10 percent) of the 2002–2004 average emissions.

¹ GHG sinks are a form of carbon sequestration or long-term storage of carbon dioxide or other forms of carbon.

² CO₂e emissions are commonly expressed in metric tons of carbon dioxide equivalent (MTCO₂e). Larger quantities of emissions, such as on the State or world scale, are expressed in million metric tons of carbon dioxide equivalent (MMTCO₂e). Metric tons may also be stated as “tonnes”. The CO₂e for a gas is derived by multiplying the tons of the gas by the associated global warming potential (GWP) such that MMTCO₂e = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for CH₄ is 21. This means that emissions of 1 million metric tons of CH₄ are equivalent to the emissions of 21 million metric tons of CO₂.

AB 32 requires CARB to develop a Scoping Plan to lower the State's GHG emissions to meet the 2020 limit. The Scoping Plan was approved at the December 2008 board meeting and the measures in the Scoping Plan, listed in Table 4.17-1, will be developed and in place by 2012. As shown in the table, statewide measures addressing vehicle emissions, energy efficiency, vehicle fuel, and power generation are planned to achieve the greater amounts of emissions reductions. However, reductions at all levels will be needed to reach the 2020 targets.

**TABLE 4.17-1
AB 32 SCOPING PLAN RECOMMENDED GREENHOUSE GAS
REDUCTION MEASURES**

Recommended Reduction Measures	Reductions Counted toward 2020 Target of 169 MMTCO₂e	Percentage of Statewide Year 2020 Target
Cap and Trade Program and Associated Measures		
California Light-Duty Vehicle GHG Standards	31.7	18.2%
Energy Efficiency	26.3	15.1%
Renewable Portfolio Standard (33% by 2020)	21.3	12.2%
Low Carbon Fuel Standard	15	8.6%
Regional Transportation-Related GHG Targets ^a	5	2.9%
Vehicle Efficiency Measures	4.5	2.6%
Recommended Reduction Measures	Reductions Counted toward 2020 Target of 169 MMTCO₂e	Percentage of Statewide Year 2020 Target
Goods Movement	3.7	2.1%
Million Solar Roofs	2.1	1.2%
Medium/Heavy Duty Vehicles	1.4	0.8%
High Speed Rail	1.0	0.6%
Industrial Measures	0.3	0.2%
Additional Reduction Necessary to Achieve Cap	34.4	19.8%
<i>Total Estimated Reductions from Cap and Trade Program and Associated Measures</i>	<i>146.7</i>	<i>84.3%</i>
Uncapped Sources/Sectors Measures		
High Global Warming Potential Gas Measures	20.2	11.6%
Sustainable Forests	5	2.9%
Industrial Measures (for sources not covered under cap and trade program)	1.1	0.6%
Recycling and Waste (landfill methane capture)	1	0.6%
<i>Total Estimated Reductions from Uncapped Sources/Sectors</i>	<i>27.3</i>	<i>15.7%</i>
Total Reductions Counted Towards 2020 Target	174.0^b	100%

TABLE 4.17-1 (Continued)
AB 32 SCOPING PLAN RECOMMENDED GREENHOUSE GAS
REDUCTION MEASURES

Recommended Reduction Measures	Reductions Counted toward 2020 Target of 169 MMTCO ₂ e	Percentage of Statewide Year 2020 Target
Other Recommended Measures – Not Counted Towards 2020 Target	Estimated Reductions MMTCO ₂ e	
State Government Operations	1.0 to 2.0	
Local Government Operations	To Be Determined	
Green Buildings	26	
Recycling and Waste	9	
Water Sector Measures	4.8	
Methane Capture at Large Dairies	1	
MMTCO ₂ e: million metric tons of carbon dioxide equivalent; GHG: greenhouse gas(es)		
^a Reductions represent an estimate of what may be achieved from local land use changes. It is not the SB 375 Regional target.		
^b The total reduction for the recommended measures slightly exceeds the 169 MMTCO ₂ e of reductions estimated in the Draft Scoping Plan. This is the net effect of adding several measures and adjusting the emission reduction estimates for some other measures.		
Source: CARB 2008		

Key elements of the Scoping Plan include (1) expanding and strengthening existing energy efficiency programs and building and appliance standards; (2) achieving a statewide renewable energy mix of 33 percent; (3) developing a California cap and trade program linked with other similar programs; (4) establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets; (5) implementing existing laws and standards such as California's clean car standards identified in Table 4.13-1 as Light Duty Vehicle GHG Standards and described above under the AB 1493 heading, goods movement measures, and the LCFS; and (6) issuing targeted fees to fund the State's long-term commitment to AB 32 administration.

On April 23, 2009, CARB approved the LCFS, which has a goal to reduce GHG emissions from California's transportation fuels by 10 percent, equal to 16 MMTCO₂e, by 2020. The regulation requires providers, refiners, importers, and blenders to ensure that the fuels they provide for the California market meet an average declining standard of "carbon intensity". This is established by determining the sum of GHG emissions associated with the production, transportation and consumption of a fuel, also referred to as the "fuel pathway".

Senate Bill 375

Signed September 30, 2008, SB 375 provides for a new planning process to coordinate land use planning and regional transportation plans and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires Metropolitan Planning Organizations, including the Southern California Association of Governments (SCAG) to incorporate a Sustainable Communities Strategy (SCS) in their regional transportation plans that will achieve GHG emission reduction targets set by CARB. There are two mutually important facets to SB 375: reducing VMT and encouraging more compact, complete, and efficient communities for the future. SB 375 also includes provisions for exemptions from or streamlined CEQA review for projects classified as transit priority projects. However, a requirement for these CEQA features is that the project must conform to the SCS, and SCAG's SCS is currently scheduled for adoption in April 2012.

Title 24 Energy Efficiency Standards

The Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, of the *California Code of Regulations* [CCR], known as Title 24) were established in 1978 in response to a legislative mandate to reduce California's energy consumption. Since that time, Title 24 has undergone several revisions. Effective January 1, 2010, the adopted 2008 Title 24 standards replaced the 2005 Title 24 standards. The CEC adopted the 2008 changes in order to (1) "Provide California with an adequate, reasonably-priced, and environmentally-sound supply of energy" and (2) "Respond to Assembly Bill 32, the Global Warming Solutions Act of 2006, which mandates that California must reduce its GHG emissions to 1990 levels by 2020".

An impact analysis of the 2008 Energy Efficiency Standards estimates that compared to the 2005 Standards, for new multi-family residential construction, electricity use will be reduced by 19.7 percent; peak demand will be reduced by 7.4 percent; and gas consumption will be reduced by 7.0 percent. For new non-residential construction, electricity use will be reduced by 4.9 percent; peak demand will be reduced by 7.2 percent; and gas consumption will be reduced by 9.4 percent. These percent savings are relative to heating, cooling, lighting, and water heating only and do not include other appliances, outdoor lighting that is not attached to buildings, plug loads, or other energy uses.

Title 24 Green Building Standards

The California Green Building Standards Code (24 CCR 11) was adopted in June 2008. The purpose of the Green Building Standards is to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) planning and design; (2) energy efficiency; (3) water efficiency and conservation; (4) material conservation and resource efficiency; and (5) environmental air quality. Although the Green Building Standards became effective August 1, 2009, according to the cover date; effective dates for various elements are specified within the publication. Accordingly, the California Building Standards Commission (CBSC) advises that this version of the standards is primarily a voluntary one. There are mandatory provisions within the Code, but these are items that are currently either required by State law or required by existing regulations. Most of the mandatory provisions adopted by the Department of Housing and Community Development (HCD) have a delayed effective date until the 2010 State building codes are in effect.³ The CBSC states that nothing within California Building Standards Law would preclude a local jurisdiction from adopting the current voluntary version of the Code prior to its effective date in January 1, 2011.

Regional

South Coast Air Quality Management District

Air quality in Los Angeles County is regulated by the South Coast Air Quality Management District (SCAQMD) and is further discussed in Section 4.3, Air Quality, of this EIR. Beginning in April 2008, the SCAQMD convened a working group to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. The Working Group meets approximately once per month. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for industrial projects where the SCAQMD is the lead agency. The interim screening threshold for industrial projects is

³ The indoor water use measures are required as of July 1, 2011.

10,000 metric tons of carbon dioxide equivalent per year (MTCO₂e/yr). The Working Group adopted a philosophy similar to recommendations made by other agencies in California to identify “Significance Screening Levels” (or thresholds) for GHG emissions. Projects with GHG emissions less than these levels or thresholds would be less than significant although the projects may be required to demonstrate (1) energy efficiency greater than that required by the Title 24 standards and (2) water use efficiency, such as recycled water use or the installation of “smart” controllers for landscape irrigation. Projects with GHG emissions greater than the Significance Screening Levels would be required to implement specific performance standards or purchase offsets⁴ to reduce global warming impacts to less than significant. As of November 2009, the SCAQMD was continuing to consider screening levels under CEQA for residential, commercial, and mixed-use projects; however, the working group has not met between November 2009 and the preparation of this EIR in June 2010.

City of Arcadia

The City of Arcadia supports a sustainable development approach; as such, the City supports efforts of energy service providers to utilize renewable energy resources and reduce consumer energy use. The City will integrate energy efficiency considerations into the development design process. The City also recognizes the benefits of “green” building practices, and will analyze ways to incorporate these practices into both public and private developments. Thus, the City plans to adopt green building standards by November 2010.

“Green” buildings or sustainable buildings are buildings that are designed, constructed, and operated to incorporate water conservation, waste minimization, pollution prevention, use of recycled and efficient materials, and energy efficiency. Sustainable building practices have become more prominent in recent years, with sustainable practices including buildings that incorporate water-efficient plumbing and landscaping, and buildings that re-use and incorporate recycled building materials into project design. Examples of energy-saving practices include designing buildings that utilize their sites and orientation for natural heating, cooling, and even lighting options; incorporating energy-efficient heating, ventilation, and air conditioning (HVAC) systems and other appliances into buildings; designing a building to and for maximum insulation and climate control through material use and window placement; and incorporating renewable energy sources such as solar panels and small wind turbines.

4.17.3 EXISTING CONDITIONS

Global Warming

Global warming is currently an important and highly debated environmental, economic, and political issue. Increasing GHG emissions have led to an anthropogenic⁵ warming trend of the earth’s average temperature, which is causing changes in the earth’s climate. GHG emissions are primarily associated with (1) the burning of fossil fuels during motorized transport, electricity generation, consumption of natural gas, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition. This increasing temperature phenomenon is known as “global warming”.

⁴ Purchase of offsets consists of contributions to a fund that would be used to implement GHG emission reductions at some location other than the project site.

⁵ Anthropogenic effects, processes, objects, or materials are those that are derived from human activities, as opposed to those occurring in natural environments without human influence.

Global warming refers to the change in average meteorological conditions on the Earth with respect to temperature, wind patterns, precipitation, and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO₂, N₂O, CH₄, HFCs, PFCs, and SF₆. These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth's atmosphere, but prevent radioactive heat from escaping, thus warming the Earth's atmosphere. Global warming can occur naturally as it has in the past with the previous ice ages. According to CARB, changes in climate that is currently occurring differs from past changes in both rate and magnitude (CARB 2004).

Greenhouse Gases

GHGs are atmospheric gases and clouds within the atmosphere that influence the earth's temperature by absorbing infrared radiation that rises from the sun-warmed surface and that would otherwise escape into space. This process is commonly known as the "Greenhouse Effect". GHGs are emitted by natural processes and human activities. The earth's surface temperature averages about 58 degrees Fahrenheit (°F) because of the Greenhouse Effect. Without it, the earth's average surface temperature would be somewhere around an uninhabitable 0°F. The resulting balance between incoming solar radiation and outgoing radiation from both the Earth's surface and atmosphere maintains the planet's habitability.

GHGs, as defined under California's (Assembly Bill) AB 32, include CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆. While general discussions on global warming often include water vapor, ozone, and aerosols in the GHG category, water vapor and atmospheric ozone are not gases that are formed directly in the construction or operation of development projects, nor can they be controlled in these projects. Aerosols are not gases. While these elements have a role in global warming, they are not considered by either regulatory bodies, such as the CARB, or independent groups, such as the California Climate Action Registry (CCAR), as gases to be reported or analyzed for control. Therefore, no further discussion of water vapor, ozone, or aerosols is provided.

Anthropogenic emissions of GHGs into the atmosphere enhance the Greenhouse Effect by absorbing radiation from other atmospheric GHGs that would otherwise escape into space, thereby trapping more radiation in the atmosphere and causing temperatures to increase. CO₂ is the most important and common anthropogenic GHG. The global atmospheric concentration of CO₂ has increased from a pre-industrial (roughly 1750) value of about 280 parts per million (ppm) to 379 ppm in 2005, primarily due to fossil fuel use, with land use change providing a significant but smaller contribution. The annual growth rate in CO₂ concentrations continues to increase, with a larger annual CO₂ concentration growth rate average during the ten-year period between 1995 and 2005 than since the beginning of continuous direct measurements in 1960.

CO₂ constitutes approximately 84 percent of all GHG emissions in California. Worldwide, the State of California ranks as about the 12th largest emitter of CO₂ and is responsible for approximately 2 percent of the world's CO₂ emissions (CEC 2007, CEC 2006). However, throughout the U.S., California is the fourth lowest in CO₂ emissions per capita.

GHGs are global pollutants unlike air pollutants such as ozone, particulate matter and toxic air contaminants (TACs), which are pollutants of regional and local concern. While pollutants with localized air quality effects have relatively short atmospheric lifetimes (generally on the order of a few days), GHGs have relatively long atmospheric lifetimes, ranging from one year to several thousand years. Long atmospheric lifetimes allow for GHGs to disperse around the globe.

Therefore, the GHG impacts are global, as opposed to the localized air quality effects of criteria air pollutants and TACs.

Because GHGs vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO₂. For example, since CH₄ and N₂O are approximately 21 and 310 times more powerful than CO₂, respectively, in their ability to trap heat in the atmosphere, they have GWPs of 21 and 310, respectively (CO₂ has a GWP of 1). Carbon dioxide equivalent (CO₂e) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO₂e. The atmospheric lifetime and GWP of selected GHGs are summarized in Table 4.17-2.

**TABLE 4.17-2
GLOBAL WARMING POTENTIALS AND ATMOSPHERIC LIFETIMES**

Greenhouse Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)
Carbon Dioxide (CO ₂)	50–200	1
Methane (CH ₄)	12	21
Nitrous Oxide (N ₂ O)	114	310
HFC-134a	48.3	1,300
PFC: Tetrafluoromethane (CF ₄)	50,000	6,500
PFC: Hexafluoroethane (C ₂ F ₆)	10,000	9,200
Sulfur Hexafluoride (SF ₆)	3,200	23,900
HFC: hydrofluorocarbon; PFC: perfluorocarbon. Source: Urban Crossroads 2010.		

Effects of Global Warming

According to the *Climate Scenarios* report developed by the Intergovernmental Panel on Climate Change (IPCC) and the CNRA's draft *California Climate Adaptation Strategy* report, substantial temperature increases arising from increased GHG emissions potentially could result in a variety of impacts to the people, economy, and environment of California associated with a projected increase in extreme conditions, with the severity of the impacts depending upon actual future emissions of GHGs and associated warming. Under the emissions scenarios of the *Climate Scenarios* report, the impacts of global warming in California have the potential to include, but are not limited to, the following areas:

- **Public Health.** Many Californians currently experience the worst air quality in the nation, and increases in global warming would likely make matters worse. Higher temperatures would increase the frequency, duration, and intensity of conditions conducive to air pollution formation. If global background ozone (O₃) levels increase as predicted under some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by more frequent wildfires, which emit fine particulate matter that can travel long distances. Rising temperatures and more frequent heat waves would increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress. Global warming may also increase asthma rates and the spread of infectious diseases and their vectors, as well as challenge food and water supplies. Children, the elderly, people with chronic heart or lung disease, outdoor workers, people who exercise outdoors, and the economically disadvantaged would be

particularly vulnerable to these changes. In addition, more frequent extreme weather events could also result in increased injuries and deaths.

- **Energy.** Increasing mean temperature and more frequent heat waves will drive up demand for cooling in summer; this new energy demand will only be partially offset by decreased demand for heating in winter. Hydropower, which currently provides 15 percent of in-state generation, would be threatened by declining snowpack, which serves as a natural reservoir for hydropower generation in the spring and summer. Winter storms, earlier snowmelt, and greater runoff may combine to cause flooding, damaging transmission lines and causing power outages.
- **Water Resources.** Rising temperatures, less precipitation, and more precipitation falling as rain instead of snow, could severely diminish California's snowpack. Because the Sierra Nevada snowpack provides most of California's available water, this loss would increase the risk of summer water shortages and hamper water distribution and hydropower generation. The diminished snowpack would also nearly eliminate all skiing and other snow-related recreation. Rising sea levels would push saltwater into California's estuaries, wetlands, and groundwater aquifers, threatening the water quality and reliability within the Sacramento/San Joaquin River Delta—a major California fresh water supply. Extreme precipitation and flooding could also damage water quality by creating sudden increases in runoff. Moreover, warming would increase evapotranspiration rates from plants, soil, and open water surfaces, resulting in greater demand for irrigation. Overall, global warming would reduce California's water supplies even as its growing population requires additional resources.
- **Sea Level and Flooding.** Sea level at California's coasts is expected to rise by 11 to 18 inches above 2000 levels by 2050, and by 23 to 55 inches by 2100. These increases would create more frequent and higher storm surges, erode some coastal areas, and increase pressure on existing levees, creating greater risk of flooding in previously untouched inland areas. Consequently, continued development in vulnerable coastal areas would put more people and infrastructure at risk. It should be noted that given the distance from the ocean, sea level rise is not an environmental concern in the City of Arcadia.
- **Agriculture.** Although higher CO₂ levels can stimulate plant production and increase plant water-use efficiency, in the long-term, global warming would reduce the quantity and quality of agricultural products statewide. As temperatures rise, farmers will face greater water demand for crops and a less reliable water supply, as well as increased competition from urban water users. Sea level rise may cause saltwater intrusion in the Delta region, making it difficult to raise certain crops. Rising temperatures will likely aggravate O₃ pollution, interfering with plant growth and making plants more susceptible to disease and pests. In addition, warming would reduce the chill hours needed for fruit and nuts; shift pest and weed ranges; alter crop-pollinator timing; and increase the frequency of droughts, heat waves, and floods. Higher average temperatures would also increase mortality and decrease productivity in livestock.
- **Forestry.** California timber production has declined over the past few decades, due in part to warming and increased wildfires. While further warming may increase production for some species in some locations, global warming is expected to reduce overall forest growth. Increasing average temperature and drought frequency would result in more wildfires and greater burned areas, while less frequent and more intense rainfall would increase soil erosion and landslides. Higher temperatures and less water would force

many tree species to shift their ranges; those that run out of livable habitat may die out. Pests, diseases, and invasive species may also colonize new areas, further challenging forest health and biodiversity.

- **Ecosystems.** Rising average temperatures will subject plants and animals to greater thermal stress, causing some species to adapt or shift their ranges, while others may face extinction. Invasive species may also shift their ranges, threatening native species. Changing temperatures would also alter the timing of plant flowering and insect emergence, damaging species' abilities to reproduce. Changing precipitation patterns will impact aquatic and riparian ecosystems by reducing snow pack, stream flow, and groundwater, while increasing the frequency of droughts, floods, and wildfires. As sea levels rise, some coastal habitats may be permanently flooded or eroded, and salt water intrusion into fresh water resources may threaten terrestrial species. Changes in ocean circulation and temperature, ocean acidification, and increased runoff and sedimentation will threaten pelagic species. In sum, continued global warming would alter natural ecosystems and threaten California's biological diversity.

Existing Greenhouse Gas Emissions

Global, National, State, and Regional Contributions to Greenhouse Gas Emissions

Table 4.17-3 shows the magnitudes of GHG emissions on the global, national, State, and regional scale.

**TABLE 4.17-3
COMPARISON OF WORLD, NATIONAL, STATE AND COUNTY
GHG EMISSIONS**

Area and Data Year	Annual GHG Emissions (MMTCO₂e)
World (2006)	29,000
United States (2007)	7,150
California (2006)	480
Los Angeles (2008)	93
MMTCO ₂ e: million metric tons of CO ₂ e; GHG: greenhouse gas(es) Source: WRI 2009, USEPA 2009, CARB 2007, SCAG 2008.	

Worldwide, China is the world's largest emitter, contributing approximately 19 percent, just ahead of the U.S., with approximately 18 percent. Approximately half of global emissions come from developed countries and half from developing countries; note that China and India are developing countries. The most common GHG is CO₂, which constitutes approximately 84 to 85 percent of all GHG emissions in the U.S. and California. The primary contributors to California GHG emissions are transportation; electric power production from both in-state and out-of-state sources; and industrial uses.

Existing GHG emissions for Los Angeles County were calculated for construction sources, mobile sources, natural gas consumption, and electricity generation by SCAG.

According to the GHG analysis prepared for the proposed General Plan Update, California's rate of growth of greenhouse gas emissions is slowing; however, the State is still a substantial contributor. In 2004, the State produced an estimated 492 MMTCO₂e. It should be noted, however, that between the years of 1990 and 2004, California's population has increased by

16 percent while over the same period the growth of GHG emissions has slowed by 9.7 percent. Much of this reduction in GHG emissions can be attributed to energy conservation measures in residential and commercial buildings and appliances implemented under Title 24 of the California Building Code. With the implementation of the stricter 2005 Building Energy Efficiency Standards, the CEC estimates that residential electricity consumption will be reduced by 20.4 percent, and natural gas consumption will be reduced by 8.3 percent compared to 2001 standards.

As demonstrated in Table 4.17-4, California's residential and commercial sectors are already in compliance with the goals set by AB 32 to reduce GHG emissions to 1990 levels.

**TABLE 4.17-4
CALIFORNIA GHG EMISSIONS (MMTCO₂E)**

Land Use	1990	2004
Residential	28.97	27.86
Commercial	12.65	12.19
Source: Urban Crossroads 2010.		

Building-related energy consumption was further reduced by the 2005 Building Energy Efficiency Standards, which apply to new residential and commercial construction. The CEC estimates that these new standards will reduce energy consumption for nonresidential buildings by 8.3 percent. Compliance with these updated California Building Code Title 24 standards will not only reduce energy consumption and costs, but will further reduce emissions of GHGs when compared to older construction.

Water use efficiency is another measure through which GHG emissions can be reduced. According to the California Climate Action Team Report, "19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute, and use water and wastewater. When a unit of water is saved, so too is the energy required to convey, treat, affect local delivery, perform wastewater treatment, and safely dispose of that unit of water". Therefore, reduced energy use resulting from water conservation leads to reduced GHG emissions.

City of Arcadia

The three largest emitters of CO₂ are buildings, transportation, and industry. Arcadia's carbon footprint composition reflects that of national trends and largely is comprised of emissions from energy use (in buildings and transportation).

Energy use in residential and commercial buildings is generally for heating and cooling for comfort, lighting, and operating electronic equipment. Although emissions may not result directly from such uses, the indirect emissions resulting from electricity generation (such as coal power plants) is accounted in the carbon footprint. Transportation emissions sources are a result of the fact that drivers whose trips originate or end in Arcadia tend to mimic traditional California driving patterns of longer travel distances for automobiles and an increase in frequency for automobile use to go to work, school, shopping, and to run errands. An estimate of GHG emissions in the City is provided in Table 4.17-5 below.

4.17.4 THRESHOLDS OF SIGNIFICANCE

Pursuant to the direction of SB 97, the OPR released the preliminary draft CEQA Guideline amendments for GHG emissions on January 8, 2009, and submitted its final proposed guidelines to the Secretary for Natural Resources on April 13, 2009. The CNRA adopted the Guideline amendments and they became operative on January 1, 2010. It should be noted that the new guidelines state that a lead agency shall have discretion to determine whether to use a quantitative model or methodology, or in the alternative, rely on a qualitative analysis or performance-based standards. New Section 15064.4(a) of the CEQA Guidelines states, "A lead agency shall have discretion to determine, in the context of a particular project, whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use . . .; or (2) Rely on a qualitative analysis or performance based standards".

The CEQA Guideline amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. Instead, they call for a good-faith effort, based on available information, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis and preserve lead agencies' discretion to make their own determinations based upon substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs from which to tier when they perform individual project analyses.

It is accepted as very unlikely that any individual development project would have GHG emissions of a magnitude to directly impact global warming; therefore, any impact would be considered on a cumulative basis. The analysis presented in this section represents the cumulative impact analysis for the project related to GHG emissions. The following significance criteria are derived from Appendix G of the State CEQA Guidelines.

The project would result in a significant impact related to GHG emissions if it would:

Threshold 4.17a: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Threshold 4.17b: Conflict with an applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

4.17.5 GENERAL PLAN GOALS, POLICIES, AND IMPLEMENTATION ACTIONS

A number of goals, policies, and implementation actions in the proposed Arcadia General Plan Update address sustainability and the reduction of the carbon footprint of the City. Specifically, the City will continue active participation in cooperative regional efforts to reduce pollutant emissions as well as focus more attention on improvements at the local level. Implementation of these goals, policies, and programs would reduce impacts related to global warming. These include:

Goal RS-2: *Reducing Arcadia's carbon footprint in compliance with SB 375 and AB 32.*

Policy RS-2.1: *Cooperate with the state to implement AB 32, which calls for reducing greenhouse gas emissions to 1990 levels by 2020, and Executive Order S-3-05, which calls for 1990 levels by 2020 and 80% below 1990 levels by 2050.*

Policy RS-2.2: *Reduce per capita greenhouse gas emissions to 15% below 2005 levels by 2020, and total municipal greenhouse gas emissions to 15% below 2005 levels by 2020.*

Policy RS-2.3: *Participate in regional strategies and plan to implement SB 375, and in particular, use the legislatively authorized incentives, such as grants and transportation funding and waivers to environmental assessments, to encourage infill and transit-oriented development.*

Policy RS-2.4: *Pursue the strategies in the Land Use and Community Design Element to encourage transit-oriented development in established focused areas.*

Policy RS-2.5: *Pursue the enhancement of bicycle and pedestrian infrastructure set forth in the Circulation and Infrastructure Element to help decrease vehicle miles traveled and vehicle trips.*

Policy RS-2.6: *Coordinate land use, circulation, and infrastructure improvement efforts with the West San Gabriel Valley Planning Council, regional planning agencies, and surrounding municipalities.*

Goal RS-3: *Promoting and utilizing clean forms of transportation to reduce Arcadia's carbon footprint.*

Policy RS-3.1: *Develop a City fleet that to the extent feasible uses clean, alternative fuel and consists of energy-efficient vehicles.*

Policy RS-3.2: *Incorporate energy-efficient vehicles into the City's transit system.*

Policy RS-3.3: *Educate residents on methods of sustainable driving techniques such as: reducing excessive speeding, preventing car idling, regular car maintenance for maximizing fuel efficiency, and car pooling.*

Policy RS-3.4: *Promote residents' and business owners' awareness and education of traffic congestion's affect on air pollution and help create voluntary programs that reduce traffic throughout the City.*

Goal RS-5: *Wise and creative energy use that incorporates new technologies for energy generation and new approaches to energy conservation.*

Policy RS-5.1: *Support State agencies' efforts to adopt regulations that can increase the thermal integrity of buildings, increase the efficiency of combustion equipment, and reduce building thermal loads through controls or automation.*

Policy RS-5.2: *Support the development and use of alternative energy technologies for regional and local use. Remove barriers to use of individual energy systems that are consistent with City aesthetic and design objectives.*

Policy RS-5.3: *Require that all new development meets or exceeds the state and local energy conservation requirements.*

Policy RS-5.4: *Investigate the options for adopting local "green" building standards that address energy use in particular. Consider having City facilities serve as a model for*

energy efficiency by incorporating state-of-the-art energy features in new public buildings and significant remodeling of existing buildings.

Policy RS-5.5: Support State legislative initiatives to revise utility rates in a manner that provides incentives for energy conservation and provides funding for research and development of alternative energy sources.

Policy RS-5.6: Reduce the amount of energy consumed by City operations, and assist residents and businesses in reducing their energy consumption by:

- emphasizing fuel efficiency in the acquisition and use of City-owned vehicles and equipment;
- periodically reviewing energy consumption in City buildings and implement programs to reduce energy use; and
- increasing public awareness of energy conservation techniques through the public dissemination of conservation information.

Policy RS-5.7: Promote the installation of heat recovery and co-generation facilities, where feasible, in new industrial and large commercial developments.

Policy RS-5.8: Promote innovative building, site design, and orientation techniques which minimize energy use.

Policy RS-5.9: Facilitate the provision of energy-efficient modes of transportation and fixed facilities which establish transit, bicycle, and pedestrian modes as viable alternatives.

Policy RS-5.10: Support efforts at the State and federal levels relative to the funding of research and the development of renewable/reusable energy sources.

Policy RS-5.11: Support efforts of the City's electricity provider that increase energy conservation in all households and businesses.

Policy RS-5.12: Adopt green building guidelines and/or incentives, which may include assessing green building techniques as a formal stage of City design review and developing a green building ordinance or program that addresses both new and existing buildings.

Policy RS-5.13: Promote the application of active solar energy systems in residential development by facilitating, where possible, the efforts of federal and state entities in the allocation of cost incentive programs.

Policy RS-5.14: Explore the possibility of identifying City facilities that can accommodate solar installations.

Policy RS-5.15: Educate the public on sustainable building practices and the environmental and economic benefits they offer.

Policy RS-5.16: Set an example in the design and operation of new civic buildings by implementing LEED or similar building standards.

Policy RS-5.17: Investigate providing incentives for LEED or equivalent for new and/or retrofitted private commercial and industrial buildings.

A number of implementation actions are proposed in the General Plan Update that would reduce impacts related to greenhouse gas emissions. These include:

Implementation Action 6-1: Development Projects and Energy Performance Guidelines

Implementation Action 6-2: Energy Conservation Demonstration Projects

Implementation Action 6-3: Conservation Education and Promotion

Implementation Action 6-4: Green Building Initiatives

Implementation Action 6-6: Solar Energy

Implementation Action 6-9: Water Conservation

Implementation Action 6-10: Waste Reduction and Recycling

4.17.6 STANDARD CONDITIONS

While several legislations have imposed requirements on State agencies, utility companies, and the manufacturing and transportation sectors, no regulations for local government operations or for individual development projects have been adopted. However, a number of regulations aimed at trip reduction, energy and water conservation, and waste reduction would also reduce GHG emissions from future development pursuant to the proposed General Plan Update. These include:

Repeated from Section 4.15, Transportation

SC 4.15-6: New non-residential developments shall comply with City's Traffic Congestion Management regulations, which require non-residential development to provide transportation demand management and trip reduction measures, such as display/kiosk for transportation information, preferential parking space for carpool/vanpool vehicles, bike racks, loading/unloading zones, bus stop improvements, designated pathways, and convenient access for bicyclists.

Repeated from Section 4.16, Utilities and Service Systems

SC 4.16-3: All new construction and rehabilitated landscapes for public agency projects and private non-residential development projects of a qualifying size shall be subject to compliance with the Water Efficient Landscape Ordinance. In compliance with City regulations, development projects that fall into these categories shall implement water conservation measures in accordance with the standards for plant selection and grouping, water features standards, irrigation design and system requirements, and soil and grading requirements.

SC 4.16-5: All development projects in the City shall implement waste reduction, disposal, and recycling measures during construction and operation in accordance with the City's Source Reduction and Recycling Element (SRRE), prepared in compliance with the California Integrated Waste Management Act, as well as provide collection and loading areas for recyclables, as required under the City's Zoning Regulations.

SC 4.16-6: The City of Arcadia shall require all future projects implemented under the 2010 General Plan Update to comply with all State Energy Efficiency Standards and City Municipal Code requirements in effect at the time of application for building permits (Title 24). Title 24 covers the use of energy-efficient building standards, including ventilation, insulation, and construction and the use of energy saving appliances, conditioning systems, water heating, and lighting, as well as the Title 24 Green Buildings Standards on planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. Plans submitted for building permits shall include written notes demonstrating compliance with energy and green building standards and shall be reviewed and approved by the Planning Department prior to building permit issuance.

4.17.7 ENVIRONMENTAL IMPACTS

Future development pursuant to the proposed General Plan Update would generate GHG emissions.

Impact Analysis

GHG Emissions

Threshold 4.17a: Would the proposed 2010 General Plan Update generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction (Short-Term) GHG Emissions

The proposed General Plan Update does not directly involve construction activity. However, GHG emissions would result from construction activities associated with long-term implementation of land use policies in the proposed General Plan Update. The primary source of GHG emissions generated by construction activities is from use of diesel-powered construction equipment and other combustion sources (i.e., generators, worker vehicles, materials delivery, and other sources). In general, site preparation including demolition, grading, and excavation represent the construction activities that would result in the highest levels of GHG emissions. GHGs would not only be emitted by on-site construction equipment but also from off-site haul trucks and construction workers traveling to and from the site.

However, at this programmatic analysis level, project-specific construction information is not known. Because specific projects are not proposed as part of the General Plan Update, total construction emissions related to implementation of the General Plan Update cannot be quantified.

Long-Term GHG Emissions

With implementation of the proposed General Plan Update, CO₂, N₂O, and CH₄ emissions are expected to increase as a result of future development in the City and a corresponding increase in the number of daily trips and vehicle miles traveled (VMT). The GHG emission analysis conducted for the General Plan Update compared CO₂ equivalent GHG emissions between existing conditions and buildout (year 2035), and found that implementation of the proposed General Plan Update would result in a net increase of approximately 553,736.21 MTCO₂e/yr at buildout of the City. GHG emissions estimates are summarized in Table 4.17-5.

As stated above, California's 2004 statewide CO₂ emissions were approximately 492 million metric tons. Compared to 2004, the increase of 553,736.21 metric tons resulting from implementation of the proposed General Plan Update represents only 0.112548 percent of 2004 statewide emissions.

Since annual GHG emissions under buildout of the City are projected to increase the existing emissions, the proposed General Plan Update would contribute to the exacerbation of global warming. By generating increased GHG emissions, future development that occurs in accordance with the proposed General Plan throughout the City of Arcadia would incrementally contribute to the adverse economic, public health, natural resources, and other environmental impacts discussed above that are projected to occur in California and throughout the world as a result of global warming.

**TABLE 4.17-5
TOTAL GHG EMISSIONS (METRIC TONS PER YEAR)**

Scenario	Source	CO ₂	N ₂ O	CH ₄	Total
		mtpy	mtpy of CO ₂ e	mtpy CO ₂ e	mtpy CO ₂ e
2010	Mobile Source Emissions	588,213.49	7,137.15	407.27	595,757.91
	Energy Use Emissions	120,296.04	417.15	105.36	120,818.55
	Water Use Related Emissions	23,055.17	9.28	2.42	23,066.87
	Natural Gas Emissions	68,865.46	665.42	47.13	69,578.01
	Hearth	1,530.29			1,530.29
	Landscape	156.94			156.94
	Municipal Solid Waste			32,690.30	32,690.30
	Total (metric tons per year)	802,117.39	8,229.00	32,690.30	843,036.69
2035	Mobile Source Emissions	1,082,234.76	12,151.12	691.27	1,095,077.15
	Energy Use Emissions	144,225.60	500.12	117.06	144,842.78
	Water Use Related Emissions	25,864.09	10.68	2.80	25,877.57
	Natural Gas Emissions	92,227.20	716.48	50.74	92,994.42
	Hearth	340.31			340.31
	Landscape	161.71			161.71
	Municipal Solid Waste			38,340.83	38,340.83
	Total (metric tons per year)	1,345,053.67	13,378.40	38,340.83	1,396,772.90
Net Increase in Emissions (metric tons per year)		542,936.28	5,149.40	5,650.53	553,736.21
mtpy = metric tons per year; CO ₂ e: carbon dioxide equivalent Source: Urban Crossroads 2010					

The proposed Land Use Policy Map and goals, policies, and implementation actions that would reduce VMT through the implementation of mixed-use developments and increased development intensity around the Gold Line station, and through Citywide pedestrian and bicycle system improvements would reduce GHG emissions. Implementation of the goals and policies in the Resource Sustainability Element identified above would also reduce GHG emissions from future development. Implementation Actions 6-1, 6-2, 6-3, 6-4, and 6-6 promote energy conservation and Implementation Action 6-9 promotes water conservation. Implementation Action 6-10 would require the City to continue to implement solid waste diversion programs, as well as public education programs outlined in the City's Resource Reduction and Recycling Element, as required by AB 939. These would reduce GHG emissions associated with energy and water generation and waste disposal.

In addition, the standard conditions (SCs) related to trip reduction (SC 4.15-6), water conservation (SC 4.16-3), energy conservation (SC 4.16-6), and waste reduction (SC 4.16-5) would reduce GHG emissions from individual developments in the City. However, it is not possible to accurately quantify the GHG reductions that could occur with the implementation of these SCs and the General Plan policies, implementation actions, and programs aimed at vehicle trip reduction, GHG reduction, energy conservation, water conservation, and waste reduction for the purposes of the analysis in the *Air Quality Evaluation*.

Mitigation Measures (MMs) 4.17-1 through 4.17-3 are provided below to further reduce the GHG emissions from the City; however, the current state of the science also precludes the quantification of the GHG emission reduction that could occur with the implementation of these mitigation measures.

Because a majority of the GHG emissions in the City will originate from mobile sources (i.e., traffic), and most of the measures described are aimed at reducing emissions from non-mobile sources, it is concluded that implementation of the proposed General Plan Update would still result in a net increase in GHG emissions. Therefore, this impact would be cumulatively significant and unavoidable.

Conflict with GHG Reduction Plan, Policy or Regulation

Threshold 4.17b: Would the proposed 2010 General Plan Update conflict with an applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs?

As discussed above under Section 4.17.2, Regulatory Setting, there are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The principal overall State plan and policy is AB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. This goal has been calculated by various methods as reducing 2020 GHG emissions by 28 to 30 percent compared to “business as usual”. The achievement of this reduction quantitatively at the general plan level requires speculation as to the timing of implementation and effectiveness of statewide policies as well as the characterization of business as usual. However, as described in the goals, policies, and implementation actions the General Plan Update incorporates many characteristics and features that would reduce GHG emissions as compared with development of similar land uses in other locations or without commitments to sustainable design or net zero increase in water consumption. However, increased GHG emissions associated with the proposed General Plan Update could potentially impede implementation of the State’s mandatory requirement under AB 32 to reduce statewide GHG emissions to 1990 levels by the same year. Therefore, the incremental GHG emissions associated with development under the General Plan Update could cause cumulatively considerable incremental contribution to the significant cumulative (worldwide) impacts when viewed in connection with worldwide GHG emissions. Because emissions associated with future development in the City could potentially impede implementation of the State’s mandatory requirement under AB 32, future development under the proposed General Plan Update could result in a significant and unavoidable impact.

In the proposed General Plan Update, Goal RS-2 in the Resource Sustainability Element requires the City to reduce its carbon footprint in compliance with SB 375 and AB 32. Its supporting policies include Policy RS-2.1 (coordinate with the State to implement AB 32); Policy RS-2.2 (reduce per capita GHG emissions to 15 percent below 2005 levels by 2020 and total municipal GHG emissions to 15 percent below 2005 levels by 2020); and Policy RS-2.3 (participate in regional strategies and plans to implement SB 375). Goal RS-3 in the Resource

Sustainability Element promotes the utilization of clean forms of transportation to reduce Arcadia's carbon footprint. Its supporting policies include Policy RS-3.1 (develop a City fleet that, to the extent feasible, uses clean, alternative fuel and consists of energy-efficient vehicles); Policy RS-3.2 (incorporate energy-efficient vehicles into the City's transit system); and Policy RS-3.3 (educate residents on methods of sustainable driving techniques). Goal RS-5 and its supporting policies in the Resource Sustainability Element promote energy conservation by public projects and private developments in the City. Specifically, Policy RS-5.16 encourages the City to set an example in the design and operation of new civic buildings by implementing Leadership in Energy and Environmental Design (LEED) certifiable or similar building standards, and Policy RS-5.17 calls for the City to provide incentives for LEED-certifiable or equivalent for new and/or retrofitted private commercial and industrial buildings.

Goal CI-4 in the Circulation and Infrastructure Element is supported by numerous policies that provide for connected, balanced, and integrated bicycle and pedestrian networks that provide viable alternatives to use of the car. These include Policy CI-4.1 (develop and maintain the citywide bicycle network of off-street bike paths, on-street bike lanes, and bike streets); Policy CI-4.2 (establish bike hubs at key transit and commercial nodes); Policy CI-4.5 (develop and implement a comprehensive pedestrian circulation plan); and Policy CI-4.13 (require new and major renovations to office, industrial, and institutional developments to provide secure off-street bicycle parking, and encourage such developments to provide bicycle facilities, such as showers and changing rooms).

Statewide plans and regulations such as GHG emissions standards for vehicles (AB 1493) and the LCFS are being implemented at the statewide level and compliance at the general plan level is not addressed. Therefore, the proposed General Plan Update does not conflict with those plans and regulations. SB 375 is also being addressed at the State and regional level, and application at the general plan level is not anticipated until 2012 or later.

With the City largely built out, the proposed General Plan Update focuses future development along major transportation/transit corridors, promotes mixed use development in the City, intensifies the development intensity allowed in the downtown area, and calls for high density residential and commercial uses near the proposed Gold Line transit station. Thus, the proposed Update is consistent with programs that would reduce automobile use; locate high density development near transit stations; and promote the use of alternative transportation systems. With the transition of existing land uses into mixed use projects and into high density and intensity uses, GHG emissions citywide would decrease over existing levels. Thus, the proposed General Plan Update would not conflict with a GHG reduction plan, policy or regulation. Impacts would be less than significant, and no mitigation is required.

4.17.8 CUMULATIVE IMPACTS

As discussed above, the assessment of GHGs is inherently cumulative because global warming is a global phenomenon. Therefore, the analysis above describes the cumulative impact of the proposed General Plan Update. Impacts would be cumulatively significant.

4.17.9 MITIGATION MEASURES

Implementation of the following programmatic mitigation measures, derived largely from the General Plan Implementation Program, will reduce potential impacts but would not prevent the generation of GHG emissions. Also, any reductions in emissions would not be to levels considered less than significant as it is impossible to quantify the effectiveness of each measure at the General Plan level. Individual development projects will be required to undergo

project-specific environmental review and mitigation measures will be identified at that time to reduce any significant impacts.

MM 4.17-1: The City shall actively encourage the development and maintenance of mixed uses, particularly in the Mixed Use and Downtown Mixed Use areas, by maintaining a list of sites available for mixed use and infill development and making the list available to developers. The City shall establish developer incentives to encourage well-designed, mixed use and infill development projects in these areas.

MM 4.17-2: The City shall encourage future development and major renovation projects to achieve LEED certification, and/or other green certifications. The City shall investigate the potential to offer density bonus incentives on residential projects that achieve LEED certification, and other green certifications and ratings.

MM 4.17-3: The City shall consider and evaluate the applicability of the policies contained in the California Attorney General's *Sustainability and General Plans: Examples of Policies to Address Climate Change* California Attorney General's Office 1/22/10 and the California Air Pollution Control Officers Association's (CAPCOA's) *Model Policies for Greenhouse Gas Emissions in General Plans* June 2009. Attachment B of the *Air Quality Report* (Appendix E of this EIR) includes the referenced documents in their entirety.

4.17.10 LEVEL OF SIGNIFICANCE AFTER MITIGATION

GHG Emissions

Significant Unavoidable Impact

Conflict with GHG Reduction Plan, Policy or Regulation

Less Than Significant Impact

Cumulative Impacts

Significant Unavoidable Impact